



BECE-002
Indian Economic
Development: Issues and
Perspectives

Block

4

AGRICULTURAL SECTOR

UNIT 13

Phases in Agricultural Development **5**

UNIT 14

Impact of Green Revolution **21**

UNIT 15

Agriculture, Productivity and Farmers' Welfare **40**

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BLOCK 4 AGRICULTURAL SECTOR

Introduction

The present block, the fourth in the course, is on agricultural sector. The block consists of three units.

Unit 13 deals with the different phases with which the agricultural sector in India has passed through during the last six decade period. The factors essential for modernising agriculture and the long term problems of agriculture are also discussed in the unit.

Unit 14 deals exclusively with the agricultural strategy followed in India. In particular, it focuses on the experiences of 'green revolution' strategy. Since the phase of green revolution, after taking the nation not only to a point of near self-sufficiency but also to an extent to exports, needs a renewed thrust in the current times, the unit discusses the contours of a 'new strategy' on which the policy focus is called for.

Unit 15 focuses on 'productivity and farmer's welfare'. Various issues of current interest relating to agricultural reforms like organic farming, contract farming, future trading, agricultural subsidy, crop insurance and trade in agriculture are discussed in the unit.

UNIT 13 PHASES IN AGRICULTURAL DEVELOPMENT

Structure

- 13.0 Objectives
- 13.1 Introduction
- 13.2 Overall Growth
- 13.3 Transformation of Traditional Agriculture into Modern Agriculture
 - 13.3.1 Phase I : Traditional Agriculture
 - 13.3.2 Phase II : Technologically Dynamic Agriculture With Low Capital Intensity
 - 13.3.3 Phase III : Technologically Dynamic Agriculture With High Capital Intensity
 - 13.3.4 Factors Essential for Modernisation
 - 13.3.5 Performance During the Modernisation Phase
- 13.4 Long-Term Problems of Agriculture
- 13.5 Let Us Sum Up
- 13.6 Key Words
- 13.7 Some Useful Books
- 13.8 Answers or Hints to Check Your Progress Exercises

13.0 OBJECTIVES

After studying this unit, you will be able to:

- 1 make an assessment of the importance of agricultural sector in the Indian economy;
- 1 identify the different phases of transformation of Indian agriculture from a traditional system to a modern system;
- 1 explain the different factors that brought about transformation;
- 1 establish the course of growth in agriculture through its different phases; and
- 1 highlight the different problems that the Indian agriculture is currently faced with.

13.1 INTRODUCTION

Agriculture has been the major source of livelihood in the Indian economy. Although, over the years, its contribution to GDP has come

down to 20.9 percent in 2004-05, the sector still supported an overwhelming 52.1 percent of workers in 2004-05. Notwithstanding major diversification in the structure of the economy over the last few decades, the dependence on agriculture thus still continues heavily. As agriculture remains a key sector in rural areas, it continues to have great potential for reducing poverty and hunger in the rural sector. For every additional rupee generated through agricultural production in India, the existing linkages can add three more rupees to the income of the rural economy. The pulls and pressures in the agricultural sector continue to exert their influence on the overall course of economic activity, although the relative dependence of the economy on the agricultural sector has registered a marked decline. Although double digit growth of the economy in some years may be feasible even with a very low contribution from agriculture, this cannot happen year after year without triggering an industry downturn.

During the era of economic planning (right from the first plan period to the eleventh) agricultural output has recorded a steady growth, along with growth in other sectors of the economy. The present unit provides a profile of growth in the agricultural sector distinguishing its different phases of growth, highlighting their features and identifying the factors underlying the growth in each of the phases.

13.2 OVERALL GROWTH

We begin by taking a look at the aggregate picture as it obtained beginning with the year 1951-52. For this purpose, we make use of the data presented in Table 13.1. It would be seen from Table 13.1 that:

1. Agriculture and allied activities sector maintained a steady growth of about 2.5 percent per annum during the period 1951-52 to 1980-81, when the total economy was growing at about 3.5 to 3.7 percent.
2. With acceleration in the rate of growth of GDP during the period 1981-82 to 1996-97, the growth rate in the agricultural sector also moved up to an average of 3.5 percent during 1981-82 to 1990-91 and 3.7 percent during 1991-92 to 1996-97.
3. Subsequently, while the total economy moved to a higher growth trajectory, clocking 6.6% during 1997-98 to 2004-05 and 9.5% during 2005-06 to 2006-07, growth rates in the agricultural sector initially dropped from 3.7 percent during 1991-92 to 1996-97 to 2.5 percent during 1997-98 to 2004-05 but accelerated to record 4.8% growth during 2005-06 to 2006-07.

Table 13.1 : Average Growth Rates of GDP, Agriculture and Non-Agriculture Sectors (percent)**(1999-2000 Prices)**

Sl. No.	Phase/Period		GDP	Agriculture	Non-Agriculture
1.	Pre-Green Revolution	1951-52 to 1967-68	3.7	2.5	4.9
2.	Green Revolution Period	1968-69 to 1980-81	3.5	2.4	4.4
3.	Wider Technology Dissemination Period	1981-82 to 1990-91	5.4	3.5	6.4
4.	Early Reforms Period	1991-92 to 1996-97	5.7	3.7	6.6
5.	Ninth Plan	1997-98 to 2004-05	6.6	2.5	7.9
6.	Early years of Tenth Plan	2005-06 to 2006-07	9.5	4.8	10.7

It would be further seen from the data in Table 13.1 that:

- (i) Growth of agriculture over the entire period i.e. 1951-52 to 2006-07 remained lower than the growth in non-agricultural sector.
- (ii) The gap between the growth of agricultural and that of the non-agricultural sector began to widen since 1981-82, and more particularly since 1996-97, because of : (a) an acceleration in the growth of industry and service sectors, and (b) a deceleration in the growth of agriculture. This deceleration in the growth of agriculture is a cause for concern in view of the dependence of large proportion of workforce on the sector in the economy.

The growth in the agricultural sector, though lower than in the non-agricultural sector, remained higher than the growth of population. Between 1950-51 and 1990-91, production of food grains increased at an average annual rate of 2.5 percent compared to the growth of population which averaged 2.1 percent during this period. As a result, India almost became self-sufficient in food grains and there were hardly any imports during 1976-77 to 1990-91, except occasionally. The rate of growth of food grains production, however, decelerated to 1.2 percent during 1990-2007, lower than annual average rate of growth of population of 1.9 percent. The per capita availability of cereals and pulses, therefore, witnessed a decline during this period.

How did the initial transformation come about? Why did the rate of growth slow down? What were the determinants of growth in each of the phases? We analyse these factors in the subsequent sections below. Before that, you may attempt the following questions to know your grasp of what we have outlined so far.

Check Your Progress 1

1. Why is agriculture important to the Indian economy?

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2. In terms of the relative position of growth in the agricultural sector, with that in the non-agricultural sector, presented in Table 13.1, identify two periods in which the growth in the latter was more than that in the growth of the former.

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3. What was the major consequence of slow-down in growth of output in the agricultural sector?

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13.3 TRANSFORMATION OF TRADITIONAL AGRICULTURE INTO MODERN AGRICULTURE

A study of the economic framework within which traditionally low productivity agriculture is transformed into high productivity modern agriculture is important in policy-formulation and planning for growth. Productivity here refers to productivity of available land, labour and capital resources; and this involves larger use of the more abundant labour resources and a smaller use of scarce resources like capital, foreign exchange and expert personnel. An absolute criterion cannot be laid down about the content and chronological order of such compositions, since agriculture varies vastly from area to area in terms of **physical conditions** (i.e. soil moisture, cropping pattern, responses, availability of labour, etc.), **cultural factors** (education, receptivity to innovations, consumption pattern, etc.), **economic factors** (prices of inputs and outputs) and **institutional factors** (nature of research, extension, marketing supply and other institutions). Nevertheless, in the context of Indian agriculture, three distinct phases of growth can be distinguished as follows.

Phase I : Traditional agriculture

Phase II : Technologically dynamic agriculture, with low capital intensity

Phase III : Technologically dynamic agriculture, with high capital intensity

13.3.1 Phase I: Traditional Agriculture

This is a technologically stagnant phase in which a larger farm production becomes generally possible only through increased application of all three traditional inputs viz. land, labour and capital. The rate of increase of output is normally smaller than the rate of increase in inputs - revealing diminishing productivity of inputs, even at a low yield. Even if some elements of dynamic agriculture like application of fertiliser, improved seeds, and land reform are introduced, the increase in productivity is smaller. Further, given their resources and knowledge, the traditional farmers cannot become any more efficient as both these factors strongly limit their participating actively in contributing to higher production.

Till mid 1960s, the Indian agriculture was typically embodied within the framework of traditional agriculture outlined above. The period 1950-51 to 1966-67 can be easily divided into two sub-periods as follows:

1. **First sub-period (1951-61) :** This period lasted over the first decade of economic planning spread over the period covered by the first and second Five Year Plans. The primary characteristic of this period was that production of agricultural crops consistently maintained an upward trend, except for small dips in two years, 1957-58 and 1959-60. The index number of production of all crops went up from 45.6 in 1950-51 to 66.8 in 1960-61 (Base: 1981-82=100).
2. **Second sub-period (1961-67):** During this period [i.e. 1960-61 to 1966-67] production either declined or remained stagnant in the case of a number of major crops, especially food grains, as can be seen from Table 13.2 below:

Table 13.2: Production of Food Grains in India
(Million Tonnes)

Year	Output
1961	60.9
1962	61.8
1963	60.2
1964	61.8
1965	67.3
1966	54.6

This led to a serious crisis in the Indian economy prompting a re-appraisal of the growth strategy pursued in the agricultural sector. This reappraisal of policies and strategies brought about a transformation in Indian agriculture, leading to what can be marked as phase II of Indian agriculture.

13.3.2 Phase II: Technologically Dynamic Agriculture With Low Capital Intensity

The Indian agriculture entered the next phase after mid 1960s. This is described as phase II marked for technologically dynamic agriculture with low capital intensity. This is the beginning of the process of transformation from traditional agriculture to modernisation.

In this phase, agriculture still represents a large portion of the total economy. But population and incomes would be rising, increasing the demand for agricultural products while the size of the average holding would be coming down. There is scarcity of capital both for industry and agriculture. The farm sector tends to use more labour than capital, since labour, owned or hired, would be still, relatively cheaper than mechanisation.

The distinguishing feature of phase II is the application of science and technology, evolved by research institutions, in a progressively large measure. This increases the productivity of farms when small capital additions are made in the form of improved seeds, fertilisers and pesticides. The profitable innovations are accepted by the farmers despite imperfections in land tenure, marketing and input supply system.

Indian agriculture entered this phase of transformation after the mid-1960s. The stagnancy that had marked the agricultural sector during the early 1960s, had largely been overcome around the end of the decade. In the wake of the new agricultural strategy of growth (called the Borlaug seed-fertiliser-technology) that had been adopted, agricultural production especially food grains, began to increase sharply (Table 13.3).

Table 13.3: PRODUCTION OF MAJOR CROPS

(Million Tones)

Crop	1960-61	1970-71	1980-81	1990-91
Food grains	82.0	108.4	129.6	176.4
Oil seeds	7.0	9.6	9.4	18.6
Sugarcane	110.0	126.4	154.2	241.0
Cotton	5.6	4.8	7.0	9.8
Jute	5.3	6.2	6.5	7.9

This fact is brought out more clearly by the index numbers of agricultural production presented in Table 13.4.

