Indian Agriculture

Indian Agriculture:

Trends in Food Grains Production

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Cambridge
Scholars
Publishing

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This book first published 2017

Cambridge Scholars Publishing

Lady Stephenson Library, Newcastle upon Tyne, NE6 2PA, UK

British Library Cataloguing in Publication Data
A catalogue record for this book is available from the British Library

ISBN (10): 1-4438-7278-4
ISBN (13): 978-1-4438-7278-2

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ABBREVIATIONS

AoA	Agreement on Agriculture
AP	Andhra Pradesh
AMS	Aggregate Minimum Support
Ar P	Arunachal Pradesh
APL	Above Poverty Line
CESS	Centre for Economic and Social Studies
CV	Coefficient of Variation
BPL	Below Poverty Line
BMI	Body Mass Index
CED	Chronic Energy Deficiency
CPI	Consumer Price Index
CSO	Central Statistical Organisation
EU	European Union
EPW	Economic and Political Weekly
FAO	Food and Agricultural Organisation
FCI	Food Corporation of India
FFWP	Food for Work Programme
FG	Food grains
GATT	General Agreement on Trade and Tariff
GCF	Gross Capital formation
GDP	Gross Domestic Product
GNP	Gross National Product
GoI	Govt. of India
GSDP	Gross State Domestic Product
Ha	Hectares
HH	Households
HP	Himachal Pradesh
HR	Haryana
HYV	High Yielding Variety
IARI	Indian Agricultural Research Institute
ICAR	Indian Council for Agricultural research
ICDS	Integrated Child Development Scheme
ICMR	Indian Council for Medical research
ICRISAT	International Crop Research Institute for Semi-Arid Tropics.

IFPRI	International Food Policy Research institute
IMF	International Monetary Fund
IMR	Infant Mortality Rate
IPCC	Inter Continental Panel on Climate Change
J&K	Jammu and Kashmir
KG	Kilograms
LDC	Lower Development Countries
M.Ha	Million Hectares
MoHFW	Ministry of Health and Family Welfare
MDG	Millennium Development Goals
MH	Maharashtra
MMR	Maternal Mortality Rate
MMS	Mid day Meals Scheme
MNC	Multi National Company
MoA	Ministry of Agriculture
MP	Madhya Pradesh
MSP	Minimum Support Price
MSSRF	M.S.Swaminthan Research Foundation
MT	Million Tons
NDA	National Democratic Alliance
NEHR	North East Hill Region
NFHS	National Family Health Survey
NFSA	National Food Security Act.
NFSM	National Food Security Mission.
NNMB	National Nutritional Monitoring Bureau
NNP	Net National product
NSSO	National Sample Survey Organisation
OBC	Other Backward Castes
OR	Orissa
PDS	Public Distribution System
QR	Quantity Restrictions
RBI	Reserve Bank of India
RJ	Rajasthan
RTF	Right to Food
SAP	Structural Adjustment Programme
SC	Scheduled Caste
SD	Standard Deviation
SDT	Special Drawing Rights
SSA	Sub Saharan Africa
ST	Scheduled Tribe
TE	Triennium

TFR	Total Factor Productivity
TNC	Tran's National companies
TPDS	Targeted Public Distribution System
UK	United Kingdom
UNICEF	United Nations Children's Emergency Fund
UNO	United Nations Organisation
UP	Uttar Pradesh
UPA	United Progressive Alliance
USA	United States of America
WB	West Bengal
WFP	World Food Program
WPI	Whole sale Price Index
WTO	World Trade Organisation

CHAPTER ONE

INTRODUCTION

Dr. B. R. Ambedkar enshrined the Directive Principles of state policy, which envisaged the democratic notions of "Liberty, Equality and Fraternity". According to him, democracy is both the end and the means of this ideal. It is the end because he ultimately considered democracy itself as synonymous with the realisation of liberty, equality and fraternity. At the same time, democracy was also the means through which this ideal was to be attained.[1]

From Ambedkar's perspective, democracy is comprehensively geared to social transformation and progress in human society. In one of his famous and inspiring definitions, he elaborated democracy as "a form and method of government whereby revolutionary changes in the economic and social life of the people are brought about without bloodshed".[2] In order to realise this vision it is essential to link political democracy with economic and social democracy. This is one of the basic objectives of the constitution. In Ambedkar's words: "Our object in framing the constitution is really twofold: to lay down the form of political democracy; and to lay down that our ideal is economic democracy and also to prescribe that every government, whichever is in power, shall strive to bring about economic democracy." But in India, 64 years down the line, economic democracy appears quietly buried as a tool of public service, and even the so-called notion of political democracy is in no way in the pink of health.

India is a country with a population of 1,210 million.[3] It is a federal parliamentary democratic country comprising diversified sections of people in terms of language, religion, region, custom, climate, costume, colour, cuisine and dietary patterns. It is a highly and densely populated

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[1] Dreze, Jean. "Democracy and Right to Food." from 'Economic and Political Weekly', April 24th 2004, pp. 1723–1935.
[2] Ibid.
[3] 2011: Census of India.

nation, standing second only to China at present. It also claims to be one of the fastest growing and emerging economies in the world. Ever since India became independent in 1947, it has been a developing country. In the past 60 years, we have made reasonable strides in economic progress, though we have to admit that this progress has been quite slow and not inclusive at the grassroots level. Ours is still a developing country, with heavy dependence on agriculture, as still 56 per cent of the population find their livelihood in agriculture and allied activities.[4] Though the share of agriculture in the nation's GDP has come down marginally to 17 per cent (2012), the population pressure on agriculture has not come down significantly. Three out of five people employed in India depend on agriculture for their livelihoods, as cultivators, agricultural labourers or both. Many of these people, a large share of whom make up the poorest section of society, continue to be bound to agricultural activities with low value and productivity.

