
UNIT 14 IMPACT OF GREEN REVOLUTION

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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