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Lesson No.

1.1 : Farm Size and Productivity Relationship in Indian Agriculture

1.2 : Development of Agricultural Marketing in India

1.3 : Diversification of Indian Agriculture

1.4 : Farm Mechanisation in Indian Agriculture

1.5 : Agricultural Price Policy

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FARM SIZE AND PRODUCTIVITY RELATIONSHIP IN INDIAN AGRICULTURE

Farm size is an important element in determining the earning capacity of a farmer as well as the efficiency of the farm unit. It is a question of high debate among the economists and farmers that what should be the appropriate size of farm. Some people advocate the larger size of the farm for efficient operations. Others favour small size on the ground of social justice.

Third world countries generally depend upon agriculture and production of primary goods. The great majorities of farm families in these developing countries with low income live on undersized and inadequate units. Poverty in agriculture in most of the third world countries is as much a problem of farm size as of any other single factor. Therefore, appropriate size of farm has a direct relationship with productivity. But, it is difficult to define as appropriate size of the farm. It may vary from region to region and country to country. It depends upon the size of the region, population pressure, fertility of land, climate, cropping pattern and so on.

To study in detail the relationship between farm size and productivity, we have divided this lesson into four sections. In section-I measurement of the size of farm is discussed. Section-II deals with some theoretical aspects of farm size and productivity. Section-III deals with the inverse relationship between farm size and productivity and farm size and profitability is a part of section IV.

I. Measurement of Size

There are generally four methods in vogue to measure the size of a farm. These are discussed below :-

I. Usually it is measured on the basis of acreage. This method is used by agricultural census of many countries of the world. A 300 acres farm is said to be larger than 150 acres. Acreage as a measure of size has the merit that it can not be concealed and is crucial input. But this is not always a suitable measure except in few identical areas of single crop farming. With this measure, we cannot compare accurately two areas with dissimilar systems of farming, as it does not take into consideration the intensities of production. The only merit in using this measure is that it cannot be concealed and is also

free from annual fluctuations and changes in composition.

II. Amount of work (man-work units) necessary to raise crops and take care of the live stock on the farm is also used as a measure of a farm size. But this method also faces limitations. Labour employed may not be of the same quality and productiveness. Farms on which labour has been used inefficiently would appear to be larger in size than those on which labour use has been efficient. Further a comparison of capital intensive farm using less labour is not possible with labour intensive farm using more labour.

III. Total capital employed on the farm may also be used as a measure of farm size. The value of all inputs of land, machinery equipments and so on are added together to determine the total capital employed on the farm. But this measure is again not free from limitations, as capital is one input among many others.

IV. The volume of gross output is considered as the most useful measure of the size of a farm. But it does not take into account the soil and weather variability. Comparison of year to year changes in volume of output are difficult because of shifts in prices of farm products.

II. Large Vs Small size of Farms :

We have some advantages of large scale farming in agriculture. These advantages stress from technical, financial and marketing economies. Here the capability of farmer is also important to organise to manage the farm of a large size. All the technical advantages open to small sized farms is also open to large size farms, while all the advantages open to large sized farms are not available to small sized farms. This is why, large sized farms are more economical in working and conductive to greater efficiency than the small sized farms. It is claimed that large farms enjoy economies of production, management, finance and marketing.

Production economies are reaped by large sized farms on account of use of upto date machinery, division of labour and specialization, better utilization of by products and benefits of research. Therefore, on large farms, a higher proportion of capital and land is available for direct productive use with a consequence of reduction in overhead costs per unit of product produced. Marketing economies arises from the facilities for buying and selling on large scale. While buying the agricultural inputs, large farmers get preferential treatment in prices in discount and rebates. Large farmers also get advantages while selling their produce. They fetch the higher price on many grounds. Similar economies occur in the financial sphere on account of better credit worthiness of large farmers. He is generally able to borrow money with greater ease and with less expenses. Large farmer is

better placed as far as the self finance is concerned.