Table 13.4: Index Numbers of Agricultural Production

(Base : 1981-82 = 100)

Year	Index No.
1960-61	66.8
1970-71	85.9
1980-81	104.1
1990-91	148.4

Increase in agricultural production can be attributed either (i) to increase in area under cultivation (i.e. horizontal expansion) or (ii) to an improvement in yield per hectare (i.e. vertical expansion) or (iii) to both an increase in area under cultivation and an improvement in yield per hectare. During this phase of transformation, significant contribution to improved agricultural output was achieved by way of improvement in agricultural productivity with little change in area under cultivation. Index number of area under cultivation changed marginally from 96.3 in 1970-71 to 105.2 in 1990-91. On the other hand, the index number of agricultural production increased from 85.9 in 1970-71 to 148.4 in 1990-91 (Base: 1981-82 = 100).

This phase of agriculture transformation came to be known as the period of **Green Revolution**. The green revolution was, however, confined to a few crops- wheat and rice, and to few regions. The shortcomings of this revolution are discussed separately in the next unit (unit 14: section 14.4).

13.3.3 Phase III: Technologically Dynamic Agriculture With High Capital Intensity

As phase II advances, more and more innovations giving small returns singly, but large returns jointly, would be accepted leading to higher productivity. In order to expedite progress, there should be an extensive utilisation of available abundant factors. At the same time, relatively scarce infrastructural facilities like research, extension, marketing, etc. should be utilised optimally with efforts directed towards expanding the infrastructural resources.

Indian agriculture entered the third phase of technologically dynamic agriculture with high capital intensity towards the end of the decade of 1980s. This was precisely the period when the non-agricultural sectors also began their march towards modernisation. Non-agricultural sectors were facilitated in their move towards aggressive modernisation by the new policies of liberalisation, privatisation and globalisation. You will be studying more about this in units 21 and 23 separately.

This phase of agricultural transformation is thus characterised by the substitution of labour by capital by way of large-scale farm machinery, and considerable competition between the sectors for capital.

Before we review the performance of the agricultural sector in this phase of modernisation we first identify the factors that brought about this transformation to modernisation.

13.3.4 Factors Essential for Modernisation

The various factors that can be identified as essential for modernisation of agriculture can be classified into following five groups.

I. Physical Input Factors

- (1) Non-human physical inputs: (a) land, (b) climate, (c) seeds, (d) water, (e) fertilisers, (f) pesticides, (g) institutional arrangements, (h) work animals, (i) other animals, (j) tools and machinery, (k) fuel and power other than animal power.
- (2) Human resources: Manual labour and skilled labour

II. Economic Factors

- (1) Transport, storage, processing, and marketing facilities.
- (2) Facilities for the supply and distribution of inputs, including credit.
- (3) Input Prices including interest rates.
- (4) Product prices including prices of consumer goods.
- (5) Taxes, subsidies and quotas.

III. Organisational Factors

- (1) Land tenure
- (2) Farm size
- (3) General government services and policies
- (4) Voluntary and statutory farmers' organisation for:
 - (a) Co-ordinating physical input use like irrigation, tractors, etc.;
 - (b) Economic services like purchase, sale, credit, etc.;
 - (c) Social services like education and health;
 - (d) Diffusion of knowledge like adult education, youth clubs etc. and;
 - (e) Local government.

IV. Cultural and Motivational Factors

- (1) Integration of agricultural institutions (like practices and values) within the culture and social system of the nation;

- (2) Public administration factors like structure and mode of operation of the bureaucracy;
- (3) Social structure like cultural values and dynamics of peasant communities;
- (4) Processes of socio-cultural changes like barriers and motivations in the innovative practices, functional harmony, etc.

V. Knowledge Factors

- (1) Organisations of research
- (2) Diffusion of knowledge relating to
 - (a) technical knowledge like agronomy, plant genetics, soil science, water management, agricultural engineering, pest control, etc.;
 - (b) economic knowledge like land economics, general economics, farm management;
 - (c) knowledge of policies in planning and public administration;
 - (d) general educational initiatives like literacy promotion, adult education, mass communication, etc.

It would be observed from the above classification that modernisation of agriculture results from a whole galaxy of factors, that include economic, organisational, cultural, motivational and knowledge factors. While all these factors cannot be provided in one go, they trickle in slowly over a long time before they get established and stabilised.

There is thus no single point of time which can be identified as the point of transformation. Emergence of these factors is the culmination of efforts initiated both by the state and the market forces.

Check Your Progress 2

- 1. Broadly, outline the three phases of agricultural transformation in India.

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- 2 Outline the performance of agriculture during the traditional phase in India in about 50 words.

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3. Outline the salient features of Indian agriculture during the phase of early modernisation in about 50 words.

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4. Mention in brief the different factors essential for modernisation of agriculture.

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13.3.5 Performance During the Modernisation Phase

The phase of modernisation of agriculture, in terms of performance, can be divided into two sub-periods: (i) 1985-86 to 2000-01, and (ii) 2001-02 onwards.

(i) Sub-period 1985-86 to 2000-01: This phase of modernisation witnessed a jump in agricultural production. The index number of agricultural production jumped up to 165.7 in 2000-01 from 104.1 in 1980-81. There was not much change in area under cultivation; the index number of area under cultivation moved up from 99.7 in 1980-81 to a mere 102.7 in 2000-01. It thus follows that the improvement in agricultural output could be attributed solely to increases in yield per hectare. The index number of yield per hectare moved up from 102.9 in 1980-01 to 144.3 in 2000-01.

This phase of modernisation was different from the earlier phases because the sources of agricultural growth and growth processes were considerably different which may be identified as follows:

One, from a food grain led growth of the earlier period, to horticultural products, livestock products and fishery.

Two, food grain growth in the past was largely driven by technology, incentives by the government in terms of support/procurement prices and heavy investments in public sector as in canal irrigation and power supplies. But in this phase the growth was *demand and market driven*.

Three, incentives in terms of trade, and private sector investments in minor irrigation and agricultural machinery have acted as *new drivers of growth*.

(ii) **Sub-period 2001-02 onwards:** Despite favourable terms of trade for agriculture and normal south-west monsoon, growth of agricultural production has been sluggish during this phase. It fluctuated wildly as would be seen from Table 13.5 below.

Table 13.5: Index Numbers of Agricultural Production

Year	Index No.
2001-02	178.8
2002-03	150.4
2003-04	183.0
2004-05	177.3
2005-06	191.6
2006-07	197.1

The sluggishness and volatility in growth may not have big impact on overall growth of the economy. But as the agriculture sector supports more than half of the population, it implies rising skewness of income.

Factors Responsible for Sluggishness

The sluggishness and volatility in agricultural output in the post 2001 years can be attributed to the following factors:

1. Decline in public investment in agriculture, which slowed the expansion of irrigation.
2. Low public investment in R&D (0.5 percent of agricultural GDP as against the norm of 1 percent recommended by the ICAR), affecting technological progress.
3. Decline in the annual growth rate of area under high yielding variety (HYV) crops;
4. Fall in soil fertility due to intensive cultivation and wheat-rice rotation year after year in the north-western region.
5. Over-exploitation of groundwater due to unregulated expansion of tube-wells.

All these factors make it imperative that closer attention is paid to the long-term problems.

Check Your Progress 3

1. How was the growth in agriculture during the early phase of modernisation different from its earlier phase (i.e. traditional agriculture).

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2. Make an assessment of agricultural growth during the recent phase of modernisation i.e. during post-2001 years in about 50 words.

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3. Account for the sluggish growth in agriculture in recent (i.e. post-2001) years in about 50 words.

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13.4 LONG-TERM PROBLEMS OF AGRICULTURE

The current phase of modernisation has thrown up some challenges which cannot be ignored any more. Unless these are squarely faced and comprehensive solutions worked out, the growth of the economy may be up against insurmountable barriers. The more important of these challenges are as follows:

1. **Problems Relating to Rain-fed Crops:** In respect of rain-fed crops such as coarse grains - poor man's food - specially pulses, constraints on raising production are well-known. These are:
 - i) An effective set of fully-developed technologies and extension methodology requires to be devised.
 - ii) High degree of uncertainty together with the relative poverty of the farmers make the application of even known improved practices difficult and risky.
 - iii) The rural poor, particularly in the drought-prone areas and in remote areas of the country, continue to suffer from fluctuations in employment and income and inadequate availability of food grains in years of drought.

2. **Problems Relating to the Use of Farm Inputs:** No less crucial to sustaining high growth rates in agriculture is the role played by farm inputs. Problems in this respect are the following:

- (i) In regard to irrigation, though the area has shown a good improvement, the flow of benefit has not been commensurate. This is reflected both in the low intensity of cropping and in the under utilisation of the potential created. The efficiency in the use of irrigation facilities also leaves much to be desired. In view of this, the productivity of irrigated land in the country is less than 50 percent of the potential.
- (ii) We have not been able to reach the targeted levels in the consumption of fertilisers. Even more important than the quantity consumed is the efficiency in the use of fertilisers. This has not been the case in the recent past, although there is a growing awareness of the problem. Besides this, the pattern of fertiliser consumption in the country is very highly skewed. In certain regions, a few crops and the rabi season account for the bulk of the fertiliser use.

Recent plans have stressed the need for equitable and efficient distribution system, reduction in regional disparities and correction of the crop-wise imbalance that now exists in regard to various inputs.

3. Problems of Small Farmers: Over 80 million of 90 million operational farm holdings in the country are below 2 hectares in size. About 60-70 percent of GDP from agriculture comes from subsistence agriculture. Unless small farmers are helped to improve their productivity and profitability through optimum use of their land, water, credit and other resources, it will not be possible to achieve our goal in food production for a population of billion-plus.

4. Decline in Productivity of Input: A major concern has been the decline in the productivity of modern inputs. Various explanations have been given for declining productivity of inputs. These are:

- i) The new technology was initially adopted in areas with assured irrigation. The extension of new technology into more difficult terrains is bound to be more costly and capital intensive.
- ii) Of late, there is evidence to suggest that new agricultural technologies are also spreading in the rain-fed areas. The investment cost are substantially higher in the case of rain-fed areas than in the areas with assured irrigation.
- iii) The fall in productivity could also have taken place because of the inefficiency in the use of inputs.

5. Rising Cost of Production in Agriculture: Over the last two decades, the prices received by the farmers have lagged behind the input prices, especially with regard to the prices of industrial inputs. The prices of important agricultural crops are reviewed every year by the government to keep them in line with costs of production and input prices. But often, what the farmers receive in effect is a weighted sum of the prices offered by the government and those prevailing in the free market. In

this situation, the deteriorating terms of trade for farmers would mean either the inability of the government to compensate them adequately for the increases in cost of production and/or inadequate impact of the government measures on the free market prices.

6. Weakening of Linkages Between Agriculture and Industry:

Although the inter-dependence of the agricultural and the industrial sectors has increased over the years, the strength of linkage between the agricultural and the manufacturing sectors has weakened. It must be realised that with the majority of the population still depending on agriculture, and with a high rural bias in the culture of population, weakening of this linkage is a serious matter of concern. One should recognise that it is not just the neglect of the agricultural sector, but also the declining strength of the linkages between the agriculture and the industry that could be quite disastrous for the development process.

7. Highly Regulated Sector:

Equally critical is the fact that agriculture is highly regulated that imposes restrictions on movement of agricultural products. Among these, the more important can be identified as: (i) compulsory levies (e.g. sugarcane, cotton); (ii) licensing requirements (e.g. exports of agricultural products), and (iii) internal trade restrictions (i.e. inter-state restrictions).

To sum up, although during the last six decades impressive gains have been made in agricultural production in some parts of the country, much still remains to be done to establish a balanced progress.

