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Indian Agriculture and Food Security: Current Concerns and Lessons

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INTRODUCTION

Since its independence in 1947, India has aimed its agricultural development policies at reducing hunger, food insecurity, and poverty. The new strategy of agricultural development launched in the mid-1960s was successful in improving macro (national) food security in a reasonably short period of around two decades. From a precarious situation of heavy dependence on imports of staple food in the mid-1960s, India not only had reduced its imports but also emerged as a net exporter of cereals since the early 1990s. However, while India became a star performer in terms of economic growth in the last decade, its agricultural sector has not performed as well. This happened mainly due to complacency in the matter of production and availability of cereals in the country. Hence, the situation has turned into a serious case of macro food insecurity and farmers' loss of faith in farming around the middle of the current decade. To address the current situation, the government launched special programs in the past three years and took several steps to bring on track the agricultural sector's performance.

The objectives of this paper are: (a) to document the agricultural and food policies pursued in India and their outcome in terms of growth and food security; (b) to identify the current issues and concerns relating to performance of Indian agriculture, particularly

since the mid-1990s; and (c) to glean lessons and key messages from the Indian experience for developing countries that are trying to reduce hunger, food insecurity, and poverty.

The paper is divided into seven sections. Some structural characteristics of Indian agriculture are briefly presented in the second section. An overview of agricultural development policies pursued in India is given in the third section, which also includes changes in policy objectives. Some key policy instruments are discussed in detail in the fourth section. The performance of India's agricultural sector is analyzed in the fifth section, which also includes the status of macro and household food security. Current concerns as well as new initiatives and perspectives in terms of projected demand and supply are brought out in the sixth section. Concluding observations and lessons from the Indian experience are given in the last section.

SOME STRUCTURAL CHARACTERISTICS OF INDIAN AGRICULTURE

India's current population is around 1.11 billion. Over the years, India has reduced the population growth from a high of around 3 percent in the 1950s to 1.9 percent in the 1990s (1991-2001), and 1.63 percent in 2002-07. It is estimated to remain at 1.41 percent in 2007-12 and go down to 1.20 percent in 2012-17.

Of the total population, 71.5 percent (786 million people) live in the rural areas. The annual growth rate of the rural population in 1990-2005 was lower at 1.4 percent, due to migration of rural people to urban areas (World Bank 2007).

Of the 148 million rural households, 89.4 million (60.4 percent) are farmer families (IASRI 2007). Owing to the joint family system, some families have more than one operational farm. The total number of operational farms has increased over the years due to subdivision of farms among the owners' children. In 2000-01, there were 120.8 million farms in India (Government of India 2007).

The average farm size in 2000-01 was 1.32 ha, smaller by 22 percent than in 1985-86 (1.69 ha). Sixty-three percent (76.1 million) of the farms are categorized as marginal: less than 1 ha, averaging 0.40 ha only. Around 18.9 percent (22.8 million) are small farms (1-2 ha, averaging 1.41 ha). There are 14.1 million farmers operating 2-4 ha (called semi-medium farms), averaging 2.72 ha. Thus, 93.6 percent of farmers in India operate less than 4 ha of land, which altogether account for 63 percent of total farm land. There

are 6.6 million (5.4%) medium-sized farms (4-10 ha) and only 1.2 million (1%) farms of 10 ha or more land (Table 1).

A closer look at marginal farm holdings shows that 37.8 million farmers operate 0.1-0.4 ha and 1.7 million farmers, less than 0.1 ha. Thus, around 39.5 million farmers have in fact tiny farms.

India has a total land area of 328.7 million ha, but land use statistics indicates only around 305 million ha. The net sown area in the country fluctuates from year to year. During the 1950s and 1960s, arable waste lands and fallow lands were brought under cultivation, increasing the net sown area from 119 million ha in 1950-51 to 140 million ha in 1970-71 and to 143 million ha in 1990-91. Since then, it has stayed around that level, but tended to marginally decline due to diversion of land to other uses. Moreover, areas that have been sown more than once have been increasing. In 2004-05, they covered 49.6 million ha, meaning that the Gross Cropped Area was 190.0 million ha, with a cropping intensity of 135 percent (Table 2).

Table 1. Farm size in India (2000-01).

Group	Number of farms		Area operated		Average size (ha)
	Million	%	Million ha	ha %	
Marginal (below 1 ha)	76.1	63.0	30.1	18.8	0.40
Small (1-2 ha)	22.8	18.9	32.3	20.2	1.41
Semi-medium (2-4 ha)	14.1	11.7	38.3	24.0	2.72
Medium (4-10 ha)	6.6	5.4	38.1	23.8	5.80
Large (10 ha & above)	1.2	1.0	21.1	13.2	17.18
All	120.8	100.0	159.9	100.0	1.32

Source: Government of India (2007)

Table 2. Land use pattern in India (million hectares).

Particulars	1950-51	1970-71	1990-91	2004-05
Total land area	328.7	328.7	328.7	328.7
Reported area (for land use)	284.3	303.8	304.9	305.2
Net Sown Area (NSA)	118.8	140.3	143.0	141.3
Gross Cropped Area (GCA)	131.9	165.8	185.7	190.9
Sown more than once	13.1	25.5	42.7	49.6
Cropping intensity (%)	111.0	118.2	129.9	135.1
Net Irrigated Area (NIA)	20.8	31.1	48.0	58.5
NIA as % of NSA	17.5	22.2	33.6	41.4
Gross Irrigated Area (GIA)	22.6	38.2	63.2	79.5
GIA as % of GCA	17.1	23.0	34.0	41.6

Source: Government of India (2007)

Irrigation development has been one of the priority areas of agricultural development in India. In 1950-51, only 17.5 percent of sown area (20.8 million ha) had irrigation facilities. The net irrigated area increased to 31.1 million ha in 1970-71, 48.0 million ha in 1990-91, and 58.5 million ha in 2004-05. Similarly, the gross irrigated area went up from 22.6 million ha in 1950-51 to 79.5 million ha in 2004-05 (Table 2). In 2004-05, 41.6 percent of the gross cropped area had irrigation facilities, made possible through huge investments from the government as well as farmers.

The share of agriculture in the Gross Domestic Product (GDP) of India has registered a steady decline from 36.4 percent in 1982-83 to 18.5 percent in 2006-07. Yet, this sector continues to support more than half a billion people, providing employment to 52 percent of the workforce (Government of India 2008).

The gap between the growth of agriculture and non-agricultural sectors began to widen starting in 1981-82; it has been more particularly evident since the mid-1990s because of acceleration in

the growth of the industry and service sectors. From the 1950s to the 1970s, India's economy had grown at the rate of around 3.6 percent. The economic growth rate accelerated in the 1980s and 1990s to around 5.6 percent per annum. It further sped up in the current decade, recording a growth rate of 7.6 percent in 2002-07 and around 9.2 percent in the past two years. The agricultural sector's annual growth rate, which was around 2.5 percent from the 1950s to the 1970s, increased to 3.6 percent in the 1980s and up to the middle of the 1990s. However, since then, it has decelerated to less than 2.5 percent per annum. It rose again during the past two years; but whether or not the increase will be sustained is yet to be seen (Table 3). In 2007-08, the annual growth rate was 4.5 percent.