Some of economies tend to be offset by inefficiencies, if the size is extended beyond a limit. As the farm size increases beyond a certain size, the difficulties of supervision and organisation decreases the efficiency of a large farm. The small family farm employing little or no hired labour in a favourable position. Not only does the financial interest of the family workers ensure the qualitative intensity of their work but the more intimate relationships existing on small farm to gain more than loss from the absence of potential benefits of division of labour and the use of machinery.

Further, in most cases, the small farming is more intensive and large farming is more extensive. With the result of that higher gross production per acre is generally obtained from the smaller farms.

Since large sized farms lead to concentration of economic power and hence are antisocial. But, small farm size as it exists in most of the under developed countries exhibit serious disadvantages.

I. The small size of the farm makes it impossible for the farmer to use the best available tools and the best methods of production. Thus, instead of method of production determining the size of unit, it is the size of the farm that determines the method adopted by farming.
II. A very small farm in unable to provide full time remunerative employment to family members.
III. The marketing economies are absent in the case of small farming. The small farmer is exposed to the exploitation of the army of middlemen.
IV. Small farmers also face problems for getting credit at reasonable rates of interest.

Returns to Scale Farm Size :

The farmer is always interested in the additional profit he gets by increasing the scale of production i.e. farming is done on large scale. Because his sole aim in profit. But, how does the scale of production is related to productivity? To explain it, we consider a production function to study the scale relationships.

$Y = f(X_1, X_2, X_3 \ldots\ldots\ldots\ldots X_n)$

Where all resources are variable. Pure scale relationships exist only when all resources which go into production are increased in same proportion.

In the case of proportionality relationships, following type of production function is considered.

$Y = f(X_1, X_2, X_3 \ldots\ldots\ldots\ldots X_n)$

In this production function, resources on the left of the vertical bar are variable, whereas those on the right are constant. In such relationships,

we are interested in knowing whether the marginal productivity of one factor is constant, increasing or decreasing as that factor is added to the fixed collection of other factors. In pure scale relationships, we are interested in knowing whether the product increases in (1) the same proportion (2) a greater proportion or (3) in a small proportion, when all factors are increased in same proportion.

Distinction between proportionality and scale relationships has been made more clear with the help of a diagram.

In this figure we have drawn four contours representing the possible combinations of X_1 and X_2. The proportionality relationship can be illustrated by keeping the input of resources of X_1 fixed at 200 and X_2 is varied from 20, 40, 80, 140. The resource input X_2 is depicting here productivity because when its input is increased from 20 to 40 units, i.e. increase of 100 percentage, output increase only from 100 to 200 or by 100 percents.

The scale relationships are indicated by line OT_1 and OT_2. The constant returns to scale are traced out along both scale lines OT_1 and OT_2. The vertical distances Oa, ab, bc and cd on scale line equal between intersections with the contours.

Farm size Productivity and Farm Efficiency :

For over two and half decades, economists have bee engaged in a debate on the relationship between farm size, productivity and profitability. While farm productivity implies output per unit of land, farm efficiency or farm profitability refers to the surplus of the value of output over all costs (including the imputed value of inputs contributed by the farmer or his family). On a priori reasoning, economists asserted that the small farms in India were far more productive than large holdings because of intensive cultivation. Since 1954-55, the studies in economies of farm management

undertaken by the Government of India provided a statistical base for the economists to workout the relationship between farm size on the one side and productivity and efficiency on the other.

Prof. Amartya K. Sen summed up the entire debate on farm size, productivity and profitability in the following three propositions.

I. When family labour employed in agriculture is given an imputed value in terms of the ruling wage rate, much of the Indian agriculture seems unremunerative.

II. 'By and large' profitability of agriculture increase with the size of holding. Profitability being measured by the surplus (or deficit) of output over costs including the imputed value of the labour.

III. 'By and large' productivity per acre decreases with the size of holding.

The first of these prepositions asserts that much of Indian agriculture in unprofitable. The second point relates to efficiency or profitability to farm size and Sen's conclusion is that the profitability of agriculture increases with the size of holding and that is why large sized farm are preferable. The third proposition seems to contradict the second; for it asserts that on the basis of productivity per acre, the small farms are preferable while the first two propositions are about farm size and profitability, the last one is about productivity and farm size. Sen's observations provoked considerable debate on the subject.