Check Your Progress 4

1. State in brief the problems relating to rain-fed crops in India.
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2. Make a brief assessment of use of inputs in farm sector in India.
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3. Account for the declining productivity of inputs in Indian agriculture.
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13.5 LET US SUM UP

Agriculture is the major source of livelihood in the Indian economy, notwithstanding a significant diversification and structural change that has been witnessed over the last six decades. Along with other sectors of the economy, the agricultural sector has been undergoing remarkable transformation. We have slowly and gradually, moved from a system of traditional agriculture of the 1950s to the modern technologically dynamic high capital intensive agriculture, in which along with food and non-food crops, horticulture and other allied activities have also expanded. However, rapid transformation of agriculture is faced with the challenge of meeting the food and non-food needs of a billion plus population. The challenge is daunting calling for out-of-box solutions to different problems which the sector is currently facing. In the past i.e. mid 1960s and afterward, we found a viable solution in HYV-fertiliser-water technology which ushered in Green Revolution. We have to, however, move beyond the Green Revolution now. The subsequent unit 14 deals with this theme.

13.6 KEY WORDS

- Productivity** : Refers to output per hectare of land.
- Traditional Agriculture** : A system of agriculture in which primitive inputs and techniques of production are used; it is more dependent on natural factors.
- Modern Agriculture** : A system of agriculture in which scientifically-developed inputs and advanced techniques of production are used.
- Borlaug Seed Fertiliser Technology** : Refers to the technology that banked heavily on seed and fertiliser mixed application. So named after its discoverer Norman Borlaug.
- Intensity of Cropping** : _____ ×
- Diversification of Agriculture** : It implies a use of resources in a larger mix of diverse and complementary activities within agriculture.
- Support Price** : Minimum guaranteed price at which the government is to purchase any quantity offered to it for sale.
- Procurement** : Refers to purchase of crop by the government.

13.7 SOME USEFUL BOOKS

1. Dhingra, Ishwar C. (2008), The Indian Economy, Environment and Policy, Twenty-Third Edition, Sultan Chand, New Delhi.
2. Government of India, Economic Survey (Annual).
3. Hanumanta, Rao (2005), Agriculture, Food Security, Poverty and Unemployment, OUP, New Delhi.
4. Bhalla, G.S. (2007), Indian Agriculture Since Independence, National Book Trust, New Delhi.
5. Basu, Kaushik (ed.), (2007), The Oxford Companion to Economics in India, OUP, New Delhi.

13.8 ANSWERS OR HINTS TO CHECK YOUR PROGRESS EXERCISES

Check Your Progress 1

1. See Section 13.1
2. See Section 13.2
3. See Section 13.2

Check Your Progress 2

1. See Section 13.3
2. See Section 13.3.1
3. See Section 13.3.2
4. See Section 13.3.4

Check Your Progress 3

1. See Section 13.3.5
2. See Section 13.3.5
3. See Section 13.3.5

Check Your Progress 4

1. See Section 13.4
2. See Section 13.4
3. See Section 13.4

UNIT 14 IMPACT OF GREEN REVOLUTION

Structure

- 14.0 Objectives
- 14.1 Introduction
- 14.2 Growth Strategy in Agriculture
 - 14.2.1 Background
 - 14.2.2 Earlier Growth Strategy
 - 14.2.3 Components of the Earlier Strategy
- 14.3 New Agricultural Strategy
 - 14.3.1 Theoretical Background
 - 14.3.2 Evolution of New Strategy
 - 14.3.3 Components of the New Strategy
- 14.4 Green Revolution
 - 14.4.1 Meaning and Significance of Green Revolution
 - 14.4.2 Economic Effects of Green Revolution
 - 14.4.3 Sociological Impact of Green Revolution
- 14.5 Suggested New Strategy
 - 14.5.1 Soil Health Enhancement
 - 14.5.2 Irrigation Water Supply Augmentation and Management
 - 14.5.3 Credit and Insurance
 - 14.5.4 Technology
 - 14.5.5 Market
 - 14.5.6 Regionally Differentiated Strategy
- 14.6 Let Us Sum Up
- 14.7 Key Words
- 14.8 Some Useful Books
- 14.9 Answers or Hints to Check Your Progress Exercises

14.0 OBJECTIVES

After you have studied this unit, you will be able to:

- 1 state the basic features of the strategy of growth in agriculture implemented in the earlier phase of planning;
- 1 explain the phenomenon of Green Revolution and the impact it had on the rural economy;

- 1 make a case on the need for a course-correction;
- 1 explain the need for a change in the present strategy of agricultural growth;
- 1 identify how a new strategy required should be different from the earlier strategy; and
- 1 make an assessment of the new strategy.

14.1 INTRODUCTION

India had for long practised traditional system of growth. One of the results of this was the experience of slow growth in the economy. With the adoption of economic planning the growth rates in the economy accelerated. The resultant increase in incomes, accompanied by swift demographic changes coupled with growing demand from the industrial sector for raw materials of agricultural origin, brought out the significance of agricultural output as an important determinant of long-term sustained growth. The traditional agriculture, and the strategy of growth embedded therein, were not equipped to meet the pressures on the agricultural sector in the fast-emerging economy. A serious debate over the issue led to a reappraisal of the earlier strategy pursued. This suggested a new agricultural strategy which was formulated and implemented after the mid-1960s. The results, in terms of output growth, were immediate and phenomenal. The phenomenon came to be known as The Green Revolution. The Green Revolution seemed to have solved, at least for some years to come, the problem of food security. But the Green Revolution brought in its train a whole plethora of inequalities - personal, crop and regional. Immediate solutions had to be sought to these and others. We address ourselves to a study of Green Revolution and its associated issues in the present unit.

14.2 GROWTH STRATEGY IN AGRICULTURE

Accelerated growth in agricultural production has been one of the principal aims of the Government from the beginning of the First Five Year Plan. As a matter of fact, as early as in 1948 it was reiterated by the government that 'everything else can wait but not agriculture.' In this backdrop, it would be interesting to review the changing contours of growth strategy adopted in Indian agriculture.

14.2.1 Background

During the First and the Second Five Year Plans, the production of agricultural crops persistently maintained an upward trend, except for small dips during 1957-58 and again in 1959-60. Subsequently, the eight years between the Third and the Fourth Five Year Plans (i.e. 1961-69)

were the years of great significance for Indian agriculture. This is particularly true of the latter half of the period. This period was marked by a near disaster on the one hand, and much achievements on the other. On the one hand, agriculture stagnated; food grains production and the production of other crops were not picking up even in the face of rising population and an increasing domestic demand for agriculture based raw materials. Simultaneously, however, forces were under way which were making the conditions favourable for the growth of agriculture in future. The farmer responded favourably to a combination of good prices, high-yielding variety (HYV) seeds and adequate fertilisers. He took to improved farm practices as readily as to non-traditional farm inputs. Groundwater was put to intensive use. Institutional credit was sought to be expanded. In view of the urgency of the need, it was decided to direct state effort in the first instance to those areas which were best endowed for food production.

This was the basis of what has come to be known as the new strategy of agricultural development.

14.2.2 Earlier Growth Strategy

The strategy of agricultural growth adopted since the middle of the 1960s, came to be known as the 'new strategy'. What made the strategy 'new'? The strategy is called 'new' because it marked a departure from the past.

During the first three five year plans, India's approach to agricultural development was characterised by a commitment to two main goals viz. (i) the economic aim of achieving maximum increases in agricultural output to support rapid industrialisation, and (ii) the social objective of reducing disparities in rural life.

A serious dilemma arose from the obvious advantage of concentrating scarce inputs of improved seeds, fertilisers, pesticides, and equipment in irrigated areas of the country where they could be expected to bring the greatest returns in output. Indeed the selection of the first Community Development Project was guided by this consideration. They were allocated only to the districts with assured water from rainfall or irrigation facilities.

Almost immediately, however, a serious social objection was raised to the practice of 'picking out the best and most favourable spots' for intensive development while the larger part of the rural area was economically backward. Within a year, the principle of selective and intensive development was abandoned. The Planning Commission announced a programme for rapid all-India coverage under the National Extension Service (NES) and Community Development Programme (CDP) with special attention to backward and less-favoured regions.

The social goal of reducing disparities also influenced the selection of

methods of agricultural development. The planners were inclined to give only secondary importance to the introduction of costly inputs as a means of increasing agricultural production. Instead, they devised agricultural development programmes based on 'intensive cultivation of land by hand', i.e. non-mechanisation methods of production like improving the condition of living in rural areas through community projects, land reforms, consolidation of holdings, etc.

14.2.3 Components of The Earlier Strategy

The basic elements of the growth strategy adopted in the earlier phase of agricultural development are as follows:

- 1. Extensive Cultivation:** A major plan of the government policy was to bring more land under cultivation. It was hoped that this will help in increasing agricultural production. The objective was sought to be realised by reclaiming fallow and water-logged lands and making the non-cultivable land suitable for cultivation. The efforts bore fruit as would be seen from the fact that the index number of area under cultivation went up from 100 in 1950-51 to 122.8 in 1966-67. But the country was faced with a dead-end, i.e. there was no more area of land available for reclamation. The futility of depending on this policy measure in the long run was soon realised. It began to be appreciated that agricultural development policies will have to emphasise the adoption of 'intensive cultivation' practices which became a major component of the new strategy.
- 2. Institutional Reforms:** It is universally accepted that agriculture responds to two sets of measures, viz. (a) institutional reforms, and (b) technological reforms. Institutional reforms refer to such measures as are designed to change the land relations system and the size of land holdings. It also incorporates infrastructural facilities like finance and marketing. Technological reforms, on the other hand, are concerned with improvements in agricultural practices and techniques. In the earlier period of development, the state relied almost exclusively on institutional reforms, to a near total neglect of the technological reforms. The state had come to adopt the basic principle of '*land to the tiller*' as the hallmark of its land reforms policy. In pursuance of this policy, a land reforms programme of such policy measures as abolition of all intermediaries' interest on land, grant of protection to tenants, etc. were taken. How far these measures were successful would be examined in Unit-15 below. Similarly, legislation enacted to fix a ceiling on land holdings and consolidation of holdings designed to change the ownership pattern of land were also not of much use. Rural finance was sought to be provided through the agency of co-operatives. At a later stage of the programme, even marketing was assigned to the co-operatives. But the institutional reforms of all these types were slow to come in. Steps related to technological reforms did not find a place in the 'earlier growth strategy'.

3. Increased Availability of Traditional Inputs: A third major component of the government policy related to the availability of inputs. The traditional inputs of agriculture - seeds, manure and water, received much attention. Arrangements were made to make available seeds to the farmer at his doorstep through various agencies, especially the co-operatives. Similarly, a number of irrigation schemes - both major and minor - were initiated during the First and Second Five Year Plans, so as to raise the irrigation potential. Efforts were also made to spread the use of underground water sources like wells. The nucleus of the government policy in this sphere again were the institutional reforms to arrange for the supply of these inputs. No attention was paid towards evolving better seeds or more superior production inputs. It was only in the later years that these aspects began to get the attention that was due to them.

4. Community Development Programme and Extension Services:

The community development (CD) programme was seen as the most significant device for the development and welfare of rural India. By community development is meant the upliftment of the rural community with the combined efforts of the government and the people using the resources of the community as a whole. For carrying out the national programme of community development, the country was divided into 6,265 development blocks. Each of these blocks was expected to be supplied with the basic infrastructure required for agricultural growth. However, as the experience later was to prove, the CD programme turned out to be very ambitious in terms of its content and coverage. It was realised that it would have been better had small blocks with the best growth potential been selected and helped with the required infrastructural facilities before a national programme was implemented.

In short, the agricultural development policy of the government during the first decade of its implementation was centred around institutional reforms in the rural sector. Co-operatives and community development blocks were visualised as a major means of change. The programme conceived on a national scale, was in consonance with the declared objective of 'growth with social justice'.

