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AGRICULTURAL ECONOMICS

SEMESTER-IV

ECONOMICS

BLOCK- 2

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COURSE INTRODUCTION

Agricultural Economics is the fourth course of f ourth semester of the M.A. in Economics programme of this University. This course is an optional course. Out of the two optional course viz. Agricultural Economics and Economics of Insurance, learners can opt any one course based on their interest. This course titled Agricultural Economics is designed to help the learners to have a deep understanding about various concepts and theoretical perspectives related to Agricultural Economics. This course comprises 15 units and has been divided into two blocks. Block 1 consists of 8 units and Block 2 consists of 7 units.

BLOCK INTRODUCTION

This is the second block of the course and it comprises a total of seven units, from Unit 9 to 15. Unit 9 of the course discusses the technologies in Agriculture. This unit will help you know the details about green revolution, mechanization, HYV food processing etc. as well as the definition, scope and nature of Agricultural Economics. Unit 10 deals with Agricultural Labour and take us discussion employment, types of unemployment, types of labour and differenent policies on Agricultural labour. Economics of Agricultural Production is discussed in Unit 11. This unit will give you an insight into various contents like production function in agriculture, supply response in agriculture, size of farm, productivity debates, etc. Unit 12 deals with the theories of Agricultural Economics; the Scultzian thesis, Lewis model of Agricultural development. Unit 13 deals with the concept of Food Security, definition of malnutrition, impact analysis of different production oriented policies. Concept of Public Distribution System (PDS) , Food price policies, food subsidies are discussed in Unit 14. Unit 15 discusses the importance of Agriculture in North East region, status of Agricultural Development including problems and challenges faced buy the sector in this region.

While going through the units of the block, you will find that a unit is further divided into certain sections and sub-sections, wherever necessary, for your better understanding. Again, the units carry certain activities after a particular section where needed. These “ACTIVITIES” will provide you the opportunity to practically apply your own thoughts based on the knowledge gained from reading the text in a particular section. Besides, in order to give you additional information on certain relevant topics, you will find a category called “LET US KNOW” after the sections in each unit. Another category that has been included at the end of each section of a particular unit is “CHECK YOUR PROGRESS”. The purpose of this category is to help you asses for yourself as to how thoroughly you have understood a particular section. You may then match your answers with “ANSWERS TO CHECK YOUR PROGRESS” given at the end of each unit. The section “FURTHER READING” in each unit contains the names of a few books which you might want to consult if you are interested in learning more elaborately about the concepts discussed in a particular unit. Furthermore, the category called “POSSIBLE QUESTIONS” is intended to give you a hint of the type of questions you are likely to get in the examination.

UNIT 9: NEW TECHNOLOGIES IN AGRICULTURE

UNIT STRUCTURE

9.1 Learning Objectives

9.2 Introduction

9.3 Green Revolution and Mechanisation

9.4 Irrigation

9.5 HYV of Crops

9.6 Food Processing

9.7 Let Us Sum Up

9.8 Further Reading

9.9 Answers to Check Your Progress

9.10 Model Questions

9.1 LEARNING OBJECTIVES

After going through this unit, you will be able to:

- point out the rational for new agricultural strategy in India
- discuss the various technological changes made towards promotion of agricultural production and productivity
- explain Green revolution and its achievement under different phases
- discribe the development and challenges in development of irrigation in India
- analiese the development in HYV crops and its adoption in Indian agriculture.
- present the status and potential of food processing industries in India.

9.2 INTRODUCTION

As we all know India passed through a serious phase of food insecurity notwithstanding the fact that India is basically an agrarian economy with nearly 70 percent of its population dependent on agriculture.

Between 1951 and 1966 India's food grain production rose at a rate of 2.8 percent per annum which was insufficient to keep up with the population growth of 2 percent per annum and the availability of foodgrain per head declined sharply. From mid 1950s India started to depend on food grains import to feed its burgeoning population. The two wars (with China in 1962 and Pakistan in 1965) further contributed to India's food insecurity as a large amount of resources were diverted to finance war at the cost of considerable loss in rural investment for the promotion of Indian agriculture. Meanwhile, the two consecutive droughts that took place in 1965-66 placed the country into an unprecedented food crisis with food grain production and yield declining by 19 percent and 17 percent respectively in 1966. The food crisis gripped the nation to such an extent in the early 1960 that a ship to mouth existence came to the fore. The country was left with no other option than relying on importing large grain (mainly rice and wheat) under PL-48 agreement from the USA.

It was becoming apparent by the mid 1960s that there was no alternative to technological change in agriculture for achieving self-sufficiency in food grains. The need for modernising Indian agriculture became utmost urgent in the mid 1960s. This new agricultural strategy took the form of package approach consisting of adoption or use of HYV seeds, fertilisers, pesticides, irrigation, pumpsets, tractors, etc. Thus technological intervention in Indian agriculture came into being with a slew of measures where mechanisation received the special target. This is simply because of the fact that farm mechanisation helps to enhance the overall productivity and reduce input cost 15-20 percent savings in seeds, 15-20 percent savings in fertilisers, 5-20 percent increase in cropping intensity, 20-30 percent savings in time, 20-30 percent reduction in manual labour and 10-15 percent overall increase in farm productivity. Here mention may be made that agricultural mechanisation has a very broad meaning. This includes production, distribution and utilisation of a variety of tools, machinery and equipments for the development of agricultural land, planting, harvesting and primary processing. Technological transformation in Indian agriculture has seen considerable progress in

the mechanisation of farming which stands at about 40 to 50 percent. With this background, this unit discusses various technological changes that took place in Indian agriculture over the years as a result of deliberate government policy. The importance, scope and various challenges faced in adopting new technologies with reference to mechanisation, irrigation, HYV of crops and food processing are discussed in details.

9.3 GREEN REVOLUTION AND MECHANIZATION

After the independence, there were efforts to develop agriculture in India. To increase the production of food grains many infrastructural (construction of new roads, expansion of irrigation, fertiliser production etc.) and institutional changes (mainly land reform) were made, but the agricultural production was almost stagnant. The production of food grains increased from 54.9 million tonnes in 1950-51 to only 68 million tonnes in 1955-56. The growth of food grain was only 2.8 percent in the period 1951-1966. Therefore, India continued to rely upon import of food grains to feed its rapidly growing population and to meet demand of raw materials for industrial development.

The government of India invited a team of experts sponsored by the Ford Foundation to find the way out to the problem of India's food dependency in the later years of Second-Five Year Plan. This team submitted a report titled as "India's Food Crisis and Steps to Meet It" in 1959. According to this report, India should provide intensive efforts to develop agriculture only in selected areas which has ample potential for growth. It also suggested to rely on modern inputs (particularly fertilisers, irrigation, credit, etc.) to increase agricultural production and productivity. On the basis of these suggestions, the Government of India started Intensive Area Development Programme (IADP) in seven selected districts of seven states on the basis of the availability of ample irrigation facility, less occurrence of natural calamities like drought or flood, higher potential for increase agricultural production in shorter duration, etc. in 1961. These seven districts were: West Godavari in Andhra Pradesh, Shahabad in Bihar, Raipur in Madhya Pradesh, Thanjavur in Tamil Nadu for rice,

Ludhiana in Punjab and Aligarh in Uttar Pradesh for wheat and Pali in Rajasthan for millets. In 1965, this IADP was expanded to 114 districts and renamed as Intensive Agricultural Area Programme (IAAP). This increased agricultural production to 89 million tonnes in 1965.

During this period, a new High Yielding Variety of wheat (Mexican dwarf variety) was developed by Professor. Norman Borlaug with his associates in Mexico in an International Institute for Research on wheat 'CIMMYT (Centro International de Mejorameinto de Meizy Trigo)'. The prominent result (i.e., rise of wheat production to 5,000 kg-6,000 kg per hectare of land) was shown by use of this Mexican dwarf variety of wheat in many countries: Mexico, Taiwan and countries of South and South East Asia. This HYV seed required other inputs (irrigation, fertilisers, pesticides and insecticides) to grow properly within a short span of time. Therefore, it introduced a package approach to agriculture. India also imported this dwarf variety of wheat (about 18000 tonnes) in 1966. In India, this new agricultural strategy (i.e. the package approach) was introduced in Kharif season of 1966 under the programme High Yielding Variety Programme (HYVP) in a total area of 1.89 million hectares.

The adoption of new agricultural strategy under HYVP resulted in spectacular increase in wheat and rice production. Agricultural scientist of India, M.S. Swaminathan noted that: "The progress made by India in increasing wheat production during 1964-68 exceeded that of the preceding four thousand years." In 1968, Professor William S. Gadd of Washington D.C. used the term "Green revolution" in a seminar titled as ' The Food Crisis in 3rd World Countries' for this miraculous increase in production of rice and wheat. Therefore, Green Revolution refers to the multiple increase in crop production in 3rd world countries by application of a package approach (i.e., use of modern inputs, technologies, HYVs, irrigation, fertilisation, power, pesticides and insecticides). The Green Revolution in India can be discussed under the following three phases:

- **The First Phase (1966-72):** Subramaniam, the then Minister of agriculture, adopted a new agricultural strategy to end India's food dependency on P.L. 480 by increasing food grain production with

remunerative support price to increase farmers' income. To recommend a Minimum Support Price (MSP), in January, 1965, Agricultural Prices Commission was set up, followed by setting up of the Food Corporation of India (FCI). The main task of FCI is to ascertain logistics of procuring major agricultural commodities.

In this phase of Green Revolution, benefits obtained from adoption of the new agricultural strategy 'trickled down' to the other sectors of the country and rural poverty declined significantly from 64 percent in 1967 to 57 percent in 1973.

- **The Second Phase (1973-1980):** During this period the major economic changes that took place is the nationalisation of banks inter alia other measures with a view to extend the role of the state in important areas of economic management.

  During this period especially after the oil shock, the fertilisers' prices increased resulting in drop in fertiliser consumption. Fertiliser being the important input under composite new agricultural strategy, the government increased fertiliser subsidy to prevent a drop in its consumption. At the same time during this period government put heavy emphasis on minor irrigation development which is based on groundwater irrigation. The share of groundwater irrigation rose from 0.55 percent to 19.5 percent between 1960 and 1975 on account of private investment in tube wells by farmer who reinvested the income from earlier burst in food grain production. As a result of development of groundwater based irrigation, govt. also raised the amount of power subsidies for water pumping which reached as high as 44 percent of total input subsidy at the start of 1980s.

  One of the remarkable dimensions of green revolution during this phase is the extension of HYB technology from wheat to rice. Greatly favoured by the growth of tube wells, the green revolution thus spread into new areas, marking a new phase in the expansion of domestic production.

- **The Third Phase (1981-1990):** The third phase of green revolution is remarkable in the sense that by the end of 1980s India

consolidated its status as a food secured country with sufficient amount food grains. One interesting development noticed during this phase is that the HYV technology spread eastward to states like West Bengal and Bihar, which experienced surpluses in rice with output over the 1980s growing at 5 and 3.7 percent respectively. However, in the rest of the country the impact of Green Revolution became weaker by 1985 once the new seed varieties had been widely adopted in the main producing regions.



LET US KNOW

- 'Begging bowl' is a term coined by Richard Bradly in 1940 to describe the dependence of India on import of food grains from USA.
- The starting point of Green Revolution in India was the implementation of the High Yielding Variety Programme (HYVP) in 1965-66.

9.3.1 Introduction of Mechanisation in Indian Agriculture

The transition from traditional agriculture to modern agriculture needs upgration of the agricultural technology. The technological uplift requires application of the machines in the agricultural activities for efficient use of all the inputs used in agriculture. The use of machines increases the productivity of agriculture by increasing the marginal productivity of land, labour and other inputs. The mechanisation of agriculture is the application of machines and technologies in the farming activities (for eg: ploughing, sowing, harvesting, threshing, levelling, watering etc.) which may or may not replace the manpower and animal labour to increase the efficiency of the agriculture. The machines that are used commonly in India are tractors, power tillers, harrow, harvesters, power-pump sets, etc. The mechanisation of agriculture is said to be complete when all the agricultural operations are conducted with the help of the machines (i.e., automated) while it is partial when

machines are used in combination with manpower and animal. Mechanisation of agriculture may result in replacement of the manpower and animal power by the machines. Therefore, farm mechanisation can be termed as the substitution of labour for capital which invites contradictory arguments for and against mechanisation of agriculture.

9.3.2 Arguments for Mechanisation of Indian Agriculture

- **Better Agricultural Yield:** Mechanisation helps to get better agricultural yield by sowing and harvesting in proper time. Without mechanisation, sowing and harvesting may take longer duration which may reduce the outcome of the crops. Majority of the crops have very tight sowing and harvesting time. The delaying of sowing and harvesting in such crops may lead to lower output. Sowing and harvesting with machines help to maintain proper sowing and harvesting routine. Again, mechanisation increases agricultural yield by increasing the net area sown and also increasing the cropping intensity in less time.
- **Cost Reduction:** Mechanisation helps the farmer in ploughing, sowing, harvesting, threshing, etc. in less time. It leads to large scale production. Less availability of manual labours during harvesting and sowing seasons increases wages. Therefore, using machines can enable farmers to cultivate in their lands with lower cost and lower risks of crop failure.
- **Multiple Cropping:** Multiple cropping is essential to feed increasing Indian population. Multiple cropping requires simultaneous cultivation of more than one crop on the same piece of land in a growing season.
- **Reclamation of Land:** Mechanisation of agriculture helps in reclamation of lands. In India large area of land is infested with rooted weeds. Machines help in reclamation of such weed infested lands in less time with ease.

- **Soil Conservation:** The operations like drainage, soil conservation involving contour bunding, terracing and ridging can be carried out more effectively with the help of machines. Therefore, mechanisation of agriculture helps in soil conservation in both time and time-saving manners.
- **Substitution of Land of Fodder Production for Food Production:** In the traditional method of agricultural production, animal power is used for farming operations and a large area of cultivable land is used for growing fodder to feed these animals. Modern method of agriculture uses machines in place of animal which is more efficient than animal power.
- **Use of Sub-soil Water:** Due to either slow pace of increasing or even scarcity of surface water in India, sub-soil water is the source of water for the agriculture. Sub-soil water can be extensively used only with the help of the power driven pumpset or diesel driven pumpset. Therefore, mechanisation leads to use of sub-soil water for agriculture.
- **Scarcity of Labour in Certain Areas:** Although India is a labour abundant country but distribution of the labour is not uniform across all the states. The states where labour is scarce, mechanisation is the only way to conduct agricultural activities.
- **Relief to Men and Animals:** The farming operations such as reclamation of weed infested lands, digging and carrying of earth for bunding, etc. which are extremely tiring and strenuous, labourers and animals cannot work effectively. The completion of such operations requires extra effort and time. Mechanisation of agriculture gives relief to labourers and animals from these types of extremely strenuous activities. Mechanisation also helps in completion of these operations in time effectively.
- **Employment Generation in Non-Farm Sector:** Mechanisation of agriculture also generates employment op-

portunities in non-farm activities for the labourers. The labourers can get employment in machine making industry, machines servicing industry, machine transportation services, etc.

9.3.3 Arguments Against Mechanisation of Indian Agriculture

- **Increase unemployment among low skilled rural people:** In India, the low skilled and less educated rural population is engaged. Application of machines in place of labourers increase the severity of the problem of unemployment as these low skilled and less educated people are also not fit for the non-farm activities. The use of machines also substitutes animals which also create unemployment of animals.
- **Difficulty in Use on Small Land Holdings:** Application of machines in small land is costly. No farmer would like to purchase machines for cultivation in a very small plot of land. Again, the application of machines in such land is difficult.
- **Uneconomical for Poor Farmers:** As most of the farmers in India are small and marginal farmers, the use of machines is a costly affair for them. Farmers do not have the money to purchase or hire the machines to cultivate.
- **Shortage of Fuels:** India is an oil importing country. Petrol and diesel are used to operate the machineries. Mechanisation of agriculture will lead to manifold increase of import of oil.
- **Illiteracy of Farmers:** Most of the Indian farmers are illiterate. The illiteracy in farmers leads to improper use of machines as they do not possess technical know-how to operate machine efficiently. This may lead to unnecessary frequent wear-tear of machineries used in agriculture.



LET US KNOW

The term 'mechanisation of agriculture' is used in a broader sense as it not only includes the application of machines for tillage, harvesting and threshing activities but also includes machines for transportation of agricultural produces (wagons, trucks etc.,), irrigation, processing of agricultural produce (churning of milk, crushing of sugarcane, grinding of oil seeds etc.), spraying of fertilisers, pesticides, marketing of agricultural produce.

9.3.4 Mechanisation of Indian Agriculture

The mechanisation in Indian agriculture can be discussed under two phases.

- **The First Phase:** The process of mechanisation was started in India during fifties as a consequence of land reforms. The mechanisation in India was not for developmental purposes rather it was due to land owners who started using machines in their land with an aim at turning out tenants from their lands. Contemporary literatures on land reforms also provide evidences that there were large scale eviction of tenants from the land where they were cultivating by land owners in fear of losing their lands and about their conversion into landless agricultural workers. Therefore, in this phase mechanisation was performed for self protection of land by land owners. Tractors, and tube wells were the machines used in this phase. Generally, manually operated machines or equipments were used in this phase of mechanisation in India.
- **The Second Phase:** This phase of mechanisation was started with Green Revolution in India i.e., in mid-sixties. In this phase, mechanisation was initiated in Indian agriculture for productive purposes: to increase production as well as

income of the farmers. The techniques are not only manually operated but also power (petrol, diesel, coal) driven and electricity driven. The machines used in this phase were-tractors, pumpsets, mechanical threshers, mechanical harvesters, centrifugal pumps, seed drills, disc harrows, sprayers for distribution of water, fertilisers, pesticides, etc. These machines are used in multiple cropping to increase agricultural production and to conduct farming operation before time. Before Green Revolution, the pace of mechanisation was slow because the production function related to Indian agriculture was static. The machines were used for non-productive purposes in this period. But during and after Green Revolution, the pace of mechanisation was fast as dynamism was introduced in agricultural production. The machines were used for productive purposes. Machines are also used in this phase to overcome labour shortages due to Green revolution in Indian agriculture. After Green Revolution, not only large farmers but also most of the medium farmers purchased machineries for their farms for the first time.



CHECK YOUR PROGRESS

Q 1: What do you mean by 'Green Revolution' in India?

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Q 2: Who did coin the term 'Green Revolution'?

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Q 3: What do you mean by mechanisation of agriculture?

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Q 4: Give any reasons in favour of mechanisation of agriculture.

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9.4. IRRIGATION

Irrigation is the method of artificially applying water to the soil with the help of pumps, tubes, pipes, ditch, sprayers, canals, etc. to help crop grow. According to Stern (1979), "irrigation is any process, other than natural precipitation, which supplies water to crops, orchards, grass or any other cultivated plants". The comprehensive definition of irrigation describes that irrigation includes all operations or practices in artificially supplying water to the soil for growing crops. It is a means by which water is conveyed to arid areas from rivers, reservoirs or wells to increase fertility of land. The sources of water for irrigation are ponds, rivers, lakes, wells, dams, canals, tube wells etc. The amount, frequency and time of irrigation required by crops depends on many factors: type of soil where the crop is grown, type of the crop, season of crop growing, amount of rain, location of the field where the crop is growing, etc. Before we proceed, it is important to draw the distinction between irrigation water and irrigated area. Irrigation water is the quantity of water artificially applied in the process of irrigation and does not include precipitation. Thus, irrigation requirement is the quantity of water exclusive of precipitation that is required for crop production and it includes economically unavoidable wastes. But irrigated area is the cropped area to which irrigation water has been applied at least once in a season irrespective of whether the irrigation is adequate, inadequate or surplus of requirement. Normally, irrigated area does not take into account the depth or frequency of watering.

9.4.1 Importance of Water/Irrigation in Agriculture

Water is essential for agriculture as it provides moisture to the soil and thus promotes growth in crops by making the environment more conducive for the development of overall plant growth. It

also dilutes and drains out salts from soil, softens the soil clods which facilitates easy tillage operation and reduces hazards of the frost action. It facilitates better absorption of nutrients by plant through plant roots.

Though Indian agriculture is mainly rainfed, the distribution of rain is not equitable across all areas and regions in India. The areas where rain is scanty, irrigation is the only way to provide water to the crops. In the areas with uncertain rain, irrigation helps in making water available in regular interval for the entire crop period. Irrigation helps the farmer grow water intensive crops even in dry areas/ regions.

In India about 47 percent of agricultural land is cultivable. Lack of irrigation is one of the major reasons for lower availability of cultivable land. Gross cropped area in 1951-52 was 133 million hectares and out of which only 17 percent cropped area had irrigation facility. This increased to almost 47 percent in 2012-13. Evidences also showed that the increment of crop production from early 1970s to early 1990s was related to increase in the number of lands with irrigation facility.

The role of irrigation in agriculture is two-fold. On the one hand, it promotes growth in agricultural productivity while on the other hand it contributes towards stabilisation of agricultural production. Its contribution to agricultural production takes place through (a) increase in yield, (b) rise in proportion of net sown area of a agricultural holding and (c) increase in gross cropped area and cropping intensity. In addition to these, irrigation can help in the replacement of low-valued crops by high valued crops thereby increasing gross value addition in agriculture. Irrigation contributes to stability of agricultural production by reducing farmer's dependence on rainfall which is quite erratic.

9.4.2 Classification of Irrigation Projects/Schemes (available in India)

According to Planning Commission of India, irrigation schemes/projects are classified into three types on the basis of Culturable Command Area (CCA). CCA of an irrigation project is the total command area excluding the unculturable land. These are:

- Major Irrigation Projects/Schemes
- Medium Irrigation Projects/Schemes
- Minor Irrigation Projects/ Schemes

Criteria for Classification of Irrigation Schemes

Minor schemes	Those with CCA up to 2000 hectares
Medium schemes	Those with CCA above 2000 hectares and upto 10000 hectares.
Major schemes	Those with CCA of more than 10000 hectares.

9.4.3 Methods of Irrigation/Irrigation Technology

There are different scientific methods of irrigation which have been developed by different countries in the world for efficient use of water to the crop fields. Generally, irrigation water may be applied to the fields by flooding it on the field surface, by applying it beneath the soil by spraying it under pressure or applying it by drop. The correct method however depends on availability of water (surface or ground water), the types of soil, the topography of the land and most importantly the crops grown (whether water intensive). Various methods of irrigation used by different countries are the following:

- **Surface Irrigation Methods:** In such methods, water is directly applied to soil surface diverting from the river into the canal by the construction of a diversion structure like weir or barrage across the stream without attempting to store water. This method was practiced where the stream has adequate perennial supply.