AGRICULTURAL DEVELOPMENT POLICIES

Agricultural development policy in India has remained focused on food security, both at the macro and household levels. Before the country's independence, the infamous Bengal

Table 3. Growth rates of the Indian economy and agricultural sector (% per annum).

Period	Total Economy (GDP)	Agriculture and Allied Sectors
1951-52 to 1967-68	3.69	2.54
1968-69 to 1980-81	3.52	2.44
1981-82 to 1990-91	5.40	3.52
1991-92 to 1996-97	5.69	3.66
1997-98 to 2001-02	5.52	2.50
2002-03 to 2006-07	7.64	2.29
2005-06 to 2006-07	9.17	4.35

Source: Planning Commission (2007)

famine of 1943 daunted the country, with the situation worsening after partition because a proportionately smaller cereals area was inherited by India. The huge gap between demand and supply of food grains, high food prices, and around 60 percent people living below poverty line were the main challenges of development planning at that time of independence in 1947.

Between 1947 and the mid-1960s, the country launched the following programs: Intensive Agricultural Area Programme (IAAP), Intensive Agricultural District Programme (IADP), community development programs, and land reform program. Yet the food situation continued to worsen. Food importation, food rationing, and price controls were used to keep food prices under check. By the mid-1960s, India's cereals imports had reached 16 percent of its needs; such high level was beyond the country's purchasing power. Further, the country faced unprecedented severe droughts for two consecutive years. The situation on the food front was so bad that the Prime Minister then appealed to the people to fast once a day every week to alleviate the food shortage. At that time, the need to accord the highest priority to increasing food grain (staple food) production was recognized. This marked the turning point in the entire approach to India's agricultural development policy. Consequently,

a new agricultural development strategy was designed and launched in the mid-1960s. The strategic objective was defined as 'maximizing the production of food grains.' The strategy revolved around building a solid foundation of agricultural development based on three complementary pillars or operational objectives, as follows:

- To evolve high-yielding technology packages, including improved seeds, fertilizers and agronomic practices, and transfer these to the farm level.
- To create a system for delivery of all high-yielding inputs including credit along with expansion of irrigation facilities.
- To assure a remunerative price and marketing environment for farmers through suitable market intervention schemes.

The policy instruments or schemes that were deployed in the form of a package to achieve the stated objectives are as follows:

- Creation, strengthening, and expansion of the national agricultural research system (NARS) for developing and perfecting new production technologies for food grains and other agricultural commodities.

- (ii) Establishment, strengthening, and expansion of agricultural education and training system for agricultural extension workers and farmers to transfer new technologies at the farm level.
- (iii) An arrangement for the production and/or import and distribution of high-yielding farm inputs like improved seeds, fertilizers, agro-chemicals, and improved implements/farm machines to the farmers.
- (iv) Planning and execution of major, medium, and micro irrigation schemes in order to increase the area under irrigation.
- (v) Nationalization of commercial banks, creation of cooperative credit institutions, and reorientation of monetary policy to increase institutional credit flow to the farmers.
- (vi) Creation and expansion of physical and institutional infrastructure (primary market yards, roads, storage facilities, farmers' cooperatives and public sector organizations) to improve the marketing system so it can handle and distribute the emerging marketed surplus.
- (vii) Regulation of traders' exploitative marketing practices through a series of legal and regulatory measures such as licensing, levies, stocking limits, and movement restrictions.
- (viii) Fixing of the minimum support prices and arrangements for price support purchases and procurement by public or cooperative agencies.
- (ix) Building-up and maintenance of buffer stocks of cereals and distribution of cereals through a public distribution system.
- (x) Provision of food and input subsidies, explicit or implicit, to reconcile the conflicting objectives of cereal producers and consumers in terms of prices.
- (xi) Regulation of imports and exports through several instruments, including canalization, licensing, minimum export prices (MEPs),

and custom duties to maintain price stability in the domestic market.

The strategy paid rich dividends: 15 or so years later (early 1980s), a balance between demand and supply of cereals was in sight. Given this comfortable macro food security situation, two major shifts in the policy were adopted in the 1980s. One was a change in the broad objective of "maximizing the production of food grains" to "evolving a production pattern consistent with the emerging demand pattern." To achieve this policy shift, three broad elements of support were extended to non-cereals: technology, inputs, and marketing. The other was a shift in focus from macro food security to household and individual food security. Several schemes to provide food assistance and supplementary nutrition, including a food for work program, were launched.

Three aspects of the policy shift since the early 1980s must be recognized. One, the sequencing and mix of programs were based on the perception that: (a) adequate availability of food at the national level is a necessary but not sufficient condition for assuring physical access of all households to food; (b) physical access to food is a necessary but not sufficient condition for ascertaining economic access to food; and (c) physical and economic access of all households to food is a necessary but not sufficient condition for all individuals to receive and consume adequate food. Two, the policy instruments were designed to cover people deriving livelihoods from either production-based, exchange-based, labor-based, transfer-based, or a combination of these entitlements (Acharya 2005). Provision of production inputs for small and marginal farmers; provision of efficient marketing system for those with small market surplus; employment opportunities and low food prices for labor-based families; and direct food assistance for those depending on transfers were considered as means of assuring household food security. And three, the mix of programs followed a life-cycle approach;

that is, there were different programs *inter alia* for expectant women, nursing mothers, infants, school going children, and senior citizens.

In 1991, in response to the financial crisis faced by the country, India launched a program of economic reforms. The program gained momentum in 1994 when the country became a signatory to the new international trade agreement. Initially the reforms program focused on the industrial, trade, and financial sectors. With these sectors becoming increasingly liberalized, the need for agricultural reforms also became obvious. The approach to agriculture sector reforms was initially cautious and gradual. The policies and programs related to price support, public distribution system, input prices, and marketing system for food grains were rigorously and repeatedly reviewed; several changes were brought about to bring these in line with the emerging liberalized economic environment.

SOME MAIN INSTRUMENTS OF AGRICULTURAL AND FOOD POLICY

National Agricultural Research System

Strengthening of the agricultural research system has been an important and strategic instrument of agricultural policy. India now has the largest national agricultural research system (NARS) in the world. The Indian Council of Agricultural Research (ICAR), set up in 1929 and reorganized twice (1965 and 1973), now has 14,321 scientists and technical staff in its 173 institutes. These include 48 research institutes, 5 national bureaus, 12 project directorates, 32 national research centers, and 76 all-India coordinated research projects (ICAR 2008). In addition, the country has 41 state agricultural universities (SAUs), one central agricultural university, and five deemed universities, which constitute the NARS. Each SAU has several regional research centers, at least one for each agro-climatic sub-zone.

