Photo: Jorge Duarte



"We want more open innovation"

Mauricio Antonio Lopes

President of the Brazilian Agricultural Research Corporation (Embrapa)

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SINCE ASSUMING the presidency of Embrapa in October 2012, agronomist Mauricio Antonio Lopes has been working to make the corporation less dependent on public funding. This year, with enactment in January of the new Legal Framework for Science, Technology and Innovation, Lopes plans to launch Embrapatec, which he expects to accelerate generation of businesses based on Embrapa's knowledge assets and technology and attract more private resources for research. An Embrapa researcher since 1989 with a PhD in molecular biology from the University of Arizona, Lopes argues for expansion of genetic improvement programs to prevent plant diseases and for continuous gains in productivity of Brazilian agriculture. "Side by side with large producers, there are also poor, small, excluded agricultural producers where there is substantial room for efficient growth," he says.

How has Embrapa's budget grown in recent years?

Embrapa's budget has been relatively constant at about US$1 billion, though in 2015 the total executed budget was down to US$909 million, reflecting the situation that the country was in and the strong devaluation of the real. For this year, we anticipate US$914 million. But we have sought other sources of funding. We no longer depend solely on the National Treasury. Since I became president, I have been making great efforts to give Embrapa the ability to access funds from other sources.

What are these alternative sources?

As an example, we have just signed a major agreement with the National Development Bank (BNDES), totaling R$66 million (of which we have already received R$33 million) for the Amazon Integrated Project (research and technology for recovery and conservation). We are moving ahead with another big project with BNDES, R$40 million, for creation of a new Embrapa unit in Palmas, Tocantins state, which will be doing the most advanced fishing and aquaculture research in Latin America. We also have many public-private partnerships. One of the most interesting is the network for Crop-Livestock-Forest integrated systems. It was developed completely in partnership with five companies: John Deere, Dow, Cocamar, Syngenta, and Parker, who invest about R$500,000 a year. They support Embrapa's entire technology transfer work, which disseminates technologies for sustainable intensification of Brazilian agriculture. Today we have cooperation agreements with 200 public-private partners, national and international companies. This brings in a substantial amount; though it varies from year to year, it represents 20–30% of our research funding.

Minister of Agriculture Katia Abreu argued for the creation of Embrapatec as a commercial arm of Embrapa. How do you intend to achieve it?

This story begins in 2007 when Senator Delcídio Amaral (Workers' Party, Mato Grosso do Sul state) introduced a bill to broaden the capitalization of Embrapa. This generated a huge controversy, and many people pointed out risks that the company's first sale of stock would attract strong investors who would skew the interest and focus of Embrapa, which

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is a public company with a mission to generate public goods. When I became president in October 2012, I talked to the senator. I said I did not particularly agree with his project, and suggested that, instead of opening up Embrapa's capital, we encourage formation of a subsidiary. We have studied several cases where institutions like ours have subsidiaries. In France, for example, the INRA [National Institute of Agronomic Research] has a subsidiary. Senator Amaral agreed and presented a substitute bill to allow Embrapa to create a privately held subsidiary, controlled exclusively by Embrapa, to promote Embrapa's knowledge assets and technology, make deals with companies, receive resources from investors, and stimulate development of startups. The bill was approved by the House Economic Affairs Committee in December 2012 and the Committee on Constitution and Justice, but during the 2014 elections it was on a back burner and 2015 was a very difficult year. The new Legal Framework for Science, Technology and Innovation, approved last December by

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Congress and by the President in January has created a new opportunity … to realize what we had envisaged for Embrapatec. The Technological Innovation Center (NIT) will allow Embrapa to create Embrapatec with virtually all the privileges and ability to do business in the innovation market that we had foreseen.

When do you expect to launch it?

Today the necessary regulations are still pending, but we are not waiting for it. We are establishing Embrapatec version 1.0, entirely linked to Embrapa but without the freedom we would want it to have. When the regulations are ready, Embrapatec will have considerably more autonomy to negotiate with public and private, national and international partners, and boost Embrapa's participation in the market of technological innovation. That will generate more resources, feed back into our research programs and development, and gradually reduce Embrapa's dependence on the National Treasury. We have all the elements ready to launch Embrapatec's version 1.0 and I foresee that by the middle of this year Embrapa will do that.

Embrapa is recognized for its contribution to Brazilian agribusiness, the country's exports, and world food security, thanks to developments such as the tropical soybean seed. You stated, however, that Embrapa should not be seen only as a provider of seeds. Why?