- **Sub-surface or Storage irrigation method:** In this system water is stored in a reservoir during monsoon by construction of a dam across the river. The stored water is diverted to the fields through a network of canals during the dry period. It is further classified into the following types:
  - **Perennial Irrigation Scheme:** In this scheme assured supply of water is made available to the comand area throughout the crop period to meet irrigation requirement of the crops.
  - **Non-Perennial Irrigation Scheme:** In this scheme canal supply is made available in non-monsoon period from the storage. It is also known as the restrictive irrigation scheme.
- **Sub-surface irrigation method:** Under this method water is applied below the ground surface by maintaining an artificial water table at some depth depending upon the soil texture and the depth of the plant roots.
- **Sprinkler irrigation methods:** In this method irrigation is done by spraying water onto the air and allowed to fall on the ground surface like rainfall. The spray is made by the flow of water under pressure (obtained by pumping) through small nozzles.
- **Drip (trickler) Irrigation Methods:** Drip irrigation method is also known as micro irrigation method. In this method water is applied at low rate over a long period of time at frequent intervals directly to the plant's root zone and also through a low pressure deliver system.
- **Lift irrigation method:** The lift irrigation method consists of installation of a pump at a height close to the riverbank that taps water from the river and allows it to reach the field through small channels. It can be of two types: (a) surface water lift and (b) ground water lift.

9.4.4 Development of Irrigation in Indian Agriculture

Irrigation being the crucial sector for the overall development in agriculture, the sector received considerable attention as a part of India's agricultural development strategy from the economic planners since independence. However, development in the provisioning of irrigation facility/infrastructure has become more prominent since the later half of 1960s when India adopted green revolution and the new technology required assured irrigation for optimal use of other inputs.

There has been tremendous growth in both gross irrigated area and net irrigated area in the country since 1950-51 and particularly since the Green Revolution. During 1950-51 to 2012-13 gross irrigated area increased by almost four times while net irrigated area increased by about 3 times during the same period. Comparing the same with the land utilisation statistics in the country, it is found that in 1950-51 the total net irrigated area of the country was 20.8 million hectares which was about 17.56 percent the net sown area. The share of net irrigated area as percentage of net sown area increased moderately to 19.34 percent in 1965-66 which then increased rapidly to reach 33.61 percent in 1990-91 and 47.24 percent in 2012-13. The fact that since 1965-66 there was spectacular growth in net irrigated area is clearly ramification of adoption of green revolution strategy in India.

Though irrigation development in India is tremendous, the growth is not even across the country. The north-western region of the country has experienced relatively high expansion in terms of area irrigated compared to other regions. The ratio of gross cropped area to total cropped area for the country as a whole increased from 41.7 percent in 2001-02 to 47.6 percent in 2012-13 with a great deal of variation in its growth across states and regions. While states like Bihar, Jharkhand, Chhattisgarh, Madhya Pradesh, Gujarat and Rajasthan have seen satisfactory improvement, Punjab

registered a huge leap and a pretty dismal development has been seen in north eastern states including Assam.

9.4.5 Challenges of Irrigation

Although the Government of India has taken many steps to irrigate crops in most efficient and proper ways, they have not been successful in meeting desired objectives. The main challenges are:

- Most of the farmers choose the crop on the basis of the government support on that crop. Most of the crops on which the Government gives MSP, subsidies are water intensive crops (crops needs large amount of water to grow). Therefore, cultivation of such crops in large areas needs more water. This also reduces amount of water available for cultivation of other crops.
- The demand for water increases with increasing population growth and industrialisation. The multiplicity demand of water reduces ground water available for agriculture.
- The percentage of contamination of surface water with poisonous or harmful chemicals through the littering process of pesticides, chemical and fertilisers in agriculture has increased over years. This deteriorates water quality and reduces clean water availability for all purposes (domestic use, agricultural use, industrial use, etc.)
- Lack of proper implementation of irrigation projects, lack of proper operation and maintenance, incomplete distribution system, changes in cropping patterns, diversion of use of irrigated lands for other purposes are also responsible for poor availability of irrigation facility in India.

  The challenges confronted by the major/medium irrigation projects in India as suggested by various committees constituted to evaluate the schemes were:

  - Lack of adequate drainage facilities in irrigation areas,
  - Absence of proper irrigation distribution system,

- Lack of non-introduction of rotational distribution system of water to the farmers,
- Lack of anticipatory research on the optimum irrigation water use,
- Poor coordination among the concerned governmental organisations in the command areas, and
- Lack of suitable infrastructure and extension services.



CHECK YOUR PROGRESS

Q 5: What do you mean by irrigation?

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Q 6: Mention different types of irrigation projects in India.

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.....

Q 7: Give two examples of major irrigation projects of India.

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9.5 HYV OF CROPS

High Yielding Variety (HYV) crops are those crops which are resistant to environmental damage, disease and pests. HYV seeds are genetically modified seeds which are created by selective cross pollination. The yields obtained from the cultivation of HYV seeds are about two to ten times higher than the traditional varieties.

9.5.1 Importance

HYV crops were developed to increase agricultural production and to reduce occurrence of famines particularly in developing and less developed countries.

- HYV crops have shorter life span which helps farmer to practice multiple cropping.
- HYV crops are resistant to disease, pests and insects.

- HYV crops require more labour per unit of area which increase employment.
- HYV crops are scale neutral that the large farmer and small farmer get output and income in the same proportion of crop area.

9.5.2 Government Initiatives

High Yielding Variety (HYV) seeds were introduced during Green Revolution in India. In 1960, hybridisation techniques for maize and millets were initiated. In the beginning, HYVs were introduced for five crops: wheat, rice, bajra, maize and jowar. The production of maize, bajra and jowar increased. The new strategy of agriculture was also concerned with greater intensity of cropping. The development of short varieties of rice, maize, jowar and bajra suited to different agro- climatic conditions evolved into an entirely new rotation of crop. This new crop rotation was introduced for some other crops like barley, ragi, oilseeds, potato, etc. In 1967-68 a few multi-cropping programmes were taken up.

In Fifth Five-Year Plan, HYV seeds were used in 35.2 million hectares of land. Under the 20-Point Programme introduced in 1982 during Sixth Five-Year Plan, improved and drought resistant seeds were extensively used. The area under High Yielding Varieties (HYV) was increased from 38.4 million hectares during 1979-80 to a level of 56 million hectares in 1984-85. In the Eight Five-Year Plan, technological advancements were introduced in crop production which led to development of over 550 HYV of different crops. Hybrid varieties of rice for commercial cultivation were released in different States. Development of hybrids of oilseeds also took place which increased the production of oilseeds. Three superior hybrids for maize with cold tolerance were identified. New hybrids of cotton released for cultivation in Punjab, Haryana and Rajasthan. All India Coordinated Research Project on Biological Control laid more emphasis on biological control of insect- pests for protection of plants. The Integrated Pests Management (IPM) approaches worked out for the

major nematode pests in a number of crops. A number of improved breeds of cattle and poultry such as Frieswal and CARI-Gold were also evolved.

For ascertaining regular availability of HYV seeds Government of India established institutes like National Seed Corporation, State Farms Corporation, State Seeds Corporations, Agricultural Universities, etc. The seed sector of India comprises National Seeds Corporation (NSC), State Farms Corporation of India (SFCI), 13 State Seed Corporations (SSCs) and about 1000 major private sector seed companies. For determining and checking of quality of HYV seeds there are 22 States Seed Certification Agencies (SSCAs). SSCAs control quality and provide certification to HYV seeds. There are also 101 State Seed Testing Laboratories (SSTLs) to control quality and provide certification to HYV seeds. The private sector also significantly involve in distribution of HYV seeds in India. The Indian Council of Agricultural Research (ICAR), State Agricultural Universities (SAUs) and private Companies are continuously engaged in the development of hybrids and HYV seeds of different crops suitable for varied agro-climatic conditions of India. Government of India is promoting development of Hybrids and HYV seeds of different crops by providing financial assistance to States and implementing agencies under various schemes/ programmes related to crop development: National Food Security Mission (NFSM), Bringing Green Revolution in Eastern India (BGREI), Rashtriya Krishi Vikas Yojana (RKVY), etc.



LET US KNOW

Genetically Modified (GM) crops are those crops which are created in lab by using high-tech and sophisticated techniques like gene splicing. Examples of GM crops are Bt tobacco, Bt cotton, Bt brinjal etc. These are unnatural and therefore, it is hard to accurately predict the impact of these crops on environment and

other living components of ecology. Therefore, there are huge restrictions on use of these seeds.

9.6 FOOD PROCESSING

Processing in agriculture is basically a method that refers to the biological, physical, mechanical, and biochemical transformation of the original agricultural produce into finished products or directly consumable items. Processing involves many steps to manipulate original products into consumer finished products.The main methods of food processing are sun drying, preserving with salt, fermenting, roasting, baking, smoking, steaming etc.



LET US KNOW

Food fortification is the method of addition or alteration of nutrients to foods irrespective of the nutrients naturally present/absent in the foods. The main motive behind fortification of food is to increase food value of the food which may help to reduce nutrient deficiency in consumers. Some of the common examples of food fortification are iodine added to table salt (iodised salt), folic acid added to flour, vitamin A and D added to milk and oils/fats, artificial sweeteners added to biscuits etc.

In India, FSSAI has laid down standards for fortification of staple food like salt, wheat flour, milk and oats.

9.6.1 Development of Food Processing in India

Food processing sector is considered to be an agro-based industry. India's food processing sector is one of the largest sectors in terms of production, growth, consumption, and export. The Indian food processing industry is primarily export-oriented having its exports mostly to the countries of Europe, the Middle East, Japan, Singapore, Thailand, Malaysia, and Korea and also to the countries of the gulf regions. The food processing sector of India

covers mainly fruits, vegetables, spices, meat, poultry, milk and milk products, alcoholic beverages, fish and fish products, processed grains and other consumer product groups like confectionery, chocolates and cocoa products, soya-based products, mineral water, high protein foods, etc. India's total export of processed food was Rs. 31,204.78 crores in 2019-20 and is rising over the years.

Indian economy is an agrarian one. India has the second largest arable land of 161 million hectares and has the highest acreage under irrigation. India is the largest producer of many agricultural and horticultural foods. According to Agricultural and Processed Food Products Export Development Authority (APEDA) of India, India is the largest producer of milk, cashew nuts, coconuts, tea, ginger, turmeric and black pepper. It is the second largest producer of wheat, rice, sugar, groundnut, and inland fish. It is the third largest producer of tobacco. It accounts for 10 percent of total production of fruits in the world. In the production of banana and sapota, India is ranked first. Thus, the huge production of agricultural and horticultural products facilitates India to be emerged as a major producer of processed foods. India's food processing industry accounts for 32 percent of the India's total food market. In terms of size, the food processing industry of India ranks fifth in the world. In 2020, the food processing industry contributed 8.80 percent and 8.39 percent to the Gross Value Addition (GVA) in manufacturing and agriculture respectively. It accounts for 13 percent of India's exports and 6 percent of total industrial investments of India. According to the data of Department of Industrial Policies and Promotion (DIPP), the total Foreign Direct Investment (FDI) in the food processing industry of India from 2017 to 2020 is about US $ 7.54 billion.

Investments in the registered food processing units have been growing in the recent years. In 2007-08, the fixed capital of registered food processing units has increased by 18.93 percent

over the previous year. But, India accounts for less than 1.5 percent of international food trade despite being one of the world's major food producers, which indicates huge potential for both investors and exporters. Food processing industry in India is increasingly seen as a potential source for driving rural economy as it brings synergy between industry and agriculture.

9.6.3 Significance of Food Processing in India

The importance of food processing in India can be understood from the following grounds:

- Employment generation: It provides direct and indirect employment opportunities, because it acts as a bridge between Agriculture and Manufacturing.
- Doubling of farmers' income: Globalisation and changes in the lifestyles has changed consumer preferences for processed food all over the world. This derived demand increases the incomes of the farmers by the following ways:
  - Increasing production and productivity of agriculture.
  - Increasing price of raw materials (i.e., agricultural produces) for processed food industries as the demand for processed foods increases.
  - Increasing diversification of crops.
  - Increasing production of high valued processable varieties of agricultural outputs which has high value addition in processed food sector.
  - Increasing direct and indirect employment for disguised agricultural labours.
  - Providing employment opportunity for women.
- **Reduction in malnutrition:** Fortification of the processed foods increases the nutritional benefits of the foods. This enhances the food value of the processed food as well as helps in curbing the nutritional deficiency of the Indian population.

- **Reduction in food wastage:** Post-harvest loss is one of the main challenges in Indian agriculture. According to the survey entitled "Assessment of Quantitative Harvest and Post-Harvest Losses of Major Crops and Commodities in India," conducted by the Indian Council of Agricultural Research (ICAR) in 2016 about 3.9 to 6.0 percent, 4.3 to 6.1 percent, 2.8 to10.1 percent, 5.8 to 18.1 percent and 6.9 to 13 percent of cereals, pulses, oilseeds, fruits and vegetables respectively were lost during harvesting, post-harvesting activities including handling and storage. Here, processed food technology helps in the reduction of the food wastages by reducing the spoilage of agricultural products.
- **Source of valuable foreign exchange:** Food processing industry of India is an important source of foreign exchange. For e.g. Indian Basmati rice has great demand in Middle Eastern countries.
- **Curbing migration:** Food processing is basically a labour intensive industry. Therefore it can provide localized employment opportunities. It helps in reduction in both rural to urban and international (from backward country to developed country) migrations of labours.
- **Curbing food inflation:** Processing increases the shelf life of the food thus keeping supplies in balance with the demand. Thus, food processing industry may control food-inflation.
- **Promotes crop-diversification:** Food processing requires different types of inputs/raw materials to produce a wide range of processed food products. This generates derived demand for different types of agricultural products and this creates an incentive for the farmers to grow diversified crops.
- **Reduction in spoilage or increase in shelf life:** In food processing industry, microbes and other anti-spoilage technologies are used to increase shelf life of the agricultural products.

- **Enhances the quality and taste:** In food processing technology, fortification is used to increase the nutritional quality of foods. The additives are also used to increase the tastes of the foods.
- **Expansion of consumer choices:** International trade and processing technology can make processed food available all over the world. Food processing allows food from other parts of the world to be transported to our local market and vice versa. In this way, food processing industry helps in expanding the consumer choices.



LET US KNOW

The key growth drivers of Food Processing Sector in India are:

- Increasing expenditure on nutritional foods
- Increasing the number of nuclear families
- Increasing number of working women
- Lifestyle changes
- Growing demand for functional foods, fresh and processed foods
- Increasing income of the people

9.6.4 Government Initiatives for Development of Food Processing in India

Agricultural and Processed Food Products Export Development Authority (APEDA) is an apex organisation under the Ministry of Commerce and Industry which focuses on 'export' of scheduled processed products. The Ministry of Food Processing Industry of India introduced an umbrella scheme 'SAMPADA (Scheme for Agro-Marine Processing and Development of Agro-Processing clusters) in 2016 for the period 2016-2020 which was renamed as Pradhan Mantri Kisan SAMPADA Yojana (PMKSY) in 2017. The main objectives of PMKSY are:

- To supplement agriculture.
- To create processing and preservation capacities.
- To modernise and expand existing food processing units with a view to increase the level of processing.
- To value addition of the agricultural produce.
- To reduce the agricultural wastages.

PMKSY has seven components which are as follows:

- Mega food parks.
- Integrated Cold Chain and Value Addition Infrastructure.
- Creation/ Expansion of Food Processing Clusters.
- Creation of Backward and Forward linkages.
- Creation/ Expansion of food processing and preservation capacities.
- Food safety and Quality Assurance Infrastructure.
- Human Resources and Institutions.

Prime Minister Kisan SAMPADA Yojana is a comprehensive package which results in creation of modern infrastructure with efficient supply chain management from gate to retail outlet to promote and develop processed food industry in India. Its main objective is to boost food processing sector and providing better returns to farmers and is step towards doubling of farmers income, creating huge employment opportunities especially in the rural areas, reducing wastage of agricultural produce, increasing the processing level and enhancing export of the processed foods.

The government of India has undertaken many strategic roles for development of food processing industry. The food processing industry is playing an essential role in linking agricultural farmers to the domestic as well as international consumers. The central government has given the priority status to all agricultural processing businesses to promote growth and efficiency of food processing industry of India. The Ministry of Food Processing Industries (MoFPI) has taken many steps to ameliorate investment opportunity in food processing industry that its output could

increase to US $ 535 billion by 2025-26. The major initiatives are:

At present, there are 22 mega food parks operational in India. Many food processing units (bakeries, mills) for processing of different types of agricultural produce are available in India. At present in organised sector, there are over 516 flour mills, 568 fish processing units, 5293 fruits & vegetable processing units, 429 sugar mills, 725 solvent extraction plants and 1.50 lakh rice mills, 35088 modern rice mills and more than 15 thousand pulse mills. There is more scope for the enlargement of the food processing units in India to meet the growing domestic as well as foreign demands for processed food products. On March 31, 2021, the union cabinet approved the Central Sector Scheme 'Production Linked Incentive Scheme for Food Processing Industry (PLISFPI)' for the period from 2021-22 to 2026-2027 with a total outlay of ? 10,900 crores. The Govt. of India allowed FDI up to 100%, under the automatic route in order the develope food processing industries.



LET US KNOW

- The Agricultural and Processed Food Products Export Development Authority (APEDA) was established by the Government of India under the Agricultural and Processed Food Products Export Development Authority Act passed by the Parliament in December, 1985.
- The Ministry of Food Processing Industries (MoFPI) has announced the celebration of the Food Processing Week from 6th to 12th September, 2021 as a part of the Azadi Ka Amrit Mahotsav celebration to commemorate 75 years of India's Independence.



CHECK YOUR PROGRESS

Q 8: What is acronym of HYV seeds?

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Q 9: What do you mean by food processing?

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9.7 LET US SUM UP

- The importance of technological change in agriculture was recognised during mid 1960s as the only means to end the 'begging bowl' image of India. Therefore, during mid sixties, Indian agriculture was transformed from traditional to modern agricultural practices and as a result of this transformation, Indian agriculture experienced a spectacular increase in production of wheat and rice. This increase in production of food grains was termed as 'Green Revolution' for the first time in 1968 by William Gadd of USA.
- The 'Green Revolution' of India encompasses three phases: first phase from 1966 to 1972; second phase from 1973 to 1980 and the third phase from 1981 to 1990.
- The mechanisation of agriculture is the application of machines and technologies in the farming activities (for eg: ploughing, sowing, harvesting, threshing, levelling, watering etc.) which may or may not replace the manpower and animal labour to increase the efficiency of agriculture.
- Some experts favour mechanisation while others are against of this. The arguments in favour of mechanisation are: better agricultural yield, reclamation of land, reduction in cost of agricultural practices etc. While, the arguments against mechanisation are: increase

unemployment, difficult to adopt by illiterate and low skilled farmers, inefficient to use in small size of agricultural lands, scarcity of fuel to operate machineries, etc.

- Irrigation is the method of artificially applying water to the soil with the help of pumps, tubes, pipes, ditch, sprayers, canals, etc. to help crop grow. The sources of water for irrigation are ponds, rivers, lakes, wells, dams, canals, tube wells, etc. The amount, frequency and time of irrigation required by crops depends on many factors: type of soil where the crop is grown, type of the crop, season the crop growing, amount of rain, location of the field where the crop is growing, etc.
- There are many irrigation schemes/ projects available like major irrigation projects, medium irrigation projects, minor irrigation projects. The modern technologies for irrigation available in India are: drip irrigation, sprinkler irrigation, surface irrigation, perennial irrigation, sub-surface irrigation, etc.
- The government has taken many initiatives to ascertain irrigation in low rain areas and in dry areas.
- High Yielding Variety (HYV) crops are those crops which are resistant to environmental damage, to disease and to pests. The experts provide arguments in favour of use of HYV crops as HYV crops increase agricultural production and reduce occurrence of famines particularly in developing and less developed countries; HYV crops have shorter life span which helps farmer to practice multiple cropping; HYV crops require less water to grow than traditional crops; HYV crops require more labour per unit of area which increase employment; HYV crops are scale neutral that the large farmer and small farmer get output and income in the same proportion of crop area etc.
- The negative potential impact of application of HYV seeds are: application of HYV seeds intensifies inter regional and intra regional inequalities, creates health hazards, degrades other units of agriculture, accurse only short-time benefits, generate threat of extinction for indigenous and traditional varieties of the same crop etc.
- The government of India has been taking steps for development of

research to develop and identify new HYV crops. In the last five years, more than 100 Hybrids and HYV seeds of crops mainly maize (44), pearl millet (13), sorghum (5), rice (3) sunflower (9), castor (7), sesame (2), and cotton (23) were released and developed under different All India Coordinated Research Projects (AICRPs) of respective crops by ICAR and State Agricultural Universities.

- Processing in agriculture is the method of the biological, physical, mechanical, and biochemical transformation of the original agricultural produce into consumer finished products. Thus, processing involves many steps to manipulate original products into consumer finished products.
- Processing of food emerged as a need to preserve food for future consumption or to reduce spoilage and wastages of perishable agricultural products. Processing of food has been done since pre-historic period although at that time the processing techniques were in nascent stage. The main methods of food processing were sun drying, preserving with salt, fermenting, roasting, baking, smoking, steaming, etc.
- India's food processing sector is one of the largest sectors in terms of production, growth, consumption, and export. The Indian food processing industry is primarily export oriented. India has geographical advantage for the export to the countries of Europe, the Middle East, Japan, Singapore, Thailand, Malaysia, and Korea and also to the countries of the gulf regions.
- The food processing sector of India covers mainly fruits, vegetables, spices, meat, poultry, milk and milk products, alcoholic beverages, fish and fish products, processed grains and other consumer product groups like confectionery, chocolates and cocoa products, soya-based products, mineral water, high protein foods, etc.
- The focus sectors in the food processing industry in India are Nutraceuticals, fruits and vegetables, dairy, food grains, poultry and meat, fisheries and marine, spices, RTE (Ready to Eat)/ RTC (Ready to Cook).
- Agricultural and Processed Food Products Export Development

Authority (APEDA) is an apex organisation under the Ministry of Commerce and Industry which focuses on 'export' of scheduled processed products.

- The food processing sector of India has a lot of scope to make India as the country with 'largest food processing industry' in the world in the near future.



9.8 FURTHER READING

1) *Agriculture Growth and Green Revolution*. (2008). In B. Chandra, M. Mukherjee, & A. Mukheerjee, India Since Independence (Vol. 12). Penguin Books. Chandra, B., Mukherjee, M. & Mukharjee, A. (2008). "*Agriculture Growth and Green Revolution". India Since Independance (Vol 12)*

2) Kapila. U. (2021).Indian Economy since Independence.(32nd ed.). Academic Foundation.

3) Chandr, B., Mukheerji, M., & Mukheerji, A. (2008).Agriculture Growth and Green Revolution. (Vol. 12) Penguin Books.

4) Dev, S. M. (2015-16). *Agricultural Development in India*: Peformance, Issues and Policies. In U. Kapila (Ed.), Indian Economy Since Independence (Vol. 26, pp. 647-676). Academic Foundation, New Delhi.



