Economic Development and Agriculture in India

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This article discusses the key developments in the agricultural sector in India including productivity gains and integration with global food markets, before discussing some of the challenges for future development, which include land distribution policies, access to credit, water management, and food distribution.

Introduction

India's already large population is expected to become the world's largest in the next 20 years, while its economy will soon overtake Japan's to become the world's third largest. The resulting increase in the demand for food will need to be met through higher agricultural productivity or by increasing food imports. This article discusses some of the key areas of progress and challenges for India's agricultural sector, including: productivity, water management, government policies and programs, and food distribution and storage.

Background

India has a particularly large agricultural sector. While the sector's share of GDP has halved in the past 30 years to around 15 per cent, it still employs around half of India's workforce and accounts for much of the volatility in Indian GDP. India has the second largest area of arable land in the world and is a major producer of a number of agricultural products (Table 1). Around the turn of the century, India overtook the United States as the world's largest producer of milk and is also a major producer of pulses, such as chickpeas and lentils, which are major sources of protein in vegetarian diets.

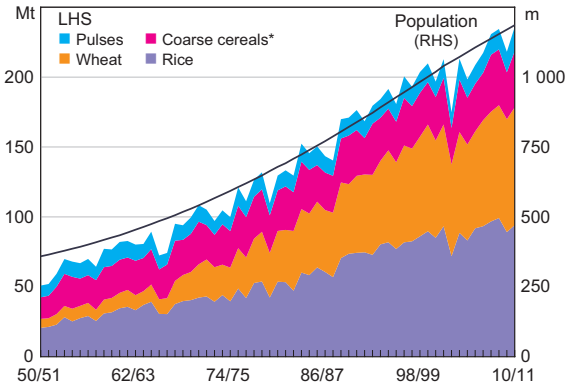
Table 1: India – Major Agricultural Products in 2008

Commodity	World Rank	Production Mt
Buffalo milk	1	60.9
Bananas	1	26.2
Paddy rice	2	148.7
Cow milk	2	44.1
Wheat	2	78.6
Sugar cane	2	348.2
Fresh vegetables	2	31.4
Cotton lint	2	3.8
Potatoes	2	34.7

Source: Food and Agriculture Organisation of the United Nations (FAO)

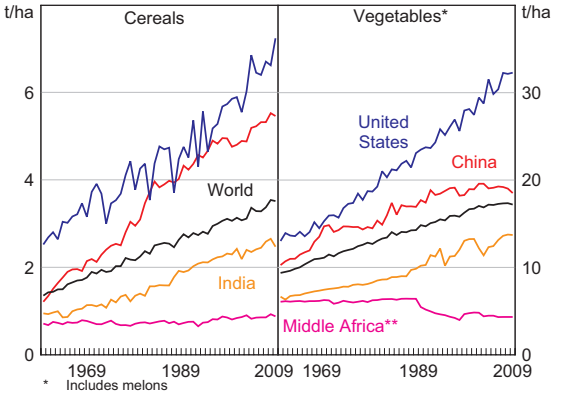
* The authors are from Economic Group.

Graph 1
India – Crop Production and Population
Indian financial years



* Includes barley, maize, millets and sorghum
Source: CEIC

Graph 2
Crop Yields



* Includes melons
** Angola, Cameroon, Central African Republic, Chad, Congo (Brazzaville), Democratic Republic of the Congo, Equatorial Guinea, Gabon, Sao Tome and Principe
Source: FAO

Growth in agricultural output over the past three decades has been strong and, importantly, crop production has been able to broadly keep pace with the demands from a growing population (Graph 1). The introduction of high-yielding seeds (such as improved strains of wheat) from the mid 1960s and the increased use of chemical fertilisers epitomised what became known as the 'green revolution'. Wheat production increased by nearly 150 per cent between the mid 1960s and mid 1970s and the country became self-sufficient in grain production by the end of the 1970s. The increase in agricultural production boosted rural incomes while also causing food prices to fall. This had the effect of reducing rural poverty (World Bank 2004).

Despite the productivity improvements in the Indian agricultural sector over recent decades, yields remain low by international standards and growth in yields has only been marginally higher than the world average (Graph 2). In particular, yields for cereals and vegetables remain substantially lower than the world average. Crop yields have increased much more for rice and wheat than for other cereals, such as barley, or for pulses. Wheat yields have tripled over the past 50 years and rice yields have doubled, while yields for pulses improved little over this period.