India's NARS also has a frontline extension or technology transfer unit at the district level. These units are called Krishi Vigyan Kendras (KVKs or Agricultural Science Centres). Each of the 588 rural districts now has a KVK. Further, for better coordination of technology transfer efforts at the district level, each district has an Agricultural Technology Management Agency (ATMA), which is headed by the district's chief administrator. All KVKs have well-equipped demonstration farms, testing laboratories, and training facilities for the agricultural department's extension personnel, farmers, farmwomen, and rural youth.

A comprehensive analysis of India's agricultural research resource allocation reveals the following (Jha and Kumar 2006):

- a) A total of 21,869 scientists are engaged in agricultural research in 564 establishments. Nearly 95.7 percent of them are in the public system (SAUs—63%, ICAR—20%, and others—12.7%). The private sector accounts for only 4.3 percent of the scientists and 10 percent of the research resources.
- b) Public investment in agricultural research (at constant prices) has increased at the rate of 8.6 percent per annum in the 1960s, 1.9 percent per annum in the 1970s, 5.2 percent per annum in the 1980s, and 4 percent per annum in the 1990s. Between 1971 and 2000, the research investment in real terms registered a growth rate of 4.4 percent per annum.
- c) Agricultural research investment as a percentage of agricultural GDP went up from 0.32 percent in 1971 to 0.4 percent in 1981, 0.45 percent in 1991, and 0.50 percent in 2000.
- d) Nearly 23 percent of total agricultural research resources are allocated to cereals research; 45.1 percent of total cereals research resources are allocated to rice research. Thus, 10.32 percent of total agricultural research resources in India are allocated for rice research.

Irrigation

Many of the high-yielding fertilizer-responsive varieties require an assured supply of water, particularly at critical stages of crop growth. In the majority of the country, rainfall is very low, uncertain, and only a few days in a year. In this scenario, irrigation development has been another plank of agricultural development and food security policy. Massive investment was made by the government as well as farmers to increase the area under surface and groundwater irrigation.

As mentioned earlier, nearly 41.6 percent (79.5 million ha) of the cropped area in India has irrigation facilities. The irrigated area has increased at the rate of 2.6 percent per annum between 1950 and 1990; since then, the rate of increase has come down to 1.5 percent due to both higher incremental cost of irrigation construction and decrease in growth of public investment in irrigation. As of 2006-07, 87.0 million ha (74%) of land was irrigated out of a total potential of 103 million ha.

Farm Inputs Delivery

India has a well-defined system for supplying quality certified seeds to the farmers. While the breeder seed is produced mainly by ICAR institutes and SAUs, the production of foundation and certified seeds is done by private companies, cooperatives, and government agencies. Over the years, the private sector's share in the total seed business has been increasing. Private seed companies accounted for nearly 58 percent of total seed produced and supplied to farmers in 2006-07. During this year, 1.55 million tons of quality seed were supplied to the farmers, compared with only 0.58 million tons in 1991-92.

Fertilizer use in terms of nutrients almost doubled in 2006-07 at 22 million tons (113 kg/ha), as against 12.7 million tons (70 kg/ha) in 1991-

92. While the use of quality seed and fertilizers is increasing, the use of plant protection chemicals has been declining due to several developments, including use of resistant varieties, biocontrol practices, and integrated pest management techniques. The use of chemical pesticides decreased from 72,000 tons in 1991-92 to 38,000 tons in 2006-07. The outlets for supply or sale of these inputs are mainly the farmers' cooperatives and private sector.

Moreover, mechanization of farm operations has expanded manifold. For example, the use of irrigation water lifting pumps (both diesel engine and electric motor) went up from 0.1 million in 1951 to 3.2 million in 1972 and 15.7 million in 2003. The number of farm tractors increased from 0.15 million in 1972 to 2.4 million in 2003; threshers increased from 0.2 million to 9.1 million during this 30-year period. Electricity use in agriculture increased from 96 billion kwh in 1982-83 to 386 billion kwh in 2004-05, accounting for around 23 percent of total electricity used in the country. However, the actual use was much lower than the demand. The demand for electricity in agriculture as well as other sectors of the economy is increasing at a very rapid rate.

To facilitate the use of high-yielding inputs, the credit delivery system was reorganized and geared toward farmers and rural areas through several monetary policy measures. The credit flow to farmers in 2007-08 was Rs 1.4 trillion (~US\$30 billion) (Government of India 2008). In addition, to reduce the farmers' production risks, the provisions of crop and livestock insurance were rigorously reviewed and made more farmer-friendly. In 2006-07, 18 million farmers were covered by crop insurance programs. Now, weather-based crop insurance has been introduced, and both public and private sector companies are trying to increase the coverage to help farmers cover their weather-induced risks (Raju and Chand 2008).

Price Support for Farmers

Price support for farmers in general and food producers in particular has been an important instrument of food policy and agricultural development strategy since the mid-1960s. Each year, the support price level is determined by the Commission for Agricultural Costs and Prices, an independent body of experts. The Commission considers several factors and tries to objectively reconcile the conflicting short-term objectives of farmers, consumers, and government budget. Currently, minimum support prices (MSP) have been prescribed for 25 farm products, including cereals, pulses, oilseeds, sugarcane, and fibers. Farmers have the freedom to sell in the open market. The MSPs are usually announced before the sowing season. Whenever market prices dip below the support level, designated government agencies buy the products from farmers at support prices. The quantities that the government agencies need to purchase at support prices depend on the behavior of market prices and private trade, and fluctuate from year to year. For example, price support purchases of rice and wheat accounted for 15.8 percent of production in the triennium ending (TE) 1992-93, 24.6 percent in TE 2002-03, and 22.7 percent in TE 2006-07. In terms of absolute quantities, these varied between 20 and 39 million tons at these points of time. About 22 percent of production was retained by producer farmers for self-consumption; the rest (i.e., more than half of production) was handled by private traders.

Public Distribution System (PDS) of Cereals

The supply at affordable prices of cereals, being India's staple food, has been an essential component of food security policy. Chronic food insecurity is being addressed through subsidized food distribution, food for work, and employment generation and guarantee programs. Transitory food insecurity is addressed through

short-term disaster relief programs. Nutritional insecurity of women and children is addressed through supplementary nutrition and mid-day meals programs in schools. The assessment of the World Food Programme showed that food assistance programs in India have moved from "food for the nation" to "food for the people" and recently to "food security for the vulnerable" (UNWFP 2002). For a clear understanding of India's PDS of food grains, one needs to look at buffer stocking, provisions of targeted PDS, size of PDS, and food subsidy involved.

