

Innovation as the Key Driver of Sustainable Agriculture and Future Food Security in the Developing World



The primary obligation of a nation is to protect its citizens from hunger and malnutrition by enabling sustainable and equitable food production and distribution channels. The developing world, characterized by gross economic and social inequalities coupled with inequitable access to safe, nutritional food and quality healthcare, requires innovation to meet the ever-rising demand for food and to sustain its agricultural growth.

Despite the fact that India is one of the world's largest producers of food grain, the largest producer of milk, and its second largest producer of sugar, low-quality inputs such as low-grade seed, saline soil, inadequate irrigation, traditional farming methods (combined with small, scattered landholdings), restrictive access to formal credit, dependence on private moneylenders, and weak market linkages have long plagued its agriculture sector.

To counter these challenges, a gradual infusion of tech-based tools such as digital remote sensing, geographic and price information systems, crop and soil health monitoring, and farm management platforms has taken place. These tools promise to rationalize processes and enhance efficiency, productivity, distribution, and access along the entire continuum of the food system from farm to fork and beyond.

Public policy plays a pivotal role in making an environment conducive to this transition. The adoption of innovation-led farm technologies has spurred public and private investments in R&D, helped technology transfer and uptake, as well as inter-sectoral cooperation. Over the last two decades, this has enabled sustainable agriculture to gradually gain momentum.

The Confederation of Indian Industry (CII) has been a strong proponent of this paradigm shift. The theme of this year's Global Innovation Index (GII), 'Innovation Feeding the World', thus resonates well with the agenda and focus of CII in this sector, and like previous years may prove beneficial for stimulating effective policy dialogue within the government.

For last two years, in collaboration with the GII, CII has been engaged with the Indian government to boost India's ranking. I am delighted to report that this effort has improved India's 2016 GII results. Another outcome of this sustained effort was the launch of the GII 2016 in India at a special event, jointly organized by the Department of Industrial Policy and Promotion (DIPP), the National Institution for Transforming India (NITI Aayog), and CII, in the presence of the Director-General of the World Intellectual Property Organization (WIPO). During the event, India's Minister of State for Commerce and Industry instituted a high-level Task Force on Innovation to suggest ways India can improve its innovation eco-system.

As a follow up to this launch, the first international consultative exercise was organized in January 2017 in New Delhi to address existing data gaps in the GII. International agencies such as UNESCO, among others, participated in the exercise where the first India Innovation Index Portal was launched. These developments have created the desired momentum for states to work on building their innovation ecosystems and improving their innovation indicators.

In line with this year's theme, Chapter 5 covers the current ecosystem of digital technologies in Indian agriculture—the rise of agro-tech start-up ventures and the advocacy initiatives that are the backbone needed to modernize Indian agriculture.

CII has been a longstanding partner of GII. I would like to take this opportunity to congratulate the GII team once again for coming out with this important edition, and for taking up a theme that resonates very well in today's challenging times.

CHANDRAJIT BANERJEE
Director General
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Innovating to Feed the World



We live in a world of finite resources but infinite passion and creativity. At PwC, we are committed to building trust in society and solving important problems. But as problems become more global and complex, the solutions require a greater focus on innovation. The Global Innovation Index (GII) does just that by creating metrics to evaluate innovation and by identifying new ways to address the challenges that affect business and society.

At Strategy&, PwC's strategy consulting business, we are proud to be part of the 2017 GII. This year's theme of innovation in food systems highlights one of the most complex challenges humanity faces: managing the global food supply. We know that without significantly expanding agricultural production over the next three decades, the world's population will increasingly face hunger, malnutrition, and famine.

Resource scarcity is one of the key megatrends shaping our world today and in the years to come, so meeting the needs of the world's people in a sustainable way will require renewed focus on innovation in a variety of fields and from a variety of stakeholders. In this case, addressing global food insecurity involves technological innovation, including leading-edge advances in data analytics; global distribution and supply chain management; risk assessment; economic flexibility; a deeper understanding of climate and weather conditions; and sustainability practices. It's clear that no company, government, or any other institution can solve the food crisis on its own. To find a lasting solution, we have to work together.