While able to meet most of its food requirements from domestic production, India still needs to import some food. Trade in agricultural products accounts for a modest share of total merchandise trade, currently about 8 per cent of exports and 2 per cent of imports. Agricultural trade has, however, grown rapidly over the past decade, with the value of exports and imports both recording average annual growth rates of about 15 per cent. Rice, animal feed and seafood are India's principal food exports, while fruit and vegetables are its largest food imports (Table 2). The diversification of agricultural production over the past couple of decades is also reflected in the changing composition of India's food exports, with the share of traditional exports like tea and coffee declining and the share of meat exports increasing. Food grain imports are relatively low, consistent with India being broadly self-sufficient in grain production. Much of India's trade is with economies within a relatively short shipping distance, although imports of wheat and sugar come from more distant sources such as Russia and Brazil.

Overall, India has become more open to agricultural trade in recent years, although government policies have often been driven by developments in domestic food production

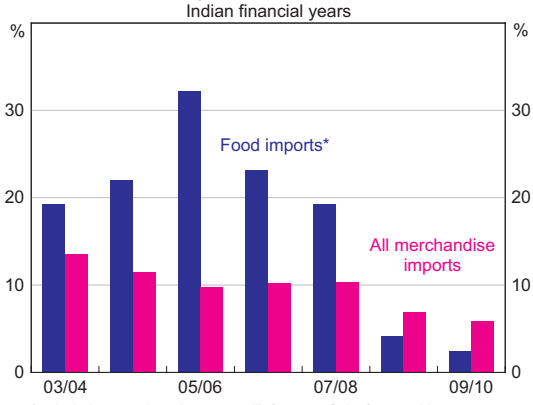
Table 2: India's Agricultural Trade
Annual average over 2005–2009

	Average trade value	Average volume	Largest export/ import partner	Share of trade with largest partner
	US$ million	kt		Per cent
Exports				
Rice	2 137	4 287	Saudi Arabia	24.6
Animal feed	1 636	6 188	Vietnam	23.4
Crustaceans, molluscs	1 093	237	United States	21.6
Fruit and nuts	943	686	United States	22.9
Bovine meat	826	464	Vietnam	15.3
Imports				
Vegetables	1 257	2 650	Myanmar	39.3
Fruit and nuts	935	1 066	United States	19.0
Wheat	374	1 440	Russia	40.3
Sugar, mollasses and honey	258	713	Brazil	74.0
Spices	150	106	Sri Lanka	25.1

Source: UN Comtrade

and global food prices. Since 2006, import duties on wheat, rice and pulses have gradually been abolished to boost the domestic availability of these commodities and to reduce domestic price pressures from rising global food prices. The Government has also, on occasion, used trade policy to ensure domestic supplies. For example, in December 2010, the Government decided to ban all onion exports and abolished import duties on onions after a fall in onion production caused prices to more than double. Two months later, when retail onion prices fell from around INR 70 per kilogram to less than INR 20 per kilogram, the Government lifted its ban on onion exports. In general, agricultural export earnings are mostly exempt from income and other taxes, although the exports of wheat, (non-basmati) rice and pulses (other than chickpeas) are currently prohibited. Overall, average tariff rates on food peaked at just over 30 per cent in 2005/06, but fell significantly in 2008/09, due mainly to a reduction in tariffs on edible vegetable oils from an average of almost 75 per cent to 7.5 per cent (Graph 3).

Graph 3
India – Average Tariff Rates on Imports
Indian financial years



* Includes cereals, pulses, tea, milk & cream, fruits & vegetables, animal fats, and sugar
Source: Ministry of Finance, Government of India

Rural Land Distribution and Access to Finance

A major institutional factor that has limited agricultural productivity in India is regulation of land holdings. In order to address the highly concentrated ownership structure of land in India prior to independence, the Government instituted land reforms that placed ceilings on land holdings. As a result, agriculture in India is dominated by a large number of small-scale, owner-occupied farms. The most recent estimates suggest that around 100 million households were engaged in agricultural production in 2002, roughly 70 per cent of all rural households and only marginally lower than the share of rural households engaged in agriculture in the early 1960s. Over the past 50 years, the share of farming households tending plots of land of less than one hectare has increased from 60 per cent to just under 80 per cent and the average farm size has fallen to around 1 hectare, with only ½ per cent of households farming more than 10 hectares of land (Table 3). By the early 1990s, most Indian states had enacted tenancy laws conferring ownership of land on tenants who were able to buy the land they farmed at a fair price, which reinforced the trend of increased fragmentation of land holdings during that decade. Additionally, the increase in population has also contributed to smaller land holdings, while the subdivision of original family land holdings over generations has left many families with land holdings too small to provide an adequate stream of income.