Buffer Stocking of Rice and Wheat

The Indian government maintains stocks of rice and wheat to meet the requirements of the public distribution system (PDS) and also for open-market sales to reduce price fluctuations. The stocks are built up mainly through price support operations. Occasionally, the import route is also used to build up the stocks. The minimum normal stock level is determined every five years by an expert group and is guided by the degree of inter-year fluctuations in production and government's commitment for PDS. The minimum normal public stock levels since April 2005 for rice and wheat are shown in Table 4. The actual stocks differ from the prescribed minimum due to a variety of factors such as scale of PDS desired to be operated by the government, difference between support price and open-market price, and the government policy related to stocking by private traders.

Distribution of Subsidized Cereals

The food grains are distributed to target groups at different prices through a network of 462,000 shops spread throughout the country. The target groups have been issued differently colored ration cards for use in buying subsidized grains. There are four categories of entitled citizens (non-income tax payee) under the PDS:

Table 4. Minimum normal buffer stock levels of food in India (since 1 April 2005) (million tons).

Date	Rice	Wheat	Total
April 1	12.2	4.0	16.2
July 1	9.8	17.1	26.9
October 1	5.2	11.0	16.2
January 1	11.8	8.2	20.0

Source: Government of India (2007)

(a) Twenty million poorest of the poor families are supplied with 35 kg of rice or wheat per month at Rs 3 and Rs 2 per kg, respectively.

(b) The remaining 61.6 million poor families (BPL) are supplied with 35 kg of rice or wheat per month at half the economic cost (purchase price plus handling costs) of rice and wheat. Since July 2002, central issue prices have been Rs 5.65/kg for rice and Rs 4.15/kg for wheat.

(c) Families above the poverty line are eligible to receive grains at a price close to the economic cost. For this group of families, the central issue prices are Rs 8.30/kg for rice and Rs 6.10/kg for wheat.

(d) Indigent senior citizens without any means of income or family support are provided with 10 kg of rice or wheat per month free of cost. About 65,000 persons are covered under this scheme. The distribution of subsidized rice/wheat is supplemental in nature and does not intend to meet the entire requirement of a family. The system is operated under the control of state governments.

Supplementary Nutrition Programme (SNP)

The objective of SNP is to alleviate or prevent malnutrition among vulnerable children below six years of age and expectant or nursing mothers. The program was launched in 1975 and now covers 4.8 million mothers and 22.9 million children through a network of 4,200 projects covering 75 percent of development

blocks in the rural areas and 273 slum pockets in urban areas. Hot meals or snacks, along with other items (vitamins and iron tablets, etc.), are provided to address the nutritional needs of the beneficiaries through childcare (Anganwari) centers established in the locality, with a local lady as the in-charge.

Mid-Day Meals (MDM) for School Children

The MDM program was taken up as a national program of nutrition support to primary education in 1995. Its twin objectives are to improve the nutritional status of primary school children and to increase enrollment, regular attendance, and retention in schools. The central government supplies the food grains free of cost to the state governments; the latter bear the transport and cooking costs. This program offers three options to the states: (a) providing a hot cooked meal consisting of 100 g of rice or wheat per day per child for 200 school days; (b) distributing pre-cooked ready-to-eat meals; or (c) dispensing 3 kg of rice or wheat per child per month for 10 months. Presently, 120 million children in almost one million schools are covered by this program (Government of India 2007).

Food for Work and Rural Employment Guarantee Programmes

The Food for Work Programme was started in 1977-78. Since then, there have been several

modifications on rural wage employment programs, with a food grain component built into these as part of wages. In September 2001, different programs were merged into an umbrella program called SGRY (Sampoorna Gramin Rozgar Yojana or Comprehensive Rural Employment Scheme). Under SGRY, the works taken up were labor intensive; the wages are equal to the statutorily prescribed minimum by provincial (state) governments and paid in the form of 5 kg of food grains (at subsidized prices) plus cash.

In February 2006, a National Rural Employment Guarantee (NREG) scheme was launched under the NREG Act passed by the Parliament to benefit the 200 most backward rural districts. Under the NREG Scheme, at least one member of a rural family is guaranteed employment for 100 days a year. In case the local agency fails to provide employment within 15 days of application, the said member of the family becomes entitled to cash compensation. The scheme was extended to 300 districts in 2007. Since April 2008, it has been extended to the entire country (588 rural districts). Moreover, SGRY has been subsumed in NREG from April 2008.

Size of the Public Distribution System (PDS)

The quantities of subsidized cereals distributed under PDS have increased considerably during the current decade (Table 5). Around 10 million tons of food grains per year had been distributed in the 1960s and 1970s, and around 15 million tons per year in the 1980s and 1990s. Since 2002, the commitment under PDS has been increased, with the annual average going up sharply to around 39 million tons. Out of the total distribution of subsidized food grains from 2002 to 2005, nearly 82 percent went to families below the poverty line.

Food Subsidy

Food subsidy is the difference between MSP plus handling/distribution expenses incurred by the Food Corporation of India (FCI) and the issue prices of food grains under PDS. This is the amount disbursed by the government to FCI for its procurement, handling, and distribution activities. In India, the food subsidy has served the multiple objectives of minimum guaranteed prices to the farmers, maintenance of buffer stocks, supply of subsidized food grains under identified schemes

Table 5. India: Distribution of subsidized cereals (million tons).

Year	Rice	Wheat	Others	Total
1965	3.6	5.9	0.6	10.1
1970	3.0	5.4	0.4	8.8
1975	3.2	7.5	0.5	11.2
1980	6.1	8.8	0.1	15.0
1985	7.2	8.5	0.1	15.8
1990	8.7	6.6	0.1	15.4
1995	9.4	5.6	-	15.0
1996-02	9.9	6.5	-	16.4
2002-05	21.0	18.3	-	39.3

Source: Government of India (2008)

of the government, and occasionally open-market sales for stabilizing market prices. The magnitude of food subsidies is, therefore, linked to the scale of operations for achieving the above-mentioned national objectives. Food subsidy in India was 0.43 percent of GDP in 1990-91 (Rs 24.5 billion). It increased to 0.57 percent (Rs 120.1 billion) of GDP in 2000-01 due to a higher commitment of distribution of subsidized grains under different programs. It further increased to around 0.99 percent of GDP (Rs 241.8 billion) during 2002-03 due to severe drought in the country. However, since then, the subsidy level has been relatively contained (Table 6). In 2007-08, the Union Budget indicated the food subsidy at Rs 254 billion, which is 0.62 percent of GDP.