The composition and characteristics of the Indian population are diversified and unique. On the one hand, there are sections of affluence, while on the other hand, we have nearly 27 per cent (2011 census) of the population living below the poverty line: unable to get sufficient food every day. Some of our human development indicators like human capital, expenditure on health, education and infrastructure lag behind those of many South Asian and African countries.

India is the only Asian country, other than Bangladesh and Yemen, that has faced severe food shortages. About 42 per cent of underweight children in the world claim India as their home (UN Hunger Force). 47 per cent of children under 5 years old are underweight, 45 per cent are stunted, and 46 per cent have severe malnutrition (wasting: disproportionate growth) (National Family Health Survey III, 2005/06). India is also home to a large number of people affected by nutrition deficiency (iron, iodine, vitamin A). This hidden hunger contributes to low human capital through reduced cognitive ability and low labour productivity.

1.1 Definition of food security

The term 'food security', as understood today, implies both physical and economic access to a balanced diet for each household and for all members in a household. The Rome Declaration on World Food Security

[4] Economic Survey of India 2013.

and the World Food Plan of Action 1996 defined food security in unambiguous terms as, "when all people, at all times, have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life" (Food and Agricultural Organisation (FAO), 1996).

In Amartya Sen's words: "A person is brought down to starvation if some change in his endowment (e.g. alienation of land, loss of labour power due to ill health), or in his exchange entitlement mapping (e.g. fall in wages, rise in food prices, loss of employment, drop in the price of the goods he produces and sells), makes it no longer possible for him to acquire any commodity bundle with enough food."[5] Sen's analysis has also paved the way for the examination of intra-household distribution and the allocation of food and thereby resulted in a shift of focus from national- and household-level food security to individual-level food and nutritional security.

In Jean Dreze's words: "It will direct attention to the various economic, political, social and cultural relations that determine the acquirement of food by individuals." Today the notion of food security implies not only physical and economic access to food but also access to biological utilisation of food consumed, e.g. elements like environmental conditions, safe drinking water and sanitation, as well as nutrition, which collectively determine or hinder the food absorption of a human being. It means that *Availability*, *Access* and *Absorption* together would determine the holistic concept of food security.

A World Bank (1986) report says that food security means "access by all people at all times to enough food for an active, healthy life". Its primary elements are not only the availability of food but also the ability to access it. The report also draws a distinction between chronic and transitory food insecurity. Basically, chronic food insecurity indicates "continuous insufficient diet due to inability to acquire grains. This affects poor households that persistently do not have the leeway to either procure or produce food on their own." The issue of transitory food insecurity is understood as a short-term decline in the household's access to sufficient food. This is the culmination of factors like instability in the price of food grains, the household's income and food production. Sometimes it might even lead to a famine-like situation. A country which is not self-sufficient

[5] Sen, Amartya. "The Real Food Problem." From Yojana. July 2008.

in food grain production may not be able to enjoy adequate entitlement for its domestic food security if it does not have the economic and political strength needed to meet its food requirements through exchange with the countries in surplus.

The term 'food security' has many dimensions:

Production: determined by agriculture and food grain production;
Consumption: determined by the purchasing power of the people and prevailing food prices;
Distribution: determined by the food management of both government agencies and private players. It assumes a greater role when there exists a large difference between production and consumption.

Again, food security is determined by the availability of food grains, accessibility in terms of purchasing power and absorption related to the acceptance of a particular food by the people and also the availability of other basic amenities like drinking water, sanitary conditions, hygienic conditions and medical and toilet facilities.

1.2 Scope of food security

On the other hand, food security can also be defined as the stable availability of food grains at national, regional and household levels. National-level food security can be attained through domestic production and imports and also through changes in food stocks. Food security at the regional level can be achieved through inter-regional food grain adjustments from regions of food surplus to regions with food deficits. Finally, food security at the household level can be achieved through equipping poor people with enough purchasing power to acquire the minimum food requirements for all members of the family.

The considerable achievements that we have had in our past have been a matter of great pride. But we have bigger challenges ahead in the future and we have to shoulder the responsibility of more than 380 million poor people who still remain undernourished while the global undernourished figure is 925 million,[6] indicating that more than one-third is in India**.** 65 per cent of the world's hungry live in only seven countries, namely India, China, the Democratic Republic of Congo, Bangladesh, Indonesia,

[6] FAO 2010.

Pakistan and Ethiopia.[7]

The salient features or indicators of food-insecure people are owning poor quality or no land, the sale of productive assets, taking small and informal loans from money lenders, relying heavily on wage work, migration, purchase of staple grains more than once a week, suffering from physical disabilities or chronic illness, women who work for wages and have young children, providing dowries, buying gifts and fulfilling obligations to relatives etc. Almost all these indicators are related to poverty. Therefore, poverty is the major determinant of chronic food insecurity.[8]

In today's world, the poorest of the poor families spend 80 per cent of their total income on food grains. Moreover, inadequate purchasing power deprives them of access to food in sufficient quantity. The shocking news is that, today, hunger is on the rise. There are now 925 million people across the globe suffering from undernourishment in a world that already grows more than enough food to feed the global population. It is shocking that in the 21st century, one child under the age of five will die every five seconds from a hunger-related disease. In the years ahead, hunger may kill more people than war. But unfortunately there seems to be no serious war against this.