With small land holdings, farmers have limited incentive to adopt capital-intensive farming techniques, as productivity gains from capital through mechanisation and exploiting economies of scale are minimal. Larger land holdings would also allow farmers to engage in multiple cropping, which would make them less susceptible to adverse weather conditions and help diversify their income base.

Private investment in the agricultural sector has also been limited by restricted access to credit and insurance, although access has generally improved over the past decade with credit to the agricultural sector growing, on average, by more than 20 per cent annually over the period. Nevertheless, credit extension remains predominately focused on assisting farmers through the annual cycle rather than helping them to finance the building and purchase of assets, such as tractors and pump-sets. Government programs have been used to improve access to credit for farmers through a number of channels, including: interest rate subsidies; debt relief; collateral-free loans; improving administration;

Table 3: India's Rural Land Distribution
Millions

	1960/61	1971/72	1981/82	1991/92	2002/03
Total rural households	72.5	78.4	93.9	116.4	147.8
Engaged in agriculture	52.9	56.9	69.4	93.4	101.8
of which land holdings:					
Less than 1 hectare	30.5	34.3	46.6	65.5	80.4
1–2 hectares	8.6	9.3	10.1	13.3	11.4
2–4 hectares	7.3	7.3	7.4	9.1	6.3
4–10 hectares	5.0	4.6	4.4	4.6	3.0
Over 10 hectares	1.6	1.3	1.0	1.0	0.5

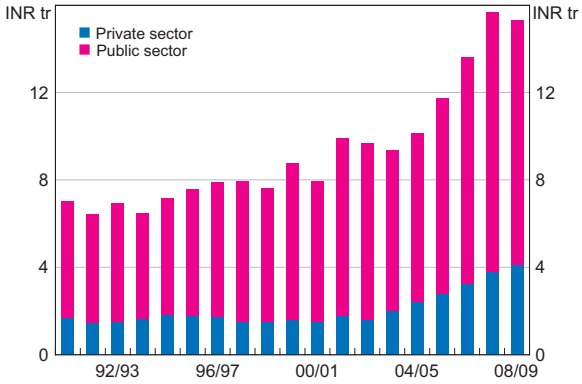
Sources: NSSO (2006); RBA

and mandating banks to increase the flow of credit to rural customers. Much of this expansion has been through so-called micro-finance facilities but while such lending has increased significantly over the past decade, borrowers have often faced interest rates as high as 40 per cent. Furthermore, many have had difficulties repaying debts after crops have failed. In 2009/10, the Indian Government spent roughly 0.2 per cent of GDP on debt waivers and debt relief for farmers.

The Government is also gradually improving access to insurance through the National Insurance Scheme, although in 2009 only 18 million farmers were insured under the scheme. The scheme covers farmers who produce cereals, millets, pulses, oilseeds, sugarcane, cotton and potatoes. In certain areas, farmers growing these crops and accessing Seasonal Agricultural Operations loans from financial institutions are required to purchase this insurance, while others can opt in voluntarily. Importantly, the scheme covers drought and other weather events as well as loss of production due to pests and disease. Premium rates are typically between 1.5 per cent and 3.5 per cent of the value insured, with those farming less than 2 hectares receiving a 50 per cent subsidy. Recently, the Government trialled a modified insurance scheme, expanding coverage to more areas and providing premium subsidies of between 40 and 75 per cent. By reducing credit risk faced by lending institutions, increased coverage of insurance should give farmers better access to credit and encourage further investment in the agricultural sector.