Check Your Progress 1

1. What were the two major goals of agricultural development policy in India during the first two five year plans?

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2. Mention in brief the steps taken to achieve the stated goals of development in agriculture.

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3. Distinguish between extensive cultivation and intensive cultivation.

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4. Distinguish between institutional reforms and technological reforms in agriculture.

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5. Which type of reforms in the agricultural sector were given priority during the first two five year plans?

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14.3 NEW AGRICULTURAL STRATEGY

The government's agricultural development policy, and the programmes based thereon, were in consonance with the declared objectives of 'growth with social justice'. But, as it turned out, the results were not encouraging especially when measured in terms of agricultural production.

As early as in 1958, lagging growth rates in the agricultural sector became a serious limiting factor on the overall rate of economic advance. By the middle of the Third Five Year Plan, four years of relative static production levels convinced the government that continuation of short-falls in agriculture would jeopardise the entire programme of industrial development in the country.

In 1964, the government announced a fresh set of plans for implementation in the field of agriculture. In this, two major departures made from the earlier policy were in respect of the following:

- (a) Development efforts were concentrated in the 20 to 25 percent of the cultivated area where supply of assured water provided 'fair prospects of achieving rapid increases in production'. In other words, to recall Tholepin's famous expression, a conscious decision was taken 'to bet on the strong'.
- (b) Within these areas, there was a 'systematic effort to extend the application of science and technology' including 'adoption of better implements and scientific methods' to raise yields. These two departures in the new approach became the basis of what came to be known as the *new strategy of agricultural development*, put into practice in October 1965.

14.3.1 Theoretical Background

The theoretical background of the new strategy are to be traced to the Chicago School Thesis which stated that 'farmers are everywhere capable of producing the right things in the right amounts at low costs if they receive the proper economic signals.' The crux of this thesis is that *farmers are efficient and economically rational*. They are profit maximisers, can allocate resources efficiently and respond to market signals appropriately.

A lucid explanation of this thesis, in the context of traditional agriculture, was provided by the Chicago economist, T.W. Schultz in a seminal book published in 1964. Citing various pieces of empirical evidence, Schultz argued that farmers in traditional agriculture allocate available resources, in such a way that factor rewards equal their marginal products. The fact that they do so shows that they can respond to market signals, despite the fact that they are poor. Their poverty, therefore, is to be attributed to the nature of inputs and techniques of production they adopt. As these are inputs and techniques of cultivation that have been in use for many years, their rates of return to investment tend to be meagre. Given the low rates of return, there is no inducement for additional work effort and savings. It is thus that traditional agriculture has reached a stage of long-run low-equilibrium level.

14.3.2 Evolution of New Strategy

The implementation of the new strategy began with the Intensive Agriculture District Programme (IADP) launched in 1960-61. Initially launched in three districts, the IADP was subsequently extended in stages to another thirteen districts. While the performance varied among districts, it clearly demonstrated both the values of the 'package approach' and the advantage of 'concentrating efforts in specific areas'.

A modified version of the same approach was extended to several other parts of the country in the year 1964-65. Implemented in the form of Intensive Agriculture Area Programme (IAAP), the programme focused on some specific crops. While both the IADP and IAAP were concerned with the promotion of intensive agriculture, they operated within the limitations set by existing crop varieties which had relatively low response to fertilisers.

A major change in this direction was made with the introduction of the High Yield Variety (HYV) seeds. Hybridisation techniques for maize and millets had been initiated as early as in 1960. But a beginning of major importance was made in wheat in 1963-64 when the Mexican dwarf variety was tried out on a selective basis. Paddy seeds of exotic varieties were subsequently introduced in 1965. By 1967-68, nearly 6.04 million hectares were brought under the purview of the HYV programme. The application of various other HYV seeds, over fairly large areas, was later taken up as a full-fledged programme from 1967-68 onwards.

The year 1967-68 thus marked the beginning of the new agricultural strategy. Since then, agricultural production and productivity picked up fast and the country could get out of the whirlpool of stagnation in which it had got stuck for many years. The year 1967-68 is also therefore known as the *benchmark year* in the history of Indian agriculture.

14.3.3 Components of the New Strategy

Although it is proper to identify the new strategy with the HYV seeds, there are other components of the strategy which are also important. These can be identified as follows:

I. Greater Intensity of Farming

The new strategy is concerned not only with cropping. Entirely new crop relations have been made possible by the development of *chori* duration varieties of paddy, jowar, maize and bajra suited to different agro-climatic conditions. Among other crops included in the rotation are barley, oilseeds, potato and vegetables. Besides, the other factors contributing to the cropping intensity are: programmes like major irrigation projects, flood control, development of markets and rural infrastructure, urbanisation and rural industrialisation, pricing policies, etc.

II. Agricultural Technology

- (i) A new emphasis has come to be attached to the role of agricultural technology as a major input of agricultural production. A number of steps have been taken to facilitate organisation and development of agricultural research through the state-funded National Agricultural Research System (NARS). Towards this end, the Indian Council of Agricultural Research (ICAR) was reorganised in 1965. To it were

transferred the research institutes which had been previously administered by the union Government. An important step was the establishment of agricultural universities which were conceived as extension of education. Another development of importance was the organisation of all-India co-ordinated research projects. All these constituted a significant advance towards the planning of agricultural research on a national basis.

(ii) *Monsoon Rainfall Predictions*: This has been another major technological breakthrough facilitated by recent advances in remote sensing techniques. The Indian Meteorological Department has managed to develop a fairly reliable monsoon prediction model based on 16 global weather-related parameters. Preliminary monsoon rainfall predictions made as early as in March-April by using this model have consistently been holding true for several years. An early monsoon forecast and advance knowledge of the likely pattern of rainfall makes crop planning possible and efficient. In case of an anticipated unsatisfactory rainfall, farmers can evolve contingency crop plans and make necessary arrangements for their implementation to minimise the damage. Technology is now available for mitigating the impact of such a situation.

III. Package of Inputs

The approach in the new agricultural technology, is the application of the package or a 'combination' of improved practices. In other words, instead of recommending to the farmers to adopt an improved practice in isolation, the strategy aims at making them adopt simultaneously all the elements needed for augmenting production. The constituents of package are: improved seeds, fertilisers, plant protection, manures, improved agricultural practices, etc. It is only when a standard combination of all components as recommended by agricultural scientists is applied that the yield can be maximum.

IV. Role of Public Institutions

In view of the importance assumed by inputs and services in the new agricultural strategy, several new public institutions were promoted and provided with funds to lend support to production programmes.

- i) **The National Seeds Corporation** was set up in 1963 with sole responsibilities in the field of seed production, particularly the foundation stock of HYV seeds.
- ii) **The State Farms Corporation of India** was set up in 1969 for developing quality seed and farm yields.
- iii) Starting with 1965, **agro-industries corporations** have been set up in different states.

- iv) The **National Co-operative Development Corporation** was set up on a statutory basis in 1963.
- v) Also in 1963, the **Agricultural Refinance Corporation**, since redesignated as Agricultural Refinance and Development Corporation, which was subsequently merged with National Bank for Agriculture and Rural Development (NABARD), was set up.
- vi) A policy of support prices for food-grains came to be adopted throughout the country in 1964. In 1965, the Agricultural Prices Commission (now known as the Commission on Agricultural Costs and Prices) was set up to advise the Government on policies of agricultural commodities.
- vii) In 1965, the Food Corporation of India was also established to provide an all-India machinery for purchase of food-grains.

In brief, it can be observed from the above that the new agricultural strategy cannot be identified with one input or one institution as such. It touches the whole of the agricultural economy providing for a package of measures, services and practices. The adoption of the new agricultural technology has led to a breakthrough in agricultural production - a phenomenon that has come to be known as the Green Revolution.

Check Your Progress 2

- 1. State the two major departures in the 'new agricultural strategy' from what was followed in the 'earlier strategy of growth.'
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- 2. Which year is known as the benchmark year in the history of Indian agriculture and why?
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- 3. What do you mean by package of inputs? What are its important components?
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4. Name some of the important public institutions that were set up during the 1960s to promote agricultural growth.

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5. What was the major consequence of adoption of the new agricultural strategy?

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14.4 GREEN REVOLUTION

As stated earlier, the adoption of the new agricultural strategy led to a breakthrough in agricultural production - a phenomenon that has come to be known as the **Green Revolution**.

14.4.1 Meaning and Significance of Green Revolution

The word 'revolution' implies two things:

- i) a fast change in some phenomenon, the change being so fast that it is well marked; and
- ii) the impact of the change is felt over a fairly long period of time bringing about certain fundamental changes.

When we add the prefix 'Green' (the colour being symbolic of agriculture crops), to the word revolution and coin the phrase 'Green Revolution' it implies:

- i) well-marked improvement in agricultural production in a short-period; and
- ii) the sustenance of a higher level of agricultural production over a fairly long period of time.

It is this type of green revolution which occurred in India after the 1960s. The basic significance of the green revolution therefore lies in the fact that it brought out the farmer from the whirlpool of stagnation. In the process, the farmers responded in an active manner to many incentives and policies.

14.4.2 Economic Effects of Green Revolution

Two important effects of the green revolution are: (i) an increase in agricultural production, and (ii) an increase in productivity.

I. Increase in Agricultural Production

The first major direct effect of the green revolution was a sharp rise in agricultural production. The results of the implementation of new strategy, as measured by the production of agricultural crops, were immediate and spectacular, i.e. there was no more waiting involved and the returns were very fruitful (for a study of trends in agricultural production refer Unit-13).

Concentration on Wheat: In the second phase of Green Revolution, the revolution spread, at least in parts, to other crops. The production of wheat maintained its upward trend. In addition, production of other crops like rice, cotton, Jute and Sugarcane also registered a significant improvement.

However, this improvement was not shared equally by all the crops, at least not in the initial stages. The gains of the green revolution were largely cornered by wheat, and only to a very little extent by rice, both of which happen to be food crops.

II. Increase in Productivity

The increase in agricultural production was a result of the adoption of intensive agricultural practices. By implication, the productivity of agriculture, as measured in terms of yield per hectare, also increased during the period with no large-scale shift in the land-use pattern. This is held out by the data relating to the index number of agricultural productivity (refer to Unit-13 for more details).

14.4.3 Sociological Impact of Green Revolution

Important sociological impact of Green Revolution can be briefly stated as follows:

I. Personal Inequalities

The green revolution promoted inequalities, widening the already existing gulf between the rich and the poor in the rural sector. Different methods are generally applied to measure the extent of inequalities. We can make use of the following two important ways.

- i) Under the impact of the new strategy, the landowners' income per unit of land increased between 50 and 100 percent and that of labour between 25 and 30 percent. Thus, while labourers and landowners both benefited from agricultural development, the latter cornered most of the benefits giving rise to disparity between the landowners and the labourers. The

relative share of labour in the value of the gross output therefore declined.

- ii) The institutional framework of India's rural economy has always been such that it has always favoured the big i.e. those who matter by virtue of their command over land and other assets. As a result, the green revolution has, by and large, bypassed the small and marginal farmers. It has instead become the handmaid of the rich to become richer.

II. Regional Inequalities

Another harmful consequence of green revolution has been that it promoted regional inequalities. However, this could be expected as a natural consequence of the shift of strategy from "*something everywhere to 'everything somewhere'*".