In our research for the GII, we have identified promising agricultural innovations being developed by the private sector. Many of these are a result of more corporate R&D investment in software and services, and new technologies that are improving efficiency and productivity. However, the public sector—which has traditionally represented the majority of agricultural R&D expenditures—continues to play an important role in spurring agricultural innovation. There's a real opportunity for governments and businesses to collaborate to

support corporate ventures and to ensure that investments have a greater impact.

In PwC's most recent CEO survey, we asked CEOs how the corporate community can help spread the benefits of globalization more widely. The majority of them said the best way is to collaborate, particularly with government. As a GII Knowledge Partner, we hope to do our part in helping to close the gap between innovation and finding tangible solutions to important problems that affect communities around the world.

TIM RYAN
US Chairman and Senior Partner
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Innovation in Food Production: Learning from the Past with an Open Mind for the Future



The National Confederation of Industry (CNI), the Social Service of Industry (SESI), the National Service of Industrial Training (SENAI), and the Brazilian Micro and Small Business Support Service (Sebrae) are more and more concerned with innovation. We are convinced that the only way to achieve sustainable development is through innovation. Since 2008, CNI business leaders have maintained the Entrepreneurial Mobilization for Innovation (MEI), putting innovation at the centre of corporate strategy and enhancing the effectiveness of innovation policies in Brazil.

‘Innovation Feeding the World’, this year’s theme for the Global Innovation Index, is a central issue for environmental sustainability and for the world’s social and economic well-being. Innovations are spread across different economic sectors, sustaining one another with new ideas and state-of-the-art technologies. Innovation in agribusiness and food production now requires the knowledge and technologies produced by other sectors.

Brazil’s role in grain production is not just a result of abundant natural resources and good climate conditions. Historically, the country has developed a consistent and comprehensive system of research and development to support innovation and new agriculture technologies. This system benefits from the leadership of Embrapa (Brazilian Agriculture Research Corporation), one of the country’s most important public research enterprises, which has provided Brazilian farmers with crucial tools needed for a modern and dynamic agroindustry.

Inspired by Embrapa, in 2013 the government launched the Brazilian Agency for Industrial Research and Innovation (Embrapii), which manages non-refundable grants invested in projects carried out by companies and research institutions and is acknowledged for its excellence, technological focus, and ability to meet companies’ needs.

The technology challenges for agro-industry are now more complex than ever. In the past, soil fertilization, mechanization, plant breeding, genetic engineering,

and improvements in cultivation techniques were the main drivers for the increase in agriculture productivity; today other challenges demand a new set of technologies and policies.

Agriculture and food production greatly impact the environment. With the growing demand for agriculture products, sustainable productivity growth in agriculture is a vital issue. This includes not only increasing crop productivity but also reducing inefficiencies in transportation and food industrialization. Another significant issue relates to how best to adapt to climate change and the expected increased frequency of extreme weather events. New technologies could contribute a great deal in this domain too.

Fortunately, a vast array of new technologies promises to increase efficiency in food production. New equipment and devices are at the centre of such technologies. Precision agriculture raises the possibility of using knowledge and information technologies to adapt cultivation techniques to each specific location, with its own soil and climate characteristics. Crop sensors could use agriculture inputs much more precisely by using the exact amount needed by a specific site. Drones and robots have already automated several tasks in agriculture production.

All these innovations are blurring the boundaries between industry, services, and agriculture. More and more, industrial and service technologies are offering new possibilities in agriculture. These new possibilities are also becoming more accessible to small innovative businesses in all sectors. To seize the resulting opportunities, a new framework of policies and institutions is needed to take advantage of lessons learned from successful past experiences and envision new possibilities for agriculture and food production. The theme of the Global Innovation Index this year could not be timelier.

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