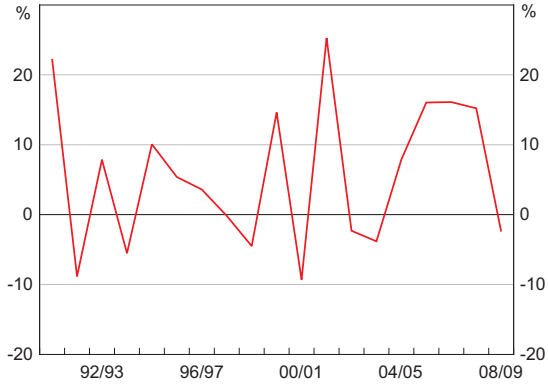
The increase in the flow of credit to the agricultural sector has seen investment by the private sector double over the past decade, although public sector investment still dominates (Graph 4). Since the early 1990s, investment growth in the agriculture sector has averaged over 4 per cent, although prior to the onset of the global financial crisis, investment growth exceeded 10 per cent, suggesting that the improved flow of credit to the sector, and higher food prices, had encouraged capital deepening in the sector (Graph 5).

Graph 4
India – Investment in Agriculture
Constant 2004/05 prices



Sources: Central Statistical Office; RBA

Graph 5
India – Agricultural Investment
Real annual growth in gross capital formation



Sources: Central Statistical Office; RBA

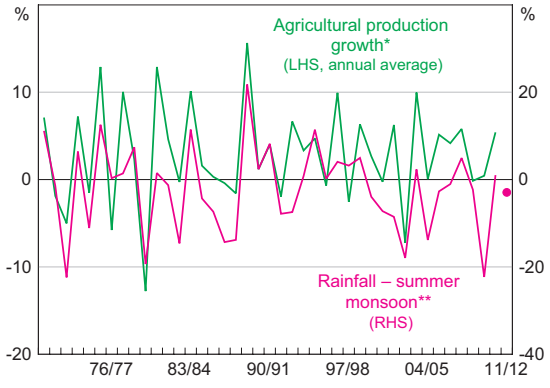
Water Management

Water management is crucial to improving conditions in agriculture. India currently has around 5 000 large dams that are able to store more than 220 teralitres, which ranks seventh in the world in terms of capacity. While dams in other parts of the world are built for flood mitigation, power generation and water supply, the primary purpose of India's dams is irrigation. Around 40 per cent of crop areas are now irrigated, and these areas produce 70 per cent of India's crop output. A significant proportion of farms

have limited or no access to irrigation, and therefore still rely on rainfall as their sole source of water.

With just over 80 per cent of India's rainfall occurring during the summer monsoon season, which occurs from June through to September, deficient rainfalls have often had significant effects on the Indian economy. In 2009, the summer monsoon rainfall was lower than normal, which caused a fall in grain production of 7 per cent and pushed up grain and other food prices. In the past, agricultural production has been much more dependent on the summer monsoon, with large fluctuations in rainfall accounting for most of the volatility in agricultural production (Graph 6). Over time, however, the effect of the summer monsoon rain season has been mitigated through drought management (including drought monitoring), increased use of irrigation, and diversification of agricultural production. These measures have made food production less vulnerable to poor weather conditions. In part, this helps explain why deficient rainfalls since the late 1990s have resulted in less significant contractions in agricultural output. In fact, variations in agricultural output, which once accounted for 60 per cent of the variation in GDP, now account for only 20 per cent, which in part reflects agriculture's lower share of GDP.

Graph 6
India – Rainfall and Agricultural Production



* Indian Government estimate for 2010/11
** Percentage deviation from long-run average; Indian Meteorological Department's first forecast for 2011/12 monsoon
Sources: CEIC; Indian Meteorological Department; RBA

The Food Procurement and Distribution System

In addition to policies on land distribution, the Government has significant influence on the agricultural sector through other policy instruments, including subsidies for inputs, minimum price support arrangements and government procurement of food.

One-third of input subsidies are paid in the form of fertiliser subsidies, which are equivalent to 1 per cent of GDP. Under this subsidy scheme, the Government quotes a maximum retail price for various types of fertilisers and reimburses the seller the difference between the retail price and the 'market' price. The market price for domestically produced fertilisers takes into account transportation, storage, labour and energy costs. The subsidy for imported fertiliser is the difference between the import price and the maximum retail price. Urea fertilisers are a major input into agricultural production and its price has been fixed since 2003 despite large fluctuations in the cost of inputs. While India is able to produce enough urea fertiliser to meet domestic needs, it relies on imports to satisfy its demand for compound fertilisers, so that the increase in global fertiliser prices during 2007 and 2008 saw a large outlay in the subsidies paid for compound fertilisers (Graph 7). There are also substantial subsidies for electricity. Many farms use unmetered power and pay a subsidised lump-sum based on the power ratings of pump-sets used for irrigation purposes.