(a) Inverse Relationship between Farm Size and Productivity :

Let us consider the third proposition first. It has generally been asserted that the relationship between farm size and productivity is inverse, that is, productivity per acre is high on the small farm and it declines with increase in the size of farms. While Khusro confirmed the existence of the inverse relationship after analysing the farm management data. Ashok Rudra, challenged the statistical validity of the inverse relationship. While G.R. Saini, confirmed the existence of inverse relationship between farm size and productivity in traditional agriculture.

The common explanation of inverse relationship between farm size and productivity is in terms of higher inputs of family labour in small farms. Sen argues that, in a labour surplus economy such as India the opportunity cost of family labour is low and, therefore, the small farms use abundant family labour and extend the cultivation up to the point where the marginal productivity of labour may approach to zero or may even become's zero, while in the case of large farms which use a high proportion of hired labour equals the ruling wage rate. In the case of small farms, the output per acre is maximized, while in case of large farms using hire labour, output per unit of labour is maximized.

While the application of heavy dose of labour to small farms is obviously a factor for the inverse relationship. Sen's assumption of law of opportunity cost of labour as the factor responsible for liberal application of labour in small farms is not accepted by Saini and others. For one thing, small peasant farms coexist with medium and large farms which engage high proportion of hired labour. This implies that the opportunity cost of peasant family labour is the market wage rate and that peasant family will attempt to equalize its opportunity cost of work in self-employment in the family farm with the wage it can get elsewhere. Naturally, it is not correct to argue that the small farm will use labour till marginal productivity of labour becomes zero or almost zero. Secondly, there is plenty of empirical evidence to show that the opportunity cost of labour on the small farms is not significantly different from market wage. The explanation of inverse relationships in terms of low opportunity cost of family labour does not appear to be correct.

In this connection Deepak Mazumdar writes, "The higher output per acre in smaller farms is really a function of higher input of per acre—the other factors varying more or less in the same proportion as labour. There is greater intensity of cultivation on smaller farms than on the larger farms. Besides, heavy input of labour on small farms is not one crop only but on two or more crops produced on the same piece of land during a given production year. This further explains the higher productivity on smaller farms.

We may conclude in Saini's words, By and large the inverse relationship between farm size and productivity is a confirmed phenomenon in Indian agriculture and that its statistical validity is adequately established by an analysis of the disaggreated farm management data.

(b) The Inverse relationship and the Green Revolution :

The green revolution in agriculture is characterized basically by capital intensive technology in which hybrid seeds, use of chemical fertilizers, existence or creation of assured irrigation, etc. play a significant role. Even though a new agricultural technology, is not size neutral, the access to capital and use of inputs for small and large farms has not been same accordingly the distribution of gains between them has been uneven. Saini used the Farm Management data for the states of Punjab and Uttar Pradesh to find out the impact of green revolution on the inverse relationship. His important findings can be summarized as follows :

I. A comparison of the co-efficients over time shows that they have moved nearer unity in the late sixties and early seventies-pointing to the gradual closing up of the productivity, gap between the small and large farms. This is in favour of big farmers.

II. In the mid fifties there was inverse relationship between farm size and income per acre but the inequalities of income arising

out of unequal distribution of land were to some extent reduced by productivity differences between small and large farms in favour of the former. The new technology shows a positive relationship between farm size and farm income per acre in late sixties and early seventies. This shows that as farm size increases, the income increases more than proportionately. This will widen inequalities in rural areas.

Their conclusions clearly show growing disparities in income distribution because of the setting of new technology and call for the application of suitable policy measures to correct these trends.

IV. Farm Size and Profitability :

Let us now take up the relationship between farm size and profitability. Amartya Sen who started the whole debate initially has argued, that much of Indian agriculture appears unremunerative and that profitability of agriculture increase with the size of holdings. As indicated earlier, Sen's thesis is based on the assumption that if family labour is given an imputed value in terms of ruling wage, much of Indian agriculture would become unremunerative.