In fact, the United Nations World Food Programme (WFP) shows that the quantity of food produced is one and a half times more than what is needed to provide every person on earth with a nutritious diet. Yet, while the percentage of the world's population living with extreme food shortages has plummeted in recent decades, the absolute numbers have grown. Nearly 875 of the 925 million who suffer from chronic undernourishment live in developing countries. The FAO (2009/10) describes it as 'a continent of the hunger that overtakes the population of Latin America or even Sub-Saharan Africa'. According to UNICEF analysis in 2010, 42 per cent of the world's underweight children and 31 per cent of its stunted children are in India. When we observe popular slogans like 'Incredible India' and 'India Rising', India's condition is not much better than that of the 'Dark Continent' (Africa) or specifically Sub-

[7] Ibid.

[8] George, P.S. "Some Reflections on Food Security in India." From "Indian Agriculture – in the new Millennium (Vol II), Changing Perceptions and Developing Policy." Edited by N.A. Majumdar and Uma Kapila. Indian Society of Agriculture Economics. AF. 2006.

Saharan Africa as far as the issue of food security is concerned.

1.3 Poverty and the gravity of food insecurity in India

Generally, the demand for the food grains depends on the income of the consumer, the food habits of people and, finally, on the rate of urbanisation and growth of a population. India accounts for 16.7 per cent of food consumers worldwide. At the time of independence in 1947, India was in the clutches of a severe food crisis, which was exacerbated by the partition of the country, as demand for food exceeded supply.

Statistics on poverty suggest that there are still around 380 million people who are food insecure in India. Trends in employment and real wages growth also provide some information regarding the purchasing power of the people. Even the coverage of the PDS[9] **(**National Sampling Survey Organisation (NSSO), 1999/00**)** is about 30 per cent of rural households for rice and 17 per cent for wheat in India, which again differs from state to state. The total proportion of households reporting grain purchases from PDS in India is just 30 per cent. At the national level, the share of rice consumption was 9 per cent in 1993/94. Due to PDS, 5.6 per cent is the share of wheat consumption in rural areas; the percentages for urban rice and wheat were 14.2 per cent and 9.2 per cent respectively. The huge increase in population and reasonable growth in income demands an additional 2.5 mt of food grains annually, besides there are significant increases needed in the supply of livestock, meat, eggs, fish and horticultural products.[10]

Poverty Estimates:

According to World Bank estimates, 34 per cent of Indians live on less than US$1 a day (extremely poor) and 80 per cent live on less than US$2 a day (moderately poor). The National Commission for Enterprises in the Unorganized Sector (NCEUS 2009) estimates both the percentage of people below the poverty line (Rs.12 per day per capita consumption in 2004/05) and the percentage of people vulnerable to poverty (per capita consumption expenditure of Rs.20 per day in 2004/05). As per its

[9] Public Distribution System.

[10] Bansil, P.C. "Demand for Food Grains by 2020 AD", from 'Towards a food secure India-Issues and Policy', edited by Mahendra Dev S, Kannan K.P, Ramachandran Nira. 2003.

estimate, about 77 per cent of the people are poor and vulnerable. This poor and vulnerable group constituted about 88 per cent of Schedule Caste (SC)/Scheduled Tribes(ST), 80 per cent of Other Backward Castes and 85 per cent of the Muslim population. Most of them are socially discriminated, educationally deprived and economically destitute. The IFPRI (International Food Policy Research Institute) Report on hunger published in 2013, ranks India at 63 out of 120 countries, slightly above Bangladesh and below all other South Asian countries. The National Family Health Survey (NFHS III) of 2005/06 shows that the percentage of malnutrition among children is higher in rural areas than in urban areas. According to the National Nutritional and Monitoring Bureau (NNMB), even today, there is a deficit of over 500 calories in the intake of children between 1 and 3 years of age and about 700 calories among 3–6 year olds. Therefore, there is a clear gap in access to food (quality and quantity) and health services for children.

The percentage of women (aged 15–49 years) who are anaemic has climbed to 56.2 per cent in 2005/06 from 51.8 per cent in 1998/99. In the same way, the NFHS III (2005/06), shows that the percentage of anaemic married women in the age group 15–49 increased from 53.9 per cent in 1998/99 to 58.2 per cent in 2005/06 in rural areas and from 45.7 to 51.5 per cent in urban areas. The percentage of anaemic children (aged 6–35 months) has increased from 74.2 per cent in NFHS II to 79.2 per cent in NFHS III. Similarly, the percentage of anaemic children also increased from 75.3 to 81.2 per cent in rural areas and from 70.8 to 72.7 per cent in urban areas over the same period. This indicates that undernourishment among women and children has increased quite alarmingly in India.

The UN Human Rights Declaration of 1948 recognised the right to food as being at the centre of an adequate standard of living. Considered to be the best state in India, Kerala maintains a rate of malnutrition that is comparable to many African countries. In the year 1992/93 (NFHS I), the rate of malnutrition was 54 per cent, it rose further to 46 per cent in 1998/99 (NFHS II), and ultimately to 46 per cent in 2005/06 (NFHS III). We can observe hardly any positive change but meanwhile, ironically, the economy was growing at about 6 per cent per annum.

I.1 Childhood (0–3 years of age) **malnutrition in India (%)**

Nutritional parameter	1992/93 NFHS I	1998/99 NFHS II	2005/06 NFHS III
Stunted[11]	52.0	45.5	38.4
Wasted[12]	17.5	15.5	19.1
Underweight	53.4	47.0	45.9

Note: Figures of NFHS I above are for 0–4 years. However, NFHS I later generated data for children below 3 years with 51.5 per cent of children being underweight. Source: NFHS Surveys, IIPS, MoHFW, GoI.

Though the percentage of stunted[13] children has declined marginally, that of the wasted[14] has increased dismally. But the percentage of these underweight children, though it has declined marginally, has shown alarming volatility. These are some of the basic indicators of prevailing high food insecurity and malnutrition in India. States like Madhya Pradesh (MP), Chhattisgarh, Bihar, Jharkhand and Uttar Pradesh (UP) suffer severe rates of malnutrition, which are well above the national average of 46 per cent.