9.9 ANSWERS TO CHECK YOUR PROGRESS

Ans to Q No 1: The Green Revolution is the new agricultural strategy that was initiated in 1965-66 for making India self-sufficient in the production of food grains.

Ans to Q No 2: The term 'Green Revolution' is coined by

Ans to Q No 3: The mechanisation of agriculture is the applications of machines and technologies in the farming activities (for eg: ploughing, sowing, harvesting, threshing, levelling, watering etc.)

which may or may not replace the manpower and animal labour to increase the efficiency of the agriculture.

Ans to Q No 4:

Ans to Q No 5: Irrigation is the method of artificially applying water to the soil with the help of pumps, tubes, pipes, ditch, sprayers, canals, etc. to help crops grow.

Ans to Q No 6: The different types of irrigation projects in India are major irrigation projects, medium irrigation projects and small irrigation projects.

Ans to Q No 7: Bhakranangal irrigation project, Hirakund irrigation project.

Ans to Q No 8: High Yielding Variety seeds.

Ans to Q No 9: Food processing in agriculture is the method of the biological, physical, mechanical, and biochemical transformation of the original agricultural produce into consumer finished products.



9.10 MODEL QUESTIONS

Short Questions (Answer each question in about 150 words)

Q 1: What do you mean by Green Revolution?

Q 2: When did Green Revolution start in India?

Q 3: How did Green Revolution increase mechanisation of Indian agriculture?

Q 4: What do you mean by 'mechanisation'?

Q 5: Define irrigation.

Long Questions (Answer each question in about 300-500 words)

Q 1: Critically discuss Green Revolution and mechanisation of Indian Agriculture.

Q 2: Do you think mechanisation is always helpful for agriculture in India? Give arguments.

Q 3: Discuss the importance of irrigation in Indian agriculture.

Q 4: Critically discuss the impact of introduction of HYV crops in Indian agriculture?

Q 5: Discuss the present status of food processing sector of India.

Q 6: Discuss the role of Government in development of food processing sector in India.

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UNIT 10 : AGRICULTURAL LABOUR

UNIT STRUCTURE

10.1 Learning Objectives

10.2 Introduction

- 10.2.1 Categories of Agricultural Labour
- 10.2.2 Landless Labour
- 10.2.3 Characteristics of Agricultural Labour
- 10.2.4 Magnitude of Agricultural Labour in India
- 10.2.5 Causes of the Poor Status of Agricultural Labourers

10.3 Agricultural Labour and Employment Conditions

10.4 Agricultural Labour and Unemployment Problem

- 10.4.1 Disguised Unemployment
- 10.4.2 Seasonal Unemployment

10.5 Income and Wage Determination of Labour

10.6 State Policy For Agricultural Labour

- 10.6.1 Important Policies
- 10.6.2 Suggestions

10.7 Let Us Sum Up

10.8 Further Reading

10.9 Answers to Check Your Progress

10.10 Model Questions

10.1 LEARNING OBJECTIVES

On reading this unit, you should be in a position to-

- explain the concept of agricultural labour
- identity the different types of unemployment that are seen in the agricultural sector
- describe how incomes and wages of agricultural labour are fixed
- gain an idea of the various state policies which are introduced for the betterment of agricultural labour.

10.2 INTRODUCTION

One of the important factors of production is labour. According to Prof. Marshall “Labour is any exertion of mind or body undertaken partly or wholly with a view to some good other than the pleasure derived directly from the work.” In Economics, labour indicates both physical and mental work undertaken for earning livelihood. Therefore, labour is regarded as an active factor of production. Labour can be classified in many forms such as physical labour, mental labour, skilled labour, unskilled labour, etc. But one of the famous types of labour is agricultural labour which is mainly seen in most of the less developed countries and developing countries.

In simple words, agricultural labourers are those persons who are engaged in the agricultural sector. Basically, those persons who work on the land of others on wages for the major part of the year and earn a major portion of their income as a payment in the form of wages for works performed on the agricultural farms owned by others are known as agricultural labourers. According to the first Agricultural Labour Enquiry Committee of 1950-51, those who worked for 50% or more days on the payment of wages were termed as agricultural workers or agricultural labourers. However, the second Agricultural Labour Enquiry Committee of 1956-57 gave an extended version and regarded those persons as agricultural labourers who worked in agriculture as well as in allied activities such as horticulture, animal husbandry, fisheries, dairy, etc. We have to define agricultural labour separately from industrial labour as the definition of industrial labour cannot be applied to them. One of the reasons for this is that it is not possible to make distinction among agricultural labourers as unskilled, semi-skilled and skilled labour like industrial labourers.

10.2.1 Categories of Agricultural Labour

Like industrial labour, agricultural labour cannot be classified as unskilled, semi-skilled and skilled labour. However, the first Agricultural Labour Enquiry Committee of 1950-51 categorises agricultural labour as

- **Attached Labour:** Those labourers who are attached to some other farmer household on the basis of a written or oral agreement are known as Attached Labourers. They are also termed as Bonded Labour as they are working as serfs or servants. These workers are not allowed to work in other places.
- **Casual Labour:** When workers are free to work in any farm or any places on the basis of the payment of daily wages, then that type of labour is known as Casual Labour. Casual labour may include different types of labour. For example in India, casual labour includes:
  - Small farmers who possess very little land and consequently have to devote most of their time working on the lands of others as labourers.
  - Share-Croppers who, while sharing the produce of the land for their work, work as agricultural labourers.
  - Landless labourers who exclusively work for others.
  - Tenants who work on leased land but work most of the time on the land of others as labourers.

Significantly, agricultural labourers can be divided into two main categories-

1. Landless agricultural labourers 2. Very small cultivators whose main source of earnings due to their small and sub-marginal holdings is wage employment. Again, landless labourers may be Permanent Labourers attached to cultivating households or Casual Labourers.

10.2.2 LANDLESS LABOUR

One of the main categories of agricultural labourers is Landless Labourers. Landless labourers are those persons who work on the land of others on wages as they do not have their own plot of land. Landless labourers in turn can be classified into two broad categories: (1) Permanent Labourers attached to cultivating households. (2)

Casual Labourers. The second group can again be divided into three subgroups: (i) Cultivators (ii) Shares Croppers (iii) Lease holders. Permanent or attached labourers generally work on an annual or seasonal basis and they work on some sort of contract or agreement. Their wages are fixed by the custom or tradition. On the other hand, temporary or casual labourers are engaged only during peak periods for work. Their employment is temporary and they are paid at market rate. They are not attached to any landlords.

The problem of landless labourers is quite common in India. Therefore, from time to time, the government has taken some measures to solve this problem. Bonded Labour System (Abolition) Act, Land Reform Policy, etc. were mainly introduced to solve the problem of landless labour.

10.2.3 Characteristics of Agricultural Labour

From the definition and the categories of the agricultural labour, we can identity the following main characteristics of agricultural labour:

- Agricultural labourers are those persons who work on the land of others on wages for the major part of the year and earn a major portion of their income as a payment in the form of wages for works performed on the agricultural sector.
- Agricultural labour includes those workers who are engaged in agriculture as well as in allied activities such as horticulture, animal husbandry, fisheries, dairy, etc.
- Agricultural labourers are mainly seen in the rural areas of a country. Therefore, it is said that agricultural labourers are the most exploited unorganised class in the rural population of a country like India.
- Agricultural labourers can be categorised as attached labourers, landless labourers, tenants labourers, etc.
- Agricultural labourers are unskilled and unorganised in nature.

10.2.4 Magnitude of Agricultural Labour

During the colonial period, the number of agricultural labour was very insignificant. According to the 1881 census, the number of landless labourers was 7.5 millions. This margin was increased to 21 millions in 1921 which constituted around 17.4 % of the total labour force. After that the number of agricultural labour has increasing to 27.5 million, 31.5 million, 47.5 million, 55.4 million and 74.6 million in the year 1951,1961,1981 and 1991 respectively. Simultaneously the percentage of landless workers as a proportion of the rural labour force has increased from 18 % in 1964-65 to 25% in 1981. Due to the increasing size of population, decline of cottage and village industries, growing indebtedness and expansion of capital intensive farming, the number of agricultural labour has been increasing.

10.2.5 Causes of the Poor Status Agricultural Labour

The condition of agricultural labourers in India is not very good. Basically they are living in inhumanc conditions and are deprived of all the basic necessities of their life. The main factors which are responsible for the poor conditions of agricultural labourers in India are discussed in the following points:

- **Unorganised:** Because of aspects like ignorance, illiteracy and widely scattered; agricultural labourers are totally unorganised in India. They do not even have the capacity to fix a proper wage level for their work.
- **Low Social Status:** The social status of agricultural labour in India is very low as they come from oppressed classes and they have no courage to assert their basic rights.
- **Seasonal Unemployment:** Indian agricultural sector is seasonal in nature. Therefore, most of the agricultural labourers often face the problem of seasonal unemployment in India. Thus, the conditions of labourers are very poor.
- **Growing Indebtedness:** Due to low wage level, lack of proper

credit facilities, etc. most of the agricultural labourers in India are highly indebted. They are compelled to borrow from lenders and become their bonded labour.

- **Absence of Alternative Occupations:** Indian agricultural labourers frequently face the problem of disguised unemployment and seasonal unemployment because of the absence of alternative occupations or jobs in the rural areas. That is why, the conditions of agricultural labour in India are poor.



CHECK YOUR PROGRESS

Q 1: Define agricultural labour. (Answer in about 20 words)

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Q 2: What are the main features of agricultural labour? (Answer in about 40 words)

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Q 3: Identify the factors responsible for the continuous and enormous increase in the number of agricultural labourers in India. (Answer in about 30 words)

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10.3 AGRICULTURAL LABOUR AND EMPLOYMENT CONDITIONS

The conditions of agricultural labour in India are not very good. They are generally poor. Their standard of living is also very low as they face many problems like poverty, unemployment, exploitation, uncertainty, etc.

If we discuss the employment condition of agricultural labour, then we have seen that most of the agricultural labourers do not get a regular basis of work. Some of them remain unemployed or underemployed. For example, labours do not get permanent work for longer periods. Bonded labourers are not allowed to work in other places and are exploited by the land owners. Moreover, wages of the agricultural labourers are very low. Data of the Secondary Agricultural Labour Enquiry, 1956-57 stated that casual workers get wages employment for 197 days and work on their own for 40 days. For the remaining 128 days of the year, these labourers remained unemployed. Female workers remained unemployed for a longer period of about 197 days. Thus, casual agricultural labourers remained without work for 4 to 5 months in a year. The position is not even better in the present time. Agricultural labourers are not only adequately employed, but also their working conditions are not very good. They have to do very hard labour in dificult conditions at times. There is no provision for holidays or other facilities. All these adversely affect their health, work efficiency, etc.

10.4 AGRICULTURAL LABOUR AND UNEMPLOYMENT CONDITIONS

Unemployment is the most serious problem from which India has been suffering from the very beginning till now. In fact it is regarded as the greatest problem faced by many countries of the world. The nature of unemployment differs from developed countries to underdeveloped countries. In India, the unemployment problem is structural in nature which can be broadly classified into rural unemployment and urban unemployment. Between rural unemployment and urban unemployment, the magnitude of rural unemployment is high in India. Rural unemployment is basically related to the agricultural sector. Basically agricultural labourers face the problem of unemployment in rural areas of the country. Since the agricultural sector is not free from limitations, the problem of unemployment is also seen in the agricultural sector. However rural unemployment is of two types. They are-

- Disguised Unemployment
- Seasonal Unemployment

10.4.1 Disguised Unemployment

Disguised unemployment refers to that type of unemployment in which some people look like being employed but are not employed fully in reality as their marginal productivity is either zero or even negative. Indian agriculture is characterised by this type of unemployment. As a result of not having opportunities for jobs other than agriculture, disguised unemployment is seen in India. This is also known as perennial unemployment. The main reasons for disguised unemployment are -

- Practices of the joint family system.
- Small size of land holdings.
- Lack of alternative jobs other than agriculture.

Following measures should be taken to solve the problem zof disguised unemployment:

- Agricultural sector should be modernised.
- Consolidation of land holding should be done by proper legislation.
- Impart knowledge, skill so that rural people can get other jobs.

10.4.2 Seasonal Unemployment

If people are employed only in seasons of the year and unable to get employment in other seasons then that type of rural unemployment is known as seasonal unemployment. This type of unemployment is seen in the agricultural sector in India. For example, the agricultural labourers are employed only in certain months of the year, for example, at the time of waiting seeds planting harvesting etc. Except these period and seasons they are unemployed. This type of unemployment is seen in India because of the following reasons:

- Absences of multi-cropping systems.
- Absences of other occupations in rural areas.

By adopting the following measures, we can solve the problem of seasonal unemployment:

- Promote co-operating farming.
- Educate rural people so that they can find jobs in other fields.



CHECK YOUR PROGRESS

Q 4: What do you mean by perennial unemployment? (Answer in about 20 words)

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.....

Q 5: What are the main reasons for seasonal unemployment? (Answer in about 40 words)

.....

.....

10.5 INCOME AND WAGE OF THE LABOUR

The reward that a labour earns for his/her work is simply known as wage. Basically wage can be determined by the equilibrium position of labour supply and labour demand. But in India, labour supply indicates surplus labour. Here, the total agricultural population determines the size of the labour force available to agriculture. This raises the problems of its employment. Similarly, the demand for labour is determined by the nature of the farm work. Moreover, demand for agricultural labour is seasonal in nature. So, demand for labour is neither permanent nor stable. Therefore, we have seen an organised labour market in India. Because of this, the agricultural wages are very low in India. Wage includes both money wage and real wage. The certain amount of money paid to the labourers for the work is called the money wages. Again the amount of goods and services which the labourer actually gets is called the real wages. In India the agricultural labour has not been benefited by an appropriate amount of money wages or real wages.

The statistical data of the First Agricultural Labour Enquiry committee revealed that the per capita annual income of Agricultural labour families was as poor as Rs. 104 in 1950-51 and the annual average income of the household was Rs. 447. In 1955 -66, the average annual income declined to Rs. 437. But that was increased to Rs. 600 and 1,671 in 1963- 64 and 1974 -75 respectively. But due to the introduction of improved farming methods and mechanisms, the demand for labour and real wages declined continuously. In 1984-85, G. Parthasarathy estimated that the daily money wages varied between Rs. 6 and Rs. 11 in all states except Punjab, Kerala and Haryana. Thus, we can say that the living condition of Agricultural labourers is not very good in India as the level of agricultural wages is very poor.

10.6 STATE POLICY FOR AGRICULTURAL LABOUR

India is an agrarian country. Majority of the people of the country is engaged in this sector. Therefore, agricultural labour plays an important role in the process of economic development. The government has shown awareness of the problems of agricultural labourers and suggested various ways and measures to improve their situation. Some of the main measures adopted under the various plans are be briefly mentioned:

- **Minimum Wages Rate:** The Minimum Wages Act was passed in 1948. In view of the practical difficulties of fixing minimum wages for agricultural labourers because of differing employment conditions, the first plan recommended that fixation of minimum wages should be covered first to improve the conditions of agricultural labour. Now most of the states except Jammu and Kashmir, Nagaland and Sikkim have taken necessary legislation for fixing minimum wages.
- **Abolition of Bonded Labour:** The practices of bonded labour should be abolished in order to improve the conditions of agricultural labourers. Because of this, the Bonded Labour System (Abolition) Act was passed in 1976 where about 2.51 lacs bonded labours were identified and freed in different parts of the country. Moreover around 2.29 lacs bonded labour were rehabilitated till 1995 in India.

- **Distribution of Landless Labourers:** Agricultural labourers have been helped to settle on land as cultivators. For this purpose, the ceiling on land holdings was fixed by proper legislation under the land reform system. Because of this, 74 lakh acres of land were identified as surplus land and around 45 lakh acres were distributed among 41.5 lakh landless labourers.
- **Various Schemes:** From time to time, both state and central government have introduced various programmes and policies for the betterment of the agricultural labourers. Some of them are Food for Work, National Rural Employment Programme, Rural Landless Employment Guarantee Programme, Jawahar Rozgar Yojana, etc.
- **Special Programmes for Weaker Sections:** As part of the overall strategy of helping weaker sections of the population through special programmes, agricultural labourers were given special assistance. These programmes were designed to promote social justice through the spread of the new technology. The programmes were - Small Farmers Development Agency (SFDA) and Marginal Farmers and Agricultural Labourers Development Agency (MFAL). They were developed for conducting various works like irrigation, land leveling, poultry breeding, etc. Both the Agencies were merged into one single programme in the fifth plan.

10.6.1 Important Policies

- **Integrated Rural Development Programme (IRDP):** Integrated Rural Development Programme was launched on 2nd October, 1980 in all the blocks of the country. The main aim of this programme was to provide productive assets or skills to the poor labourers so that they can employ themselves usefully to earn greater incomes and not remain unemployed.
- **Rural Landless Employment Guarantee Programme (RLEGP):** Rural Landless Employment Guarantee Programme was launched during the Sixth Five Year Plan on 15th August, 1983. It was totally a centrally sponsored scheme

as its entire cost was financed by the central government. The main purpose of this programme was to provide guarantee of employment to at least one member of every rural landless household up to 100 days in a year and improve the standard of living of the poor.

- **National Rural Employment Programme (NREP) :** National Rural Employment Programme was introduced on 24 October, 1980. But it became a regular plan programme from April 1981. This was a centrally sponsored scheme where 50% assistance came from the central government. The main purpose of this programme was to extend the employment of 300-400 million men per year and improve nutritional status and living standards of the rural people.
- **Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA) :** Initially, National Rural Employment Guarantee Act was launched on February 2, 2006. However, it was renamed as Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA) on 2nd October 2009. The main aim of this Act is to provide jobs to the rural poor. It aims to enhance livelihood security in rural areas by providing at least 100 days of wage employment in a financial year to every household whose adult members volunteer to do unskilled manual work.
- **Swarna Jayanti Gram Swarozgar Yojana (SGSY) :** Swarna Jayanti Gram Swarozgar Yojana was launched in April 1999. Actually Integrated Rural Development Programme (IRDP)and allied programmes such as Training of Rural Youth for Self Employment (TRYSM), Development of Women and Children in Rural Areas (DWCRA) and Million Wells Scheme have been reconstructed into a single self employed programme and this is known as Swarna Jayanti Gram Swarozgar Yojana (SGSY). This programme aimed at providing self employment to villagers through the establishment of self help groups (SHGs).

- **Kisan Credit Card Scheme:** Kisan Credit Card Scheme was launched in 1998-99 on the basis of the model scheme prepared by NABARD. This is an innovative mechanism for facilitating short run credit to agricultural labourers. To rescue the agricultural labourers or farmers from growing indebtedness, this scheme was launched in India. By introducing this scheme, the Government of India tried to facilitate access to credit from commercial banks and regional rural banks to the farmers.

10.6.2 Suggestions

To uplift of the socio-economic and cultural conditions of the agricultural labourers, the following suggestions can be made-

- Agricultural sector should be modernised.
- Working conditions should be improved so that agricultural labourers can do their work efficiently.
- Credit should be given at cheaper rates of interest on easy terms of payment for undertaking subsidiary occupation.
- Steps should be undertaken for proper training for improving the skill of farm labourers.
- Initiative should be taken for Cooperative farming.



CHECK YOUR PROGRESS

Q 6: In which year was the IRDP scheme launched? (Answer in about 20 words)

.....

.....

.....

Q 7: What is the main aim of the Kisan Credit Card Scheme? (Answer in about 20 words)

.....

.....

Q 8: What is the full form of MGNREGA? (Answer in about 20 words)

.....

.....



10.7 LET US SUM UP

- Agricultural labourers play an important role in an economy. Basically those workers can be termed as agricultural labourers who are mainly engaged in agriculture and allied activities like animal husbandry, dairy, piggery, poultry farming, etc.
- Like industrial labour, agricultural labour cannot be classified as unskilled, semiskilled and skilled labour. Agricultural labourers can be categorised as attached labourers, landless labourers, Tenants labourers, etc. They are unskilled and unorganised in nature.

  The number of agricultural labourers has been increasing from time to time. Due to the increasing size of population, decline of cottage and village industries, growing indebtedness and expansion of capital intensive farming; the number of agricultural labour has been increasing.
- Most of the agricultural labourers do not get a regular basis of work. Some of them remain unemployed or underemployed. For example, laborers do not get permanent work for longer periods. Bonded labourers are not allowed to work in other places and exploited by the land owners. They have to do very hard labour under unfavorable conditions.
- We can identify many factors for the poor conditions of agricultural labourers in India. Some of them are-
  - Unorganised labourers.
  - Lower social status of the labourers.
  - Problem of seasonal as well as disguised unemployment.
  - Absence of alternative occupations.
  - Growing indebtedness.

- Since Indian agricultural sector is seasonal in nature, agricultural labourers are facing the problem of seasonal unemployment and disguised unemployment. Disguised unemployment refers to that type of unemployment in which some people look like being employed but are not employed fully in reality. If people are employed only in seasons of the year and unable to get employment in other seasons then that type of rural unemployment is known as seasonal unemployment.
- The agricultural wages are very low in India. The agricultural labour has not been benefited by an appropriate amount of money wages or real wages. Therefore, they are living in inhumance conditions and in the absence of organised status they are deprived of all the basic necessities of their life.
- Both the central government and the state governments have taken various steps in order to improve the conditions of agricultural labourers in India. Government have introduce various schemes and policies for this purpose. Some of the important schemes and policies are Food for Work, National Rural Employment Programme, Rural Landless Employment Guarantee Programme, Jawahar Rozgar Yojana, MGNREGA, etc.



10.8 FURTHER READING

1) P. K. Dhar; *Indian Economy- Its Growing Dimension* (Edition-2020). Kalyani publisher

2) V. K. Puri and S. K. Misra (2017); *Indian Economy*. Himalaya Publishing House Pvt. Ltd.



10.9 ANSWERS TO CHECK YOUR PROGRESS

Ans to Q No 1: Those persons who work on the land of others on wages for the major part of the year and earn a major portion of their income as a payment in the form of wages for works performed

on the agricultural farms owned by others are known as agricultural labourers.

Ans to Q No 2: The main features of agricultural labour are:

- Agricultural labourers are mainly seen in rural areas.
- Agricultural labour are engaged in agriculture as well as in allied activities such as horticulture, animal husbandry, fisheries, dairy, etc.

Ans to Q No 3: The factors responsible for the continuous and enormous increase in the number of agricultural labourers in India are-

- Increase in population
- Decline of cottage industries and handicrafts.
- Absence of alternative occupations, etc.

Ans to Q No 4: Perennial unemployment refers to that type of unemployment in which some people look like being employed but are not employed fully in reality as their marginal productivity is either zero or even negative.

Ans to Q No 5: Seasonal unemployment is seen in India because of the following reasons:

- Absences of multi-cropping systems.
- Absences of other occupations in rural areas.

Ans to Q No 6: Integrated Rural Development Programme (IRDP) was launched on 2nd October, 1980.