Farm Input Subsidies

Input subsidies or supply of key farm inputs at reasonable prices has been another important instrument of food security policy in India. The twin and conflicting objectives of assuring remunerative prices to farmers and making food available to the consumers at affordable prices were reconciled by, *inter alia*, keeping the prices

of inputs at reasonable levels. This led to the emergence of input subsidies. Input subsidies in Indian agriculture are of two broad categories: direct or explicit and indirect or implicit. Direct or explicit subsidies are in the nature of payment to the farmers to meet part of the cost of inputs like seeds, plant protection chemicals, or machines. These are usually made available to specific target groups like marginal or small farmers and account for a small proportion of the total input subsidies. Indirect or implicit subsidies arise on account of the manner of determination of sale prices of inputs. There is no explicit payment of subsidy to the farmers. The inputs are supplied at a price or user charge lower than the cost of production, which amounts to implicit subsidy. Implicit or indirect subsidies on fertilizers, electricity for irrigation, and canal water are the major input subsidies in Indian agriculture. The estimates of input subsidies during the last 13 years, as reported by the Ministry of Agriculture, are shown in Table 7.

According to these estimates, the input subsidies increased from Rs 140.7 billion in 1993-94 to Rs 487.9 billion in 2004-05. Out of the total input subsidies, canal irrigation accounts

Table 6. Food subsidy in India (in billion Rs).

Year	Food Subsidy at Current Prices	Food Subsidy as Percent of GDP
1990-91	24.5	0.43
2000-01	120.1	0.57
2001-02	174.9	0.77
2002-03	241.8	0.99
2003-04	251.6	0.91
2004-05	257.5	0.83
2005-06	230.7	0.66
2006-07	238.3	0.63
2007-08	254.2	0.62

Source: Government of India (2008)

Table 7. Input subsidies in agriculture, India (in billion Rs).

Year	Fertilizer	Electricity	Irrigation	Others	Total
1993-94	45.6	24.0	58.7	12.4	140.7
1994-95	57.7	23.4	67.7	12.5	161.3
1995-96	67.4	19.8	79.3	10.3	176.8
1996-97	75.8	83.6	92.2	9.0	260.6
1997-98	99.2	49.4	103.2	9.8	261.6
1998-99	115.9	38.2	118.3	11.8	284.2
1999-00	132.4	60.3	112.0	31.2	335.9
2000-01	138.0	60.6	134.6	26.9	360.1
2001-02	126.0	93.4	131.6	30.4	381.4
2002-03	110.2	73.5	150.1	31.3	365.1
2003-04	118.5	NA	111.4	40.2	270.1
2004-05	158.8	154.3	129.6	45.2	487.9

Source: Government of India (2006, 2007)

for 27 percent, fertilizers 32 percent, and electricity 32 percent; direct subsidies account for 9 percent. Across farm-size groups, the share of subsidies follows the share in operated land, with small farmers having the larger share. The subsidy per hectare works out to Rs 3,000 or US\$75. Computation across crops shows that 96 percent of the input subsidies go to the food crops (Acharya and Jogi 2007).

Trade Policy Instruments

The import and export policy for food grains has been used to maintain domestic supply and price stability at reasonable levels. Until the mid-1980s, the policy instruments included canalization through public agencies, quota restrictions, licensing, minimum export prices (MEP), and devaluation of currency to maintain balance of payments. Liberalization of general trade policy began in the mid-1980s. Since then, changes in trade policy have been usually announced every five years, but those on import duties and other specific instruments are announced yearly or whenever the need arises.

Since 1997, MEP had been abolished, stocking limits for exporters relaxed, and levy on non-basmati rice meant for export and quantitative restrictions (QRs) were withdrawn. Rice exportation was allowed freely, but recently the ban on exports of non-basmati rice and MEP on basmati rice was re-imposed in response to the sharp rise in domestic prices.

Regulation of the Food Marketing System

As mentioned earlier, regulation of the food marketing system has been a part of the food policy instruments since India's independence. Until the mid-1990s, several regulations were in place at different points of time. Some of these are:

- (i) Legal restrictions on activities of traders and processors, including licensing, stocking limits, movement restrictions on food grains, levy obligation, and size restrictions on grain milling
- (ii) Restrictions on bank credit for traders

- (iii) Ban on futures trading and canalization of imports and exports
- (iv) Restrictions on setting up of private market yards

In the late 1990s and during the first half of the 2000s, several official committees reviewed the marketing situation and came out with recommendations on deregulation and liberalization of the domestic markets for food commodities. Consequently, many steps were taken between 2000 and 2003 toward liberalization of the food grain markets. The situation of domestic market deregulation in 2004 has been as follows:

- Movement restrictions – lifted
- Storage controls – lifted
- Small scale reservation – lifted
- Credit control – lifted
- Ban on futures trading – lifted
- Bulk handling and storage (BHS) by private trade – allowed
- Ban on foreign investment in BHS – lifted
- Licensing system – lifted
- Export and Import – liberalized
- Ban on set up of private wholesale markets – lifted
- Contract farming – allowed
- Direct purchase from farmers outside market yards – allowed
- Minimum support prices – continue
- Levy on rice mills and sugar factories – continue
- Entry of organized retail trade – allowed

PERFORMANCE OF AGRICULTURE AND STATUS OF FOOD SECURITY

Growth and Instability

As already mentioned, the growth rate of agricultural GDP, which was around 2.5 percent

per annum during the 1950s, 1960s and 1970s, accelerated to around 3.6 percent during the 1980s and up to the mid-1990s. From the mid-1990s to the mid-2000s, it was around 2.4 percent per annum, but has picked up during the last three years to around 4.5 percent.

The share of agriculture in the national GDP, however, has shown a declining trend and was estimated to be 17.8 percent during 2007-08.

Sector-wise growth rates reveal that the livestock and fisheries sectors recorded high growth rates of 3.5 percent or more per annum since the middle of the 1960s (Table 8). The crop sector's growth rate was around 3 percent per year until the mid-1990s, after which it decelerated to 1.88 percent during 2002-07. However, growth has picked up again during the last three years to more than 4 percent.

Crop group wise analysis of growth rates (Table 9) shows that while fruits-vegetables recorded reasonable rates, the growth rate of the cereal sector started decelerating in the 1990s. From 1997 to 2002, it went down to 1.49 percent, which was marginally lower than the population growth rate. This endangered the staple food security. However, the trend has reversed during the last three years after the government carried out a series of new initiatives.

Apart from achieving reasonably satisfactory production growth rates of staple and other foods, another important achievement of India's agriculture is the continuous decline in instability of crop production and yields, which greatly depend on uncertain monsoons. This has happened for food grains as well as non-food grain crops. The instability index (standard deviation of natural log $yt+1/yt$) of production of all crops taken together declined from 8.30 in 1951-65 to 6.95 in 1968-88 and further to 5.05 in 1989-07. For yields, the instability index during these periods declined from 7.93 to 4.97 and 4.65 (Chand and Raju 2008).

Table 8. Agriculture growth rates, India (% per annum at constant prices).