I.2 Per capita intake of calories and protein:

Year	Calorie (Kcal/day)		Protein (gm/day)	
	Rural	Urban	Rural	Urban
1983	2221	2089	62.0	57.0
1993/94	2153	2071	60.2	57.2
1999/2000	2149	2156	59.1	58.5
2004/05	2047	2020	57.0	57.0

Note: 1983, NSSO 38th round; 1993/94, 50th round; 1999/2000, 55th round; 2004/05, 61st round. Source: NSS Report No. 513, Nutritional Intake in India 2004/05.

[11] Children who fall below the fifth percentile of the reference population in height for age are defined as stunted, regardless of the reason for their shortness.
[12] Wasted refers to low weight-for-height, where a child is thin for their height but not necessarily short. Also known as **acute** malnutrition, this carries an immediate increased risk of morbidity and mortality. Wasted children have a 5–20 times higher risk of dying from common diseases like diarrhoea or pneumonia than normally nourished children.
[13] A child that has not been able to grow or develop as much as it should.
[14] A child that is too thin, especially because of illness.

The table shows that, over a period of 25 years, the notable aspect is that the per capita intake of calories as well as protein has been coming down continuously. Here, the rural consumption of calories has come down from 2,221 Kilo calories (Kcal) to 2,047 Kcal showing an 8 per cent decline. Similarly, the urban consumption of calories also has come down from 2,080 Kcal to 2,020 Kcal, a 3.3 per cent decline. In the same way, the rural protein consumption has declined by 8 per cent while urban consumption has remained the same during this time. All these figures for both rural and urban areas show us that the levels are way below the prescribed levels of 2,440 Kcal for rural and 2,100 Kcal for urban areas. Though the data may not show the exact picture, the intra-household differences in calorie and protein consumption especially of women and children are also worth considering; these show a low quality and the prevalence of latent food insecurity.

1.4 Trends in malnutrition

Malnutrition in India is worse than that of even South Asian countries like Nepal and Bangladesh. In this respect, between 1990–92 and 2001–03, the number of people suffering from hunger fell from 194 million to 150 million in China and from 21 million to 14 million in Vietnam. But unfortunately in India, the official decline was negligible, only decreasing from 215 million to 212 million during the same period.[15]

I.3 Malnutrition rate and anaemia in children and women in various age groups (%) by state

State	Children between 0–5 months exclusively breast fed	Children under 3 years underweight	Anaemia among women (15–49 yrs)
India	**46.3**	**45.9**	**56.1**
AP	62.7	36.5	62.0
Arunachal Pradesh	60.0	36.9	48.9
Assam	63.1	40.4	69.0
Bihar	27.9	58.4	68.3
Chhattisgarh	82.0	52.1	57.6

[15] Jose, Sunny and Navaneetham, K. "A factsheet on Women's Malnutrition in India." From Economic and Political Weekly, August 16th 2008, pp 61–67.

Delhi	34.5	33.1	43.4
Goa	17.7	29.3	38.9
Gujarat	47.8	47.4	55.5
Haryana	16.9	41.9	56.5
HP	27.1	36.2	40.9
J & K	42.3	29.4	53.1
Jharkhand	57.8	59.2	70.4
Karnataka	58.0	41.1	50.3
Kerala	56.2	28.8	32.3
Maharashtra	53.0	39.7	49.0
MP	21.6	60.3	57.6
Manipur	61.7	23.8	39.3
Meghalaya	26.3	46.3	45.4
Mizoram	46.1	21.6	38.2
Nagaland	29.2	29.7	30.8
Odisha	50.2	44.0	62.8
Punjab	36.0	27.0	38.4
Rajasthan	33.2	44.0	53.1
Sikkim	37.2	22.6	46.8
Tamil Nadu	33.3	33.2	53.3
Tripura	36.1	39.0	67.4
UP	51.3	47.3	50.8
Uttaranchal	31.2	38.0	47.6
West Bengal (WB)	58.6	43.5	63.8

Source: NFHS III (2005/06), IIPS, MoHFW, GoI. Note: For state-level figures, pro-rata reduction has been applied on the basis of targeted reduction at the all-India level.

The table gives us a clear picture of the amount of severe negative health and nutrition indicators of different states as well as at the aggregate level. States like Chhattisgarh, Jharkhand, Bihar, Madhya Pradesh, Odisha, Rajasthan and West Bengal have been performing very badly on this account while the states like Kerala, Punjab and Himachal Pradesh and Haryana have shown a relatively decent performance.

1.5 Alarming hunger rates

Emergencies like droughts, cyclones and earthquakes account for less than 8 per cent of hunger-related deaths in India, the remaining 92 per cent is the result of chronic hunger which kills over 7,000 Indians daily.[16] India has to fight with the perennial problem of hunger, in spite of the availability of food. Nearly 380 million Indians remain chronically undernourished. Alarmingly, this is a massive increase since 1991, when only 215 million Indians were food insecure. Malnutrition among pre-school children is a cause of concern. Still half of these children suffer from malnutrition, when it is only 33 per cent in Sub-Saharan Africa. Adults whose growth has been stunted by childhood malnutrition are 2.9 per cent less productive than non-stunted adults. Girls born into tribal and SC families are far more likely to be poor and food insecure. Insufficient intake of these micronutrients, often called a 'hidden hunger', affects vast numbers of people, with serious public health consequences.