Ans to Q No 7: The main aim of the Kisan Credit Card Scheme is to facilitate short run credit to agricultural labourers at cheaper interest rate.

Ans to Q No 8: The full form of MGNREGA is Mahatma Gandhi National Rural Employment Guarantee Act.



10.10 MODEL QUESTIONS

Short Questions (Answer each question in about 150 words)

Q 1: What do you mean by agricultural labour? What are the main categories of agricultural labour?

Q 2: Analyse the employment condition of agricultural labourers in India.

Q 3: Write a short note on:

- Disguised Unemployment
- Seasonal Unemployment

Long Questions (Answer each question in about 300-500 words)

Q 4: Distinguish between money wage and real wage.

Q 5: Explain the main factors that are responsible for the poor conditions of agricultural labourers.

Q 6: Explain the measures that were adopted by the Government to improve the conditions of Indian agricultural labourers.

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UNIT 11 : ECONOMICS OF AGRICULTURAL PRODUCTION

UNIT STRUCTURE

11.1 Learning Objectives

11.2 Introduction

11.3 Meaning of Production Function

11.4 Laws of Returns

11.5 Cost Functions and Cost Curves in Agricultural Production Decisions

11.6 Let Us Sum Up

11.7 Further Reading

11.8 Answers to Check Your Progress

11.9 Model Questions

11.1 LEARNING OBJECTIVES

After going through this unit, you will be able to-

- explain the meaning of production function and, the different cost curves in agricultural production
- discribe the meaning of isoquant, isocost and laws of return in agricultural production.

11.2 INTRODUCTION

Farmers are the producers of farm products like crops, livestock products, etc. They use factors of production or resources or inputs for producing various farm products. But in actual farm situation, resources or inputs are limited or scarce. Moreover, these resources have alternative uses i.e. the inputs can be put to different uses. As a consequence, farmers are frequently confronted with production decision problems relating to the use of scarce resources. The major production decision problems faced by the farmers are:

- What to produce? It involves decision relating to type of product or

combination of products to be produced using given amount of input for maximisation of profit.

- How much to produce? It is related to level of input to be used for producing optimum amount of output for maximisation of profit.
- How to produce? It involves selection of type of inputs and their combination to be used for producing given level of output at minimum cost.
- When to buy and sell? This decision is related to buying of inputs and selling of farm products.

Answers to these decision problems are obtained with the use of certain production relationship between products and resources.

11.3 MEANING OF PRODUCTION FUNCTION

Production is a process whereby some goods and services, called inputs are transformed into other goods and services called output. The production function refers to the relationship between the input of factor services and the output of the resultant product. The production function is based on the idea that the amount of output in a production process depends upon the amount of inputs used in the process.

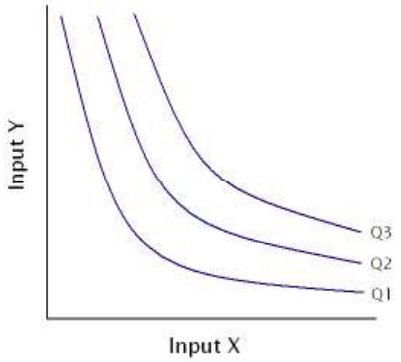
Output depends upon an input or a set of inputs in such a way that there is one unique amount of output resulting from each set of inputs. This unique relationship between output and inputs is termed as production function.

Halcrow defines production function as follows :

"Production function is the technical relationship between inputs and output indicating the amount of output that can be produced with each and every set or combination of the specified inputs".

11.3.1 Conventional Isoquant

- An isoquant (derived from quantity and the Greek word iso, meaning equal), in microeconomics, is a contour line drawn through the set of points at which the same quantity is produced while changing the quantities of two or more inputs.



A family of isoquants can be represented by an isoquant map, a graph combining a number of isoquants, each representing a different quantity of output. Isoquants are also called equal product curves.

11.3.2 Isocost Approach

In economics an isocost line shows all combinations of input which cost the same total amount. Although similar to the budget constraint in consumer theory, the use of the isocost line pertains to cost-minimisation in production, as opposed to utility-maximisation.

11.3.3 Cobb Douglas Production Function

In economics and econometrics, the Cobb–Douglas production function is a particular functional form of the production function, widely used to represent the technological relationship between the amounts of two or more inputs (particularly physical capital and labor) and the amount of output that can be produced by those inputs.

11.4 LAWS OF RETURNS

Production is the result of application of various input factors. In the process of production, the farmers combine the required input factors in various proportions. This type of usage of inputs by the farmers gives way for the operation of the laws of returns. In the production process, the relationship that takes place between single variable input and the

consequent output pertains to either one or a combination of the following relationships

- **Law of increasing returns :** The addition of each successive unit of the variable factor to the fixed factors in the production processes, adds more to the total output than the previous unit i.e., each successive unit of variable factor adds more and more to the total output.
- **Law of constant returns :** The addition of each successive unit of the variable factor to the fixed factors adds the same to the output as observed for the previous unit i.e., each successive unit of variable factor results in an equal quantity of additional output.
- **Law of decreasing returns :** The addition of each successive unit of the variable factor to the fixed factors adds less to the total output than the previous unit i.e., each successive unit of variable factor adds less and less to the total output.
- **Return to Scale :** It refers to the change in output as a result of a given proportionate change in all the factors of production simultaneously. When all the factors or inputs involved in a production process are increased or decreased simultaneously, in a certain fixed proportion, the response of output to such an increase or decrease in the input levels is explained through the concept of returns of scale.

11.5 COST FUNCTIONS AND COST CURVES IN AGRICULTURAL PRODUCTION DECISIONS

Production cost is related to cost of producing a commodity or product. It refers to expenditures incurred for producing one unit of a product. Thus cost of production is always expressed as cost per unit of the product e.g. cost/kg, cost/q, cost/t etc. Cost production has no meaning if the time and unit of product is not mentioned. For example, price of rice is Rs 30/kg in the month of July, 2017. Therefore, cost of production has great influence on the decisions of the farmers.

In cost function, cost is a function of output i.e. C = f(Y) whereas

in input-output relationship or production function, output is a function of input i.e. Y = f(X). However, both the functions are used to determine the optimum level of output to be produced for profit maximisation.

11.5.1 Types of Cost Function

- **Aggregate cost function :** It shows the total cost of production at any level of production. In other words, cost involved in total quantities of output produced is called as aggregate cost function. Various aggregate cost functions are:
  - **Total fixed cost (TFC) :** Sum of expenditure on all the fixed inputs, these are the costs which are incurred irrespective of level of output. Thus, it remains same for all output levels. These are relatively long run cost. It is expressed as

$$TFC = \sum P_j X_j$$

Where, Xj = fixed input and Pj = Price/unit of the fixed input

  - **Total variable cost (TVC):** These are also called as out of pocket cost. It represents sum of expenditure on all the variable input. It gradually increases with the increase in the output quantity. They are short run costs. Farmers have control on all the variable inputs. In short run, TVC must be covered i.e. gross return must be higher than TVC. It is expressed as

$$TVC = \sum P_i X_i$$

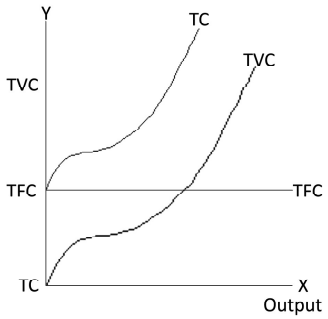
Where, Xi = variable input and Pi = Price/unit of the variable input

  - **Total cost (TC):** It is the sum of total fixed cost and variable cost. It also increases gradually with the increase in output quantity.

TC = TFC + TVC

Relationship between TFC, TVC and TC

TFC is a straight line parallel to the x-axis. This is because fixed costs are same for all output levels.



Cost

TVC is zero when output is zero. It increases as output increases. The shape of TVC curve depends on shape of production function used.

TC curve is exactly similar to that of TVC. But it starts higher on y-axis by the units of fixed cost because TC is sum of fixed cost and variable cost.

TFC

- **Unit cost function:** It shows per unit cost of production at any level of production. Unit cost functions play an important role in deciding optimum level of output. These cost functions are also used to understand the relationship between cost and output at different levels of output. Various unit cost functions are:
- **Average fixed cost (AFC):** It is computed by dividing TFC by the amount of output produced. It gradually declines as output increases.

$$AFC = \frac{\text{Total fixed cost}}{\text{Total quantity of output}} = \frac{TFC}{}$$

- **Average variable cost (AVC):** It is computed by dividing total variable cost by the amount of output produced. It initially declines, reaches minimum and increases again with the increase in output quantity.

$$AVC = \frac{\text{Total variable cost}}{\text{Total quantity of output}} = \frac{TVC}{Y} = \frac{Px.X}{Y}$$

- **Average total cost (ATC):** It is the sum total of AFC and AVC. It can be computed in two different ways i.e.

$$ATC = \frac{\text{Total cost}}{\text{Total quantity of output}} = \frac{TC}{Y}$$

$$ATC = AFC + AVC$$

The shape of ATC depends on the shape of production function. Its nature is similar to AVC. It also declines initially, reaches minimum and again rises with the increase in output quantity. ATC is often referred to as unit cost of production i.e. cost of producing one unit of output.

- **Marginal cost (MC):** It is the additional cost of producing one additional unit of the output. It is expressed as:

$$MC = \frac{\Delta TC}{\Delta Y} \text{ or } \frac{\Delta TVC}{\Delta Y}$$

$$AVC = \frac{1}{APP}$$



CHECK YOUR PROGRESS

Q 1: What do you mean by production function? Define isoquant and isocost line.

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Q 2: Define returns to scale and discuss in brief the different laws of return.

.....

.....

Q 3: Define production cost and also discuss the different cost function.

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11.6 FURTHER READING

1) Reddy, S.S. and Ram P.R. (2018) Agril. *Finance and Management*, Oxford & IBH Publishing Co Pvt.Ltd.

2) Reddy S.S. (2006) *Agricultural Economics*, Oxford & IBH Publishing Co Pvt.Ltd.



11.7 ANSWERS TO CHECK YOUR PROGRESS

Ans to Q No 1: The production function refers to the relationship between the input of factor services and the output of the resultant product. The production function is based on the idea that the amount of output in a production process depends upon the amount of inputs used in the process.

An isoquant (derived from quantity and the Greek word iso, meaning equal), in microeconomics, is a contour line drawn through the set of points at which the same quantity is produced while changing the quantities of two or more inputs.

An isocost line shows all combinations of inputs which cost the same total amount.

Ans to Q No 2: The major production decision problems faced by the farmers are

1. What to produce?
2. How much to produce?
3. How to produce?

Ans to Q No 3: Production cost refers to expenditures incurred for producing one unit of a product. Thus cost of production is always expressed as cost per unit of the product e.g. cost/kg, cost/q, cost/t etc. The different cost function are:

- **Total fixed cost (TFC):** These are the costs which are incurred irrespective of level of output.

- **Total variable cost (TVC):** These are also called as out of pocket cost. It represents sum of expenditure on all the variable input.
- **Total cost (TC):** It is the sum of total fixed cost and variable cost. It also increases gradually with the increase in output quantity.

  Various unit cost functions are:
- **Average fixed cost (AFC):** It is computed by dividing TFC by the amount of output produced. It gradually declines as output increases.
- **Average variable cost (AVC):** It is computed by dividing total variable cost by the amount of output produced.
- **Average total cost (ATC):** It is the sum total of AFC and AVC. It can be computed in two different ways i.e.

  ATC = AFC + AVC
- **Marginal cost (MC):** It is the additional cost of producing one additional unit of the output. It is expressed as:

Ans to Q No 4: The different laws of return are:

1. Law of increasing returns: Increasing returns to scale or diminishing cost refers to a situation when all factors of production are increased, output increases at a higher rate.
2. Law of constant returns: Constant returns to scale or constant cost refers to the production situation in which output increases exactly in the same proportion in which factors of production are increased.
3. Law of decreasing returns: Diminishing returns or increasing costs refer to that production situation, where if all the factors of production are increased in a given proportion, output increases in a smaller proportion.



11.8 MODEL QUESTIONS

Short Questions (Answer each question in about 150 words)

Q 1: Discuss the major production decisions faced by the farmers.

Q 2: Define Production Function and discuss its types

Q 3: Explain laws of return.

Long Questions (Answer each question in about 300-500 words)

Q 1: Describe Cobb Douglas Production Function

Q 2: Discuss the types of cost function

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UNIT 12 : THEORIES OF AGRICULTURAL ECONOMICS

UNIT STRUCTURE

12.1 Learning Objectives

12.2 Transforming Traditional Agriculture- The Schultz Thesis

- 12.2.1 Characteristics
- 12.2.2 Schultz's Suggestions for Transforming Traditional Agriculture
- 12.2.3 Critical Appraisal of the Suggestions made by Schultz to Transform Traditional Agriculture

12.3 Lewis' Model of Economic Development

- 12.3.1 Assumptions of the Model
- 12.3.2 The Working of the Model
- 12.3.3 Critical Evaluation of Lewis Model

12.4 Let Us Sum Up

12.5 Further Reading

12.6 Answers to Check Your Progress

12.7 Model Questions

12.1 LEARNING OBJECTIVES

After going through this unit, you will be able to-

- discribe how Schultz defined the 'Traditional Agriculture'
- explain how Schultz proved that zero value labour does not exist in traditional agriculture
- elaborate how Lewis divided the capitalist and subsistence sector

12.2 TRANSFORMING TRADITIONAL-AGRICULTURE THE SCHULTZ THESIS

T.W. Schultz is one of those economists who have suggested ways and means to develop agriculture. His book entitled *Transforming Traditional Agriculture* appeared in 1964 and is considered a hallmark on

agricultural development.

Schultz defines traditional agriculture in his own way; it does not mean a backward, labour intensive agriculture, using very little of modern machinery and other necessary inputs and having a low productivity. This is Mellor's definition of traditional agricultural and it provided a very general concept about traditional agriculture. For Schultz, agriculture can be capital intensive as well as highly productive and yet be traditional in its character. Schultz used the term "Traditional" in a different sense. It is in the sense of being stagnant or non-dynamic. With this view, even the American agriculture of today, can be traditional after sometime if its further development comes to a halt. We cannot deny the fact that traditional agriculture ultimately becomes a backward agriculture in relation to the agriculture of other economies, if it stagnates while others move forward. But according to Schultz, "traditional agriculture" and backward agriculture are not synonymous.

- **Clarification of some Misconceptions :** In order to clarify what Schultz means by traditional agriculture, he makes the following important observations-
  - Traditional character of agriculture has nothing to do with the cultural attributes of the cultivating community. Some people might feel that customs and conventions of the society, its level of literacy and aspiration for a higher standard of living will determine whether the agriculture is traditional in character or not. They might say that agriculture is traditional simply because the society is conservative, superstitious and consists of members who are not at all ambitious. Schultz does not agree with such views. He feels that the factors influencing production e.g., thrift attitude towards work and industriousness have nothing to do with the culture of a society. Rather these can be handled as economic variables. Take for example, the attitude towards work. There is every likelihood that one finds people of an economy, with stagnating agriculture idling away their time. They may not

seem to be hard working. According to Schultz, this lack of hard work is not due to any value system of a society. This is either because of their poor health or because of the fact that hard work does not yield sufficient returns. Both of these reasons are economic in character.

According to Schultz the basic attitude towards work in all societies, irrespective of their social and cultural values, is the same. As he says, "……when it comes to being industrious, including work and thrift, it is hard for even an industrious protestant to fault the behaviour of the Guatemalan Indians described with such care and thoroughness by Sol Tax in Penny Capitalism". We may note here that Schultz considers Guatemalan agriculture as traditional in character.

- Another important observation that Schultz makes with regard to the traditional agriculture, is that the traditional character of agriculture is not determined by the institutional arrangements, obtaining in agriculture. According to Shultz, like cultural attributes of a society, the institutional arrangements for agriculture also, do not help in determining whether the agriculture is traditional in character or not. Traditional agriculture is compatible with tenancy cultivation as well as with self-cultivation, with large farms as well as with small farms, with private as well as public enterprise in agriculture, and with production carried on for domestic purposes as well as with production carried on for the market.
- The third observation concerning traditional agriculture that has been made by Schultz is that technical attributes of factors of production also do not determine the nature of agriculture. Though some economists fell that if sophisticated machinery and other highly productive inputs are being used in agriculture, it should be called non-traditional agriculture. Schultz does not distinguish between traditional and non-traditional agriculture

on the basis of technical efficiency of the inputs used. According to him, as indicated earlier, different types of farming skills and capital goods can be found in a traditional agriculture. According to his definition of traditional agriculture, even American agriculture, at present considered to be most modern agriculture, can become traditional in character if it starts showing some economic symptoms.

- **The Definition :** The above narration was aimed at clearing some misconceptions which Schultz felt, people could have about traditional agriculture. The next logical step, was to give a lucid, positive definition of traditional agriculture.

Schultz has defined 'Traditional Agriculture' in economic terms. According to him, an agriculture becomes traditional when it comes to acquire some characteristics which are economic in nature. According to his definition, agriculture can become traditional only if, in the first instance, the art of cultivation becomes static. The farmers use the same factors of production and in the same manner as their forefathers have been doing. Neither new factors of production are introduced nor is there any change in the relative importance attached to the existing factors as sources of income. When such a situation comes to prevail in agriculture, farmers as a result of their long experience, start expecting a well-defined and at the same time, an unchanged pattern of returns (in physical terms) to various factors being used in production. Such a certainty in return, in turn, will encourage agricultural production to move towards an equilibrium. Farmers will go on employing more and more of the each of the existing factors till a situation arrives when, to put it in simple words, the cost of each factor becomes equal to its marginal return (at given input and output prices). An equilibrium is then reached and there is no incentive to invest beyond this point of equilibrium simply because the marginal return to a factor of production will be less than its cost. So incentive to make savings for purposes of net investment will disappear.

Such an equilibrium will indicate that the agriculture has become traditional and will remain so as long as the art of cultivation and motives and preferences to hold productive assets remain static.

12.2.1 CHARACTERISTICS

Schultz highlights two important characteristics of traditional agriculture. These are: (a) there is perfect allocation of resources in traditional agriculture and (b) there is no disguised unemployment in traditional agriculture.

- **Allocative efficiency in traditional agriculture :** Schultz is of the view that as the art of cultivation is completely static for a long time and as the farmer knows, by his long experience, about the returns to various factors of production, a state of equilibrium is likely to be reached where the marginal returns of these factors are finely balanced with their respective marginal cost. This is called perfect allocation of resources. He puts forth a hypothesis which is quite well known now called "poor but efficient hypothesis". He mentioned some assumptions under which such a perfect allocation of resources will be obtain in traditional agriculture. These are as under :
  - The factors of production are traditional in character. These have been used without any change, for generations.
  - There is no significant event taking place as will temporarily disturb the equilibrium e.g., construction of road, dam, canal, etc.
  - The prices of factors or of the returns to these factors can change, though not repeatedly.
  - There are no political upheavals in the society, such as war, partition, recruitment of available labour in the army etc.
  - Relative prices of various agricultural products are not

constantly changing.

- The community is not experiencing any advance in knowledge which can be useful in agriculture.
- There is perfect knowledge about the rate of return to various factors.
- There are no significant indivisibilities.

➢ **Doctrine of zero value labour in agriculture :** The other important characteristic of traditional agriculture, according to Schultz, is non-existence of zero value labour in such an agriculture.

Existence of zero value labour in agriculture means that if some seemingly active labourers are shifted from agriculture to the other sectors of the economy, or if they are simply asked not to work in agriculture, the agricultural production will not suffer at all. And this is despite the fact that all workers engaged in agriculture are assumed to be equally efficient. The reason for no change in agricultural production even after these labourers have ceased to work in agriculture is that their marginal productivity is equal to zero (or even negative).

Schultz, however, has questioned the existence of disguised unemployment or zero value labour in such economies. In order to elaborate his view, he refered to the three economic situations, in this regard.

- Where marginal productivity of labour engaged in agriculture is very low but is quite comparable with that of labour engaged in other sectors, after cost of transfer of labour is taken into considerations. Such a situation exists in many backward economies.
- Where marginal productivity of labour, engaged in agriculture is lower than that of labour engaged in other sectors of the economy when cost of transfer of labour is taken into consideration. It may otherwise, be quite high. This is what we find in developed economies. This

implies that there is excess of labour in the agricultural sector and that should be transferred to non-agricultural sector.

- Marginal productivity of a part of the labour engaged in the agricultural sector is zero.

Schultz does not believe that the third situation exists in a traditional agriculture. According to him, it can be very low but can never be zero and any transfer of labour from the agricultural sector to the non-agricultural sector will always, reduce total production in the agricultural sector.

Schultz has tried to adduce evidence to prove that there is no zero-value labour in traditional agriculture. In the first instance, he has cited two examples from Latin American countries where labour was withdrawn from neighbouring farms in order to meet the increased demand for labour for construction activity at the nearby site. The two examples pertain to a) construction of a road in Peru and (b) construction work in a city in Brazil. Schultz found that as a result of withdrawal of labour from agriculture in the two cases, agricultural production in these countries declined. Schultz thus concludes that marginal productivity of labour engaged in agriculture is positive.

In his book “Transforming Traditional Agriculture” he also cites the example of influenza that raged in India in an epidemic form in 1918-19 to show that zero value labour does not exist in traditional agriculture.

Through such examples Schultz has tried to prove that marginal productivity of labour in traditional agriculture is not zero and as such, there is no disguised unemployment in traditional.

12.2.2 Schultz's Suggestions for Transforming Traditional Agriculture

According to Schultz, problem of transforming traditional agriculture, is basically a problem of creating new investment opportunities in agriculture. And this is possible only when the equilibrium of the traditional agriculture is disturbed through the introduction of new and at the same time more productive factors of production in agriculture. This also implies that the art of cultivation will undergo a change. According to Schultz, agricultural transformation will follow only a technological transformation. And technological transformation as per Schultz, implies the introduction of some new factors of production or of some new agricultural practices or of some new skills and sometimes even the dropping of some of them from the process of cultivation.

Schultz has made various suggestions, in order to ensure that more efficient factors of production are used by the farmers to take agriculture out of its traditional rut.

The following points discuses his suggestions.

- **Market approach Vs Command approach :** Market approach implies that the farmers should be left free to decide whether to adopt a new factor or not. Let them be guided by the profitability of new factors, as determined by the market forces. The responsibility of the Government, under market approach should be confined only to measures for development and distribution of new agricultural inputs, publicity about them, development of necessary skills through education and training, provision of cheap credit and such other measures. But in no case, the farmers should be coerced to use the new inputs. Mexico is considered to be a fine example of market approach.

  In case of command approach, the farmers who happen to be the ultimate adopters of the new factors are simply directed to use them. They have no choice in this regard. It is

the state that takes the ultimate decision about what to produce, how to produce and how much to produce. The farmers are supplied the inputs by the state and in return, they are expected to deliver a part of the produce to the state. Working of collective and state farms in Russia is an example of command approach.