The above point is confirmed by a comparison of the state-wise cumulative growth rates of agricultural output over the period. The point is sharply made if we compare the growth performance of the top and the bottom districts during this period i.e.. irrigated areas in the major river basin such as those of the Indus and the Ganges in the north, of Godavari and Kaveri in the south, and some assured rainfall areas at the foothills of the Himalayas along the northern plains. The Assam Valley, and the western coastal plains, all together covering about 14 percent of the districts recorded more than 5 percent per annum growth in their agricultural production over the triennium 1962-63/64-65 to 1970-71/72-73. At the other end there were 25 districts located mostly in the regions of the central plateau and around its fringes together covering 27 percent of the country's gross cropped area where the agricultural production declined over the same period at rates up to 3 percent per annum. In relation to these districts, the agricultural income of the top districts was thus growing at more than 8 percent per annum.

This mixed pattern of sharp agricultural growth and decline involving more than 40 percent of the country's gross cropped area in its orbit positively contributed to the widening of regional disparities.

The main reasons for the differentiated rates of growth have been the following:

- i) Differences in the availability of water and irrigation facilities;
- ii) Different levels of fertiliser use at the right time and in the right amount;
- iii) Differential flow of information about the HYV seeds and other complementary inputs;
- iv) Differences in the availability of new varieties of seeds, fertilisers and pesticides; and

- v) Differences in the nature and attitude of farmers towards risks and uncertainties.

Check Your Progress 3

- 1. Explain briefly the meaning of the term ‘green revolution’?

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- 2. Define and elaborate the term ‘package of inputs’.

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- 3. What was the impact of green revolution on agricultural output in India?

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- 4. Did green revolution result in better distribution of income in India?

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- 5. How did green revolution contribute to widening of regional disparities in India?

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14.5 SUGGESTED NEW STRATEGY

We have reached a stage in development where we need what the noted agricultural scientist, M.S. Swaminathan calls an ‘evergreen revolution’, i.e. producing more in less land with less water.

Agri-business and agri-processing should be the main driver of this revolution with crop diversification as one of the main strategies. We can thus outline the main components of the strategy as follows:

14.5.1 Soil Health Enhancement

Agricultural universities, research institutes, krishi vigyan kendras, fertiliser companies, state departments of agriculture, and farmers' associations should aim to increase the productive potential of soil through concurrent attention to their physics, chemistry (macro - and micro-nutrients), and micro-biology. Dry farming areas need particular attention.

14.5.2 Irrigation Water Supply Augmentation and Management

Water is a public good and a social resource and not a private property. The privatisation of its distribution is fraught with dangers and could lead to water wars in local communities. Improving supply through rainwater harvesting and recharging of the aquifer should become mandatory. In addition, a nationally debated and accepted strategy for irrigating 10 million hectares of new area under Bharat Nirman Programme should be developed. All existing wells and ponds should be renovated. Demand management through improved irrigation practices, including sprinkler and drip irrigation, should receive priority attention.

A water literacy movement should be launched and regulations developed for sustainable use of ground water as well as for preventing pollution. Seawater farming should be promoted in coastal areas through the cultivation of mangroves, salicornia, casuarinas, and appropriate halophytic plants. The conjunctive use of rain, river, ground, sea, and treated sewage water should become the norm.

14.5.3 Credit and Insurance

Credit reform is the primary pathway to enhancing small farm productivity. The spread between the deposit and lending interest rates is high in India by international standards. The need is to improve efficiency in the financial delivery system by controlling both transaction and risk costs.

On the part of the Government, crop insurance as well as the speed and manner in which the debt recovery and settlement process operates would need to be considerably improved. Keeping in view the decline in profitability of agriculture, and the farmers' distress, the Government must consider providing support to the banking system for reducing the rate of interest for crop loans. There are areas in the country where recurrent and frequent drought and floods cripple the incomes of farmers. These farmers become defaulters to the banks and thereby become 'push-outs' of the formal credit system. Rescheduling and restructuring of

farmers' loans are not enough in the event of successive natural calamities. The Central and State governments must step in to create an Agriculture-Risk Fund to provide relief to the farmers in the case of successive droughts and in areas hit by floods and heavy pest infestation.

14.5.4 Technology

Agricultural scientists should state the performance of new varieties and technologies in terms of net income per hectare, and not just in terms of yield per hectare. For this purpose, there is a need for a farming system orientation involving crop-livestock integrated production systems to both research and resource use. There should be a proper match between production and post-harvest technologies. A post-harvest technology wing should be added to every krishi vigyan kendra. Also, lab-to-land demonstrations should include post-harvest technology. Many of them should be organised in dry farming areas where millets, pulses, oilseeds and cotton are grown. Value addition to biomass will help generate skilled jobs in the non-farm sector. Rice occupies the largest area in the country and there are opportunities for generating more jobs and income by establishing rice bio-parks. Similarly, eco-boards can be produced from cotton stalks as a replacement for plywood made from timber.

Biotechnology (BT) and Information Technology (IT) should be demystified and a cadre of Rural Farm Science managers should be developed by training a couple of women and men members of every panchayat in the management of new technologies, such as the establishment of refugia in Bt cotton fields. A professionally led National Biotechnology Regulatory Authority should be established to assist the development.

14.5.5 Market

Ultimately, it is only opportunities for assured and remunerative marketing that will determine the economic viability of farming both as a way of life and a means to livelihood. Market reform should begin with production planning, so that every link in the cultivation-consumption-commerce chain receive adequate and timely attention.

14.5.6 Regionally Differentiated Strategy

With wide variations in agro-climatic and economic conditions across the country, there cannot be a single strategy of agricultural growth to be followed everywhere. At the macro level, the development strategy need to be differentiated by broad regional characteristics of agro economic situations as follows:

- I. North-Western High Productivity Region:** The strategy will be to promote diversification of agriculture and raising of high value crops and to strengthen strong linkages with the agro-processing industry and exports, besides creation of relevant infrastructure.

II. Eastern Region: Productivity in this region is very low despite abundant water availability and good soil. The strategy for this region should be to achieve the productivity potential of this region to bring the yield to the levels of high productivity states like Haryana and Punjab. The major thrust should be on flood control, drainage management, improvement of irrigation facilities-especially minor irrigation, input delivery systems supported by adequate credit and extension services.

III. ARD Zones of Peninsular India: The productivity in this region is low because of water scarcity. The emphasis should be on: (i) development of efficient water harvesting and conservation methods and technologies; (ii) suitable irrigation packages based on watershed approach; and (iii) promotion of an appropriate farming system which economises on water use and generates higher value from land.

IV. Ecologically Fragile Regions Including Himalaya and Desert Areas: The thrust should be on the development of agricultural systems which do not damage the fragile ecological balance in the region, but help in conserving and strengthening the sustainability of natural resources.

Check Your Progress 4

1. Make some suggestions for better water management in agriculture.

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2. What should be the role of credit and insurance in a strategy to promote agriculture?

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3. Outline the different measures of growth for different regions of the country.

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14.6 LET US SUM UP

After a good start during the first two five year plans, agricultural output began to stagnate. Consequently, it became imperative to adopt a new strategy of growth. The new strategy of growth emphasised the adoption of 'package of inputs' approach in those areas that have demonstrated a high potential of growth. The new agricultural technology, i.e. HYV seeds, fertilisers, water technology, etc. brought about a phenomenal increase in agricultural production. The phenomenon came to be known as the Green Revolution. The Green Revolution came to result in widening of personal and regional inequalities. Moreover, the effect of this green revolution itself has been weakening in recent decades. There is therefore a need to adopt a new strategy to provide a further push to agriculture. Such a strategy involves varied institutional and technological reforms.

14.7 KEY WORDS

Intensive Cultivation : An agricultural practice wherein more and improved inputs are employed on a given piece of land to raise more output.

Extensive Cultivation : An agricultural practice wherein additional areas of land are brought under cultivation to raise more output.

Institutional Reforms : Refers to such measures that are designed to improve agrarian relations and size of holdings.

Holding : A piece of land.

Technological Reforms : Refers to such measures that bring about improvements in agricultural techniques and practices.

Package of Inputs : An agricultural practice that requires all the recommended inputs to be simultaneously used in order to derive the optimum results.

Regional Inequalities : Refers to differences in the rate of growth between different regions of the country.

Personal Inequalities : Refers to differences in the levels of income between different individual households.

14.8 SOME USEFUL BOOKS

Dhingra, Ishwar C., 2008, *The Indian Economy: Environment and Policy*, Sultan Chand, New Delhi.

Basu, Kaushik (ed.), 2008, *The Oxford Companion to Economics in India*, Sultan Chand, New Delhi.

Impact of Green Revolution

Bhalla, G.S., 2007, *Indian Agriculture Since Independence*, NBT, New Delhi.

14.9 ANSWERS OR HINTS TO CHECK YOUR PROGRESS EXERCISES

Check Your Progress 1

1. See Section 14.2.2
2. See Section 14.2.3
3. See Section 14.2.3
4. See Section 14.2.3
5. See Section 14.2.3

Check your Progress 2

1. See Section 14.3
2. See Section 14.3.2
3. See Section 14.3.2
4. See Section 14.3.2
5. See Section 14.3.2

Check Your Progress 3

1. See Section 14.4.1
2. See Section 14.4.2
3. See Section 14.4.3
4. See Section 14.4.2
5. See Section 14.4.3
6. See Section 14.4.3

Check Your Progress 4

1. See Section 14.5.2
2. See Section 14.5.3
3. See Section 14.5.6

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UNIT 15 AGRICULTURE, PRODUCTIVITY AND FARMERS' WELFARE

Structure

- 15.0 Objectives
- 15.1 Introduction
- 15.2 Productivity in Indian Agriculture
- 15.3 Measures to Increase Agricultural Productivity
- 15.4 Issues Related to Agricultural Reforms
 - 15.4.1 Size of Holdings and Land Reforms
 - 15.4.2 Organic Farming
 - 15.4.3 Contract Farming
 - 15.4.4 Futures Trading
 - 15.4.5 Subsidies in Agriculture
 - 15.4.6 Crop Insurance
 - 15.4.7 Trade in Agriculture
- 15.5 Let Us Sum Up
- 15.6 Key Words
- 15.7 Some Useful Books
- 15.8 Answers or Hints to Check Your Progress Exercises

15.0 OBJECTIVES

After reading this unit, you will be able to:

- 1 make an assessment of the level of productivity in Indian agriculture;
- 1 suggest how to improve the level of productivity in Indian agriculture;
- 1 identify the different issues related to agricultural reforms;
- 1 explain the significance and relevance of land reforms in the present stage of economic development in India;
- 1 elaborate the concept of organic farming and contract farming;
- 1 enumerate the issues relating to futures trading in agricultural products;
- 1 examine the rationale for subsidies;

- 1 appraise the state for agricultural insurance; and
- 1 assess the advantages and disadvantages of globalisation.

15.1 INTRODUCTION

Notwithstanding a significant increase in agricultural output brought about by improvements in productivity (as reviewed in units 13 and 14 before), productivity levels in Indian agriculture continue to be relatively low as compared to the potential in terms of yield per hectare. In the present unit, we deal with the reasons behind low productivity in Indian agriculture and examine the different areas of reforms that would have a bearing on increasing productivity like size of holdings, land reforms, organic/contract farming, futures trading, subsidies, crop insurance, trade, etc.

15.2 PRODUCTIVITY IN INDIAN AGRICULTURE

We have reviewed in the earlier units of the present block (units 13 and 14) the trends in agricultural production in India. One unmistakable conclusion that emerges is that the productivity of agriculture is relatively low in India compared to other countries. This situation continues to obtain, notwithstanding marked improvements that have taken place during the last few decades.

Quantitative Evidence

There are three simple ways of examining the trends in the productivity levels of Indian Agriculture.

One, an easy yardstick is to make use of data relating to yield per hectare of major crops. The relevant data are summarised in Table 15.1. The data brings out that the yield per hectare of principal crops in India is very low - as low as 1/2 to 1/5 - as compared to yield in some other countries. In absolute terms, lower yield per hectare implies lesser total output, sometimes even with higher land area under cultivation.