It is a tale of two different people. In one version of the story, a country with a lot of poor people suddenly experiences fast economic expansion, but only half of the people share in the new prosperity. The favoured ones spend a lot of their new income on food, and unless supply expands very quickly, prices shoot up. The rest – the poor – now face higher food prices but no greater income, and they begin to starve. Tragedies like this happen repeatedly around the world (Amartya Sen 2008).[17] Agricultural crops like corn and soya beans can be used for manufacturing ethanol for motor fuel. So the stomachs of the hungry must also compete with fuel tanks. The global food problem is not due to the falling trend in world production or, for that matter, the food output per person. It is the result of accelerating demand.

1.6 International commitments

India is signatory to, and member of, many renowned international treaties or covenants like the Universal Declaration of Human Rights (UDHR 1948), The International Covenant on Economic, Social and Educational Rights (ICES 1966) and specific conventions like the

[16] Jayant K. Bhugan and Suarna Karunakar. "Private Sector Contribution towards a Hunger Free India." From "National Food Security Summit – 2004 – some selected Papers Food on Security." Edited by M.S. Swaminathan, Pedro Medrano, Daniel Gusta and Pravesh Sharma. 2004.

[17] Sen, Amartya (2008): "The Real Food Problem." From Yojana. July 2008.

Convention on the Elimination of All Forms of Discrimination Against Woman (CEDAW 1979), the Convention on the Rights on the Child (CRC 1989) and Genocide Prevention. But it is very clear that India has failed to live up to the requirements of these treaties, having also failed miserably in providing all its citizens with basic access to food.

The extent of food insecurity is deeper and more troublesome, especially for the low-income groups, landless labourers, agricultural workers, small and marginal farmers, SC/ST sections, women, people living in remote villages and hilly and forest regions, unorganised and daily wage workers. India accounts for about one fifth of the world's poor.[18] The poorest of India do not have sufficient economic access to food despite India being self-sufficient in food grain production at the aggregate level. This phenomenon is labelled '*hunger amidst plenty*'. In this respect, India has violated the right to food in the worst way. There have been starvation deaths in many places such as Kashipur in Odisha, Ananthapur, Mahabubnagar in AP and Kalahandi-Bolangir-Koraput (KBK) in Odisha. The KBK region in Odisha is one of the most food-insecure regions in the country.[19]

Food consumption cannot be postponed.[20] According to the Planning Commission, between 1993 and 2000, food grain prices rose by 76 per cent while the prices of manufactured goods went up by 33 per cent. Though the Government of India reduced food grain issue prices, it only went to the food processing industry and exporters. And the highly subsidised wheat and rice only increased private profit. There also exists a rapid and continuous decline of rain-fed-based coarse cereals such as jowar, bazra and ragi consumed by the poor. Interestingly, non-food grain items of food now account for over 60 per cent of expenditure on food. India may be the second fastest growing economy in the world, the world's largest producer of milk and edible oils, and the second largest producer of wheat and sugar, but it fares far worse than lesser economies when it comes to taking care of its malnourished children.

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[18] Suryanarayana, M.H. and Silva, Dimitri. "Poverty and Food Security in India – A disaggregated Regional Profile." From 'India: Perspectives on Equitable Development', edited by Mahendra Dev and Chandrashekar Rao, Academic Foundation. 2006

[19] Vyas, V.S. "Food security in India – Towards elimination of hunger and malnutrition." From 'Economic Developments in India – Vol.94'. AF. 2002.

[20] Reddy, Amarendar A. "Disparities in Agricultural Productivity Growth in Andhra Pradesh." From 'The Indian Economic Journal', Vol. 58(1). April–June 2010.

1.7 Role of Indian agriculture

In view of the deceleration of both public and private investment in agriculture, it is not surprising that in the last 20 years, the rate of growth of agricultural production, especially food grains, has slowed to the current figure of about 2.7 per cent from a little over 3 per cent in the 1950s and 1960s. This rate of growth, while still ahead of the rate of population growth is clearly inadequate in relation to the rate of population growth combined with increases in incomes, given the observed income elasticity of demand for food grains ranging between 0.4 and 0.6 per cent. The requirement for food security, therefore, suggests that even to maintain the present average levels of consumption, we should aim at a significant step-up in food grain production (which accounts for more than 70 per cent of the total agricultural output) to well over 3 per cent per annum in the coming years to provide for larger domestic consumption needs. In India, yields of rice and wheat have not altered much in the last 10 years. The yield of rice hovers around 1,900 kg/ha while that of wheat is around 2,600 kg/ha. Unless these yield levels are doubled in the next 10–15 years, achieving food security through improving the income of the rural masses will not happen.[21]

Nearly 56 per cent of the total employment and 73 per cent of rural employment is generated in the agricultural sector. The share of unorganised agricultural labour in the total agricultural workforce was 98 per cent during 2004/05. Nearly two-thirds of agricultural workers (64 per cent) are self-employed, or farmers as we call them, and the remaining, a little over one-third (36 per cent), wage workers. Almost all wage workers (98 per cent) are casual labourers.

According to NSSO surveys, nearly 40 per cent of farmers would love to leave agriculture if provided with an alternative. Moreover, the average income of a farm household having 2 ha of land was less than 80 per cent of their total consumption expenditure. Also, the agricultural sector grew a mere 2.5 per cent per annum between 2000 and 2010; average per capita growth of income of farm households during the same period was a shocking figure of just over 1 per cent. The face of Indian agriculture is

[21] Swaminathan M.S. "Science and Technology for Sustainable Food Security." From 'Indian Agriculture – in the new millennium (Vol II), Changing Perceptions and Developing Policy', edited by N.A. Majundar and Uma Kapila (Indian Society of Agricultural Economics). AF. 2006.

female labour, but 85 per cent of women languish in the primary sector without proper wages and in inappropriate working conditions. They also suffer from very low health standards. In the context of food security, women are at a disadvantage, lacking proper access to food and having absolutely no ownership rights over land.