According to Schultz, market approach is better than the command approach, In market approach the farmers who are the ultimate judge of the efficiency of a factor are given full freedom to decide whether to use it or not and if yes, in what quantity. In case of command approach, the new inputs are rationed out to the farmers for compulsory use. In such a case, the local conditions of soil are totally ignored.

- **The process of transformation :** According to Schultz, the whole process of transformation can be explained in terms of supply of and demand for the new factors. It has to be ensured that on the one hand the new factors of production which are really more profitable than the traditional factors so far in use, are made available in the market and on the other hand the demanders of such factors i.e., the farmers who are so far using the traditional factors, are willing to accept them. Only then, these factors will be actually used in agricultural production.
  - **Supply of new factors:** On the supply side, the ultimate object is to ensure that the new factors are available in ample supply and that too, at reasonable prices. Both these conditions are necessary for their effective use and profitability.

    Schultz is of the view that there are three important steps involved in the process of ultimate supply of the new factors to the people who have to use them. These are (a) research and development of new inputs, (b) distribution of new inputs to cultivators and (c) development of extension services for the new inputs.

- **Demand for new factors:** Not only has the state to make certain that the new factors are available in the market and the users are made aware of their availability, but it also has to ensure that the users are willing to use it. Or in other words, it has to see that a demand is generated for them.

  Schultz then points out that the basic factor favouring the use of new inputs is purely economic in character. It is the profitability of the new inputs that will generate a demand for them. And profitability of a non-traditional input, according to Schultz depends upon two factors namely, the supply price of the new input and its prospective yield.

- **Importance of acquired skills in Agricultural Transformation :** It may be noted that availability of a new input and even its acceptability by the farmers may still fail to produce the desired results. Additional knowledge and skills are required for the use of new inputs. If the farmers are not imparted the necessary knowledge or if they themselves are unwilling to acquire it, the new input may not be used at all. This becomes more important when the new inputs happen to be technically far superior to existing ones. This is the reason, why Schultz lays much emphasis on the acquisition of knowledge and skills while suggesting various measures for transforming traditional agriculture.

12.2.3 Critical Appraisal of the Suggestions Made By Schultz to Transform Traditional Agriculture

- In the first instance, Schultz's undue bias for market approach seems to reveal an ideological tilt rather than an assessment of economic reality. In the initial stages of agricultural transformation, the state may have to undertake many other activities in the form of controls and intervention than what has been suggested by Schultz. Financial and material resources

of an economy are limited. These have to be used in the optimal manner. Only a planned economy, with a set of national and sectoral priorities, will achieve this objective. A free market means uncoordinated decisions. This can often lead to an imbalance between the supply and demand for factors.

- Moreover, market approach dos not ensure a complete harmony between the social welfare and private interest or between the national interests and regional interests. This can be ensured only through a central planning.
- Shultz has totally ignored the role of institutional reforms. In the transformation of traditional agricultural, this constitutes a serious omission from the thesis.
- Further, Schultz has totally ignored the differences in various poor economies with regard to their factor endowments, infra-structure necessary for developments, degree of commercialisation, extent of monetisation, administrative efficiency, etc. These differences do affect the extent of final use of the new input.



CHECK YOUR PROGRESS

Q 1: State the characteristics of traditional agriculture as mentioned by Schultz. (Answer in about 30 words)

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Q 2: Define "Traditional Agriculture" as described by Schultz. (Answer in about 40 words)

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.....

12.3 LEWIS' MODEL OF ECONOMIC DEVELOPMENT

In his model, Lewis divides the economy of an under-developed country into two sectors namely: the capitalist sector and the subsistence sector.

The capitalist sector is that part of the economy which uses reproducible capital and pays capitalists for the use thereof. The capitalist sector includes, besides the manufacturing industries, the plantations and the mines where labour is hired. The capitalist sector can be private or public in character.

The subsistence sector is that part of the economy which does not use reproducible capital. It mainly includes agriculture which is predominantly labour intensive, uses poor techniques of cultivation and has low productivity. Output per head in this sector is lower than the output per head in the capitalist sector.

12.3.1 Assumptions of the Model

Before we explain the working of the model of economic development given by Lewis, it is necessary to describe the assumptions of this model.

The basic assumption of Lewis' model is that there exist surplus labour in the subsistence sector, i.e., labour with zero marginal productivity as well as that whose marginal productivity is positive but is less than the institutional wage. This labour mainly consists of farmers, casual workers, petty traders, domestic retainers and women. According to Lewis the surplus labour in the subsistence sector acts as a source from which an unlimited supply of labour can be drawn for the development of the capitalist sector. Unlimited supply of labour implies that the labour is available to the industrial sector at a constant wage rate. This wage rate has to be the higher from the institutional wage rate that prevails in the subsistence sector, by a small and fixed margin.

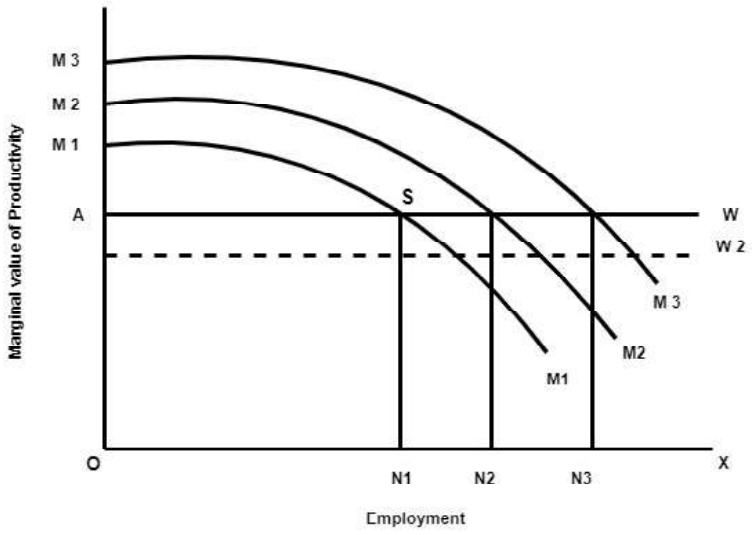
Lewis presumes that everybody in the subsistence sector get an equal share in the total product in the subsistence sector. This is despite the fact that marginal productivity of the surplus labour is less than this average share. He has called this share, the institutional wage because it cannot be ensured for everybody in the subsistence sector if only the market forces are allowed to operate.

There is yet another assumption underlying Lewis' model. It is that it is only the capitalist sector (whereby he means the industrial sector) which utilises its saving productively. The subsistence sector, on the other hand, squanders away its savings, if any, in unproductive pursuits like purchase of jewellery, land, construction of temples, etc. The propensity to save the subsistence sector is also lower than that of the industrial sector.

12.3.2 The Working of the Model

Lewis feels that existence of surplus labour in the subsistence sector is a boon for entrepreneurs with a high propensity to save, for expanding the capitalist sector. This labour is available at a constant wage and it can be attracted to the industrial sector if it is offered a wage rate which is a little higher than the institutional wage rate prevailing in the rural areas. The saving generated in the capitalist sector through the employment of this labour can be reinvested, leading to more employment of surplus labour from subsistence sector. His will in turn lead to more savings, more investment, and more employment and so on. This process of expansion goes on for quite some time. This process is explained with the following diagram.

Figure 12.1: The Working of the Model



Here W2 is the institutional wage in the rural sector and W represents the conventional wage in the industrial sector. In the first stage, labour up to ON-1, is attached and engaged in the industrial sector by payment of wage rate W. Here its marginal value productivity is equal to its wages. AM1S is the surplus earned in the industrial sector. When the capitalist invests this surplus in the industrial sector and also possibly improves the existing technologies of production, the marginal value productivity curve of labour will shift to M2M2. The new marginal value productivity curve of labour makes it profitable for the capitalist to employ labour up to ON2 because at this point, the marginal value productivity of labour and the wage rate which remains constant, are equal to each other. The per capita income of workers remain unchanged and entire benefit of development accrues to the capitalists. There is now more surplus in the industrial sector which will be reinvested. This will shift the marginal value productivity curve for labour to M3M3 making it possible for the capitalists to employ more labour which is still available at a constant wage. This process of the expansion of the capitalist sector and that of the transfer of surplus labour from the rural sector continues for quite some.

According to Lewis, even the state can act as a capitalist and supplement the efforts of the private capitalists by employing surplus labour in its own projects. It can even tax the subsistence sector for getting funds for investment. It can also resort to deficit financing for this purpose.

- **Role of Bank Credit**

  According to Lewis, the main problem in labour surplus economies, is to employ the labour available in the subsistence sector for the development of the capitalist sector and this can be done even through increase in money supply, especially by way of expansion of bank credit. Such a method will lead to extra output without loss of any other output.

  No doubt, expansion of bank credit can lead to inflationary

pressures. However, according to Lewis, the price rise cannot go on forever. The inflationary process will come to an end as soon as the level of total voluntary savings, made after the capitalist sector has expanded, as a result of the use of bank credit, becomes just equal to the total level of investment, as it would be after the use of bank credit. This, in fact, amounts to saying that a new equilibrium is reached as soon as the savings generated through additional bank credit becomes equal to the latter.

- **Decrease in the Pace of Expansion of the Capitalist sector**

  According to Lewis, there are four reasons due to which labour may no longer be available to the industrial sector at constant wages. These are:

  Firstly, the expansion of the industrial sector may be at such a rapid pace that it encourages a transfer to labour from the rural sector at a rate which is more than what is made up by the growing population in that sector.

  Secondly, the technological progress in the agricultural sector itself may raise the productivity per man in that sector. This may mean an increase in both W 2and W.

  The fourth factor that will raise the wages in the industrial sector, will operate when the workers in the capitalist sector, start imitating capitalist way of life. For that, they may demand higher wages and this will slow down the process of capital formation.

12.3.3 Critical Evaluation of Lewis Model

Lewis' model is based upon many assumptions. And most of these assumptions have not been accepted by economists. Some of the objections are as follows:

- Existence of disguisedly unemployed labour force and the impression that its transfer to the non-agricultural sector will not affect the agricultural production for quite some time, has

been questioned by a number of economists. Schultz for example, has tried to prove that there is no disguised unemployment in under-developed countries and agricultural production falls when labour is transferred from the agricultural sector to the non-agricultural sector. According to him, marginal productivity of labour in the agricultural sector in under-developed economies may be quite low but it is not zero.

- The model assumes, not only an unlimited supply of labour in the subsistence sector but also an ample supply of entrepreneurs for the industrial sector. This is not a correct assumption. Majority of the under-developed countries, especially in the early stages of development, have suffered from the problem of non-availability of entrepreneurial skills.
- Profits of the industrial sector may not be reinvested. The model assumes that whatever surplus is earned in the industrial sector, is reinvested for its further expansion. The industrialists may use their surpluses for speculative purposes. They, too, can squander away their earnings.
- The model takes the market for the industrial products for granted. Lewis assumed that there would be no problems of marketing the industrial products. The market for the industrial products too, was taken to be 'unlimited'. This assumption is not correct for the under-developed countries.
- Low income group also saves. According to the model, only top 10% of the people save. This is not correct. Even low income group saves. In fact, Lewis himself has admitted about the saving made by low income groups in Japan.
- Every under-developed country does not have unlimited supply of labour. The model is applicable to over-populated countries. However, an under-populated country can be under-developed. Latin American countries fall in this category.
- **Conclusion:** The model, no doubt, has unrealistic assumptions and suffers from various infirmities. However, despite its failure

to find any empirical evidence in support of its broad conclusions, it has succeeded in highlighting the fact that in the initial stages, the surplus agricultural labour has an important role to play in economic development, and that efforts should be made to keep the terms against agriculture, at least in the initial stages of economic development.



CHECK YOUR PROGRESS

Q 3: Define subsistence sector of Lewis model. (Answer in about 30 words)

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Q 4: What is the fundamental assumption of Lewis' model? (Answer in about 30 words)

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12.4 LET US SUM UP

- T.W. Schultz is one of those economists who have suggested ways and means to develop agriculture. His book entitled "Transforming Traditional Agriculture" appeared in 1964 and is considered as a hallmark in the literature on agricultural development.
- Schultz has defined 'Traditional Agriculture' in economic terms. According to his definition, agriculture can become traditional only if, in the first instance, the art of cultivation becomes static.
- Schultz is of the view that as the art of cultivation is completely static for a long time and as the farmer knows, by his long experience about the returns to various factors of production, a state of equilibrium is likely to be reached where the marginal return of these factors are finely balanced with their respective marginal costs. This is what called perfect allocation of resources.
- Existence of zero value labour in agriculture means that if some

seemingly active labourers are shifted from agriculture to the other sectors of the economy, or if they are simply asked not to work in agriculture, the agricultural production will not suffer at all. And this is despite the fact that all workers engaged in agriculture are assumed to be equally efficient.

- Market approach implies that the farmers should be left free to decide whether to adopt a new factor or not. Let them be guided by the profitability of new factors, as determined by the market forces. In case of command approach, the farmers who happen to be the ultimate adopters of the new factors are simply directed to use them. They have no choice in this regard. It is the state that takes the ultimate decision about what to produce, how to produce and how much to produce.
- Lewis divides the economy of an under-developed country into two sectors namely: the capitalist sector and the subsistence sector.
- The basic assumption of Lewis' model is that there exist surplus labour in the subsistence sector, i.e., labour with zero marginal productivity as well as that whose marginal productivity is positive but is less than the institutional wage.
- Lewis' model has succeeded in highlighting the fact that in the initial stages, the surplus agricultural labour has an important role to play in economic development, and that efforts should be made to keep the terms against agriculture, at least in the initial stages of economic development.



12.5 FURTHER READING

1) Soni, R.N., & Malhotra, S. (2017). *Leading issues in agricultural economics* (12th ed.). Jalandhar, Delhi: Vishal Publishing Co.

2) Singh, A., Sadhu, A.N., & Singh, J. (2012). *Fundamentals of Agricultural Economics* (12th ed.). Girgaon, Mumbai-40004: Himalayan Publishing House.

12.6 ANSWERS TO CHECK YOUR PROGRESS

Ans to Q No 1: Schultz highlighted two important characteristics of traditional agricultural. These are: (a) there is perfect allocation of resources in traditional agriculture and (b) there is no disguised unemployment in traditional agriculture.

Ans to Q No 2: According to Scholer, an agriculture becomes traditional when it comes to acquire some characteristics which are economic in nature. According to his definition, agriculture can become traditional only if, in the first instance, the art of cultivation becomes static.

Ans to Q No 3: The subsistence sector is that part of the economy which does not use reproducible capital. It mainly includes agriculture which is predominantly labour intensive, uses poor techniques of cultivation and has low productivity.

Ans to Q No 4: The basic assumption of Lewis' model is that there exist surplus labour in the subsistence sector, i.e., labour with zero marginal productivity as well as that whose marginal productivity is positive but is less than the institutional wage.

12.7 MODEL QUESTIONS

Short Questions (Answer each question in about 150 words)

Q 1: Discuss how does Schultz proved that zero value labour does not exist in traditional agriculture.

Q 2: Explain the notion of allocative agriculture in traditional agriculture.

Q 3: Explain the role of bank credit in Lewis model.

Long Questions (Answer each question in about 300-500 words)

Q 1: Explain Shultz's views on "Transforming traditional agriculture".

Q 2: Explain the Lewis model of economic development.

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UNIT 13 : FOOD SECURITY AND MALNUTRITION

UNIT STRUCTURE

13.1 Learning Objectives

13.2 Food Security and Malnutrition: As a Concept

13.3 Food Security and Nutritional Status at Global Level

13.4 Food Security and Nutritional Status in India: An Analysis

13.5 Policy Level Nutritional Interventions to Fight Against Malnutrition in India

13.6 Ministerial Level Efforts to Combat Malnutrition Problem

13.7 Some Strategic Community Level Nutrition Related Interventions Rolled out by the Government of India

13.8 Impact Analysis of Production Oriented Policies

13.9 Let Us Sum Up

13.10 Further Reading

13.11 Answer to Check Your Progress

13.12 Model Questions

13.1 LEARNING OBJECTIVES

After reading this unit, you will be able to-

- explain the meaning of food security and malnutrition
- discribe the different directions of Food Security and its determinants
- list the types of Food Security
- discuss Food and Nutritional Security in India
- point out the policies to combat malnutrition in India

13.2 FOOD SECURITY AND MALNUTRITION : AS A CONCEPT

Food and Nutrition security are related but both are distinct concepts. The acceptable definition of food security has been given by the Food and Agriculture Organisation of the United Nations (FAO), which states that Food Security prevails “when all people, at all times, [have]

physical, social and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life" (FAO 1996, par. 1). Thus, from this definition it is imperative in food security that food must be available in adequate quantity and with sufficient quality at all times throughout the year which should be also culturally acceptable. The definition of food security highlights four crucial dimensions: availability, accessibility, utilisation and sustainability, which recognizes that food security is a multi-facet problem.

Table 13.1: The Four Dimensions of Food Security

Physical AVAILABILITY of food	The availability dimension of the food security deals with the "supply side" of food security and is determined by the level of food production, stock levels and net trade
Economic and physical ACCESSIBILITY to food	Mere availability and adequate supply of food at the national or international level does not inevitably contribute household level food security. Concerns about insufficient food access have resulted in a greater policy focus on incomes, expenditure, markets and prices in achieving food security objectives
Food UTILIZATION	Food Utilization is generally the practice of Sufficient energy and nutrient intake by individuals, which is the result of good care and feeding practices, food preparation, diversity of the diet and intra-household distribution of food. Combined with good biological utilization of food consumed, this determines the nutritional status of individuals
SUSTAINABILITY/STABILITY of the other three dimensions over time	Sustainability could be understood as the consistent intake of nutritious food every day. A person is considered to be food insecure if you have inadequate access to food on a periodic basis, risking a deterioration of your nutritional status. Adverse weather conditions, political instability, or economic factors (unemployment, rising food prices) may have an impact on your food security status.

Sources: *Ruel, M and Aldrin, B. Food Security and Nutrition: Linkages and Complementarities*

However, for the food security objectives to be realised, it is imperative that all the four dimensions must be fulfilled simultaneously. A failure in achieving any one of them would mean that food security does not

prevail. Therefore, it is important to take into the consideration the determinants of these four dimensions.

Table 13.2: Dimensions of Food Security and its Dereminants

Dimension of Food Security	Determinants
Availability	•Domestic production • Import capacity • Food stocks • Food aid
Accessibility	•Income, purchasing power, own production • Transport and market infrastructure • Food distribution
Utilization	•Food safety and quality • Clean water • Health and sanitation • Care, feeding and health-seeking practices
Sustainability/Stability	•Weather variability, seasonality • Price fluctuations • Political factors • Economic factors

Thus, each dimension of food security and its determinants are pivotal to ensure the food security at household level. The analysts have defined the problem of food insecurity into two broad types:

- Chronic food insecurity and
- Transitory food insecurity.

The definition of these two types of food insecurity is based on their temporality, severity and the rate of occurrence. Chronic food insecurity is a long-term and persistent condition of food insecurity. The common indication of this type of food insecurity is that people lack access to minimum requirements of food for a sustained period of time due to extended periods of poverty, lack of assets and lack of access to productive or financial resources. While transitory food insecurity is a short-term and temporary condition of food insecurity. It is caused by short-term shocks and fluctuations in food availability, food access, and variation in domestic production, inflationary issues and household incomes. An overview of the

nature, occurrence, causes and remedial measures of chronic and temporary food insecurity are discussed in table 3 below.

Table 12.3: Types of Food insecurity types

	Chronic Food Insecurity	Transitory Food Insecurity
Is	Long-term or persistent.	Short-term and temporary.
Occurs When	People are unable to meet their minimum food requirements over a sustained period of time.	There is a sudden drop in the ability to produce or access enough food to maintain a good nutritional status.
Results From	Extended periods of poverty, lack of assets and inadequate access to productive or financial resources.	Short-term shocks and fluctuations in food availability and food access, including year-to-year variations in domestic food production, food prices and household incomes.
Can be overcome With	Typical long term development measures also used to address poverty, such as education or access to productive resources, such as credit. They may also need more direct access to food to enable them to raise their productive capacity	Transitory food insecurity is relatively unpredictable and can emerge suddenly. This makes planning and programming more difficult and requires different capacities and types of intervention, including early warning capacity and safety net programmes.

Source: *United Nations Food and Agriculture Organization (FAO)*

Hence, food security refers to availability, accessibility, affordability and sustainability of food globally and locally at all times. However, food security is a necessary, but not sufficient condition to ensure nutrition and to prevent malnutrition. Nutrition security, by contrast, exists when, besides people have access to a healthy and balanced diet, they also have access to adequate care giving practices and to a safe and clean environment that allows them to stay healthy and utilise the foods they eat effectively. Thus borrowing from both definitions, “food and nutrition security” can be defined as a situation that prevails when all people have physical, social and economic access to food, at all times, which is consumed in adequate quantity and quality to meet the dietary needs, food preferences and requirements for growth and is also supported by an environment of adequate

sanitation, health services and care-giving (United Nations Food and Agriculture Committee on World Food Security)". Thus nutrition security implies an optimal nutritional status of an individual.

"Malnutrition refers to deficiencies, excesses or imbalances in a person's intake of energy and/or nutrients. The term malnutrition covers two broad groups of conditions. One is 'under-nutrition'—which includes stunting (low height for age), wasting (low weight for height), underweight (low weight for age) and micronutrient deficiencies or insufficiencies (a lack of important vitamins and minerals). The other is overweight, obesity and diet-related non-communicable diseases (such as heart disease, stroke, diabetes, and cancer)" (WHO).



CHECK YOUR PROGRESS

Q 1: What are the dimensions of food security?

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Q 2: Name two broad types of food insecurity.