Table 15.1 : Yield Per hectare

(Kg/hectare)

Crop	Potential of Indian HYV	India's Yield (actual)	World's Largest Producer		World's Most Productive	
			Country	Yield	Country	Yield
Rice	4,000-5,810	3,191	China	5,807	Australia	8,813
Wheat	6,000-6,800	2,671	China	3,295	Ireland	7,556
Jowar	3,000-4,200	1,196	US	3,704	Italy	5,949
Maize	6,000-8,000	1,841	US	4,505	Holland	25,000

Source: CMIE

Two, agricultural productivity is much less than the potential, as can be seen from Table 15.1 itself. With so much sun light round, India can grow at least two crops in a year with low technology, and three to four crops with higher investment and better technology. The available evidence shows that crop production, given the available technology, is far below the optimum. There is still a lot of scope for increasing production by following multiple cropping and through proper use of improved agricultural technology. There is a wide gap between the average yields obtained under national demonstration projects and the existing crop yields obtained under identical conditions in various states. It suggests an under performance.

Three, quantitative evidence of low productivity can also be found by placing India's rank in world in respect of: (i) area, (ii) production, and (iii) yield of major crops, as shown in Table 15.2 below:

Table 15.2: Indian's Global Rank in Major Agricultural Crops

Crop	Rank		
	Area	Production	Yield
Rice (Paddy)	1	2	52
Wheat	1	2	38
Coarse Grains	3	4	125
Pulses	1	1	138
Oilseeds	2	5	147
Cotton	1	4	77
Jute	1	1	13
Tea	2	1	13
Coffee	7	7	14
Sugarcane	2	2	31

Source: Indian Agricultural Statistics, 2007.

The data in Table 15.2 are averages over a period as per recent data available. The data shows that there is a serious mismatch between India's rank in terms of area and production of a crop on the one hand and yield on the other. This is suggestive of low productivity in Indian agriculture. For example, India is the largest producer of pulses in the world, but it ranks miserably low at 138 in terms of yield. The same picture, more or less, obtains when we look at other crops.

That the productivity levels are low in agriculture can also be seen in terms of the following:

- i) About 58 percent of the labour force in agriculture produce only 18 percent of the GDP.

- ii) Net income per hectare in the northern zone is only Rs. 95, in the central zone Rs. 76 and in the southern zone Rs. 110.
- iii) The proportion of costs to gross returns per hectare in the northern zone is 78.5%, in the central zone 82.5% and in the southern zone 75.3%.

Read another way, deficiency means opportunities. The low productivity undoubtedly speaks of the vast potential of growth that exists for India to explore in future, but at the same time it needs a proper diagnosis; something lies at the root that hinders the growth of agricultural productivity in India.

Causes of Low Productivity

The various causes that are responsible for low productivity in agriculture can be grouped as follows:

I Demographic Factors

With demographic growth rates being what they are, an increasing addition to the labour force could be expected to be absorbed in the industrial sector of the economy. But the rate of growth in the industrial sector has been far from adequate. Consequently, the increasing population has fallen back on land for its livelihood, with the result that the mounting pressure has bred a number of evils like: (i) fragmentation and subdivision of holdings; (ii) supply of improved practices and services always falling short of requirements, (iii) conditions of unemployment and disguised unemployment, etc.

II Technological Factors

Under this, the following may be counted:

- i) Inadequate availability and high costs of modern inputs.
- ii) The irrigated component of total cropped area and the progress achieved in intensive cultivation of land are still at very modest levels.
- iii) Slower diffusion of agricultural technology to the farmers, especially marginal and small farmers.
- iv) Inadequate and poor post-harvest technology.
- v) Pollution has stifled growth in the country's rice harvest, depriving the staple crop of the rain and cool night-time temperatures that it needs to flourish.
- vi) Reduced research in Agriculture, for identification of HYVs in different crop.

III Institutional Factors

Among the more important causes responsible for low productivity in agriculture are the institutional and structural arrangements that exist in India. One needs to be reminded here that East Asia's success stems partly from the policies adopted and partly from the institutional mechanisms created to implement them.

Some of the institutional and structural weaknesses from which Indian agriculture suffers can be identified as follows:

- i) In the immediate post-independence period, the zamindari system was abolished. The new system that has taken its place has proved no better. Absentee landlordism still prevails; large rents are still extracted; there is no security of tenure, etc. These are all manifestations of semi-feudal production relations.
- ii) Agrarian structure is not supported by any sound infrastructure.
- iii) There has been inadequacy of agricultural support programmes.
- iv) Agricultural sector is devoid of entrepreneurship capabilities.
- v) Deficiency of investment in this sector is another problem. The rate of capital formation in this sector has been declining.
- vi) Decline in Public investment in agricultural infrastructure is also very significant in the recent years.

IV Weaknesses in Policy Perceptions

Owing to a number of economic and political compulsions, the Indian strategy for agricultural growth remained preoccupied with the goal of achieving quick increases in food-grains production by concentrating the resources and efforts on the relatively better-endowed areas and strata of cultivators. A consequence of the approach has been the less-than-optimum allocation of the critically scarce inputs like water and fertilisers across crops and group of farmers.

Check Your Progress 1

1. Advance arguments to prove that the productivity levels in Indian agriculture are relatively low.

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2. Briefly account for low levels of productivity in Indian agriculture.

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3. Identify the important institutional weaknesses in the agricultural sector of India.

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15.3 MEASURES TO INCREASE AGRICULTURAL PRODUCTIVITY

What are the various measures that can be taken to improve the agricultural productivity in India? In this section we will discuss the various issues arising out of such measures.

I Institutional Reforms

Institutional arrangements cover such measures as better agrarian relations introduced through land reforms, proper arrangements for adequate financing, and regulating the distribution of agricultural products, etc. While policies for strengthening the institutional structure for development of agriculture have been adopted and are in place, the key to their success lies in effective implementation - an aspect on which more concerted attention, than hitherto, needs to be given.

Another aspect of institutional reform is the need to improve the efficiency of delivery systems in rural development by empowering the institutions elected by the people. This would require devolution of functions, transfer of necessary resources and empowering the functionaries in discharging their administrative responsibilities.

II Technological Improvements

Technological improvements in agriculture can be classified into two broad kinds: biological and mechanical.

a) **Biological innovations** usually refer to factors that raise land productivity and are, therefore, generally land-saving. Better seeds and use of fertilisers in right doses at right time are useful instances.

b) **Mechanical innovations** usually mean the use of more machinery

like tractors that are labour-saving. In order to expedite these improvements, policies need to be so framed as to encourage and promote their adoption by designing suitable policies.

III Improving the Returns to Farmers

For this purpose both (a) price measures, and (b) non-price measures need to be adopted.

a) **Price measures** would include:

- i) Raising procurement and support prices so as to improve the terms of trade of agriculture.
- ii) In regard to the dry land and hilly areas, where only one crop can be grown - usually millets – the prices should be so fixed that the market forces would increase their demand generating more income for the growers.

b) The non-price methods include:

- i) Stabilising the returns from agriculture, especially in rain fed areas, by an effective crop insurance scheme;
- ii) Reducing the number of farmers per unit of output by promoting non-farm economic activities;
- iii) Providing the farmers direct access to market so that they can claim a share of the traders' profit;
- iv) Reducing costs by the implementation of less expensive technologies especially in rain fed agriculture;
- v) Promoting industry-agriculture linkages through contract farming;
- vi) Pooling land creating larger farms rendering benefit by economies of scale; likewise, pooling of capital making it possible to invest in items of advanced technology;
- vii) Lifting controls on free movement, stock limits, futures trading etc.; and
- viii) Improving farm productivity by an approach where agri-business is operated like an industry. In this, industry itself has to take initiative and arrange for the delivery of necessary inputs.

IV Producer Incentives for Stimulating Growth

The case for producer incentives for stimulating agricultural growth and adoption of new technology has been well argued in the literature on agricultural development. Such incentives as price supports, input subsidies, subsidised institutional credit, food subsidies, etc. are suggested for both stimulating growth and achieving certain welfare objectives like regional and social equity.

In short, **agricultural productivity is a function of a large number of determinants**. An effective policy requires a holistic approach in which the various factors outlined above are integrated with a view to achieve the desired objective.

In the subsequent section we will focus on a few important issues relating to agricultural reforms.

15.4 ISSUES RELATED TO AGRICULTURAL REFORMS

A few issues identified in current debate relating to agricultural reforms are: (i) size of holdings and land reforms, (ii) organic and contract farming, (iii) futures trading in agricultural commodities, (iv) subsidies in agriculture, (v) crop insurance, and (vi) trade in agriculture.

15.4.1 Size of Holding and Land Reforms

Size of holding has significant bearing on agricultural productivity. Although small holdings (holdings of less than 2 hectares) have certain advantages, the principles of economies of scale tend to make the large holdings more advantageous. Specifically, the arguments made in favour of the large holdings are the following.

- 1 Large farms can make use of mechanisation in a big way. Undoubtedly, small farms can also make use of machinery, but the per acre capital cost would be prohibitive for small farmers to afford the same.
- 1 Large farmers can afford more initial capital and better access to the credit market. This applies as much to the market inputs as for the non-market ones.
- 1 Small farms are constrained by the fact that their risk-bearing ability is limited preventing them from adopting innovations.
- 1 Large farms can increase the intensity of cultivation of their land by applying those inputs which matter most under the new technology like fertilisers, insecticides, hired labour and machinery.

The above factors influence the cost of production per unit of output in favour of larger farms defined as holding larger than 2 hectares. Farmers in the 4-6 hectare size category who have used the new varieties of fertilisers, seeds, etc. have been found to be the most efficient in terms of cost of production. This is seen even in cases where least farm equipment with animal ploughing methods are adopted. However, where alongside these inputs, better farm equipments have also been adopted, larger size farms have required lower cost of production.

The argument made above in favour of large farms does not mean that the small farm thesis has not received the attention of researchers and

policy planners. In fact, a series of studies, based on farm management surveys have claimed that there is an inverse relationship between the farm size and yield. Recognised as the **small farm hypothesis**, these studies have supported the contention that 'larger the farm size, smaller is the quantity produced per unit of land'. The reasons attributed to this contention have included: (i) greater reliance on highly motivated family labour; (ii) practice of multi-cropping in smaller farms giving the benefit of cropping intensity as opposed to extensive cultivation with the negative effects of non-organic farming (e.g. less nutrients in the agricultural produce, weed infestation due to more 'empty niche space', etc.) in case of large farms; (iii) practice of inter-cropping using the empty niche space; (iv) better management due to lower employment of non-family or hired labour; etc. Thus, in a country like India where the majority of farmers are small and marginal farmers, the need is to adopt suitable land reform measures to protect the interest of this large segment. What has been the experience in this direction and what corrections are further needed therein to meet the specific requirement of our agrarian economy is the subject matter of our next sub-section viz. the land reforms.

Land Reforms

Indian farming is dominated by marginal (i.e. holdings of less than 1 hectare) and small (i.e. holding size between 1 hectare and 2 hectares) holdings. They constitute more than 60 percent of the total number of holdings in the country. They, however, cover only about 36 percent of the gross land area under cultivation. The farming system is further afflicted by evils like fragmentation and sub-division of holdings.

In view of this, land reforms programme has remained one of the major policies for rural development ever since the inception of the planning process in India. The major objectives of land reforms in India have been:

1. Restructuring of agrarian relations to achieve egalitarian social structure.
2. Elimination of exploitation in land relations.
3. Actualisation of the goal of 'land to the tiller'.
4. Improvement of socio-economic conditions of the rural poor by widening their land base.
5. Increasing agricultural production and productivity.
6. Facilitating land base development of the rural poor.
7. Infusion of a greater measure of inequality in local institutions.