I.4 Trend of growth of total GDP and agricultural GDP (including allied sectors**) by five-year plan**

Plan	**Average growth rate** (% per annum)		**Compound annual growth rate** (% per annum)		**Trend growth rate** (% per annum)	
	GDP	**Agri-GDP**	**GDP**	**Agri-GDP**	**GDP**	**Agri-GDP**
5th Plan (1974–79)	4.9	3.6	4.8	3.4	5.3	4.0
6th Plan (1980–85)	5.7	5.7	5.6	5.6	5.1	3.8
7th Plan (1985–90)	6.0	3.1	5.9	3.0	6.3	4.0
2 Annual Plans (1990–92)	3.5	1.3	3.4	1.2	-	-
8th Plan (1992–97)	6.7	4.7	7.0	4.7	6.9	3.8
9th Plan (1997–2002)	5.5	2.1	5.5	2.0	5.4	2.5
10th Plan (2002–07)*	7.6	2.3	7.6	2.1	8.2	4.2

*At 1999/2000 prices. Source: original data from National Accounts Statistics from "Present Status of Indian Agriculture" by Shambhu Ghatak, 2011.

This table clearly shows that the compound annual growth of GDP in agriculture has been on the decline since the 5th five-year plan until the 10th five-year plan, while the trend growth rate has increased from 4 per cent in the 5th plan to 4.2 per cent in the 10th plan. In the 10th plan, the 7.6 per cent of average GDP growth was far above that of the agri-GDP, which hovered at a mere 2.3 per cent. In the same way, the trend growth

rate of general GDP, 8.2 per cent, more than the agri-GDP which was merely 4.2 per cent during the same 10th plan. This only goes to show the pathetic growth deceleration of the agricultural sector which thereby ultimately affects the availability of food grains.

I.5 India's global rank in major agricultural crops

Crop	Area	Production	Yield
Rice (paddy)	1	2	52
Wheat	1	2	38
Coarse Cereals	3	4	125
Pulses	1	1	138

Source: Food and Agriculture Organization (FAO), Indian Horticulture Database, 2001. From "The Crisis in Indian Agriculture" by Mohan Guruswamy, Uma Natarajan and Shagun Khare, 2008.

Table 1.5 shows that, although India has the largest area in the world dedicated to the production of rice and wheat, it ranks second in actual production. Unfortunately, it also ranks 52nd and 38th in terms of yield per hectare of rice and wheat respectively. Even in the case of area dedicated to pulses, India ranks first in the world, but in terms of production and yield, we lag behind many other countries.

I.6 International comparison of yields of rice, wheat and maize (2007)

Rice/Paddy		Wheat		Maize	
Country	Kg/ha	Country	Kg/ha	Country	Kg/ha
Bangladesh	3488	Bangladesh	2164	China	5022
Egypt	9135	China	3885	Egypt	7789
India	**2915**	France	7449	France	8813
Japan	6582	**India**	**2770**	**India**	**1705**
Myanmar	3532	Iran	1905	Italy	9560
Pakistan	2882	Pakistan	2262	Pakistan	1769
Thailand	2597	UK	8043	Philippines	1803
USA	7372				

Source: Ministry of Agriculture and Cooperation. From "The Crisis in Indian Agriculture" by Mohan Guruswamy, Uma Natarajan and Shagun Khare. 2008.

It is clear from the table above that, among all the three crops, India's performance has not been very impressive. In the case of rice, none of the above-mentioned countries is lagging behind India; while Egypt tops the

list with 9,135 kg/ha, even Bangladesh and Pakistan have been showing a better performance than India. When it comes to wheat, India is able to perform better than Bangladesh, Iran and Pakistan. In the case of maize, India is the worst performing country among all those mentioned. These trends clearly indicate the backwardness of our agriculture and present the consequent upheavals in achieving the task of food security.

1.8 Food grains and cereals production

Rice is the staple food of nearly 65 per cent of the total population of India.[22] Cereals, especially rice and wheat, are the major sources of the staple diet in India. The growth rate in the production of cereals declined from 4.13 per cent in the period 1984/85 and 1994/95 to 1.09 per cent between 1994/95 and 2004/05. The annual growth rate in the agricultural sector as a whole declined from 3.69 per cent in the period 1990–96 to 1.65 per cent during 1996–2005. Net sown area, gross cropped area, fertiliser use and electricity consumption also declined considerably. The growth rate in terms of trade for agriculture declined from 0.95 per cent per annum during 1990–96 to -1.63 per cent during 1996–2005. In Punjab, even farmers with over 3 ha are unable to earn an income comparable to that of a class IV employee of the government of India. In India, these small and marginal farmer households account for 84 per cent of all farmer households.

Food grains production grew at the annual rate of 2.5 per cent between 1950/51 and 2006/07, slightly higher than the 2.1 population growth rate. However, in the period 1990–2007, food grain production grew only by 1.2 per cent per annum while the population increased by 1.9 per cent a year. Consequently, per capita annual consumption of cereals declined from a peak of about 171 kg in 1990/91 to 150 kg in 2005/06, indicating a decline of over 13 per cent during this period. The consumption of pulses also declined from 15.33 kg to 12.05 kg per capita per year during the same period. The area under food grains also declined by 6 million ha between 1990/91 and 2005/06. It is generally argued that the consumption patterns of people are changing due to increases in per capita income, urbanisation, convergence of food habits, and greater availability of horticulture and livestock products.

[22] Barah, B.C. "Criticality of Rice and Wheat System in Sustainable Food Security in India – An Analysis." Agricultural Situation in India. August 2007.