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Q 3: State True or False:

Heart Disease, strokes are result of malnutrition. (True/False)

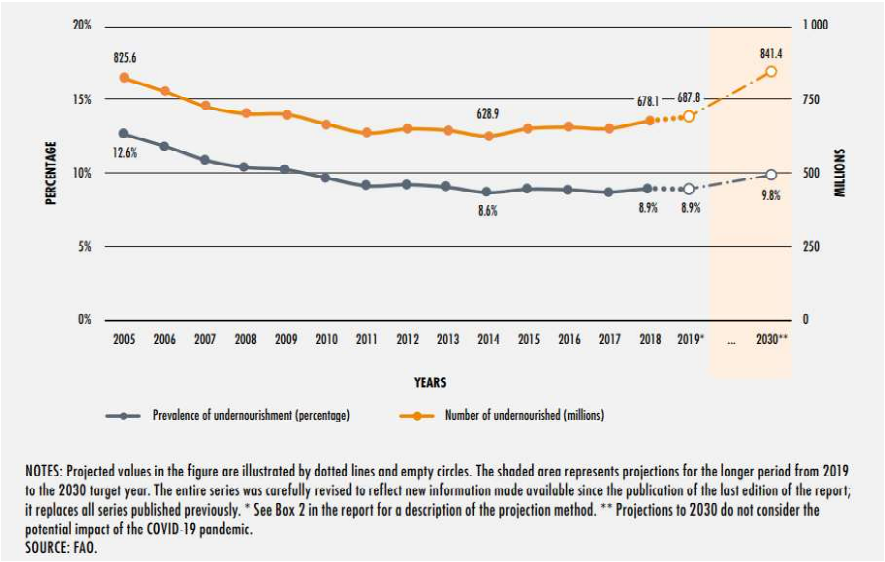
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13.3 FOOD SECURITY AND NUTRITIONAL STATUS AT GLOBAL LEVEL

FAO's most recent estimates reported that nearly 690 million people are hungry which comprises 8.9 percent of the world population, thus showing an upward trend by nearly 60 million in five years. The number of people affected by severe food insecurity also showed a similar upward trend. In 2019, close to 750 million – or nearly one in ten people in the world – were exposed to severe levels of food insecurity. The increasing trend in food insecurity contributes to malnutrition among children, in 2019, 21.3

percent (144.0 million) of children under 5 years of age were estimated to be stunted, 6.9 percent (47.0 million) wasted and 5.6 percent (38.3 million) overweight, while at least 340 million children suffered from micronutrient deficiencies. Between 2000 and 2019, the prevalence of child stunting declined by one-third, but the world is not on the track to achieve the global nutrition targets as the adult obesity is on the rise in all regions across the world. Figure 1, presents the prevalence of undernourishment in the world.

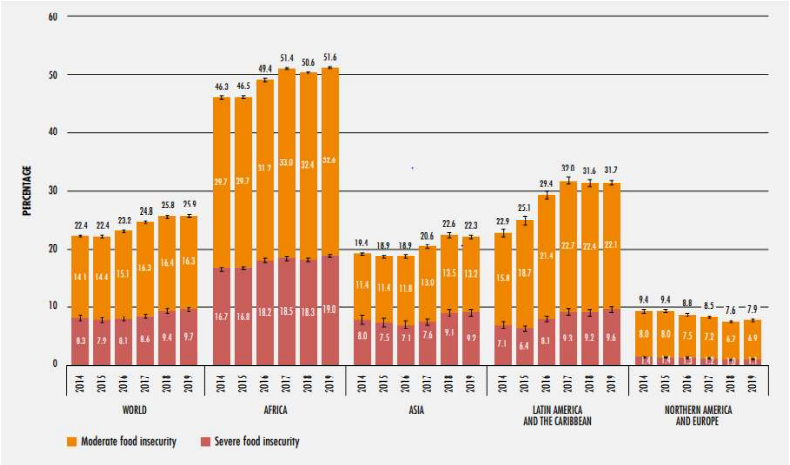
Figure 12.1: The Prevalence of Undernourishment



NOTES: Projected values in the figure are illustrated by dotted lines and empty circles. The shaded area represents projections for the longer period from 2019 to the 2030 target year. The entire series was carefully revised to reflect new information made available since the publication of the last edition of the report; it replaces all series published previously. * See Box 2 in the report for a description of the projection method. ** Projections to 2030 do not consider the potential impact of the COVID-19 pandemic.
SOURCE: FAO.

It can be seen from Figure 1 that the number of undernourished people in the world continued to increase in 2019. If recent trends are not reserved, the SDG 2.1 zero hunger target will not be achieved.

Figure 12. 2: Moderate or severe food insecurity



Source: *Unite*

Note: Differences in total are due to rounding of figures to the nearest decimal point.

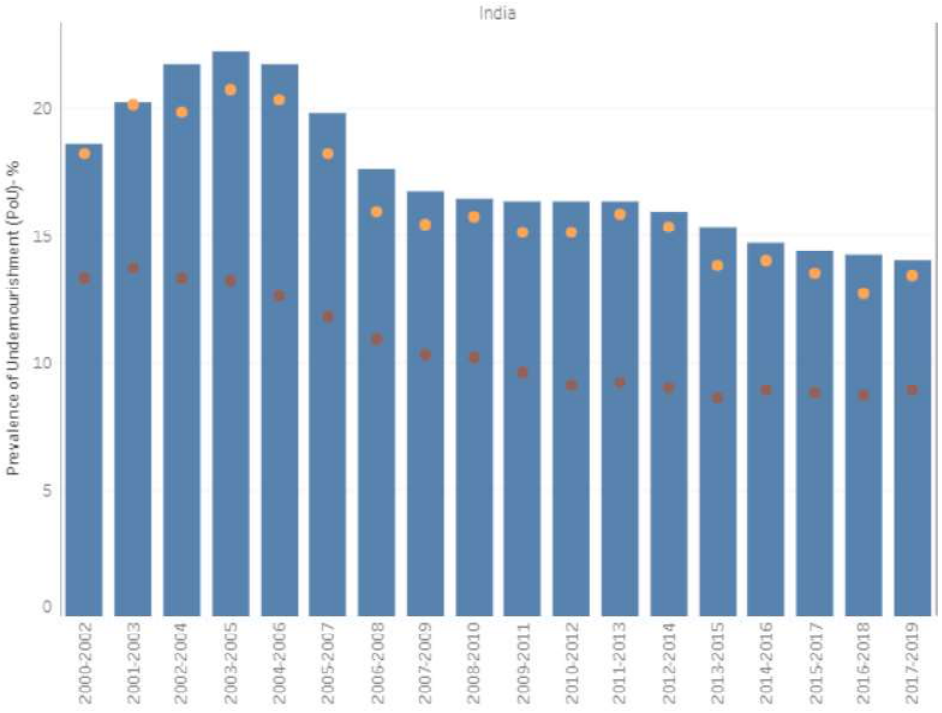
Moderate or severe food insecurity affects one quarter of the world population, and it has been increasing over the past six years. Over half of the population in Africa, almost one-third in Latin America and the Caribbean and more than one-fifth in Asia are food insecure.

13.4 FOOD SECURITY AND NUTRITIONAL STATUS IN INDIA: AN ANALYSIS

India accommodates around 46.6 million stunted children, a third of world's total as per the Global Nutrition report 2018. Almost half of under-5 child mortality in India is attributed to under nutrition. As per the recent data from the National Family Health Survey IV (2014-15), in India 38.4, 21 and 35.7% of children under 5 years suffer from stunting, wasting and underweight respectively, the corresponding figures for the NFHS III, 2005-06, were 47.9, 19.8 and 42.5% respectively.

The 'Asian enigma' is a phenomenon of consistent and unusually high prevalence of undernourishment among children in South Asia as compared to other countries across the globe. The immediate causes of under nutrition reflect a negative synergy between insufficient food intake and persistence of infectious diseases. Underlying these causes is a constellation of factors particularly salient to India (Gragnolati M, et al, 2005). These include poor health system, inefficient implementation of nutritional programmes and policies, poor sanitation, socio-economic inequality, lack of political commitment and unscrupulous governance and strategic leadership. However, India has shown a persistent and significant improvement in health indicators and food security. Figure 3 provides the scenario of undernourishment of people in India between 2000 and 2019.

Figure 12.3: Percentage of undernourished people in India



Source: *FAO*

● Central Asia and South ● Asia ● World India

The regional figures of prevalence of undernourishment was estimated for sub-Saharan Africa to be 22.0 percent of the population in 2019, which was nearly 235 million undernourished people, up from 21.2 percent in 2015. For Central and Southern Asia in 2019 more than 13 percent (259 million) undernourished people lived and the region has also shown progress in reducing the total number of hungry people by 5.8 million since 2015 and India has played a major role in reducing hunger and undernourishment. From 2013 onwards India has persistently succeeded in reducing the number of undernourishment which is apparent in the figure 3.

13.5 POLICY LEVEL NUTRITIONAL INTERVENTIONS TO FIGHT AGAINST MALNUTRITION IN INDIA

Towards the understanding of factors responsible for malnutrition, the policy makers in India adopted several multi-sectoral approaches to achieve the goal of optimum nutrition for all. Important policy interventions

and programmes led by the Indian government to combat the problem of malnutrition are as follow:

- **Direct Policy Interventions :**
  - Integrated Child Development Scheme (ICDS)
  - Fortification of essential food items with legal provisions
  - Popularize low cost nutritious food
  - Control of Micro Nutrient deficiencies
- **Indirect Policy Interventions :**
  - Guarantee food security by increasing the foodgrains production
  - Improving Dietry pattern by increasing the production and per capita availability of nutrient rich food items.
  - Prevention of food adulteration by Law
  - Strengthening nutrition surveillance
  - Improving purchasing power of rural and urban landless poor
  - Improving the efficiency of public distribution system

Besides the direct and indirect policy interventions the government of India adopted various initiatives over the years to improve the nutritional status in the country. Table 4 below provides a list of various programs and schemes that have been launched over the years as policy intervention to improve nutritional levels among population.

Table 12.4: Programmes, Plans, Schemes and Missions implemented to improve the food security and nutritional levels in population.

Programmes, Plans, Schemes and Missions	Year
Mid-day Meal Programme,	1962–1963
Goiter Control Programme, 1962 (now known as National Iodine Deficiency Disorders Control Programme)	1962
Special Nutrition Programme, 1970–1971	1970-71
Balwadi Nutrition Programme, 1970–1971	1970-71
Nutritional Anaemia Prophylaxis Programme, 1970	1970
Prophylaxis Programme against Blindness due to Vitamin A Deficiency, 1970	1970
Integrated Child Development Services (ICDS), 1975	1975
National Diarrhoeal Diseases Control Programme, 1981	1981

Wheat-based Supplementary Nutrition Programme, 1986	1986
National Plan of Action on Nutrition, 1995	1995
Public Distribution System, 1997	1997
The National Population Policy (NPP) 2000	2000
The National Health Policy 2002	2002
National Nutrition Mission, 2003	2003
National Health Mission (NRHM—2005–2017)	2005-17
National Health Mission, 2013 (subsumes former Rural and Urban Health Missions) National Iron+ Initiative, 2013	2013
Promotion of Infant and Young Child Feeding Practices Guidelines, 2013	2013
Weekly Iron and Folic Acid Supplementation, 2015	2015
National Deworming Day, 2015	2015
Sustainable Development Goals (2016–2030)	2016-30
New National Health Policy, 2017	2017

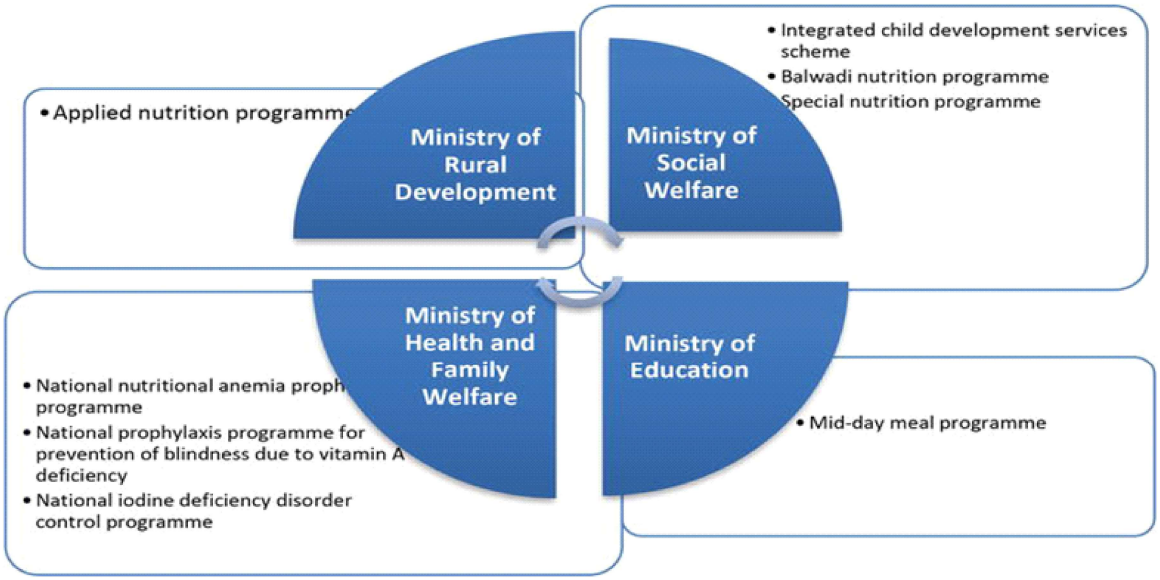
It is apparent from the table above that food and nutritional security in India has been a prime priority of the government since 1960s itself. Different schemes and programmes have been launched to curb the menace of poverty and provide food and nutrition security in the country. The decades aim to address all forms of malnutrition and ensure all people have access to healthier and sustainable diets. The results are evident from the declining patterns of poverty status in India over the years. However, the state of malnutrition in India is still alarming, despite a lot of work is done and progress has been made but the pace of improvement is too sluggish.

13.6 MINISTERIAL LEVEL EFFORTS TO COMBAT MALNUTRITION PROBLEM

Due to continuing food and nutritional insecurity, an alternative strategy of development became a national priority, which gave the rise to a number of interventions and strategies to improve the conditions of the most vulnerable sections in the country. The strategic combat to malnutrition was further consolidated by decentralising the efforts at ministry as well as community levels. Different ministries have been directed to implement programmes and schemes which help in alleviating

the food and nutritional insecurity in country. Figure 4 presents the interventions adopted by different ministries to combat malnutrition in India.

Figure 12.4: Multi-Ministerial Interventions showing Political Commitment and Inter-sectoral Approach to Combat Malnutrition



13.7 SOME STRATEGIC COMMUNITY LEVEL NUTRITION RELATED INTERVENTIONS ROLLED OUT BY THE GOVERNMENT OF INDIA

Community based nutritional programmes could be more effective in combating the malnutrition problem because these progammes are often based on strategic nutrition related interventions. A few of them are discussed below.

- **Promotion of Infant and Youth Child Feeding Practices :**

  This programme promotes the exclusive breastfeeding of children for first six months, thereafter complementary feeding commences at six months. Mother's Absolute Affection (MAA) programme was launched in 2016 to promote breastfeeding and infant feeding practices.

- **Establishment of Nutritionals Rehabilitation Centre :**

  The nutritional rehabilitation centres are established to provide

medical and nutritional care to severe acute malnourished children under five years of age. In addition to this, these centres also impart skills to mothers on child care and feeding practices which ensure adequate child care at home.

- **Anemia Mukt Bharat :**

  This campaign has been launched to intensify Iron Plus Initiative, aimed to strengthen the existing programmes and fostering the newer strategies to tackle anemia. This paved the path to the targets under the POSHAN Abhiyaan programme through focus on six target beneficiary groups with six interventions and six institutional mechanisms.

13.8 IMPACT ANALYSIS OF PRODUCTION ORIENTED POLICIES

India as a country has an enormous diversity- geographic, economic and ethnic; it is the second most populous and seventh largest country by land area in the world. While the socio-economic conditions of the country were not favorable at the time of independence, the sustained reforms have contributed much to the macroeconomic environment. Remarkable social and economic progress has been made since the start of liberalisation reforms; the strong economic performance since the mid-1990s has raised the country's GDP per capita by over 5% per year and has contributed in uplifting millions of people out of the extreme poverty, from 45% in 1993 to 22% in 2011 (OECD, 2018). Among the three sectors of the Indian economy it is the service sector which contributes the maximum to the total India's GVA (gross value added) that is 54.77% and then the secondary sector i.e., industry which contributes 27.47% to the country's GDP and the primary sector which consists of agriculture, forestry and fishing contributes 17.76% at current prices to the GDP in India (MOSPI, 2019). Although the primary sector of the economy contributes lesser than the other two sector yet it is still this sector which provides employment to the most workforce, that is, 42.39% in the country. Also the share of agriculture sector in GDP has increased

to 20 per cent for the first time in the last 17 years during 2020-2021. The total grain production of 296.65 million tonnes in 2019-20 has been estimated, which was higher by 11.44 million tonnes than 2018-19; continuous supply of different agricultural commodities ensures food security in the country. The adequate agricultural production boosts the sufficient supply of foodgrains under the National Food Security Act through PDS. The food grain production of 69.3 million tonnes in the year 1960-61 to production of 264.35 million tonnes in 2013-14, indicates significant progress in Indian agriculture over the years. The agricultural progress and reforms of the country can be categorised into different periods as follows:

- **The Period of Stagnation in Agriculture (1950s)**

  This period of Indian agriculture was marked by limited/insignificant growth in crop and grain production. The period witnessed foodgrain production of 59.2 MT (1952-53), with a yield of 579.8 kg/ha.

- **The Period of Green Revolution (1960-80s)**

  This period was characterised by a transition from stagnancy to high agriculture production in the country. The pioneering effort of agricultural scientists and the farmers led a successful Green revolution. Use of High Yield Variety (HVY) seeds, fertilisers and irrigation resulted in sharp spike in agricultural production.

- **The Period of Surplus Production and Exports (1980-2000s)**

  During this period India achieved food security by surplus production of foodgrains. This period was characterised by expanding cereal production, encouragement to exports, surplus production over domestic demand, increase in population and strong income growth.

- **The Period of Economic Reforms, Technological Advancements and Disruptive Transformation (2000 Onwards)**

  This period of Indian Agriculture witnessed introduction of new policies and adoption of technology. More emphasis were given on technology driven production, rise in agricultural credit for agriculture and NFSM to increase the production. Introduction of schemes like National Horticulture Mission and Bringing Green Revolution in Eastern India (BREI) was adopted that resulted achieve record production.

- **Horticulture Mission for North East and Himalayan States (2001-02)**

  This mission was aimed to increase the production and productivity of horticulture crops, special emphasis was given on “Low Volume, High Value, and Less Perishable Crops”. The mission was facilitated to provide employment opportunities to women by developing horticulture farming.

- **Agriculture Technology Management Agency ATMA (2005)**

  This scheme aims at making extension system farmer-driven and farmer accountable technology dissemination in the form of ATMA at district level to operationalise the extension reforms. The scheme facilitates the retrival of data from internet web portals offline by using a mobile phone. It has active participation from NGOs, Farmers/ farmer-groups, Panchayati Raj Instituions, Krishi Vigyan Kendras and other stakeholders operating at the district level or below.

- **National e-governance Plan Agriculture (2006)**

  This scheme was introduced during 11th Plan to ensure timely access to agriculture related information to the farmers and other stakeholders. The services provides important information related to pesticides, fertilisers, seeds, farm, soil health, crops, machinery, weather, productive agricultural practices, prices, arrivals, procurement, irrigation, infrastructure, reliefs and more.

- **National Food Security Mission (NFSM) and Rashtriya Krishi Vikas Yojana (RKVY) (2007)**

  NFSM was launched during the 11th five year plan. The main objective of this mission was to increase the production of rice, wheat and pulses by 10 MT, 8MT and 2MT respectively by the financial year 2012. RKVY was also launched during the 11th five-year plan and was aimed at incentivising the states to increase outlays for agriculture and allied activities and encourage the growth opportunities.

- **National Crop Insurance Programme NCIP (2013-14)**

  This scheme was introduced to ensure the food security, crop diversification and improve the growth of the sector. The scheme

provided weather-based crop insurance to minimise the financial loss of the farmers.

- **Pradhan Mantri Krishi Sinchai Yojana (2015)**

  This scheme was launched to develop the micro-irrigation and watershed facilities to increase agriculture production. An allocation of USD 830 million was provided and the states were directed to fund agriculture sector and take appropriate measures to achieve the targeted growth and address farmers' issues.

- **Pradhan Mantri Fasal Bima Yojana (PMFBY) and eNAM (2016)**

  This scheme was the replacement of existing two schemes National Agricultural Insurance Scheme and Modified National Agricultural Insurance Scheme. The central government under PMFBY provided crop insurance and financial support to the farmers for covering their crop losses. National Agriculture Market (eNAM) on the other side was a pan-India electronic trading portal network to create a unified national market for agricultural goods. It aimed to promote uniformity in the agricultural marketing by removing information asymmetry and based on demand and supply promotes real-time price discovery.

- **Contract Farming Law and Tax Incentives (2017)**

  In 2017, the government in an effort to protect the farmers' interest against price vitality came up with a law on contract farming. The committee of State Ministers on Agricultural reforms was formed which recommended that contract farming should not come under the ambit of Agricultural Product Market Committee (APMCs), because market fees and other levies are paid to the APMC when no market facilities and infrastructure are rendered to undertake contract farming. Besides this, for 100 percent export-oriented units, import duty on capital goods and raw materials was abolished. Also, no excise duty was provided for goods that are used in the installation of cold storage facilities. Services like ripening, waxing, packing, pre-conditioning, labeling of fruits and vegetables were exempted from service tax.

- **Agriculture Export Policy (2018)**

  The Government of India framed the agriculture export policy to

focus on export-oriented production, export promotion, and better farmer realisation. The policy lifted all restrictions on organic and processed food in an effort to double the farmers' income by 2022. Besides this policy the government of India in 2018 launched Pradhan Mantri Annadata Aay SanraksHan Abhiyan as procurement policy, which enabled the States to compensate and partner with private agencies to ensure fair prices for farmers.

- **Pradhan Mantri Kisan Maan-Dhan Yojana (2019)**

  This scheme was aimed to cover around 3 crore beneficiaries from small and marginal farmers to be provided a minimum fixed pension of Rs 3000 on attaining the age of 60 years. In 2019-20, government of India made a budgetary provision of Rs 900 crore for this scheme; the beneficiary is required to make a monthly contribution of Rs 55 to Rs 200 to the pension fund. The other financial push to farmers that the government of India launched in 2019 was Pradhan Mantri Kisan Samman Nidhi Yojana, under which the Prime Ministry transferred Rs 2.21 crore to bank accounts of more than 10 million beneficiaries of which the farmers received Rs 6,000 in three installments.

- **Agricultural Reforms of 2020**

  The Government of India with the aim of transforming the agriculture production and farmers income has passed three important legislations from parliament in 2020. The aim of these legislations was to bring reforms in the agriculture marketing system in the country.

  - **The Farmers' Produce Trade and Commerce (Promotion and Facilitation) Act, 2020**

    This act facilitates the farmers with freedom of choice related to the sale and purchase of their produce. It also provides the farmers' liberation from the Cess or levy for the sale of their produce. The act is believed to promote barrier-free inter-state and intra-state trade and commerce and will open more choices for the farmers and help them in getting better prices.

  - **The Farmers Agreement of Price Assurance and Farm**

Services (Empowerment and Protection) Act, 2020

This act is aimed to provide a national framework on farming agreements which will protect and empower farmers while engaging with agri-business firms, wholesalers, processors, exporters for farm services. It is believed to empower famers and will transfer the risk of market volatility from the farmers to the sponsor. It will further enable farmers to access the modern technology and attract private sector investment for building supply chain to national and global markets. Farmers will engage in direct marketing thereby eliminating the intermediaries.