Period	Crops	Livestock	Fisheries	All Agriculture
1951-68	3.00	1.02	4.68	2.54
1968-81	3.00	3.26	3.08	2.44
1981-91	2.97	4.78	5.74	3.52
1991-97	3.09	4.00	7.05	3.66
1997-02	2.25	3.52	2.62	2.50
2002-07	1.88	3.56	3.40	2.29
2005-07	4.12	4.57	3.76	4.35

Source: Planning Commission (2007)

Table 9. Growth Rates of Crop Groups, India (% per annum at constant prices).

Period	Cereals	Pulses & Oilseeds	Fruits & Vegetables	Other Crops	All Crops
1951-68	4.19	2.98	2.70	2.41	3.00
1968-81	3.43	0.97	4.80	2.98	3.00
1981-91	3.52	5.41	2.84	1.73	2.97
1991-97	2.36	2.92	6.07	2.25	3.09
1997-02	1.49	(-1.43)	3.68	4.14	2.25
2002-07	0.66	3.69	1.19	3.76	1.88
2005-07	3.52	0.47	3.12	6.83	4.12

Source: Planning Commission (2007)

Food Security Situation

Dimensions of Food Security

Food security is achieved when all people at all times have physical and economic access to food that is sufficient to meet dietary needs for a healthy and productive life. In this sense, achievement of food security implies producing (or importing) sufficient food and making it accessible to all individuals throughout the year and on a sustainable basis from year to year. Further, fulfilling dietary needs for a productive and healthy life implies physical and economic

access of all people to nutritive food, according to each individual's requirement. Food security thus connotes freedom from hunger and malnutrition.

The status of food security of a country needs to be assessed at three levels. First is availability of food at the national level on a sustainable basis, which depends on the level and growth of food production or adequate capacity to import food (if availability elsewhere is assured). Second is physical and economic access of all households to food. Physical access requires an efficient marketing, transport, and storage system to bring the food within easy reach or at a reasonable distance from human settlements (villages).

Economic access of every household to food depends on purchasing power and prices of food at which it is available. Third is utilization of available food by individuals, which depends on intra-family allocation of food, and maintenance of a reasonable level of health of all individuals to consume and absorb the required level of food. Social factors like education, primary health care, gender bias, and role of women in household decisions affect food security at the individual level.

It is in this context that India tackles hunger and food insecurity situation through both long-term and short-term measures. As part of a long-term strategy, the country adopted a development strategy encompassing maintenance of adequate growth of national food production, employment and incomes of masses, improvement in marketing infrastructure, and access to education and primary healthcare. In addition, the short-term strategy involves selective market intervention and targeted distribution of subsidized food to reduce hunger and food insecurity. Further, as the nutritional status is also influenced by non-food factors such as clean water and sanitation, it was recognized that attention to these aspects will help translate food security into good nutrition.

Macro Food Security

The most notable change has been in the increase in national production of staple food (i.e., cereals). The production of cereals went up from 44 million tons in TE 1951-52 to 203 million tons during TE 2007-08. The average incremental production was around 4 million tons per year continuously for two decades from TE 1974-75 to TE 1994-95 (Table 10). The rate of increase came down during the later decade but picked up again during the recent three years.

The growth rate of cereal production has kept pace with growth of population and cereals demand. Cereals production in general increased at an annual compound rate of more than 3 percent per annum up to 1991 and around 2.4 percent up to the mid-1990s. However, as mentioned earlier, the situation was not comfortable during the period TE 1994-95 to TE 2004-05, when the growth rate dipped to less than one percent per annum.

The increase in domestic production of staple food almost eliminated the dependence on imports. Net imports as a percentage of domestic output had increased to unprecedented levels during the mid-1960s. For example, in 1966, the

Table 10. Production of cereals in India (million tons).

Period	Rice	Wheat	Other Cereals	Total	Increase Per year
TE 1951-52	21.8	6.3	16.1	44.2	-
TE 1964-65	36.5	11.0	24.6	72.1	2.15
TE 1974-75	41.0	23.5	26.0	90.5	1.84
TE 1984-95	55.2	44.1	30.9	130.2	3.97
TE 1994-95	78.1	60.8	32.6	171.5	4.13
TE 2004-05	81.2	68.8	32.4	182.4	1.09
2004-05	83.1	68.6	33.5	185.2	-
TE 2007-08	93.4	73.7	35.9	203.0	6.87
2007-08	95.7	76.8	39.7	212.2	8.93

Source: Government of India (2007)

net import of cereals (mainly wheat) was 10.3 million tons, representing 19 percent of the net domestic production of cereals. On quinquennial basis, the net cereal imports as a percentage of net domestic production declined from 9.6 percent during 1966-70 to 4.1 percent during 1971-75, 1.5 percent during 1981-85, and 0.4 percent during 1986-90. The decline was mainly due to the export of basmati rice and lower imports of wheat. Since then, India has emerged as a net exporter of cereals, mainly owing to the exports of rice, both basmati and non-basmati. India's net exports of cereals were 0.53 million tons per year during 1990-95, 2.62 million tons during 1995-00, and 6.43 million tons during 2000-05 (Table 11).

In addition to the increase in domestic cereal production, the inter-year instability in production was reduced considerably. This happened for two reasons. First, the irrigated area under cereals expanded considerably, reducing the dependency on uncertain rainfalls. Of the total cereal area, irrigated area increased from 23.1 percent in 1964-65 to 50.6 percent by 2004-05. Second, the share of more stable grains (wheat) increased while unstable grains (coarse cereals) decreased. Wheat, which had accounted for 15.2 percent of total cereals in TE 1964-65, increased its share to 36.3 percent in TE 2007-08. On the other hand, the share of coarse cereals declined from 34.1 percent to 17.7 percent during this period.

Another noteworthy feature of India's advancements in macro food security is that 96.5 percent of the incremental output of cereals between TE 1964-05 and TE 2006-07 was due to improvements in per hectare productivity (yield); area expansion accounted for only 3.5 percent. For example, during this period, the area under cereals increased from 93.7 million hectares to 99.0 million hectares but the average yield per hectare went up from 770 kg during TE 1964-65 to 1,962 kg during TE 2006-07. The improvement in yield resulted from advancements in technology, irrigation, and the diversion of low-yielding crops to high value produce.

Household and Individual Food Security

There has been considerable improvement in physical access of households to food in different parts of the country. Several factors have contributed to this improvement. First, the share of rice (which is more geographically dispersed) in total staple food continues to be quite high at around 45 percent. Second, the expansion of the network of public distribution system helped in bringing cereals to deficit and geographically difficult regions (hilly and desert areas). Third, the expansion of road networks, creation of primary market yards, and buildup of storage facilities in the rural areas increased physical access of rural households to food even in otherwise deficit areas.

Table 11. India's imports and exports of cereals (million tons per year).