Though the total production of food grains increased from 130 mt in 1980 to 218 mt in 2009/10, the growth rate has fallen considerably. The production of rice and wheat taken together registered an annual growth rate of 2.27 per cent in the 1990s against a much higher growth rate of 3.59 per cent in the 1980s. Production of pulses showed a perceptible decline (-2.50 per cent) in the 1990s when compared to a growth rate of 2.98 per cent in the 1980s. The growth rate of total food grains slumped from 3.13 per cent in the 1980s to just 1.10 per cent in the 1990s.

I.7 Annual production growth rates (%)

Growth Rates	Rice	Wheat	Pulses	Total Food Grains
1980–90	3.31	4.27	2.98	3.13
1990–2000	1.35	2.37	-2.50	1.10
2000–2009	1.59	1.89	2.69	1.96

Source: Ministry of Agriculture, Government of India (GoI).

The table clearly shows that the production growth rates of rice and wheat have been on the decline since the period 1980–90. Especially during the period 2000–2009, rice and wheat showed a dismal performance, with the growth rates coming down drastically from 3.31 to 1.59 and from 4.27 to 1.89 per cent respectively. This deceleration can be attributed to the neo-economic reforms and structural changes in the agriculture support system. But pulses have shown stagnant progress as the growth rate fell from 2.98 to 2.69 per cent during the observation period. Unsurprisingly the growth rate of total food grains came down from 3.13 per cent to 1.96 per cent.

1.9 Area and yield contributions

Apart from this, if we make an intense analysis, of the 1967–1981 period, we see that the partial contributions to production growth were: yield 48 per cent; area 21 per cent; cropping pattern 20 per cent; and interactions 11 per cent. During 1982–96 the corresponding proportions were 57, 8, 22 and 13 percent. This underlines the importance of improving the yield of our agricultural commodities. The fall in productivity has been especially significant in the case of pulses, which actually showed a decline of 0.6 per cent annually in the past decade, since the 1990s. Also, from 1980 to 2003, it recorded a low rate of growth of 1.2 per cent. Coarse cereals are the staple food of the poor and are considered an important source of nutrition for the large rural population. Even they

have witnessed a fall in the rate of growth in productivity from the 1980s to the 1990s. Even the non-food crops did not fare any better than food crops, as most of them did not record an impressive growth rate either. The average growth rate of productivity of non-food grains was modest in the 1980–90 period but it declined in the period 1990–2000.

1.10 Impact of the Green Revolution

On the supply side, India's food grain production increased with many ups and downs. While initial scarcity was met, to some extent, by Public Law 480, the later development of agricultural production with green revolution technology has seen a vastly improved situation. Although confined to specific states, and also to specific crops, the green revolution has, by and large, revolutionised India's traditional agriculture. The supply of food grains – and, for that matter, agricultural production – depends on a number of factors. Besides prices and the cost of production, the availability of inputs like water, fertiliser and credit is equally important. Different states and regions are endowed with vastly different natural resources. Besides land and water resources, the geographical conditions and environment are also equally important. Agricultural production, therefore, is widely different in different states. The institutional arrangements like land reform, marketing organisation, and training are also equally limited. Regional disparity in agricultural production and the availability of food grains has therefore become an endemic feature of our economy.

Improving agricultural productivity and production helps to ease the problem of food security in two ways: firstly, by making food items affordable to consumers, and secondly, by generating additional employment opportunities for the rural workforce in farm and non-farm activities. In recent years, food prices have significantly increased, making food items unaffordable for poor households, and at the same time, agricultural income has not increased in line with the increase in the cost of cultivation, consequently increasing distress among farmers. A relatively faster growth rate in the tertiary and secondary sectors has been instrumental in creating a mismatch between demand for and supply of food items. Increasing energy prices have made agricultural production more expensive by raising production and transportation costs.

1.11 Population growth and food production

From the late 1960s, the production of staple cereals increased substantially, mainly as a result of productivity improvements. The dependence on food imports has decreased gradually; the country has become a marginal net exporter of cereals. Between 1964/65 and 2003/04, the production of cereals increased from 72.1 mt to 186.4 mt; the increase in the production of staple foods (cereals) has kept pace with population growth. The long-term growth rate of cereals, which was 2.61 per cent per annum over the period from 1967/68 to 1980/81 and 2.77 per cent per annum from 1967/68 to 2001/02 exceeded the Indian rate of population growth. The population growth rate between 2001 and 2007/08 was 1.64 whereas the growth rate of cereals was 1.2 per cent between 1994/95 and 2007/08, showing a decrease in cereal production while population growth came down.

The pattern in the availability of food grains indicates that six decades of economic planning have not been successful in ensuring sustainable food grain availability either through production and pricing policies or through initiatives aimed at fair distribution of food grains to the vulnerable poor in the country. The affordability dimension of food security is influenced by the price movement of food grains in the country. Food inflation based on the wholesale price index (WPI) at 1993/94 prices during the period from 1994/95 to 2009/10 indicates that the growth in the net availability of food grains has not been able to influence the demand for food grains as those same food grains, over the years, have become unaffordable. This upward price movement in food grains will pose a serious challenge to food security in India.

This table shows that the population of India more than tripled between 1951 and 2011. But the population growth rate during this period peaked in 1971 and then declined to 1.64 per cent in 2011 and is projected to be 1.19 per cent in 2020, resulting in a population of possibly 1.3 billion. But unfortunately, the growth rate of food grain production has been fluctuating quite negatively. It has come down from 4.3 per cent during the 1960s to 1.4 per cent during the 1990s and 2.28 per cent in 2011, indicating alarming trends as far as food security is concerned. Though this growth rate is projected to rise to 4.2 per cent by 2020, it would be greatly challenged by the increasing incomes and reasonable increases in population as well as changes in food habits.