- **Essential Commodities (Amendment) Act, 2020**

The amendment to essential commodities act (ECA)1955, aims to help the local farmers get better prices for their produce and more discretion over whom and where to sell. The amendment enables farmers to sell their products to anyone outside the APMC mandis and allows the market forces to determine the prices of essential agriculture produce. Any limit under the act (ECA) will be imposed only in exceptional circumstances such as famine, war, extraordinary price volatility and natural calamity.



CHECK YOUR PROGRESS

Q 4: What is 'Asian Enigma?'

.....

.....

Q 5: When and why was Mother's Absolute Affection (MAA) programme Launched?

.....

.....

Q 6: In which policy all restrictions on organic and processed food are lifted in an effort to double the farmers' income by 2022 ?

.....

.....



13.9 LET US SUM UP

- Food security is the foundation of economic security and economic security leads to national security and other forms of social security to nationals.
- Productivity gains are key to food security in countries with foreign exchange shortage or limited infrastructure to import food. India is facing twin challenges viz. a rapid rise in population, declining farm productivity and a lack of employment opportunities that translates into livelihood insecurity.
- From time to time India tried its best to increase agricultural production for providing food security to the people. Food availability depends upon production and distribution; access to food guided by purchasing power and effective use of food translates food security into nutrition security. In addition to it, food must not only be available and accessible but also be of right quality in terms of energy and micronutrients.
- The government has been implementing a wide range of nutrition intervention programmes for achieving food security at the household and individual levels.



13.10 FURTHER READING

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3) Steyn, N. (2014) Malnutrition. In: Michalos A.C. (eds) *Encyclopedia of Quality of Life and Well-Being Research*. *Springer*, Dordrecht. https://doi.org/10.1007/978-94-007-0753-5_1719

4) Gragnolati,M.,Shekar,M.,Gupta,M.D.,Bredenkamp,C.&Lee,Y.K. (2005). *India's Undernourished Children: A Call for Reform and Action*. Washington DC: The International Bank for Reconstruction and Development/The World Bank.

5) Schultz, A., & Northridge, M. (2004). *Social determinants of health: Implications for environmental health promotion*. Health Education & Behavior, 31(4), 455-



13.11 ANSWERS TO CHECK YOUR PROGRESS

Ans to Q No 1: availability, accessibility, utilisation and sustainability

Ans to Q No 2: Chronic and Transitory.

Ans to Q No 3: True.

Ans to Q No 4: A phenomenon of consistent and usually high prevalence of undernourishment among children in South Asia as compared to other countries across the globe.

Ans to Q No 5: Launched in 2016 to promote breastfeeding and infant feeding practices.

Ans to Q No 6: Agricultural Export Policy (2018).



13.12 MODEL QUESTIONS

Short Questions (Answer each question in about 150 words)

Q 1: Give an overview of food and nutritional status in India.

Q 2: Define malnutrition. How can the term malnutrition be grouped?

Q 3: Explain briefly the different types of food insecurity.

Long Questions (Answer each question in about 300-500 words)

Q 1: Describe in details about the Government efforts at community level to combat malnutrition in India.

Q 2: Write in details about Agriculture Reforms, 2020.

*** ***** ***

UNIT14: THE PUBLIC DISTRIBUTION SYSTEM IN INDIA

UNIT STRUCTURE

14.1 Learning Objectives

14.2 Public Distribution System in India

14.3 Functioning of Targeted Public Distribution System and Food Price Policies in India

14.4 Food Subsidies

14.5 Food Safety Nets and Food for Work Programme

14.6 Let Us Sum Up

14.7 Further Reading

14.8 Answers to Check Your Progress

14.9 Model Questions

14.1 LEARNING OBJECTIVES

After going through this unit, you will be able to-

- explain the Public Distribution System in India
- discribe the Targeted Public Distribution System (TPDS)
- analyse the food price policies in India
- explain the concept of food subsidies
- describe the food for work programmes.

14.2 PUBLIC DISTRIBUTION SYSTEM IN INDIA

The Public Distribution System in India was established under the Ministry of Consumer Affairs, Food, and Public Distribution to manage the scarcity of foodgrains through the distribution of food grains at subsidised prices to the poor section of the society. Public Distribution System (PDS) works under the combined responsibility of the central government and the state governments. Central government through Food Corporation of India (FCI) assures the responsibility of procurement, storage, transportation and bulk allocation of foodgrains to the states and

the later ascertains the operational responsibility of proper allocation within the State. The states have been entrusted with the main responsibilities to identify the eligible families, issue the Ration Cards and prudently supervising the functioning of Fair Price Shops (FPSs). The major commodities distributed under the PDS are wheat, rice, sugar and kerosene but some states supplement additional items such as, edible oil, iodized salt, pulses, spices etc of mass consumption through PDS.

The evolution of PDS in India dates back to 1940s; it was introduced at that time as a war-time rationing measure. However, the distribution through PDS was generally based on imports of foodgrains and during the 1950s the system was almost dysfunctional due to growth in agriculture produce but in the early 1960s, PDS was revived in the wake of acute food shortage. It was during this time the government established the FCI and Agriculture Price Commission to manage the domestic procurement and storage of foodgrains for PDS and by the 1970s, Public Distribution System in India evolved into a universal scheme for the distribution of highly subsidised foodgrains. Till 1992, the PDS scheme without any specific target operated as a general entitlement food scheme for all consumers in the country but in 1990s, the experts and even political executives strongly recommended the reforms in PDS and advocated to orient it to targeting only poor and needy people in the country. In 1992 the government reviewed the loopholes in the universal distribution of PDS foodgrains and subsequently with a view to strengthen and streamline the PDS, they reformed the universal PDS into Revamped Public Distribution System (RPDS). It was reported that people in vulnerable, remote, hilly and far-flung areas were not getting the desired benefits of PDS due to malfunctioning of the scheme. So the positive trend that emerged after the reforms was that PDS was predominantly targeting the traditionally deficit areas and the off-take against allocation which was only 73% in other areas now it was 91% in RPDS areas. However, in June, 1997, the government launched the Targeted Public Distribution System (TPDS) with a focus on the poor. Thus TPDS not only targeted the poor families in the remote areas but also improved its reach to poor

families in the urban areas. Under the TPDS initially around 6 crore poor families were targeted for whom annually a quantity of about 72 lakh tonnes of food grains was earmarked which later showed an increase. The scheme divided the beneficiaries into two categories viz. families below the poverty line (BPL) and families above the poverty line (APL). This categorisation of BPL and APL was done by the states as per state-wise poverty estimates of the planning commission. However, in December, 2000, another category Antyodaya Anna Yojana (AAY) was included in TPDS after the National Sample Survey (NSS) reported that about 5% of the total population does not have access to two square meals a day. Thus AAY category includes poorest of the poor families which are more focused and targeted by the TPDS. Upon conceiving the importance of staple food for poor people the government of India in September 2013, enacted the National Food Security Act, 2013 to deliver foodgrains as legal entitlement to poor families. The act relies largely on the TPDS and made access and availability of food a legal right for every TPDS beneficiary.

14.3 FUNCTIONING OF TARGETED PUBLIC DISTRIBUTION SYSTEM AND FOOD PRICE POLICIES IN INDIA

Both central and state governments share the responsibilities of providing foodgrains to the identified PDS beneficiaries. The Central government procures foodgrains from the farmers at a Minimum Support Price (MSP) and sells it to states at central issue prices. Then it is the responsibility of the state government to transport these foodgrains from godowns to each Fair Price Shop (FPS) and then distribute among beneficiaries at the lower central issue price. The primary objective of public distribution is to ensure food security and to have check on market prices of foodgrains. However, post independence India witnessed the highest inflation in September 1974, when overall inflation crossed 33.3 per cent and from November 1973 to December 1974 the inflation in India did not fall below 20 per cent. In 2007-08 the food prices around the

world spiked up by 20-40 per cent, India witnessed lower food price due to immediate food policy interventions, however, in 2009 due to severe drought the food prices had a rapid spike. India succeeded to mute the transmission effect of international price hike by adopting the anti export policy in rice and wheat in 2007-08. The robust policy interventions, like export controls, rise in fertilizer subsidy bill, imposition of minimum support prices and varying tariffs helped India to mitigate the abnormal high international price transmission. But in 2009 when the world food price were getting normal India had an inflationary pressure due to drought, the global price on rice moved between 2.6 per cent in April 2008 to 4.7 per cent in March 2009, India witnessed inflation on rice from 8.7 per cent to 17.1 per cent in the same period. The set back in agriculture due to drought in 2009 is called the worst drought after 1972. The food inflation during this period has been driven by both demand and supply factors. In addressing the food inflationary pressure the government of India has been adopting different policy intervention to tackle it, some of them are discussed below-

- **Minimum Support Prices (MSPs):** MSPs work as a safety net for the farmers, it ensures the price and market for their produce. It plays a pivotal role in the demand and supply market of foodgrains, this procurement based system on the one side keeps check on food inflation and other side saves the farmers from market exploitation. This system also incentivises the production at the time of rising cost of production of crops. During 2007-08, when the global food prices were flaring up, MSPs in India was increased to more than 30 per cent for wheat and MSPs of pulses, rice and maize was increased from 30 to 50 per cent in 2008-09, to catch up with the spike in global prices as well as to compensate the farmers for increasing production costs.
- **Trade policies:** Trade policies include the export bans, import tariffs and exchange rate policies. These policies help in keeping check on inflationary pressure on domestic prices. During 2007 recession, the prices of food items across the world were rapidly flaring up

and India at the same time banned the export of wheat and non-basmati rice to avoid the inflationary volatility in food items. Which although proved a prudent policy intervention in avoiding the transmission of global inflationary pressure into Indian economy. These export restrictions remained in place till early 2011 and during the financial year 2011-12, India exported 6.75 million tonnes of rice and around 1 million tonnes of wheat to foreign markets.

- **Agriculture boosting policies:** The agriculture sector of the Indian economy accommodates the large section of population and provides staple foodgrains to the local population. The sustained growth in this sector remains the priority of the government, which largely are imparted through input and output subsidies, investment and enhanced extension. From 1995-96 the aggregate subsidies which include food, fertilizer, power and irrigation increased from 7.8 per cent to 15.1 per cent in 2009-10 and during the 2007-08 rising prices of food items across world the food and fertilizer subsidies peaked to 74.3 per cent in 2008-09, all this was done to boost domestic production and sustain the supply of foodgrains in domestic markets in order to shun the food inflation.
- **Procurement, stocking and marketing policies:** The procurement of foodgrains from the farmers ascertains the demand of their produce even at the times of buffer stock. The responsibility to procure the grains from the farmers lies on the Food Corporation of India (FCI), which procures the grains from the farmer at the government fixed rates. The procurement levels have witnessed an unprecedented increase from 11.2 million tonnes to wheat and rice in 1980-81 to 56.5 million tonnes in 2010-11, and in June 2012 the grains stock reached a record high of 82 million tonnes. However, managing the stocks of abundant foodgrains incur huge financial burden to the government and there have been reports of grain damage due to improper handling and inadequate storage facilities. In a fairly move government have directed the states to lift the restrictions on the movement of certain fruits and vegetables in

order to reduce the wastage but still the foodgrains which form the staple diets are continue to be the mainstay of food security in India.



CHECK YOUR PROGRESS

Q 1: What are the major commodities distributed under PDS ?

.....

.....

Q 2: State whether True (T) or False (F):

TPDS targets only poor families in remote areas (T/F)

.....

.....

Q 3: Fill in the blanks

……..works as a safety net for the farmers, it ensures the price and market for their produce

14.4 FOOD SUBSIDIES

Food as well as other subsidies plays a vital role in the process of fighting poverty and food insecurity in India. Government with the help of providing subsidies to both consumers and producers, on one side maintain the balance between supply and demand and on the other side encourage the production of foodgrains and food security in the country. The major shares of subsidies which boosts the growth of agriculture and helps in tackling the problem of food insecurity goes to grains, fertilizer, irrigation and power (Producers subsidy). However, when we compare the percentage of subsidies to agriculture sector across different countries, India falls far behind than many developed and developing countries. The following table provides a brief comparison of subsides to agriculture sector across different countries-

Table 14.1 Comparison of Subsidies to Agriculture Sector in Different Countries

Country	Subsidy per hectare	subsidies in %	Population depend on agriculture
EEC	$82	37%	8%
USA	$32	26%	5%
Japan	$35	72%	4%
China	$30	34%	24%
South Africa	$24	60.67%	18%
India	$14	2.33%	60%

Source: *Salunkhe H.A & Deshmush B. B (2012)*

Table 1 reveals that though majority of population in India depend on agriculture sector but the country spends relatively little percentage of subsidies on agricultural sector than other developing countries. However, India spends a huge amount of subsidy on consumers i.e., on food which covers 75% of population in rural areas and 50% in urban areas (NFSA, 2013). Under food subsidy FCI receives the subsidy for procuring and storage purposes however, the states would also receive the share of subsidies if they choose to undertake the operations of procurement, storage and distribution on behalf of FCI and the share of food subsidy also goes for sugar which the Antyodaya Anna Yojana category is entitled monthly one kg. The expenditure on food subsidy in India increased from Rs 63,844 crore in 2010-11 to Rs 1,39,419 crore in 2015-16. Table 2 provides the scenario of food subsidy in India over the years.

Table 14.2: Expenditure on food subsidy during the period 2010-11 to 2020-21 (in Rs crore)

Year	Food subsidy	% increase over the previous year	% of allocation utilised
2010-11	63,844	9%	115%
2011-12	72,822	14%	120%
2012-13	85,000	17%	113%
2013-14	92,000	8%	102%
2014-15	1,17,671	28%	102%

2015-16	1,39,419	18%	112%
2016-17	1,10,173	- 21%	82%
2017-18	1,00,282	- 9%	69%
2018-19	1,01,327	1%	60%
2019-20	1,08,688	7%	59%
2020-21	1,15,570	6%	-

Source: *Demand for Grants 2020-2021 Analysis: Food and Public Distribution (PRS) Give proper source asking the writer*

Note: Figures for the years 2019-20 and 2020-21 are estimates.

Table14.3: Break-up of food subsidy (in Rs crore)

Subsidy	2018-19 Actuals	2019-20 Revised	2020-21 Budgeted	% change in 2020-21 over 2019-20
Subsidy to FCI	70,098	75,000	77,983	4.0%
Subsidy to states (decentralised procurement)	31,029	33,508	37,337	11.4%
Sugar subsidy	200	180	250	38.9%
Total	**1,01,327**	**1,08,688**	**1,15,570**	**6.3%**

Source: *Demand For Grants 2020-2021 Analysis: Food and Public Distribution (PRS) Give proper source asking the writer*

It can be observed from Table 2 that there has been persistent increase in the percentage of subsidy between 2010 and 2015 but since 2016-17, spending on food subsidy has comparatively decreased and one of the reasons for this was that a major part of the funds allocated for subsidy remained unspent. Table 3 shows that the major proportion of food subsidy goes to Food Corporation of India (FCI).

14.5 FOOD SAFETY NETS AND FOOD FOR WORK PROGRAMME

Although India has a bequest of social safety net programmes to improve the socio-economic conditions of poor and vulnerable section of the population, it has been observed that these programmes have not been fully successful in improving the socio-economic and health

outcomes. There have been a lot of criticism on the functioning, design, targeting and corruption in social safety net programmes and India has been struggling to reform these programmes to improve its functioning. The safety net programmes are designed with three main objectives, protection, insurance and poverty alleviation but the current safety net programmes do not seriously address the health risk. The five main programmes which provide appearance to the social security in India include, PDS, Integrated Child Development Scheme, Mahatma Ghandhi National Rural Employment Guarantee Scheme, Mid-Day-Meal Scheme and Pension for widows and elderly. An overview of these major programmes are presented in Table 4 below-

Table 14.4: Description of major safety net programmes in India

	Targeted population	Nature of the program	Objectives
PDS	Poor	In-kind food transfers	Hunger reduction
ICDS	Children and mothers	Supplemental food assistance	Nutritional assistance
MDMS	School going children	Hot cooked meals	Classroom hunger mitigation
MGNREGS	Universal rural population	Public works program	Rural livelihoods
Pensions	Widows and elderly	Income transfer	Poverty among elderly
RSBY	Poor	Health insurance	Safeguard against health shocks induced poverty

Source: *Reimagining Safety Net Programs (Pingali P et al, 2019)*

- **Give proper source asking the writer :**

  The main concern in India regarding the safety nets is grappling with the debates like, should the scheme be universally applicable or targeted towards poor?, should it be in the form of in-kind transfer or direct cash transfers?, should these schemes be replaced with an unconditional universal basic income?. One can categorise the safety nets into food safety nets and non food safety nets, and under food based safety net programmes safety of life is provided through , PDS, ICDS and MDMS and all these programmes are aimed at providding the nutritional improvement and food security to the under privileged section of the population. However, the major concern with these programmes are identification of the beneficiary, design or implementation and India has failed abysmally in targeting when it comes to the welfare programs. The recent estimates of 2017-18, Economic Survey reported that targeting errors continuously prevail in welfare programmes in India (Government of India, 2018). Only 28% in the bottom 40% of the households have an access to PDS, while 36% of the benefits accrue to the non-poor (Table 5). The major criticisms on ICDS were made for poor design and implementation and for MDMS which was designed to address the issue of children development and maternal nutrition supplement were heavily criticised for poor infrastructure and issues with maintaining hygiene.

Table14.5: Targeting of PDS and MGNREGS (in %)

	PDS	**MGNREGA**
Non-beneficiaries	40	65
Among the beneficiaries		
Leakages	36	20
Benefits to non-poor	36	43
Benefits to the bottom 40%	28	37

Source: *Economic Survey 2017–18*

Under non-food based safety net, MGNREGS provides the basic architecture to social welfare regime in India. Before MGNREGS there was the National Food for Work Programme (NFWP), which was launched

in 2004 with an objective of generating supplementary wage employment for all India poor to do manual unskilled labour work. Later in 2005 the NFWP was subsumed in National Rural Employment Guarantee Act of 2005. MGNREGA is currently the chief right based employment guarantee scheme, it guarantees 100 days of unskilled manual work to all adults in rural household. The scheme was aimed to address the issues of rural livelihood and infrastructure, by generating employment opportunities and creating durable assets. The scheme shares minimum wage ratio of 60:40 with centre and states. However, like other safety net programs MGNREGS was also criticised for inefficiencies, corruption, delayed payments and lower wages. Table 5 provides the targeting scenario of PDS and MGNREGA programs.



CHECK YOUR PROGRESS

Q 4: What are the major shares of subsidies which boosts the growth of agriculture and helps in tackling the problem of food insecurity? (Answer in about 10 words)

.....

.....

Q 5: Name the five main programmes which provide appearance to the social security in India. (Answer in about 30 words)

.....

.....



14.6 LET US SUM UP

- The Public Distribution System in India was established under the Ministry of Consumer Affairs, Food, and Public Distribution to manage the scarcity of foodgrains through the distribution of food grains at subsidised prices to the poor people. The major commodities distributed under the Public Distribution System (PDS) are wheat, rice, sugar and kerosene but some States supplement additional items

such as, edible oil, iodized salt, pulses, spices etc of mass consumption through PDS.

- Both central and state governments are responsible for providing foodgrains to the identified PDS beneficiaries. The Central government procures foodgrains from the farmers at a minimum support price (MSP) and sells it to states at central issue prices. Then it is the responsibility of the state government to transport these foodgrains from godowns to each fair price shop (FPS) and then distribute among beneficiaries at the lower central issue price. The primary objective of public distribution is to ensure food security and to have check on market prices of foodgrains.
- To address the food inflationary pressure, the government of India has been adopting different policy intervention to tackle it, some of the policies are: Minimum Support Price (MSP), Trade Policy, Agricultural boosting Policy and Procurement, Stocking and Marketing policies, etc.
- Poverty and food insecurity are the main problems in India among others. Providing subsidy to food as well as other inputs is vital to fight these problems. Government with the help of providing subsidies to both consumers and producers, on one side maintain the balance between supply and demand and on the other side encourage the production of foodgrains and food security in the country.
- India has a number of social safety net programmes to improve the socio-economic conditions of vulnerable section of the population. However, these programmes have not been fully successful in improving the socio-economic and health outcomes. The safety net programmes are designed with three main objectives- protection, insurance and poverty alleviation but the current safety net programmes do not seriously address the health risk.
- The five main programmes which provide appearance to the social security in India include- PDS, Integrated Child Development Scheme, Mahatma Ghandhi National Rural Employment Guarantee Scheme, Mid-Day-Meal Scheme and Pension for Widows and Elderly.



14.7 FURTHER READING

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14.8 ANSWERS TO CHECK YOUR PROGRESS

Ans to Q No 1: The major commodities distributed under the Public Distribution System (PDS) are wheat, rice, sugar and kerosene but some states supplement additional items such as, edible oil, iodized salt, pulses, spices, etc.

Ans to Q No 2: False.

Ans to Q No 3: MSP.

Ans to Q No 4: Grains, fertilizer, irrigation and power.

Ans to Q No 5: PDS, Integrated Child Development Scheme, Mahatma Ghandhi National Rural Employment Guarantee Scheme, Mid-Day-Meal Scheme and Pension for Widows and Elderly.

14.9 MODEL QUESTIONS

Short Questions (Answer each question in about 150 words)

Q 1: Discribe in brief the Public Distribution System (PDS) in India.

Q 2: What is meant by agriculture boosting policy?

Q 3: Explain the importance of food subsidies.

Long Questions (Answer each question in about 300-500 words)

Q 1: Describe the status of Social Safety Net Programmes in India.

Q 2: Discuss the functioning of TPDS and food price policies in India.

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UNIT 15 : AGRICULTURE IN NORTH EASTERN REGION

UNIT STRUCTURE

15.1 Learning Objectives

15.2 Introduction

- 15.2.1 Characteristics of the Agricultural Sector of the North East Region
- 15.2.2 Importance of the Agricultural Sector in the North East Region

15.3 Status of Agricultural Development in the North East Region

15.4 Problems and Challenges Faced by the Agricultural Sector in the North East Region

15.5 Agricultural Policies in the North East States

- 15.5.1 Suggestions

15.6 Let Us Sum Up

15.7 Further Reading

15.8 Answers to Check Your Progress

15.9 Model Questions

15.1 LEARNING OBJECTIVES

After going through this unit, you will be able to-

- acknowledge the importance of the agricultural sector in North-Eastern region of Indian Economy
- explain the different types of challenges that are seen in the agricultural sector in the North East region
- identity the present scenario of agricultural development in the North East region
- discribe the various policies which are introduced for the betterment of the agricultural sector in North-East India

15.2 INTRODUCTION

The North Eastern region of India is rich in natural resources and diversified cultural heritage. The region is endowed with unique features like fertile land, water resources, dense forest, high rainfall (ranges between 1500 mm to 12000 mm), mega biodiversity and flora and fauna. The region consists of eight states namely Arunachal Pradesh, Assam, Tripura, Nagaland, Meghalaya, Manipur, Mizoram and Sikkim with a landmass of 2.6 million sq. km accounting for 7.9 per cent of India's total geographical area. Like other regions of Indian economy, the North East region is an agriculture based economy. Around 5.3 million ha is under various crops while 1.67 million ha (NEDFi data bank, 2017-18) is under jhum (shifting) cultivation.