Saini analysed Farm management data for Uttar Pradesh and Punjab and found that the marginal value product of labour was not positive but was also higher than the labour cost proving clearly that much of Indian agriculture is not necessary unremunerative, at last on the group of valuation of family labour at the ruling wage rate. A scrutning of profit and loss figures for different size classes of farm indifferent regions shows that Sen's first proposition is not correct. Saini found the following facts.

I. A good proportion of even the smallest sized farms showed positive profit.

II. Losses are to be found not only in small sized farms but also in bigger land holdings.

The unremunerative nature of Indian agriculture may, therefore, have to be found elsewhere and not in the valuation of family labour at the ruling market wage. One possible cause is the imputation of a high value land in terms of rental value or in terms of interest. If rental value of owned land is deducted from cost, the losses of farms are converted into profits or losses disappear. In Saini's own words, "The evidence strongly suggests that the observed unremunerative character of Indian agriculture can be traced to and explained in terms of imputation of a value to owned land rather that the valuation of family labour at the ruling wage rate.

Sen's second proposition is obvious : with the increase in the size of holdings and with large application of human labour, capital equipment, fertilizers etc. profitability increases.

Conclusion :

From the foregoing discussion, the following conclusions emerge.

1. There is general statistical validity of the inverse relationship between farm size and productivity per acre in traditional agriculture.
2. Prof. A.M. Khusro demonstrated the existence of constant return to scale in Indian agriculture in the 1961. He writes, "Above the 5 acres size there is nothing to choose between large farms and small farms in respect of cost efficiency and productivity; that Indian agriculture is, typically a scene of constant returns to scale, and the ceilings are size-natural.
3. Data pertaining to 1950's indicated an inverse relationship between productivity and farm size : but the picture is likely to be totally transformed by the data of the 1960's and the later period in view of the impact of green revolution.
4. The transition form a traditional agriculture to modern agriculture characterized by capital-intensive technologies will shift the inverse relationships between farms size and productivity to one of tending towards constant returns to scale over time. Thus under traditional agriculture in which the inverse relationship existed, the small farmers were able, to some extent to reduce the inequalities of income arising out of unequal distribution of land among cultivating household. But with the change in favour of modern agriculture in the initial stages of emergence of a capital-intensive technology the inverse relationship between farm size and productivity still holds.
5. G.R. Saini has further demonstrated 'that the relationship between farm size and productivity, though important-does not bring into sharp focus the growing inequalities among farm households—in the mid fifties there existed an inverse relationships between farm size and income per acre. After the setting in of the green revolution this inverse relationships has undergone a significant changes. The inverse relationships has now yielded place to a positive relationship. It shows that as farm size increases income increases more than proportionately. This sufficiently indicates that after the setting in of the green revolution the income gap between the small and large farms has widened.

Concepts :

Here, we discuss some concepts, which have some application and importance while studying this lesson.

Farm Productivity :

It is the farm output per unit of land.

Farm Profitability :

It is the surplus of value of output over all costs (including the imputed value of inputs contributed by farmer or his family.)

Economic holding :

A holding which allows a man a chance of producing sufficient to support himself and his family in reasonable comfort after paying him necessary expenses.

Optimum holding :

It refers to the maximum size of holding which a family should possess. Three times the family holding was considered to be an adequate size of optimum holding.

Family holding :

Term was used by the panel of Reforms. While estimating the family holding they used income as the basis. Holding which ensured a net income as the basis. Holding which ensured a net income of Rs. 1200 (1980 prices) and was not less than a plough unit (cultivated with a pair of bullock) of its multiple in area, might be considered a family holding.

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DEVELOPMENT OF AGRICULTURAL MARKETING IN INDIA

1. Introduction

Agricultural marketing is defined as "sum total of economic activities that are undertaken to help the movement of the produce from the point of production to the point of consumption." It includes preparation for the market such as cleaning, grading, processing, packing, assembling, storage and sale services. A properly structured market is an essential pre-requisite for insuring remunerative prices to the producer, reducing non functional margins of traders and commission agents and promoting movement of surpluses for economic development. In India, agricultural marketing has got serious drawbacks like lack of strong transport facilities, absence of market information and competition, prevalence of innumerable middlemen, fraudulent practices with regards to quantity and weight of produce. Over the years, several institutional reforms and policy formulations have been tried to ensure an orderly marketing system and to mitigate the marketing problems of farmers.