Period	Imports	Exports	Net Export
1980-81 to 1984-85	1.58	0.54	(-) 1.04
1985-86 to 1989-90	0.70	0.48	(-) 0.22
1990-91 to 1994-95	0.39	0.92	(+) 0.53
1995-96 to 1999-00	1.10	3.72	(+) 2.62
2000-01 to 2004-05	0.01	6.44	(+) 6.43
2005-06 to 2007-08	2.66	3.72	(+) 2.06

Source: Acharya (2007), updated from Government of India (2008) and Government of India (2007)

Another important development has been the continuous improvement in the economic access of consumers to food. The increase in retail prices of two staple food items (rice and wheat) has been lower than the increase in per capita income, thus the proportion of consumer income required to buy a unit quantity of rice or wheat has continued to decline. For example, the price of 100 kg of wheat as a proportion of annual per capita income in rural areas declined from 15.4 percent in 1973-74 to 8.7 percent in 1983-84, 5.9 percent in 1990-91, 5.0 percent in 1994-95, 4.4 percent in 1999-2000, and 4.0 percent in January 2008. A similar declining trend has been noticed for urban communities, as well as in the case of rice for both rural and urban areas.

A related development needs to be mentioned. In addition to the greater availability of cereals and the decline in their relative prices vis-à-vis incomes, the per capita consumption of cereals has also dropped in recent years (Dev 2003), from 173.6 kg per year in 1987-88 to 160.8 kg in 1993-94 to 152.6 kg in 1999-2000. The decline in consumption has been sharper in coarse cereals, occurring even among the lowest 30 percent of consumers; this reflects a shift toward more nutritive foods like fruits, vegetables, and livestock products. Long-term data from the National Sample Survey Organization also indicate a declining trend in the per capita consumption of cereals in both rural and urban areas, accompanied by a decrease in the proportion of expenditure on cereals and an increase in that on milk, meat, eggs, fruits, and vegetables. This shows an improvement in nutritional levels.

The improved availability of staple food at declining real prices has contributed to a better nutritional security. Farmers have shifted from the low-yielding coarse cereals to non-cereal food products since the middle of the 1980s, which has *inter alia* helped to increase the production and availability of edible oils, sugar, fruits, vegetables, spices, milk, eggs, meat, and fish/fish products. During the 1980s and 1990s, the output of fruits

and spices increased at a rate of 3.07-3.91 percent per annum. The production of vegetables, edible oilseeds, milk, and fish also recorded increases of 4.33-4.56 percent per annum. The annual growth rates of sugar, eggs, and meat were even higher during this period: sugar increased at the rate of 6.10 percent, eggs 6.21 percent, and meat 8.59 percent. As the production growth of all these food items was considerably higher than the population growth, per capita production of nutritive foods went up substantially in India. India now produces 58 million tons of fruits, 112 million tons of vegetables, 102 million tons of milk, 46 billion eggs, and 7 million tons of fish.

As a result, there has been a considerable reduction in hunger or non-availability of food at the household level. The large sample surveys of the National Sample Survey Organization show that the percentage of households not getting enough food daily declined from 16.2 percent in 1983 to 4.2 percent in 1993-94, 2.6 percent in 1999-00, and only 1.9 percent in 2004-05. During 2004-05 also, only 0.3 percent households reported inadequate food in all the months of the year.

Economic poverty is an important factor affecting food security at the household level. Over the years, the incidence of poverty, in both rural and urban areas, has declined considerably. The percentage of population below poverty line decreased from 51 percent in 1977-78 to 39 percent in 1987-88, 26 percent in 1999-00, and 22 percent in 2004-05.

CURRENT CONCERNS AND NEW INITIATIVES

Current Concerns

Currently, India's concerns relating to food security and agricultural development can be summarized as follows:

- (i) Though over the years the country has been able to reduce hunger, 0.3 percent

of households (3.3 million persons) still report inadequate food.

- (ii) While economic poverty has been reduced to 22 percent of the population, 230 million persons are still poor in India.
- (iii) Though the proportion of the undernourished population has come down to 20 percent, the nutritional status of children and women continues to be a concern. Nearly 48 percent of under-3 children suffer from malnutrition and 39 percent of women suffer from energy deficiency, leading to both high infant and maternal mortality rates.
- (iv) Several areas in the country, particularly intensive farming areas, are now suffering from soil and land degradation, depletion of groundwater, and micronutrient deficiency.
- (v) Due to a sense of complacency in the production of cereals, the growth rate of this staple food production plummeted to less than 1 percent during the mid-1990s to 2004-05; the situation, however, has recovered during the later three years.
- (vi) The dependence on importation of edible oils and pulses has considerably increased since the mid-1990s. Imported edible oils accounted for around 13 percent (1.2 million tons) of total consumption in 1995-96; the level has sharply increased to 37.5 percent (4.7 million tons) during 2006-07.
- (vii) The profitability of crop farming or farm business income per cultivator has declined since the mid-1990s due to deceleration in growth of both total factor productivity (TFP) and terms of trade for farmers (ratio of prices received to prices paid by farmers). In fact, the terms of trade turned against the farmers.
- (viii) The initiation of the 'right to food' campaign in the country points to the need for a better food management system. The 'right to food' campaign, begun in

2001, has gained momentum. Grassroots civil society organizations have become active in the implementation of the public distribution system and wage employment programs. Even the Supreme Court of India intervened in the matter of effective implementation of PDS and wage-employment schemes. As a consequence, the demand or off-take of food grains from PDS outlets was almost equal to entitled quota. But due to a shortfall in production, relatively low support prices, and big/corporate traders remaining active in the market, the government could not procure sufficient quantities of rice and wheat to meet its PDS commitment. Consequently, it had to import 5.5 million tons of wheat at a price higher by 100 percent or more than the support price in 2005-06. There was lot of resentment among farmers and criticism of the government policy on this count.

New Policy Initiatives

Several new initiatives were taken to tackle the situation and bring back farmers' confidence in farming in general and cereal production in particular.

- (i) National Food Security Mission (NFSM)

A NFSM scheme was launched with the specific objective of increasing the production of rice, wheat, and pulses in targeted 305 districts. It had an outlay of Rs 48.8 billion covering a five-year period. It focused on providing quality seeds of high yielding varieties and all possible efforts to transfer improved technology to farmers, with enough flexibility to choose interventions at the district level (Government of India 2008).

- (ii) Rashtriya Krishi Vikas Yojana–RKVY

(National Agriculture Development Scheme)

RKVKY, also new scheme, aims at giving incentives to the state governments to increase the share of investments in agriculture in their state plans. The states have been given complete flexibility to plan on the basis of agro-climatic conditions of each region. The allocation under RKVKY is Rs 250 billion for a period of five years (Government of India 2008).

(iii) National Policy for Farmers

The Government of India approved and adopted a National Policy for Farmers in 2007. The Policy covers several areas but focuses on the economic well-being of farmers. It includes asset reforms, use of biotechnology and ICT, bio-security system, seed and soil health, credit, insurance, higher support prices for farmers, and enlargement of the food security basket.