For the fulfilment of these objectives, the major steps adopted under the land reforms programme are:

1. Abolition of intermediaries.
2. Regulation of landlord-tenant relationship by fixing fair rents, conferring security of tenure on tenants subject to the landlord's right to resume limited area for personal cultivation, bringing tenants into direct relationship with the state in respect of areas which the landlord is not entitled to possess and gradual conferment of ownership rights on the tenants.
3. Redistribution of land by placing ceiling on future acquisition and existing holdings and acquiring surplus areas above the ceilings, resettlement of landless agricultural workers and increasing the size of uneconomic holdings.
4. Consolidation of scattered holdings into compact blocks and prevention of subdivision and fragmentation of holdings below an economic size.
5. Updating and computerisation of land records.

Recognising that the access to land remains a key element of the antipoverty strategy in rural areas, the programme of action for land reforms included, in addition, the following:

- i) preventing alienation of tribal lands;
- ii) providing access on a group basis to the poor on wastelands and common property resources;
- iii) permitting the leasing-in and leasing-out of land within the ceiling limits;
- iv) according preference to women in the distribution of surplus land and legal provisions for protecting their rights on land.

It may be emphasised that the principles on which the scheme of land reforms is based do not involve adjustments between the interests of different sections of society which depend on land, but are a part of a wider socio-economic outlook which has to be applied in some measure to every part of the economy.

Implementation and Relevance of Land Reforms Today

Although land reforms as an instrument of economic policy were conceived very early in the post-independence period and pursued vigorously during the first one and a half decade of economic planning, these were side-tracked subsequently, largely on account of the introduction and spread of new technology. However, the new agricultural technology demonstrated in clear terms its inability to break through the barriers of rural poverty and unemployment.

In the wake of the limitations of Green Revolution observed in the field (viz. it remained confined to a few pockets, small number of crops and

selected farming groups) the decade of the 1980s witnessed considerable experimentation with the strategy of 'direct attack' on poverty. The direct attack emphasised on the provision of minimum needs, employment generation and integrated rural development programmes. The direct attack on poverty was conceived as a complementary approach to stepped-up growth. The two together were expected to help the process of '*trickle down*' to gain in speed, spread and thrust.

However, the outcome of direct attack strategy has been far too modest as an approach to poverty eradication. This has happened despite the acceleration in growth in the 1980s along with substantial expansion in agricultural output. In particular, the core groups of the poor like landless labourers have obtained minimal enduring benefits from both growth and anti-poverty programmes. There is now increasing awareness that attempts to integrate growth with poverty eradication remained largely ineffective owing to the absence of adequate structural reforms and improved access for the rural poor to agricultural and common lands.

Ground Realities Necessitating a New Look at Land Reforms

Three factors which can be identified in this respect are:

1. Growth in the green revolution areas is now levelling off. It is also realised that it is being achieved at a high and increasing cost vis-a-vis scarce inputs like irrigation and fertilisers. Growth in dry land agriculture and in the potentially rich eastern parts of the country needs a combination of both technical and reformist strategies. The point is that, unlike in the immediate post-independence years, the need for land reforms is now even more pressing - since sustained growth depends on it - and this requires the strengthening of the political will for reforms to make it more effective.
2. There have been two favourable fall-outs from the extensive implementation of poverty alleviation programmes:
 - i) The personnel associated in the development have been under fairly severe pressure to establish contact with the poor to assess their needs;
 - ii) The rural poor are now in a better position and mood to demand more enduring benefits from the government than the mere adhoc relief provided during periods of distress. In this sense, poverty-alleviation programmes can be regarded as instilling a 'conscientising' influence on both the development personnel and the poor;
 - iii) There is a subtle difference between the absentee-cum-non-cultivating owners on the one hand and the present dominant rural groups on the other in the nature of resistance they put up to land reforms. The former are rent-collectors whose resistance to reforms began to weaken only when they moved out of villages in

search of new economic opportunities in towns. The latter group, on the other hand, consists of profit-earners who may be expected to respond more readily and positively to new growth opportunities in the rural agricultural sector. If there are policies to ensure that the new opportunities are adequately labour-absorbing and bring a measure of affluence within the reach of even households with modest land-holdings, the feasibility of effective ceiling and tenancy legislation might show a marked improvement.

Check Your Progress 2

1. What do you understand by institutional reforms?

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2. Suggest price measures to improve the returns to farmers.

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3. Suggest non-price measures to bring about improvement in returns to farmers.

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4. Outline how bigger farms have better productivity than smaller farms.

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5. State in brief the objectives of land reforms programme in India.

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6. Bring out the need for land reforms in the present state of development in India.

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15.4.2 Organic Farming

The Green Revolution was brought about by the use of chemical fertilisers and pesticides. Over the period, three major problems came to be associated with the use of fertilisers.

One, the environmental costs of increasing fertiliser use are proving immense i.e. soil is getting degraded fast.

Two, the effectiveness of the use of fertilisers is on the decline i.e. increasingly more and more fertilisers have to be used to get the same level of output. As a result, the average cost of production in agriculture is on the rise.

Three, heavy imports of fertilisers impose a huge burden on our balance of trade.

In view of these problems, the use of an alternative system of farming, called organic farming, is being advocated.

Meaning and Purpose

Organic farming is a way of farming which excludes the use of chemical fertilisers, insecticides, etc. It is primarily based on the principles of use of natural organic inputs and biological plant protection measures. The purpose of organic farming is not to go back to primitive form of agriculture, but to blend modern scientific technologies with the indigenous knowledge and skills using the vast potential of various kinds of residues and water. This will help: (i) achieve sustainability of natural resources on the one hand, and (ii) exploit the growing global market for organic food on the other.

Progress

India has comparative advantage over many other countries because of the vast cultivated area which has remained free of contamination from chemicals. Also, it is spread over distinctly varying agro-climatic conditions. For example, large areas in north-east region, northern hills and rain fed regions with low or nil use of agro-chemicals can be instantly converted to organic farming.

In order to promote organic farming, the government has launched a new

programme, called **National Project on Organic Farming**. The programme is being implemented in the areas where use of agro-chemicals is very low, those which fall in agro-export zones, and in urban hinterland area. The main components of the programme are as follows:

- i) Putting in place a system of certification of organic produce;
- ii) Financial support for setting up commercial production units for the promotion and extension of organic farming like: fruits and vegetables, waste compost, bio-fertilisers, hatcheries for vermiculture, etc.

Standards are being developed for organic farming. Regulatory mechanism for export purposes is also being developed.

15.4.3 Contract Farming

Contract farming is viewed as an important tool to increase private corporate involvement in agro-processing. In this system, companies engaged in processing/marketing of agricultural products enter into contract with the farmers. They provide the farmers with the inputs and buy back the product at a later date at a rate specified in advance.

Contract farming has invited some criticisms. For instance, the Indian farmer had been attuned to traditional agricultural practices which provide security and stability to a small and marginal farmer. With contract farming, this degree of independence is lost, rendering him sensitive to market forces.

Policy Initiatives

In order to promote contract farming some important policy initiatives taken in recent years are briefly stated below:

- i) The Agricultural Produce Marketing Committee Act forces farmers to sell only at mandis, ostensibly to protect them from exploitative traders. But this defeats the motivation behind contract farming. In order to rectify this situation, six states have repealed their versions of the APMC Act, and six others have drafted new legislation.
- ii) India for long had been plagued by a maze of different food laws, some of which were self-contradictory. The Central Government has now instituted a new integrated food law replacing the old ones.
- iii) The Government Proposes to legislate a Warehousing Receipts Act, which will make warehousing receipts negotiable instruments qualified for bank financing. As a result, the farmers would be in a position to borrow against their stocks reflected in warehousing receipts. This along with the futures trading (see section 15.4.4.) can modernise

agricultural trading just as stock market reforms have modernised the capital market.

- iv) In order to curb hoarding, the Essential Commodities Act has long placed limits on commodity stocks restricting large-scale capital investment. To rectify this situation, the list of essential commodities has been cut from 30 to 15.
- v) Tax laws and incentives are being liberalised to encourage private investment.
- vi) Banks are keen to get into rural business. Cheap credit from banks and cooperatives can facilitate agri-business like horticulture.

These efforts are being supplemented further by private corporate sector. Corporate sector has chipped in by setting up networks to give practical shape to the concept of 'precision farming'. These networks provide remote-sensing technology, which is used to analyse soil, gather information about crop health, pest attacks and the insurance coverage of various crops; run crop clinics where agronomists access information using geographic information system (GIS) techniques; advice farmers on crop-related matters, and the type of area and nutrients to be used; set-up soil testing laboratories; and operate experimental farms where scientists conduct agricultural R&D.

Notwithstanding these initiatives, corporate farming is still facing many hurdles. Some of these are:

One, the legal and administrative system makes enforcement of contract difficult.

Two, Banks have never been able to seize the mortgaged land of defaulting farmers.

Three, Indian infrastructure is grossly poor with rural electricity, in particular, being totally unreliable.

Four, cold chains for keeping vegetables fresh repeatedly break-down.

Check Your Progress 3

- 1. Identify the problems arising out of the use of fertilisers.

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- 2. What is organic farming? Why is it being promoted?

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3. What is contract farming? State the policy initiatives taken to promote contract farming in recent years.

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15.4.4 Futures Trading

There is a considerable time gap between the time of initial investment and the receipt of returns from the final farm produce. As a consequence, a farmer is highly vulnerable to price fluctuations as planning is done at the time of sowing based on the then prevailing prices.

Likewise, purchasers of agricultural commodities for use as inputs in production must make judgements on their availability and cost at different points of time during the year. To guard against price volatility and uncertainty in availability, sellers and buyers often enter into forward contracts. These contracts specify the quantity, quality and price of the commodity they would deliver for sale or acquire for purchase at a pre-decided date in the future.

'Futures contracts' are, thus, standardised contracts to buy or sell a quantity of a standard quality of a commodity. These are traded in exchanges, through brokers, with no need for the buyer and seller to meet and negotiate. An important feature is that a contract need not be settled by actual delivery. It can be matched by an offsetting contract taken by the buyer or seller, and the two can be squared at any point at some gain or loss. To avoid paying margins, traders can buy an option to offer or acquire a contract at some specified future date. If the option is not exercised, because price movements are contrary to expectation, the loss is restricted to the premium paid to hold the option and the transaction costs of acquiring it.

Role of Futures Market

Futures trading has an important role in bringing about improvements in agricultural production system.

One, futures markets enable the farmers to deliver the crop at a specified price at some future date. The clearing houses of the commodity exchanges guarantee the performance of these contracts. A farmer, who is uncertain about the prices of his produce, can cover his risk by selling a futures contract sometime before the harvest day.

Two, the futures prices are readily available for the farmers as the commodity exchanges disseminate prices on a continuous basis through various channels. If the price available in the futures market is not profitable to the farmer, he can change his cropping plan at the beginning of production itself.

Three, the futures market provides a perfect collateral for the lenders to advance larger loans on easier terms to the farmers thereby ensuring a minimum-risk business for both the lender and the farmer.

Four, futures market provides a convenient mechanism through which a farmer who wants to speculate on commodity but does not have the storage capacity can increase his speculative ability. He can 'buy a position' while the crop is growing by buying a futures contract, and at the time of harvesting, can sell his crop in the cash market simultaneously squaring off his position in the futures market. This way he can gain from any price increase in both the spot as well as the futures market at the time of harvesting.