The marketing system prevalent in India varies from a system which is operated freely by private enterprise on the one hand and the system controlled by the government on the other hand. In between these two extremes, there are arrangements with varying degree of government intervention. At the centre, agricultural marketing is in the hands of the Ministry of Agriculture and Rural Development. At the State level, either independent departments handle agricultural marketing or it is entrusted to the State level, either independent departments handle agricultural marketing or it is entrusted to the State Department of Agriculture or Co-operation. Marketing Boards have also been opened in various states which are gradually taking over the responsibility of agricultural marketing in the state.

2. Objectives

The objectives of this lesson include discussion of some key issues relating to structure, conduct and performance of the agricultural marketing in India.

After reading this lesson you would be able to :

- give the significance of agricultural marketing and the special features of agricultural goods.

- indicate the present position of agricultural marketing in India.
- analyse the defects in the system of agricultural marketing in India.
- examine the measures taken by the government to improve the system of agricultural marketing in India.
- and suggest improvements in the system of agricultural marketing.

3. Structure

This lesson is divided into five sections. The first section highlights the significance and the special features of the agricultural markets and characteristic of agricultural goods. The second section provides a review of the present structure of agricultural marketing in India. In the third section, the defects of agricultural marketing system in India are enlisted. In the fourth section, the measures taken by the government are discussed. In the last section, summary and conclusions are given and some suggestions are made for the improvement of the agricultural marketing system in India.

4.1 Significance of Agricultural Marketing

An important problem of Indian agriculture concerns the marketing of its produce. The marketing system renders valuable service to an economy by facilitating the scale and purchase or agricultural products thereby providing a link between the producer and the buyer. The existence of a good marketing system is not only an assurance to the farmer that his produce will be bought, but also provides an indication about the demand pattern of various agriculture and allied commodities.

In a growing economy, agricultural market system links the non farm sector with the farm sector and offers opportunities to producers to produce a variety of products not just for home market but also for international markets. This assumes great significance for a country like India which is getting integrated with the world economy.

A very significant contribution of agricultural marketing system is that it transmits the impulses of modern knowledge and latest technologies from technologically advanced areas to the backward and remote regions of the country. A well designed marketing set up promotes the well being of the people. The farmer gets the highest possible price for his produce and is induced to produce greater volume and more variety of goods so as to earn maximum revenue. Secondly, the consumer can buy a number of goods and services at the right prices. Agricultural prices get aligned with non agricultural prices.

4.2 Special Features of Agricultural Marketing

The marketing problems in agriculture differ sometimes dramatically from those found in other allied industries due to the existence of large number of farmers confronted with inelastic demand for their produce, the

lack of product differentiation, fluctuation in output due to weather and other natural factors and extreme perishability of farm products.

The price that the farmer gets for his produce depends upon the organisational and operational efficiency of market structure. A study has estimated that a paddy farmer in Punjab gets only 53 percent of paddy's final gross sale proceeds, the rest 31 percent is pocketed by the broker and 16 percent is the marketing cost (Sidhu, 1990). Another study has revealed that the farmer's share in total sale proceeds is only 34% for guava 53% for oranges, 29% for mausambi and 37% for papaya. (Misra, 1999)

By its very nature, agricultural production has a number of peculiarities which influence the marketing of farm produce.

1. As production is seasonal commodities are not available throughout the year, but only during certain periods. Hence storage facilities and financial arrangements during storage assume importance.
2. Agricultural products are bulkier and more perishable as compared to other products. The bulkiness causes difficulties in the physical handling of the products. Perishable farm products require special care in handling transport and storage.
3. The producers are scattered over a large area and the individual units of production are small hence the transport and marketing facilities have to function well for the collection of agriculture produce.
4. Services such as haulage, financing, transport and market information are of considerable significance in determining the pattern of agriculture.
5. Lastly the volume of production and the marketable surplus is uncertain as it depends on natural factors. This makes it difficult to judge the volume of farm produce that marketing services would be required to handle, after harvesting of crops.
6. As the demand of agricultural products is relatively inelastic, there are frequent fluctuations in the price of the products.

