Challenge and Opportunity in Agriculture

Professor Kadambot Siddique

FDI Associate

Summary

The world’s ability to maintain food supplies through rapid demand, changing climate, declining natural resources, trade liberalisation policies, and regional disturbances is a critical issue. India, which is on a high economic growth trajectory, needs to do radically better on the agricultural front.

Analysis

The United Nations has warned that 82 countries, including China and India, face food emergencies this year, as stockpiles of grains such as rice and wheat drop to a 27 year low in 2009. Stockpiles of wheat dropped to their lowest level since 1980 – sufficient to feed the world for just 12 weeks. Food prices are soaring worldwide while crude oil prices have doubled shipping and fertilizer costs.

Food prices jumped 25 to 70 per cent in recent months. The cost of cereal imports to low-income food-deficit countries increased from $14.03 billion in 2002-03 to $33.11 billion in 2007-08. Jacques Diouf, Director-General of the Food and Agricultural Organisation (FAO), has warned: “The problem is very serious around the world due to severe price rises and we have seen riots”. Population growth, rising incomes, the declining rate of agricultural productivity trends, climate variability and change, and the increased use of grain and sugar for biofuel production are leading to a surge in food commodity demand. This is in an environment where land and water constraints will limit agricultural production growth.

Every human being on this planet is a net consumer of food. Food, nutrition, bio-energy, the environment, and livelihood are global concerns. For these reasons, the integration of whole aspects of agriculture and the food industry is important in the future.

Five global trends

I see five major trends in the global agriculture and food industry.
First, food production must be increased substantially by the mid-21st century to feed a world population that is projected to increase from the current 6.4 billion to 9 billion. The challenge is to double world food production output by 2050 using less land, far less water, and fewer nutrients – all in the background of increasing climate variability and change.

Secondly, economic development is increasing faster than expected in most countries, most significantly in China and India. With economic growth, we see rapidly changing food preferences, increasing purchasing power, and demand for high standards of food quality. However, increased food production will have to come from shrinking land, water, and other natural resources. This means increased productivity per unit of land.

The third trend is the impact of agriculture on the environment and on our natural resources. An example of this is the emerging global shortage of water for urban consumption, industrial use, and agricultural purposes. The world’s two billion farmers are the guardians of much of what is left of the natural landscape. They hold the fate of thousands of threatened species as well as the world’s remaining forests in their hands. Agriculture currently uses three-quarters of the world’s fresh water. Its runoff has degraded the earth’s major rivers, estuaries, and even seas. It occupies 40 per cent of the world’s free land surface. It is responsible for 30 per cent of global greenhouse emissions.

The fourth trend is the growing biofuel driving demand for grain crops (corn and oil seeds) and sugar cane. The rise of biofuels presents a serious issue since it takes over arable land and diverts resources from food production. It is estimated that by 2020 we will be burning 400 million tonnes of grain a year – equivalent to the entire world rice crop – just to keep our cars on the road! Billions of dollars have been poured as subsidies into developing sugar and grain-based ethanol and biodiesel to help wean rich economies from their addiction to carbon-blinking fossil fuels, the overwhelming source of human-made global warming. As soaring prices for staples bring more of the planet’s most vulnerable people face-to-face with starvation, the image of biofuels has suddenly changed from climate saviour to a horribly misguided experiment.

The fifth trend is climate change and its impact on agriculture. Potential changes in climate may reduce productivity and output in agricultural industries in major producing countries, including India, in the medium to long terms. Several analyses indicate that future climate changes and associated declines in agricultural productivity and global economic activity may affect global production of key commodities. For example, global wheat, rice, beef, dairy, and sugar production could decline by 2 to 6 per cent by 2030 and by 5 to 11 per cent by 2050, relative to what would otherwise have been the case. The Peterson Institute for International Economics predicts that “agricultural production in developing countries may fall between 10 to 25 per cent” and if global warming progress is unabated, “India’s
agricultural capacity would fall as much as 40 per cent.” During the past few months we have witnessed substantial economic losses and hardships of farmers of Kerala owing to weather damage (from untimely rainfall) of rice crops. In addition to economic losses, this has resulted in a shortage of rice and escalating prices in the market.

There is a continuing need for the agricultural sector to maintain strong productivity growth in order to cope with the potential pressures emerging from climate change and variability. In this context, adaptation measures, including improved agricultural technologies, will be particularly important in reducing the potential impact. In order to respond to climate change in an efficient manner and maintain and enhance the productivity and international competitiveness of Indian agriculture, further research and development is required in both climate change adaptation and mitigation technologies and measures.