In addition to these three medium-term initiatives, several other measures were taken to improve the economic condition of farmers and increase the incentive framework for them, as follows:

- (i) Under the farm credit package, the flow of institutional credit to the farmers was doubled within two years (2005-06 to 2006-07). More than 72 million farmers have been issued credit cards by commercial and cooperative banks.
- (ii) The crop, weather, and livestock insurance schemes for farmers have been redesigned and their coverage expanded.
- (iii) All the rural districts have been equipped with a Farm Science Centre, to increase the farmers' access to new technologies and agricultural scientists. These centers

are a part of either the national agricultural research institutes or state agricultural universities.

- (iv) The investment in agricultural research has been increased considerably. Similarly, the allocation for Horticultural Mission and several other agricultural development schemes has been enhanced.
- (v) Recently, outstanding loans of farmers (from commercial and cooperative banks) amounting to Rs 710 billion have been waived by the government to provide relief to 40 million farmers and to make these farmers eligible for fresh loans.
- (vi) The support prices for rice and wheat have been substantially increased during the recent years.

Apart from the above, the following new initiatives and expansion programs are at different stages of implementation (Government of India 2007):

- (i) Bharat Nirman (India connectivity and infrastructure program)
- (ii) Watershed Development and Micro Irrigation Programme
- (iii) Establishment of National Rainfed Area Authority
- (iv) Establishment of National Fisheries Development Board
- (v) Establishment of National Bee Board
- (vi) National Rural Employment Guarantee Scheme
- (vii) Revitalization of Cooperative Sector
- (viii) Enactment of Integrated Food Law and Setting Up of Food Safety and Standards Authority of India (FSSA)
- (ix) Agribusiness Development through Venture Capital Participation Schemes
- (x) Legislative Framework for Warehousing Development and Regulation
- (xi) Protection of Plant Varieties Regulation and Farmers' Rights Act

- (xii) Establishment of Bamboo Mission
- (xiii) Increasing Knowledge Connectivity through Common Service Centres and IT Initiatives
- (xiv) National Rural Health Mission

The outcome of the medium- and short-term measures has been positive. With a favorable behavior of the monsoon, the production of cereals increased from 185.2 million tons during 2004-05 to 212.2 million tons during 2007-08. The procurement of wheat and rice increased considerably during the recent years. Wheat procurement has been more than 23 million tons and rice, around 27 million tons; these are more than sufficient to meet the PDS requirements.

Projections of Demand and Supply

Projections of demand and supply of agricultural commodities have been made by several researchers as well as by national and international organizations. The Planning Commission (2007) has made projections for the terminal year of XI five-year plan (2011-12). The International Food Policy Research Institute (IFPRI) has made projections for 2020

and the UN Food and Agriculture Organization (FAO) for 2015, 2030, and 2050. According to FAO's projections for food groups for the year 2015 and 2030 (Table 12), India will be a surplus producer of cereals, fruits and vegetables, sugar, and milk. In the case of poultry products and meat, the projected demand and supply would almost equal, but the demand will far exceed the domestic production of edible (vegetable) oils. Projections of demand and supply of food items within these groups indicate that India will continue to depend on imports of pulses unless some major changes in production strategies and policies are put in place.

CONCLUSIONS AND LESSONS

At the time of India's independence in 1947, the country had a serious food crisis. The demand far exceeded the supply, food prices were high, and more than half of the people were poverty-stricken and could not access food. The situation had worsened by the mid-1960s. Since then, the government pursued a new agricultural development and food security policy, which has helped in increasing food production, improved physical and economic access of households to

Table 12. Projections of demand and production of food groups in India (million tons).

Food Group	2015		2030	
	Demand	Production	Demand	Production
Cereals	199	229	225	262
Fruits & Vegetables	160	175	208	227
Vegetable Oils	18	10	23	13
Sugar	40	47	47	56
Milk	104	127	146	178
Eggs	3	4	6	7
Chicken	4	4	10	10
Beef, Mutton & Pork	5	5	7	7

food, and reduced the incidence of food insecurity and hunger. When complacency in the matter of macro food security set in during the late 1990s, the situation again became a matter of serious concern. It is only through a renewed package launched in 2005 that the food security situation has again improved. The Indian experience of handling the food security issue, both at the macro and household levels, provides quite a few lessons for developing countries where the majority of the population live in rural areas and depend for livelihood on the farm sector. Such lessons include the following:

- (i) In predominantly rural and agricultural economies, a focus on agricultural development and programs for macro and household food security can help in reducing hunger and poverty at a faster pace.
- (ii) Availability of food at the national level is a necessary condition for household and individual food security. Therefore, to achieve the goal of 'food security for all,' efforts need to be made at all levels (i.e., macro, household, individual). Over time, the country should move to the right of the continuum: food security for the nation to food security at the household level to food security of vulnerable individuals.
- (iii) Poverty is usually more pronounced in the rural areas. Rural families derive their livelihoods from any one or a combination of production-based, labor-based, market-based, and transfer-based entitlements. Therefore, there must be programs catering to each one of them – provision of subsidized inputs, wage-employment, low food prices, efficient marketing system, rural infrastructure, and direct food assistance.
- (iv) Public distribution of food grains is a useful policy instrument when food is in a tight balance. The government having a buffer stock is important, whether or not PDS is maintained. However, based on India's experience, PDS needs to be continuously reformed to ensure that it is directed at targeted beneficiaries and is transparent and flexible.
- (v) Price support to food producers and input subsidies in small farm economies are important instruments of food security policy. But these must be carefully used, balancing the interests of both food producers and consumers.
- (vi) So long as poverty persists and transient food insecurity occurs at frequent intervals, direct food assistance programs will continue to be important in the fight against hunger and malnutrition. Food safety nets are important for both the chronically and transitory food insecure, and must remain in place to serve the objective of a hunger-free nation.
- (vii) The status of women is important in intra-household distribution of food. Access of women to resources, knowledge, credit, and livelihood opportunities is key to the challenges of hunger. In South Asia, the women's own perception of their status is important. To facilitate efforts toward empowering them, they need to feel empowered themselves.
- (viii) For effective implementation of public distribution, wage-employment, and food safety programs, 'right to food' campaigns need to be incorporated in the national policies. 'Right to food' is linked to 'right to work,' which, in turn, is linked to 'right to information.' Vibrant and active civil society organizations are important in their effective implementation.
- (ix) While extreme hunger may be less pronounced, the incidence of malnutrition and ill health continues to be very high. An unhealthy childhood leads to an inter-generational transfer of food insecurity.

Solutions to this must be found not only in having adequate levels of safety net and nutrition programs, but also in improving access to healthcare and education.

- (x) If there is domestic capacity for increasing food production, especially in countries with

a large population or with a big proportion of people dependent on agriculture, a move toward high degree of food self-sufficiency would help in improving both macro and household food security.

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