Due to the interplay of all such factors, agricultural markets are volatile, often depressed and highly sensitive to downward pressures. The main characteristics of agricultural goods which make marketing much more different and complex from other industries are :

Characteristics of Agricultural Goods

Production Characteristics	*Product Characteristics*	*Consumption Characteristics*
1. Small Scale	1. More bulky and less value	1. Continuous
2. Scattered	2. Perishable	2. Regular and in small quantity

3. Moving towards specialisation	3. Varying, uncertain Quality & Quantity	3. Inelastic demand
4. Seasonal Production	4. Elastic Supply	

5. Present Structure of Agricultural Marketing in India

There are various ways by which farmers dispose off their surplus produce. The first method used by farmer is to sell the produce to the village moneylender cum trader. The moneylender may buy it either on his own or as an agent of a bigger merchant of the neighbouring mandi town.

The second method is the primary or weekly village market known as haat or shandy. At present there are about 22000 haats and they cover an average area of 8-16 kilometres in radius although some of the bigger markets serve a bigger area (Govil and Tripathi, 1996). Besides, fairs are held once a year in important villages or towns in connection with religious festivals. In haats and faits, farmers bring their produce as well as livestock and sell them.

The third method of agricultural marketing is through the mandies in small and large towns. The farmer has to make special arrangements to carry his produce to the mandi, which may be located at a distance of several miles from the fields. In the mandies, the brokers or dalals act as middlemen who help the farmer to sell their produce to wholesalers and State Procurement Agencies such as Central Procurement Agency like Food Corporation of India and State Government Procurement Agencies like Food and Supply Departments, etc. The arhatiyas also sell produce to retailers or flour-mills and processing units. For example in the case of cotton, the wholesaler sells of the cotton ginning factories and in the case of foodgrains like wheat he sells to the flour mills or to retailers.

6. Defects in the system of Agricultural Marketing

Agricultural marketing is beset with a number of serious shortcomings. The present position is far from satisfactory. The following are the main defects :

6.1 Malpractices of buying and selling : The secret methods of buying and selling, use of defective weights, existence of a large number of intermediaries and arbitrary deductions from the sellers' dues make marketing defective. In this system the share of the farmer in the price of the produce is reduced substantially. The results of a study reveal that farmers obtain only about 53 percent of the price in the case of rice and only 39 percent in the case of vegetables. According to one estimate the share of middlemen in the case of fruits was 46.5 percent (Misra and Puri, 1999). Arhatiyas and brokers cheat the innocent farmers. Many a time, the farmers are forced to pay excessive 'arhat' to the arhatiyas, tulai for weighing the produce, palledari to unload the bullock carts and for doing other

miscellaneous jobs, garda for impurities in the produce, and a number of other undefined and unspecified charges.

6.2 Inadequate Storage : The Indian farmer does not have good storage facilities to store the produce. The produce is generally kept in carts, pits, kaccha storehouses where it is not safe. According to one estimate about 10 to 20 percent of the produce is eaten away by the rats (Dutt and Sundaram, 1999). Moreover the quality of the produce gets deteriorated. The lack of proper warehousing facilities also means that the farmer is more prone to make distress sales. The average farmer does not have the capacity to wait for better prices. As his economic condition is miserable he is forced to sell to the village moneylender or to the trader so as to clear his debts. As a result he does not get fair price for his produce.

6.3 Inadequate means of transport : Transport facilities are grossly inadequate. Farmers face many difficulties in transporting their produce from the farm to the markets. Apart from the under developed state of the transport system in the country, there is also a shortage of fast moving vehicles. This makes the transportation of the various perishable agricultural goods to the market very difficult. The cost of transportation increases. A part of the produce is damaged on the way, farmer do not get good returns for their produce and at various places the marketable surplus is also reduced.

6.4 Inadequate credit : The cost and availability of credit facilities is also inadequate. As a result the holding capacity of the farmer is reduced. He is forced to sell the produce immediately after harvesting the crops. As most farmers sell their produce at the same time this leads to a glut in the market and depresses the prices. Sometimes the farmer is forced to sell to the moneylender at the price which is much lower than the market price. Not only does the farmer not get adequate returns, but he also loses freedom with regard to the rate of his produce.