Critical issue

The world’s ability to maintain food supplies through rapid demand, changing climate, declining natural resources, trade liberalisation policies, and regional disturbances is a critical issue. Recent FAO reports remind us that about 800 million people are still undernourished globally. All these issues have a major influence on the way we plan future policy, education, research, and development in agriculture worldwide – and in India because two out of three Indians depend on agriculture for their livelihood.

To address these matters effectively, India needs strategic approaches to agricultural research and development that target the following areas:

(1) improved technologies for higher and more profitable production and for the sustainable conservation of natural resources;

(2) diversified farming systems that reduce risk and improve resource-use efficiency, leading to better returns to growers;

(3) enhanced vertical integration from grower to consumer;

(4) equipping a new generation of agricultural graduates and post-graduates with modern scientific, analytical, communication, and business skills; and

(5) institutional, organisational, and policy reforms.

Contrasting growth stories

There has been a dramatic change in the cost of farm inputs and services in recent years. The ‘cost to income’ ratio, excluding depreciation and family drawings, increased substantially. Experts say it will be hard to stop the ascent in commodity prices because it is connected more than at any other time in recent history to events beyond the United States. China’s economy grew well over 10 per cent last year, compared with the U.S
growth rate of around 2.5 per cent. During the past four years, India’s economic growth has been enviable (6 to 8 per cent a year). The manufacturing and service sectors are experiencing double-digit growth and have attracted investment from the private as well as public sectors.

Sadly, the farm sector, which accounts for less than one-fifth of Indian’s gross domestic product, has been growing the slowest. The growth rate in the agricultural sector has been stagnant at about 2.3 to 2.6 per cent per year over the last decade. It remains well below the potential and is unlikely to reach the Eleventh Plan target of 4 per cent without major intervention and reform. Variable and low outputs and volatile markets have affected the confidence of farmers. There is large-scale migration of farmers and farm workers to cities in search of job opportunities. India’s economic growth has not reached all sectors of the population, especially those living in rural areas. However, some analysts argue that agricultural markets are in for a long and strong future. The farm sector, they contend, is heading towards its golden era, a post-Second-World-War period. At any rate, the time is right for Indian agriculture to focus on its strengths and drive enhanced growth and continued development.

**Big challenge**

The Central, State governments and other agencies should work together to develop and implement improved policies and developmental models to radically change and modernise Indian agriculture. The challenge is to consolidate the fragmented landholdings based on land capability studies. It is to focus on areas and regions where comparative advantages of specific agricultural, horticultural, animal husbandry, and fisheries production exist. It is to introduce low cost agricultural credit systems, including micro-credits. It is to improve and strengthen input availability and delivery systems.

The challenge is also to improve the efficiency of current irrigation and expanding new systems. It is to strengthen rural infrastructure, post-harvest storage, and public distribution systems. It is to strengthen the marketing and price structure. It is to enhance technology development and transfer. It is to renew investment and modernisation of agricultural education, research, and development. It is to bring about an integrated approach among various sectors: the Centre, States, local universities, farmer groups, and NGOs. It is to lobby and negotiate through the World Trade Organisation and other world forums to remove huge subsidies provided by the EU and the U.S. to their farm sector. It is to attract private and foreign investment in Indian agriculture and the food sector.

The coming generation of Indian farmers needs to be both innovative and competitive in the global market. It is the task of government, policy-makers, educators, researchers, and extension workers to ensure they have the tools, technologies, and new farming systems that enable them to be so. The approach should be participatory, involving farmers, researchers, the market, and the political level. Training new generation agricultural scientists will take time, commitment, and resources from the government, universities, and the agricultural industries.

Urgent measures are needed to attract bright students into agricultural, food, and natural resource science areas. A reorientation in the mindset of teachers and
agricultural graduates can be brought about only by innovative changes in curricula and courses in Indian agricultural universities. It will accelerate development and adoption of improved agricultural practices and technologies to meet future constraints imposed by climate changes, population pressure, and increased food and feed demand. The expected outcome is improved productivity and the sustainable use of agricultural lands by developing a more diverse farming system, supporting economic development in India.

About the author: Winthrop Professor Dr Kadambot Siddique is Chair in Agriculture and Director of The UWA Institute of Agriculture and Associate Dean Research, Faculty of Natural and Agricultural Sciences at The University of Western Australia, Australia.)