To help alleviate poverty and to shield Indian consumers from global food price fluctuations, the Government subsidises food purchases for many consumers. The Government procures agricultural goods from producers, who must sell a share of their output to the Government at minimum support prices (MSPs), which are typically below market prices (Graph 8). Procured food is sold through the Targeted Public Distribution System (TPDS), which consists of about half a million 'fair price shops'. In order to purchase food through this system, households apply for ration cards,

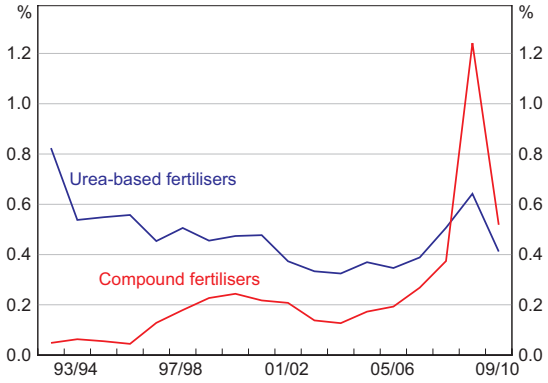
which indicate whether they are assessed to be Above Poverty Line (APL) or Below Poverty Line (BPL). In 2005, 81 per cent of rural households and 67 per cent of urban households held ration cards. The type of ration card a household holds determines the prices they pay (the central issue price) and the amount of food they can purchase through the TPDS. According to the most recent estimates, about one-third of the production of rice and wheat was released for consumption under the TPDS in the 2009/10 Indian financial year.

While the MSP program covers 26 crops, in practice, the program is used to subsidise farmers when market prices fall to very low levels for most of those crops. With market prices generally higher than MSPs for most agricultural commodities, MSPs are typically only used by the Government to procure rice and wheat. The Government also uses its stock of grains to buy or sell produce to ensure retail market prices remain broadly stable.

Although government programs have sought to make food more affordable to poorer households, India's lack of cold-storage facilities and cold-chain transportation have resulted in large quantities of food being wasted. For instance, almost all cold storage is used for potatoes for five months of each year, resulting in only around 10 per cent of remaining fruit and vegetable produce being stored in a refrigerated environment, which means that a significant amount of produce deteriorates and is unfit to consume. Some estimates suggest that between 25 and 40 per cent of fruit and vegetable output is wasted during the storage and transportation stages of distribution. Electricity supply is another major factor, with rolling brown- and black-outs contributing to a loss of food in cold-storage facilities.

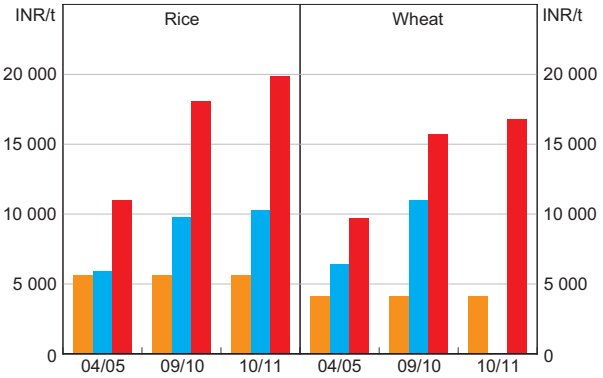
Transport infrastructure is also limited, resulting in further food damage and loss during transit. Most highways in India are narrow and congested, and about 40 per cent of India's villages have no access to all-weather roads. Most of the cold-chain transportation network is used to distribute milk, with only around 20 per cent of the network available for the distribution of other food produce. As a result, fruit and vegetables are typically transported in open-top trucks.

Graph 7
India – Fertiliser Subsidies
Percentage of total value-added



Sources: CEIC; Department of Fertilizers; RBA

Graph 8
India – Grain Prices



Sources: CEIC; Department of Food & Public Distribution, India; Directorate of Economics and Statistics, Department of Agriculture and Cooperation, India; RBA

Conclusion

India's agricultural sector is still very important to the Indian economy, although its share of the economy has decreased over the past 50 years. India has made significant advances in agricultural production in recent decades, including the introduction of high-yield seed varieties, increased

use of fertilisers and improved water management systems. Reforms to land distribution, water management and food distribution systems will further enhance productivity and help India meet its growing demand for food.

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