It's no longer possible to expand Embrapa's role as a supplier of seeds. Embrapa's share of the soybean seed market reached 60% when the private sector did not have capacity to fill this space. To the extent that Brazil now has a legal framework for patents, a plant variety protection law, and a thriving competitive agriculture, … the private sector it taking market share in the supply of seeds. Why would a public company, using public resources, operate in a market that is already very well served by the private sector? The public sector should have a strategic role, but not be a supplier. Embrapa's role is to ensure that Brazil has breeding programs with a strategic vision, looking for challenges in the medium and long term, which have greater risk than the private sector would usually consider. But Embrapa still has to have a presence in the market because our researchers have to continue participating in the competitive market to know how it works, and what products the market requires.

What is Embrapa's strategic direction today?
Embrapa is working to expand programs we call preventive breeding. There are about 400 pests and diseases around the world that have not yet arrived in Brazil but eventually will come, causing tremendous problems. Some rice diseases have already made it to Central America, so we have partnered with institutions in Panama, where our researchers are identifying Brazilian genetic material that is most resistant to these diseases. We also managed to access the entire US genetic soybean bank, about 22,000 samples, to identify genes and features that will help us face these disease challenges should arise. These are examples of investments that the private sector would never make.

Another concern is climate change, how the gradual rise in global temperature will affect Brazilian agriculture. We know that in the tropics … the effects will be felt more strongly. So we are seeking, through breeding, biotechnology, enhancement of production systems, to adapt Brazilian agriculture to a reality of increasingly more intense stress from high temperatures and increased greenhouse gases.

According to Embrapa, to double agricultural production by 2050, as is necessary for food security, total factor productivity (TFP, the efficiency of investment in physical and human capital) will have to grow by at least 1.75% annually until then. How does Brazil stand before this challenge?
Brazilian agriculture is at the forefront of world agriculture. A U.S. Department of Agriculture (USDA) study showed the large TFP growth of Brazilian agriculture in the last seven years—the increase in Brazilian TFP is above the main producing countries and second only to China. This occurred because the Brazilian agriculture has emerged from a very difficult situation in the 1970s, when it produced only coffee and sugar; in 40 years, it has become one of few sectors where expansion was rooted in science, technology, and knowledge. However, Brazil has different agricultural sectors. … Beyond the big producers, we also have small excluded poor producers, who have substantial room to become more efficient and productive. Although some corn farmers are producing 12 tons per hectare, the average Brazilian farmer still produces just 4.5 to 5 tons. … The Food and Agriculture Organization expects Brazil to become the greatest supplier of good to the world's food supplier but we have both commercial high-tech agriculture, with very strong productivity growth, and less efficient agriculture, with room to grow substantially… . We have to promote productivity gains, which will require appropriate technologies. Today we are looking at the integrated systems (crop-livestock-forest), already mentioned to … create recovery conditions with smaller investment.

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Today, automation is bringing about major changes in industrial processes in general. What is happening in agriculture?

Automation is more than a necessity, it is an imperative. In 2010, for the first time the urban population was larger than the rural population. This has several consequences. Gradually agriculture will need to incorporate more machinery, equipment, sensors, to deal with increasingly scarce and more expensive labor. This will require automation in all production systems. You can find the most suitable genetics to plant, harvest, and cultivate using sensors. Even small farmers can no longer find workers to milk their cows by hand. … As agriculture becomes more automated, it will be better able to take care of issues such as the environment and product quality and standardization.

In general, we are concerned that capacity to think strategically is very limited in Brazil compared, for example, to the attention that advanced manufacturing trends receive in countries like Germany, South Korea, and the United States. Such capacity is essential to support decision-making and formulation of public policies that lead to structural and strategic changes that will ensure bold development goals.

What is the role of Embrapa in this?

Biotechnology, automation, and information technology will significantly impact agriculture. Embrapa puts great emphasis on developing mobile applications, which promise to revolutionize the dissemination of the technologies and knowledge generated by agricultural research. We have a digital platform, webagritec, where we post information on production systems, control of pests and diseases, water management, and pesticides that farmers can access from mobile phones. Embrapa devotes much attention to helping shape an increasingly automated agriculture. We are applying the concept of precision agriculture on many fronts, such as management of inputs and crops, using information from satellites, sensors, and unmanned aerial vehicles to guide farmers to manage their businesses more efficiently and faster.

There are several ways to disseminate this new knowledge to make progress on the goal of productive inclusion—strengthening the rural middle class—which is Minister Abreu's flagship. … Technology is part of complex changes that must be implemented in the countryside, … but many farmers have great difficulty dealing with technology, so we need much more sophisticated technology transfer and support services, so that more farmers in Brazil can achieve adequate income, quality of life, and market participation.