Majority of workforce in this region is dependent on Agriculture and Allied sector for their livelihood. As it is a primary sector, agriculture plays an important role in the North East economy. According to the 2011 Census, almost 70% of the region's population earn their livelihood from the agricultural sector. North East contributes 1.5 % to India's food grains production. Agricultural land of this region includes approximately 22.20% where 54.4 7% in India. Therefore we can say that one of the important sectors of the North East region is the agricultural sector.

In North Eastern states, the level of farm mechanisation is extremely low mainly due to hilly topography, high transportation cost of farm equipment and socio-economic conditions of the farmers. The net sown area of the region is about four million hectares. Among the states, Assam (34.1 %) has the highest net sown area, followed by Tripura (23.5%), while Arunachal Pradesh has lowest net sown area (2.1%). The cropping intensity of the NE region is around 135 per cent, highest in Tripura (185%) followed by Manipur (145 %). In respect to types of crop grown in this region, rice is grown as staple crop in every state. But due to some factor endowment or climatic conditions, some special agricultural crops can be produced more in some States. For example, tea is the main cash crop of Assam. Along with tea, Assam is a leading producer

of bamboo in India. Besides these, pulses, potatoes, jute oilseeds, cotton are also produced in the state of Assam. Along with rice, maize, ginger and oilseeds are produced in Arunachal Pradesh. In Nagaland, sugarcane and potato are the main cash crops. However, Meghalaya is known for its fibre crops like cotton, jute and mesta. In Garo Hills of Meghalaya, cotton is produced more. Similarly jute and various fruits like jackfruit, orange pineapple and mangoes are the main cash crops which are grown in the state of Tripura. In Lunglei town of Mizoram state, coffee and rubber are produced to some extent. Spice crops like bird's eye chilli, ginger, turmeric, etc. are the mainly cultivated spice crops of Mizoram state. In Manipur, vegetables like cabbage, pumpkins, peas, gourds are produced more. In the slope of the low hills and hillocks of Manipur, pineapples are cultivated which is the main cash crop of the state. Sikkim has become the first organic cash crop producing state of the North East region and these crops have a large demand in domestic as well as in international markets. Sikkim produces orange, large cardamom, pepper, baby corn, buckwheat, Ginger, turmeric, etc. organically.

15.2.1 Characteristics of Agricultural Sector of North East Region

The main characteristics of agricultural sector of North East region are-

- Almost 70% people of north east India depend on the agricultural sector directly or indirectly.
- The land man ratio of the North East region is not sufficient because of high growth rate of population, lack of cultivated land, etc.
- The North East region practices the shifting cultivation which is popularly known as jhum cultivation.
- Rice is the main staple crop in all the states of North East India.
- Agricultural sector contributes 19% to 37% to different states in their State Domestic Product (SDP).

15.2.2 Importance Of Agricultural Sector In North East Region

Agriculture is considered the backbone and engine of the North East region. As a source of livelihood, employment and as a source of raw material for different sectors of an economy, agriculture has great importance in North East India. This can be discussed with the help of the following points

- **Source of Livelihood:** In each and every state of North East India, more than 70% people occupy their livelihood from the agricultural sector. Agriculture is regarded as one of the most important employers of the labour force of the North East region.
- **Supply of Raw Material:** Agriculture sectors plays a crucial role for industrial growth and expansion as it is the source of many raw materials for a number of industries. For example, the textile industries of the North East region are basically based on agricultural crops such as cotton.
- **Supplier of Food and Shelter:** Without food both human and animal cannot survive even a single day. Most of the food of human beings comes from the agricultural sector. Similarly, herbivorous animals live on agricultural products. Moreover, the people of North East India build their houses by using various agricultural products such as bamboo, hay, wood, etc. So in North East India, agriculture acts as a supplier of food and fodder.
- **Source of Employment:** Agriculture plays an important role as a source of employment in the North East region. Moreover due to Agricultural Development people find jobs in irrigation construction process, drainage system as well as in building farmhouses. So agriculture becomes a source of employment in the North East region.
- **Provision for New Industries:** More or less, industries of the North East region depend on its agricultural sector. Many industries collect their raw materials from the agricultural sector. The development of the Agricultural sector provides raw

material at lower price. This provides incentives to establish new agro based industries. This will help in industrial development or in the process of industrialisation.

- **Increase Trade Relation:** North East region's exportable products basically come from the agricultural sector. For example, tea and bamboo are the main exportable products of Assam. Similarly, Sikkim exports organic buckwheat, turmeric, large cardamom etc. to many other countries. Therefore, agricultural development leads to agricultural commercialisation which again helps in enhancing trade relationships among countries.
- **Source of Foreign Exchange:** Agriculture plays a vital role in earning foreign exchange reserves in northeast India. Nowadays, due to agricultural development all the North East states can increase their amount of export to a some extent. Therefore, export of agricultural products can provide capital inflow to the North East region of Indian economy.
- **Boost Food Security:** Food security can be obtained by the practice of agricultural activity in any economy. High yielding or higher productivity agricultural sectors can ensure food security in the North East region also. So in North East India, agriculture is very important to attain food security in an efficient manner.
- **Contribution to SDP:** Statistical data reveals that the agricultural sector contributes a lot to the GDP in India. Similarly, in North East states also, the agricultural sector contributes approximately 19% to 37% in their SDP.
- **Economic Development:** In northeast India, agriculture plays a crucial role in economic development. As a source of food, shelter, employment, foreign exchange, etc. agriculture has become more important for the economic development of the Northeast region of Indian economy. Without the development of the agricultural sector, this region cannot pave the way for economic development.



CHECK YOUR PROGRESS

Q 1: What are the main features of the agricultural sector in the North East region? (Answer in about 40 words)

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Q 2: Which is the 100% organic state of North East India?

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15.3 STATUS OF AGRICULTURAL DEVELOPMENT IN NORTH EAST REGION

15.3.1 Overview of North East India

To improve a sector, first of all we have to analyse what is the rate of growth of that sector. To understand the development process of agricultural sector in North East region, we have to study statistics data. For this purpose we shall refer to the following tables-

Table 15.1

States	1990-91			2000-01			2010-11				
	Area (Lakh ha.)	Prod (lakh MT)	Yield (Kg/ ha)	Area (Lakh ha.)	Prod (lakh MT)	Yield (Kg/ha)	Area (Lakh ha.)	Prod (lakh MT)	Yield (Kg/ ha)	% increase/ decrease of production in 2000-01 over 1990-91	% increase/ decrease of production in 2010-11 over 2000-01
Arunachal	1.83	2.14	1173	1.84	2.03	1103	2.01	3.33	1663	-5.14	55
Assam	27.19	34.42	1226	28.88	41.67	1443	27.67	48.76	1763	21.06	17.04
Manipur	1.62	2.85	1763	1.64	3.78	2305	2.64	5.92	2244	32.63	49.75
Meghalaya	1.33	1.53	1147	1.31	2.03	1550	1.32	2.39	1802	32.68	10.64
Mizoram	0.59	0.77	1296	0.61	1.24	2033	0.53	0.66	1246	61.04	-47
Nagaland	1.70	1.97	1161	2.11	2.77	1313	2.98	5.68	1902	40.61	76.10
Sikkim	0.81	1.06	13.13	0.76	1.03	1355	0.76	1.10	1447	30.86	6.87
Tripura	2.89	5.15	1783	2.54	5.23	2059	2.75	7.12	2587	1.55	36.1
NER	37.14	48.83	1315	39.69	59.78	1506	40.67	74.99	1832	22.42	23.62

Source: *(www.researchgate.net)*

In the table, it is seen that the amount of production has increased in almost all the Northeast states during the period 1990-91 to 2010-11 except Arunachal Pradesh. However, the production levels showed an increasing rate in 2010-11 over 2000-01. Compared to 2001, in 2010 the area of performance has increased a little bit in some states. Probably that is the reason why the production level increased in the year 2010-11. But unfortunately the table reveals an opposite situation as in Assam and Mizoram, the amount of area has decreased in 2010-11 compared to the period 2000-01. The practices of a joint family system, increasing rate of urbanisation may reduce the area of performance in these two states. Though all the Northeast States have shown increasing growth rates, the growth rate is very low compared to other regions of the economy. This may happen due to lack of use of modern techniques, investible funds, proper credit and marketing system, etc.

Table 15.2

	Arunachal Pradesh	Assam	Manipur	Meghalaya	Mizoram	Nagaland	Tripura
Share of Agriculture* in SDP (%)	31.2	37.5	27.1	32.0	18.9	32.5	24.7
Rural poverty (%)	33.5	36.0	28.5	33.9	19.5	32.7	34.4
Cultivated area (%)	2	35	6	10	4	13	27
Annual compound growth rate (%, 1993-2003)							
SDP	2.4	2.3	6.2	7.1	NA	7.5	10.0
Agriculture	1.3	0.4	3.5	6.0	NA	14.4	4.4
Population	2.01	1.44	2.15	2.66	NA	5.22	1.10
Per capita income	1.3	1.5	3.1	4.0	NA	1.9	7.9
Total cropped area ('000 ha)	239	3860	347	174	116	216	303

** include crops, livesstock, fisheries, forestry and mining. Source : www.mospi.nic.in, NA* : not available

The share of agriculture in the State Domestic Product is higher in Assam, Nagaland, Arunachal Pradesh as compared to other North East states. More or less, this sector contributes to SDP in all the states of the North East in spite of having so many problems. So, we cannot ignore the role of the agricultural sector in economic development. Proper steps should be taken to identify and solve the problems of the sector to increase the rate of economic development in the North East region.

15.4 PROBLEMS AND CHALLENGES FACED BY THE AGRICULTURAL SECTOR IN NORTH EAST REGION

The North East region has potential for tremendous agricultural growth as it has fertile soil, agriculture friendly climate, sufficient amount of water and other natural resources. But it has not been able to grow at an efficient rate. This is because, the agricultural sector of North East region faces various problems and challenges which are explained below-

- **Overcrowding in Agricultural Sector :** Northeast agricultural sector is very much overcrowded. Due to improper improvement of industrial and service sector as well as the high growth rate of population, the agricultural sector is overcrowded in northeast India. Hence, the agricultural growth rate is very low in Northeast region.
- **Inefficient Land-Man Ratio:** Northeast India had a large population growth rate during the period 1951 to 2011 creating a pressure on land. For example almost 81% of Meghalaya's population are agrarian but individual land holding everising half an acre only. This brings adverse effect on agricultural sector. Therefore, insufficient land labour ratio creates hurdale in the agricultural development of North East region.
- **Lack of Modern Technology:** The farmers in northeast India has been adopting traditional, inefficient technique of cultivation. They do not use modern technology such as use of HYV seed, proper irrigation system, proper use of fertiliser, ect. which can increase productivity.
- **Lack of Productive Investment:** Another problem of agricultural growth in northeast India is the lack of productive investment in agricultural sector in northeast. Due to less investment agricultural sector can not earn sufficient income.
- **Lack of Adequate Finance:** Northeast agriculture still remains backward due to its inadequate financial provision. They still depends much on the village money lenders who do not encourage the farmers to cultivate more. Moreover there is a lack of a proper Credit System

as well as proper insurance system for damages in the North East region. Therefore the growth rate is very low in this region.

- **Regional Disparities:** The Green Revolution process creates regional disparities in Indian agricultural sector as it grows inter and intra regional disparity in the development process. Only a few states are benefited from the Green Revolution Technology. States like Punjab, Haryana, Uttar Pradesh are benefited from this technology. But this technology did not touch much the Northeast states like Assam Meghalaya, Tripura, etc.
- **Lack of Proper Marketing System:** Agricultural marketing refers to those activities which are mainly related with proper grading, storing, transporting and selling system of agricultural products. There is a lack of proper agricultural marketing system in the Northeast region. Because of this, farmers cannot sell their agricultural product at fair and reasonable price. Moreover, they cannot sell their surplus product at a fair price due to lack of proper storage and transport facilities.
- **Adverse Effect of Shifting Cultivation:** Shifting cultivation is one of the main economic activities of the tribal people of the Northeast India. This cultivation which is also known as jhum cultivation is an agricultural practice adopted in the hilly areas where the trees and plants are cut and burnt down first to clear the area. But due to jhum cultivation, the amount of fertility of soil has reduced and soil erosion and landslide has increased. Because of this also, the amount of cultivated land has been decreasing gradually in Northeast region.
- **Natural Factors:** Another problem of agricultural growth in Northeast region is the problem of natural calamities. Landslide, earthquake, etc. creates destruction on the agricultural sector of North East region.
- **Improper Implementation of Various Schemes and Policies:** The schemes and policies which are launched for the development of the agricultural sector of North East region are not implemented properly. Therefore, they can not achieve their targeted goals. Moreover most of the policies have not touched the Northeast region yet.

15.5 AGRICULTURAL POLICIES IN NORTH EAST REGION

Since agriculture is the backbone as well as the engine of North East economy, the government has shown awareness of the problems of its agricultural sector and suggested various schemes and measures to improve the situation. Some of the main policy measures adopted under the various plans can be briefly mentioned as:

- **Rashtriya Krishi Vikas Yojana (RKVY):** Rashtriya Krishi Vikas Yojana was launched during the eleventh five year planning system in 2007. This was implemented during the eleventh and twelfth plan. Later on Cabinet Committee on Economic Affairs agreed the continuation of this scheme for the period 2017-2018 to 2019-2020 (now for 2021 to 2022) and now renamed it as Rashtriya Krishi Vikas Yojana - Remunerative Approaches for Agriculture and Allied Sector Rejuvenation (RKVY-RAFAAR). As an umbrella scheme it mainly focus on the development of Agricultural sector as well as the allied sector of the economy. This scheme allows all the states to choose their own important agriculture and allied sector development activities according to their agricultural plan. This is a central government assistance scheme first hour since 2015 to 2016 the funding has changed in the ratio of 60:40 between central and state government. This scheme was implemented in all the states of Northeast India. But the funding system of this policy in northeast states is 90:10 by the central and state government respectively.
- **Pradhan Mantri Fasal Bima Yojana (PMFBY) :** Combining two schemes namely National Agricultural Insurance Scheme (NAIS) and Modified National Agricultural Insurance Scheme (MNAIS), Ministry of Agriculture and Farmer's Welfare, launched Pradhan Mantri Fasal Bima Yojana on 18th February, 2016 by Prime Minister Narendra Modi. This scheme mainly tries to increase the yield or productivity of agricultural products of the farmers by reducing the premium burden of insurance. Thus, the main objective of the scheme is to ensure

financial help to the farmers who are suffering crop loss due to unforeseen factors. It covers oilseeds, food crops, horticultural crops, etc. Under the new scheme, the farmers' premium has been kept at a maximum of 2% of food grains as well as of oilseeds and up to 5% for horticulture and cotton crops. It is important to mention here that this scheme covers only Assam, Meghalaya, Tripura and Sikkim. Other 4 North East states viz Arunachal Pradesh, Nagaland, Manipur and Mizoram are not covered yet.

- **Mission Organic Value Chain Development For North Eastern Region (MOVCDNER):** During the 12 plan period, Mission Organic Value Chain Development For North Eastern Region (MOVCDNER) was launched by the Ministry of Agriculture and Farmer's Welfare, Government of India in 2015. This is a sub scheme of the National Mission for Sustainable Agriculture. This was a centrally sponsored scheme. Based on the quality of soil, climatic situation of Northeast region; the ministry realises the importance of organic farming in Northeast region and launched this scheme. The main objective of the scheme was to developed an organic production system with a value chain mode for sustainable development to link growers with consumers of agricultural products. Ensure safe and healthy food is the prime motive of this scheme. The demand for organic farming is more in North East region because of its rain fed hilly areas, fertile soil, favourable climate, etc. That is why, it is implemented in all the states of North East.
- **Paramparagat Krishi Vikas Yojana(PKVY) :** An extended version of Soil Health Management Scheme, Paramparagat Krishi Vikas Yojana was launched in 2015. This is a centrally sponsored scheme where funding ratio between central and state is 60:40. In case of Northeast States, the ratio is 90:10 by the central and state government respectively. The main aim of this scheme is to maximise the utilisation of natural resources by adopting eco-friendly cultivation process to keep the soil alive and healthy. Produced agricultural product free from pesticides, chemicals and by using organic wastages and other

biological materials with beneficial microbes in an eco friendly environment, is the main objective of this scheme. So this policy focuses on organic farming in the rural areas.

- **Other Schemes:** Along with the above mentioned schemes, some other schemes have also launched by the govt. of India to develop the agricultural sector of North East region. Some of them are Kisan Credit Card, MUDRA Bank, Pradhan Mantri Kisan Samman Nidhi, etc. State govt. of North East region also introduced some important schemes for the development of their agricultural sector. For example, in Arunachal Pradesh CM launched Chief Minister's Sashakt Kisan Yojana (CMSKY) and Chief Minister's Krishi Samuh Yojana (CMKSY). Assam govt also announced various schemes such as - Assam Farmers' Credit Subsidy Scheme (AFCSS), Assam Farmers' Interest Relief Scheme (AFIRS), Assam Farmers' Incentive Scheme (AFIS), etc.

15.5.1 Suggestions

For the betterment of the agricultural sector of North East region of Indian Economy, following suggestions can be made-

- Agricultural sector should be modernised.
- Working conditions should be improved by educating or training farmers so that they feel motived to do improvement.
- Credit should be given at cheaper rates of interest on easy terms of payment to the farmers.
- Steps should be undertaken for proper training for improving the skill of farm labourers.
- Initiative should be taken for improving proper irrigation system in the region.
- Alternative agricultural practices should be implemented instead of shifting cultivation or jhum cultivation as this system has many more adverse effects.



CHECK YOUR PROGRESS

Q 3: What do you mean by Jhum cultivation? (Answer in about 20-30 words)

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Q 4: What is the main aim of the Rashtriya Krishi Vikas Yojana ? (Answer in about 20 words)

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Q 5: What is the full form of MOVCDNER? (Answer in about 20 words)

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15.6 LET US SUM UP

- As a primary sector, agriculture plays an important role in the North East region's economy. According to the 2011 census, almost 70% of the region's population earn their livelihood from the agricultural sector. This sector provides food, shelter, employment opportunities in the economy.
- No doubt, the agricultural sector of North East region has developed to some entent but it has tailed to grow at an efficient rate and therefore unable to provide prosperity to its people in spite of having potential.
- Agriculture is the backbone of NE region because of its importance. It is important because -
  - ➢ It supplies food and fodder.
  - ➢ It supplies raw materials to the industries.
  - ➢ It helps in earning foreign exchange reserve.
  - ➢ It provides employment opportunities.
  - ➢ It contributes in the SDP.

- It helps in the economic development of the region.

- In spite of having favourable conditions, the agricultural sector of North East region faces various problems and challenges such as-
  - Lack of modern technology.
  - Lack of productive investment.
  - Insufficient land-man ratio.
  - Lack of proper marking facilities.
  - Lack of proper credit facilities.
  - Natural disasters.
- Indian and state governments have adopted some policy measures under various five years planning period. Some of them are-
  - Rashtriya Krishi Vikas Yojana - Remunerative Approaches for Agriculture and Allied Sector Rejuvenation (RKVY-RAFAAR).
  - Pradhan Mantri Fasal Bima Yojana (PMFBY)
  - Mission Organic Value Chain Development For North Eastern Region (MOVCDNER)
  - Paramparagat Krishi Vikas Yojana (PKVY).



15.7 FURTHER READING

1) Dhar, P. K.(2020). *Indian Economy- Its Growing Dimension*. Kalyani Publisher

2) Puri ,V. K., & Misra, S. K. (2016) *Indian Economy (34th ed)*. Himalayan Publishing House.

3) Barah ,B. C. (2007). *Agricultural Development in North East India-Challenges and Opportunities*. (www.ncap.res.in)

4) Pal,B. N. (1959). *Principles of Agricultural Economics*. Kitab Ghar, Allahabad



15.8 ANSWERS TO CHECK YOUR PROGRESS

Ans to Q No 1: The main features of agricultural sector of North East region

are

- Almost 70% people of north east India depend on the agricultural sector directly or indirectly.
- The land man ratio of the North East region is not sufficient because of high growth rate of population, lack of cultivated land etc.

Ans to Q No 2: Sikkim is the 100% organic state of North East India.

Ans to Q No 3: Jhum cultivation is an agricultural practice adopted in the hill areas where the trees and plants are cut and burnt down first to clear the area and then produce various products.

Ans to Q No 4: The main aim of the Rashtriya Krishi Vikas Yojana is the development of agricultural sector as well as the allied sector of the economy.

Ans to Q No 5: The full form of MOVCDNER is Mission Organic Value Chain Development For North Eastern Region.



15.9 MODEL QUESTIONS

Q 1: Why is agricultural sector important for the economic development of the North East region ?

Q 2: Explain the problems of agricultural sector of North East India.

Q 3: Write a short note on:

- Pradhan Mantri Fasal Bima Yojana
- Shifting Cultivation

Q 4: Give some suggestions to improve the situation of agricultural activities of North East region.

Q 5: Discuss the policy measures which are taken by the goverment of India to improve the North East region's agricultural sector.

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Name of the Paper: Course Code:

Centre for Internal Quality Assurance (CIQA)
Krishna Kanta Handiqui State Open University
City Office, Housefed Complex, Guwahati- 06

Learner's Feedback on Course

Dear Learner,

Regarding the course as mentioned above, we would like to know your opinions and comments so as to improve the quality of self learning materials in future. Please respond to the following statements by ticking the number you feel most reflect your opinion. After completion of the additional comments, please detach the page and send/mail the same to us at the address given below.

The Director, Centre for Internal Quality Assurance, KKHandiqui State Open University
Housefed Complex, Dispur, Guwahati- 781006
(E-mail id: ciqa@kkhsou.in)

1. Approximately how many hours did you spend for studying the units in the course?

2. Please give your opinions (by √ mark) to the following items based on your reading of the block:

Sl. No.	Statements	Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree
I.	The SLMs of the course fulfil the learning objectives set out in the beginning of each unit					
II.	The units of the SLM could satisfy my academic needs and expectations					
III.	The Unit writers have excellent knowledge about the course contents					
IV.	Language and contents of the units were presented at a level which I could readily understand					
V.	Ample opportunity for participation in the activities provided in the units					
VI.	Used enough Illustrations (Diagrams, tables etc.) for conceptual clarity					
VII.	Quality of content is engaging, relevant, and up-to-date					
VIII.	The self check questions are very helpful					
IX.	The Possible/model questions and the answers to check my progress have benefited me a lot					

Additional Comments: *(Please feel free to provide your open comments)*

1. Which aspects of the SLM, according to you, worked well?

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2. What sort of changes/improvements do you feel KKHSOU could implement to improve the overall quality of the SLM?

Thank you for taking the time to complete this form.

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