Five, commodity exchanges assist the producers and consumers in a fair price discovery and enable them to hedge their price risk. The prices disseminated by these exchanges are highly reliable and acceptable to both the business community and the farmers as they are discovered by discounting all information available at that point of time.

Six, the quality and delivery standards imposed by the exchanges in their products act as bench-marks and increase quality consciousness among farmers.

Progress

Indian commodity futures market has had a long and chequered history. Until 2003, the futures contract was being traded only at regional exchanges that specialised in one or a few commodities. In 2003, the government mandated the setting up of nation-wide online commodity exchanges and allowed futures trading in a wide gamut of commodities.

There are four national level commodity exchanges, namely, the Multi Commodity Exchange (MCX), National Commodities and Derivatives Exchange of India (NCDEX), National Multi Commodity Exchange (NMCE) and the National Board of Trade (NBOT). The first three exchanges trade in all the permitted commodities, while NBOT trades only in soyabean. The Forwards Markets Commission (FMC) currently regulates the commodities futures market.

15.4.5 Subsidies in Agriculture

Subsidy can be defined as a payment for the provision of goods or services at a price which is less than the cost of production. This payment could be made directly to the users or to the producers of the services.

In actual practice, the large bulk of these payments goes to producers and intermediaries rather than the final consumers. These are provided both through the budgetary provisions and through the pricing policies of public sector activities.

Subsidies are different from transfer payments which are straight income supplements to the poor and the vulnerable. Subsidies are the converse of indirect taxes and are specific to goods and services. And, in some cases, they could reflect positive externalities.

Governments, the world over, take recourse to subsidies. The common Agricultural Policy in the European Union leading to 'lakes of wine and mountains of beef and butter' as The Economist once derisively described the situation, is an extreme - and living - example of how subsidies once given can enslave a group of several nations. America, and Japan, are not any far behind.

Subsidies in India have a long history. Subsidy on land revenue in case of natural calamities and loans to farmers on concessional terms have been a traditional feature of the Indian revenue system. In free India, subsidies were introduced in 1947 when the relief and rehabilitation finance for refugee settlement was heavily subsidised. Since then, subsidies have covered a wide spectrum of Indian economy.

Kinds of Agricultural Subsidies in India

The main forms of agricultural subsidies in India can be identified as follows:

- 1. Food Subsidy:** It is the difference between the price at which the food corporation of India (FCI) procures food-grains from farmers, and the price at which the FCI sells (issue price) either to traders or to the Public Distribution System (PDS) with the added cost borne by FCI for storage and distribution of the food-grain. The subsidy ensures a reasonably high price to farmers (Procurement Price) and a reasonably low price to consumers (issue price) and a reliable food supply (through PDS).
- 2. Fertiliser Subsidy:** It is the difference between price paid to manufacturers of fertilisers (domestic or foreign) and price received from farmers. This subsidy ensures cheap inputs to farmers, reasonable returns to manufacturers, and stability in availability and price of fertilisers (to farmers).
- 3. Power Subsidy:** It is the difference between the cost of generating and distributing electricity to farmers (by state electricity boards) and the price paid (or the cost incurred) by the SEBs. This acts as an incentive to farmers to invest in pump sets, bore wells, etc.
- 4. Irrigation Subsidy:** It is the difference between the operating and the maintenance cost of irrigation infrastructure in the state and irrigation charges recovered from the farmers.

5. Credit Subsidy: It is the difference between interest charged to farmers and actual cost of credit to banks, plus other costs such as write-off on bad loans.

Rationale for Subsidies

The rationale of subsidising agricultural inputs is to be traced to the role that these subsidies play in stimulating development of any country through increased agricultural production, employment and investment. However, there are arguments advanced on both sides.

Arguments For: The principal arguments in support of subsidies are as follows:

- i) Products of subsidised inputs sell at lower prices. If the subsidies were to be withdrawn, the prices of the products would rise as their production cost would go up. But their higher prices would affect their sale. Reduced application of inputs in cultivation would lower agricultural production, particularly food production, and compel the country to import food products.
- ii) The subsidisation of inputs and credit has influenced and continues to influence the acceptance of the new technology.
- iii) Input subsidisation also avoids raising food (and raw material) prices, thus avoiding the plausible adverse effect on poor (and the industrial sector). This has come to be known as '*cheap-input-cheap-output policy*'.
- iv) Value-added by subsidised inputs far exceeds the cost of subsidy.

Arguments Against: The principal arguments against subsidies are as follows:

- i) Fertiliser and irrigation subsidies have widened regional disparities to some extent.
- ii) The maximum benefit of subsidisation of inputs is reaped only by large farmers, who possess the capacity to buy inputs at higher prices.
- iii) Input subsidies tax the budgetary capacity of the government. Fiscal imbalance paves the way for macroeconomic imbalances creating inflation, lowering growth and create inability to finance imports. Growth, in order to be sustainable, has to be efficient and subsidies of the kind the Indian agriculture is used to, make for enormous wastage of power, water, fertiliser and pesticides.
- iv) Heavy fiscal burden of subsidy on inputs is also responsible for stagnation, if not decline, in public investment.
- v) Where the prices of inputs do not reflect their scarcity value, there is very little incentive for farmers to adopt methods which could make more efficient use of scarce resources.

To sum up, input subsidy should be seen as a short-term programme designed to meet specific objectives and should be phased out with development. The sequencing of reforms must start with liberalising the output markets, opening them to exports and thereafter involving farmers in carrying out reforms in input markets - particularly for non-tradable inputs like canal water, electricity and rural credit. It is only through such a comprehensive package of reforms that the accelerated and sustainable growth of Indian agriculture can be facilitated. You will study more on agricultural subsidies in the context of globalisation in units 20 and 22 later.

15.4.6 Crop Insurance

Climatic variability caused by erratic rainfall pattern, and increase in the severity of droughts, floods and cyclones and rising temperatures, have been the causes of uncertainty and risk resulting in huge losses in agricultural production and the livestock population in India.

Insurance schemes have been designed and implemented seeking to protect farmers from uncertainties and risks. Three of the more important schemes under this are:

National Agricultural Insurance Scheme (NAIS), 1999

The NAIS was launched in June, 1999. The main objective of the scheme is to protect the farmers against crop losses suffered on account of natural calamities, such as drought, flood, hailstorm, cyclone, fire, pests and diseases.

The main features of the scheme are as follows:

- i) The scheme covers all farmers including those growing commercial and horticultural crops.
- ii) There is no restriction on the sum insured and all crops including coarse cereals, pulses and oilseeds are covered. In addition, three cash crops - sugarcane, cotton and potato - have also been brought under the scheme.
- iii) The scheme is available to non-loanee farmers on an optional basis, but is compulsory for loanee farmers. It covers all crops for which yield data is available and is available regardless of the size of the holding.

The scheme is being implemented by the Agricultural Insurance Corporation.

Farm Income Insurance Scheme (FIIS) 2004

A pilot project of the FIIS was inaugurated in January, 2004. The scheme covers all farmers - loanee farmers on compulsory basis, and non-loanee

farmers on voluntary basis. The scheme provides comprehensive risk insurance against loss in farm income in a notified area arising out of adverse fluctuations in yield due to natural perils or adverse fluctuation of market prices as measured against minimum support price or both.

Weather-Based Crop Insurance Scheme (WBCIS)

The WBCIS has been implemented in the selected districts of Karnataka on a pilot basis. It provides insurance protection to farmers against adverse incidence such as deficit and excess rainfall, which impact adversely the crop production.

15.4.7 Trade in Agriculture

Globalisation is the keyword of new economic policy. With World Trade Organisation replacing GATT, exports of agricultural goods have come in for attention lately. Since the global agricultural trade is moulded and exploited by the major players, it is being brought under an international discipline. The following two features included in the accord are important to note:

- i) Reduction in aggregate measure of domestic support; and
- ii) Tariffication of import barriers and their reduction.

Besides providing a level playing field, trade in agriculture is bound to open up new avenues for developing countries like India to push up their exports.

Advantages and Disadvantages of Globalisation

Opening up of agricultural trade should now be seen as a major opportunity for raising the overall growth rate by exploiting India's comparative advantage in agriculture, for improving the efficiency of resource use in agriculture, and for technologically upgrading the rural sector.

On the flip side, however, it may be argued that liberalisation needs more attention. Both unilateral liberalisation, which India may pursue as a part of its ongoing economic reforms, and multilateral liberalisation, which India may be obliged to pursue as a member of the WTO, are going to have their costs. In this connection, following three issues need a serious consideration:

- i) Volatility of prices in the international markets,
- ii) Trend of prices, and
- iii) International trade market structure.

These factors considerably influence the realisation of gains to exporting countries of agricultural commodities. Proper knowledge of these factors

and intelligent response of a country lead to enhancement of its gain from the trade. On the other hand, lack of knowledge or improper response may lead to loss of exploitation of international market situation. As said before, you will be studying more on these issues in units 20 and 22 later.

Check Your Progress 4

1. What is 'futures trading' in agricultural products?

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2. State the role of 'futures trading' in promoting agricultural productivity.

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3. Mention the different kinds of subsidies available in the agricultural sector.

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4. What are the salient features of principal crop insurance schemes presently in operation in India?

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15.5 LET US SUM UP

Indian agriculture made significant progress after adoption of the new agricultural strategy, as is evidenced in large increases in agricultural production. Most of the increase in agricultural output could be attributed to improvements in agricultural productivity. However, notwithstanding these increases, agricultural productivity continues to be relatively low, both in comparison to (i) what obtains internationally and (ii) the yield potential demonstrated on farms. Low productivity, in a way, represents

an untapped resource. If we can successfully raise productivity levels there are immense possibilities of growth in agriculture. The unit has discussed a few important issues having a bearing on agricultural productivity in India.

15.6 KEY WORDS

Biological Innovations : refer to those measures that improve agricultural productivity and are therefore 'land-saving'.

Mechanical Innovations : refer to introduction of new machinery and tools in cultivation.

Price Measures : are measures which aim at keeping the prices of agricultural products at a high level in order to provide incentives to farmers to produce more.

Non-Price Measures : are measures, other than price measures, that are designed to assure better income to farmers.

Fragmentation of Holdings : Refers to scattered pieces of holdings owned by a household.

Consolidation of Holdings : a process by which the scattered pieces of holdings are pooled together to form a single large holding.

Empty niche space : bare ground between rows of crops inviting weed infestation.

15.7 SOME USEFUL BOOKS

Dhingra, Ishwar C., 2007, *The Indian Economy: Environment and Policy*, Sultan Chand, New Delhi.

Rao, Hanumanta, 2007, *Agriculture, Food Security, Poverty and Unemployment*, OUP, New Delhi.

Ray Shavan (ed.), 2007, *Handbook of Agriculture in India*, OUP, New Delhi.

Bhalla, G.S., 2007, *Indian Agriculture Since Independence*, NBT, New Delhi.

15.8 ANSWERS OR HINTS TO CHECK YOUR PROGRESS EXERCISES

Check Your Progress 1

1. See Section 15.2 and answer.
2. See Section 15.2 and answer.
3. See Section 15.2 and answer.

Check Your Progress 2

1. See Section 15.3 (I) and answer.
2. See Section 15.3 (III) (a) and answer.
3. See Section 15.3 (III) (b) and answer.
4. See Section 15.4.1 and answer.
5. See Section 15.4.1 and answer.
6. See Section 15.4.1 and answer.

Check Your Progress 3

1. See Section 15.4.2 and answer.
2. See Section 15.4.2 and answer.
3. See Section 15.4.3 and answer.

Check Your Progress 4

1. See Section 15.4.4 and answer.
2. See Section 15.4.4 and answer.
3. See Section 15.4.5 and answer.
4. See Section 15.4.6 and answer.

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