

Antônio Márcio Buainain (\*)

In recent decades, Brazil and China have built a solid partnership that goes beyond strategic bilateral trade. In the initial stages of China's economic opening to the West, in the 1980s, Brazil and China signed important technological cooperation agreements -- such as the China-Brazil Earth Resource Satellite (CBERS), formalized in 1988 -- that played a significant role in the development of scientific and industrial capacities in both China and Brazil. It should be noted that until the mid-1990s, Brazil was ahead of China in many areas, to the extent that some of the agreements were criticized by short-sighted interested parties in Brazil with the argument that Brazil would provide much more technology than China had to offer.

With regards to agriculture, Brazil and China have much to cooperate on, and this cooperation should be rooted in the main challenges faced by world agriculture. Brazil plays a crucial role in addressing global challenges as a major producer of food and agricultural products.

Historically, many countries, including Brazil, found it easier to increase food production due to the abundance of perceived inexhaustible natural resources and an unlimited supply of labor. Lately, the conditions surrounding agricultural growth have undergone significant changes, and as a result, it faces more economic, social, political, and technological restrictions than in the past. The challenges, goals, and restrictions are intertwined, making the equation much more complicated.

One of the foremost goals and challenges is ensuring food security at all geographical levels. The recent book published by the Brazilian Science Academy (ABC), 'Food and Nutrition Security: The Role of Brazilian Science in Hunger Combat'<sup>1</sup>, addresses the complex challenge of overcoming hunger and ensuring food security. The book presents compelling evidence and arguments to support this thesis. It is worth noting that this issue transcends the confines of any single discipline.

While there are visible trends towards more sustainable and alternative agricultural practices, whose role should not be neglected, it is not possible to ignore the role that Green Revolution technologies have played in feeding the world, nor in reducing poverty in countries with large populations, such as Brazil, China and India, to name a few, nor that the world will continue for the foreseeable future to depend on the agricultural production systems built over the last 70 years and based on Green Revolution technologies.

In the recent past, there have been significant improvements in the technology used in modern agriculture, mostly in response to increasing demands related to environmental, health and social equity concerns. A major innovation challenge is to strengthen the sustainability trends of the currently dominant agricultural production systems. In this context, Brazil and China have much to cooperate on in many areas. I highlight 2 areas to illustrate the opportunities:

- Precision agriculture to increase production efficiency, improve the use of natural resources, especially water and soil, and increase crop yields. Currently, precision agriculture is basically what has been called digital agriculture or 4.0 agriculture. It requires the use of drones,

---

(\*) Professor do Instituto de Economia da Unicamp e pesquisador do Instituto Nacional de Ciência e Tecnologia em Políticas Públicas, Desenvolvimento e Estratégias (INCT/PPED).

<sup>1</sup> Hungria, Mariangela (Org.). Segurança alimentar e nutricional: o papel da ciência brasileira no combate à fome. RJ. Academia Brasileira de Ciências, 2024.

sensors, communication technology, applied software and, above all, a deep knowledge of soils, plant dynamics and their overall needs. Brazil has accumulated knowledge and industrial ability in many of these areas, especially in traditional fields such as agronomy and biology, while China is at the forefront of applied engineering and industrial production of equipment and parts used in precision agriculture.

- Pest and disease control. Brazil is currently the largest exporter of agricultural products to China, and despite China's efforts to reduce its food dependence on external suppliers, it will continue to rely on increasing imports of food and agricultural fiber. If China is successful in its ambitious food security policy goals, the share of imports in total supply will decrease, but imports will continue to grow. In this context, the development and application of modern technology to improve pest and disease management is certainly in the interest of both countries. The scientific fields involved in improving pest and disease management range from biotechnology, toxicology, animal and plant genetics to various applied fields such as monitoring tools, sensors, image analysis, etc.

One important note about the debate concerns the roles of public research institutions and the private sector in addressing these challenges. Historically, public institutions have played a significant role in providing technology for the agricultural sector, but in recent decades private companies have also made a major contribution. Public institutions still hold a significant responsibility in society; however, their duties may differ from those in the past. Private companies are expected to take on a larger role in providing technology, such as seeds, machinery, digital technology, and logistic solutions. Meanwhile, public sector institutions will need to address gaps that are strategically important for development but may not align with the interests of the private sector. Scientific knowledge in fields such as soils, animal and plant genetics, and climate science is primarily generated by universities and public research institutions.

The development of sustainable agriculture relies on innovative solutions for neglected groups and geographical areas, which could benefit from the involvement of a variety of stakeholders, in particular public institutions. In this context, it is important to ensure that institutional arrangements are in place to incentivize the proper functioning of innovative private firms, while also creating conditions that allow for the effective operation of public sector institutions. This may involve implementing funding and organizational arrangements that promote efficient functioning and encourage cooperation with the private sector.

Finally, scientific cooperation between Brazil and China in food security and agriculture development depends on building up a solid and reliable political and economic partnership, which goes beyond market-oriented trade and investments. China will never accept to relinquish part of its food security to market-oriented transactions, neither Brazil should accept a high dependence of one single market to its agricultural export based solely in its economic competitiveness. Such bilateral dependency --which is in the best interest of both countries-- is only sustainable if based also on trustful and respectful diplomatic alliance. This argument was developed by Buainain and Vieira Junior in the paper *Brasil e China: um negócio da China ou para a China?*<sup>2</sup>

---

<sup>2</sup> Buainain, A. M.; Vieira Junior, P. A. *Brasil-China: um negócio da China ou para a China? Desenvolvimento em Debate (INCT/PPED)*, v.2, p.9 - 37, 2011.