I.8 Population and food grain production growth

Year	Population (mn)	Population growth rate (%)	Cereal production (mt)	Growth rate of food grains (%)	Income growth rate (%)
1951	361.1	1.26	45.8	----	-----
1961	439.2	1.98	69.6	4.3	3.9
1971	548.2	2.24	96.6	3.3	3.7
1981	683.3	2.23	119.0	2.1	3.2
1991	846.3	2.16	162.1	3.1	5.7
2001	1027.0	1.95	185.7	1.4	5.9
2011	1210.1	1.64	203.45	2.28	NA#
2020*	1300.0	1.19	279.0	4.2	6.0

#not available. *projected. Source: Registrar General of India, Ministry of Agriculture, Prospects for India's cereal supply and demand to 2020, by Bhalla et al. India budget documents and World Development Indicators.

The GNP growth rates of the past three decades were 5.7 per cent, 5.9 per cent and 7.1 per cent respectively, while food grain production has grown only at 3.1 per cent, 4.1 per cent and 2.28 per cent respectively. The agricultural GDP growth rates for the respective periods were 3.1 per cent, 2.2 per cent and 2.8 per cent respectively. The growth rate of the economy topped 8 per cent in 2007, 2008 and 2009. This has not been matched by a desired rise in food production. While the share of agriculture in GDP fell from 55.4 per cent in 1950/51 to 18.5 per cent in 2009/10, those dependent on it for sustenance have risen in absolute terms, indicating that the incomes of farmers and farm workers are declining in relative terms. There is vast underemployment and unemployment in rural India, which means low wages and widespread poverty.

The rise in the support price also has an important impact on food procurement by the Food Corporation of India (FCI) as it has had to buy more food grains than it could manage since the off-take from the PDS has declined due to the upward revision of the issue price. This has also led to the increment of buffer stocks much beyond the recommended level in any given year. The uneconomical rise in the stock of food grains with the FCI has given rise to the overall economic cost of food grains to the FCI and has had an adverse impact on the efficacy of food-based safety nets in

India.[23]

The yield pattern in the cases of both food grains and non-food grains indicates that the highest growth in yield level occurred during the 1980s. Much of the growth in agricultural production in India is yield driven, as the growth in area is limited and marginal. However, Indian agriculture suffers from lower yield levels by comparison with major agricultural producers around the world, despite India being one of the largest producers of most of the major crops. The increase in the area under food grain cultivation appears likely to be almost stagnant in the future. Any improvement in agriculture towards achieving food security must come from the increase in the productivity and yield. If prices of food items increase faster than the income of poor households, they will not have access to food even if the market has adequate supply.

The availability of per day per capita food grains since Independence is indicated in the following table.

I.9 Population and per capita per day net availability of food grains

Year	Population (million)	Per capita net availability per day (grams)		
		Cereals	Pulses	Total
1952/53	369.2	325.4	59.1	384.5
1962/63	452.2	398.9	62.2	460.9
1972/73	563.9	419.1	47.0	466.1
1982/83	703.8	415.6	39.2	454.8
1992/93	867.8	434.5	34.3	468.8
2002/03	1050.6	458.7	35.4	494.1
2003/04	1068.2	408.5	29.1	437.6
2004/05	1085.6	426.9	35.8	462.7
2005/06	1102.8	390.9	31.5	422.4
2006/07	1119.8	412.8	32.5	445.3
2007/08	1136.5	407.4	35.5	442.8
2008/09	1153.1	374.6	41.8	436.0

Source: Economic Survey, GoI. 2008/09 and 2009/10.

[23] Radhakrishna, R. "Food Security: Emerging Concerns." From 'Social and Economic Security in India', edited by Mahendra Dev, Antony Piyush, V. Gayatri and R.P. Mamgain. IHD-New Delhi. 2005.

The per capita availability of food grains was estimated to be 384.5 grams per day in 1952/53. The net per capita availability witnessed an upward trend until 1972/73. Thereafter, the trend did not have a specific pattern. One can see a fluctuation in the per capita availability of food grains since 1972/73 until 2009/10. During 2008/09, per capita food grain availability was 436 grams per day, down from 510.1 grams per day in 1990/91. The per capita availability of cereals went down from 458.7 grams per day during 2002/03 to 374.6 grams during 2008/09. However, the per capita per day availability of pulses increased from 35.4 grams during 2002/03 to 41.8 grams during 2008/09. The per capita per day availability of pulses fell drastically by 29.5 per cent from 59.1 grams during 1952/53 to 41.80 grams during 2008/09. This only goes to show that, due to factors such as an increase in population or a decrease in production, or due to an ineffective distribution system, the per capita availability of cereals, pulses and food grains fell drastically or remained constant between 1952 and 2009.

1.12 Bottlenecks in agriculture

At present, from the agricultural point of view, the trend is for an increase in the commercialisation of farming, greater reliance on technical change as the main source of growth, the growing importance of oilseeds and livestock products in global output and the growing agricultural trade deficits of developing countries (FAO 2002). These changes are both driven by and interact with rapid urbanisation and the rapid industrialisation of the food industry.

At present Indian agriculture is not on a desirable path. Misguided and populist policies over many years have resulted in problems that have become extremely complex and deep rooted. Productivity is poor, irrigation cover is low (38 per cent), infrastructure is inadequate and the size of the average landholding is rapidly declining (1.4 hectare). The per hectare consumption of fertilisers was around just 135.3 kg/ha in 2009.

Investment in, and state outlays on, agriculture have been falling. There was a decline in the share of agriculture's capital formation in GDP from 2.2 per cent in late 1990s to 1.7 per cent in 2004/05 followed by a marginal increase to 2.97 per cent in the year 2009/10.[24] The apparent withdrawal of the government from the sector and a tentative move

[24] Economic Survey 2011.