6.5 Lack of Grading and Standardisation : There are inadequate facilities for grading and standardisation of the different varieties. As the various varieties of the produce are not graded properly, therefore it becomes difficult to assign proper prices to them as per their quality. This discourages the farmers from producing superior varieties. Consumers too do not get any satisfaction from such transactions. Only the middlemen profit from such transactions.

6.6 Non availability of Market information : Farmers do not receive correct and upto date information about prices, demand, international trends, government policies, etc. The information provided by the moneylenders, traders and other middlemen is generally incorrect and biased in favour of the purchasers.

6.7 Inadequacy of Institutional Marketing : The arrangements

for institutional marketing are inadequate. The number of co-operative marketing societies is small, only a few regulated markets are functioning properly and government arrangements to buy produce are also inadequate. As a result of which the farmers sell their produce separately on individual basis and have no or very weak bargaining power. Consequently they do not get fair prices for their produce.

7. Government Measures to Improve Agriculture Markets

The government has taken various steps to improve the condition of agricultural marketing in an effort to protect the interests of both producers and consumers. The following measures have been undertaken by the government.

7.1 Co-operative marketing : The Co-operative Act of 1912 made provision for the formation of co-operative institutions of all types and for all purposes and thus paved the way for the formation of co-operative marketing societies. During the second world war the activities of these societies increased due to the public distribution of foodgrains. Since 1954 multipurpose societies have been established to provide credit to the farmers and also market the agricultural produce. The members of the society sell their surplus produce to the society and get advances to carry on with their agricultural operations. The society sells the produce in mandis and pays the farmers the balance of amount due to them.

7.1. I. Advantages of Co-operative Marketing Societies :

The principles of Co-operative Marketing as applied to agriculture have shown very good results in Denmark, Germany and other European countries as well as in Canada and the United State of America. The advantages of Co-operative marketing societies are :

(a) The weak bargaining power of the individual farmer is replaced by the strong collective bargaining of the marketing society.

(b) Co-operative Marketing societies link credit, financing, marketing and processing to the best advantages of the farmer.

(c) The co-operative marketing societies have good storage facilities, which not only protect the produce from rodents, rains and thefts, but also enables the farmer to wait for better prices.

(d) These societies can have their own transport facilities or make arrangement for easier and cheaper transport of agricultural products.

(e) Grading and standardisation of products can be easily done by a co-operative agency than by an individual farmer. This discourages farmers to adulterate their produce.

(f) Co-operative marketing societies are able to influence the prices by controlling the flow of supplies and also by bargaining for better prices for agricultural products.

(g) By eliminating middlemen and entering into direct dealing with buyers, co-operative marketing societies eliminate exploitation and ensure fair prices to both the producers and consumers.

(h) Co-operative marketing societies arrange for bulk purchase of agricultural inputs like seeds, manures, fertilisers, pesticides etc. and consumer goods at lower prices and then distribute them to members.

(i) Co-operatives can arrange to obtain data on market prices, demand, supply and other related information from the market on a regular basis.

(j) Co-operative societies can undertake processing activities like crushing of oilseeds, ginning and pressing of cotton.

In addition to all these advantages, co-operative marketing system can arouse a spirit of self-confidence and collective action in the farmers. They can help in enlarging the marketable surplus of agricultural produce and even influence the cropping pattern through proper planning as well as implementation of plans.

7.2. II. Progress of Co-operative Marketing in India

The task of developing Co-operative Marketing was started in the Second Five-Year Plan on the recommendation of the All India Rural Credit Survey report. The Co-operative marketing structure is of 2 types—two tier and three tier system. There is the primary society at the district level and the state marketing society at the apex in two-tier system. In the three tier system besides the two levels found in the two-tier system there is the central marketing society at the district level. At present the co-operative marketing structure comprises 2633 general purpose primary co-operative marketing societies at the mandi level, covering all the important mandies in the country, 3290 specialised primary marketing societies for oilseeds etc., 172 district/Central Federations (Misra and Puri, 1999) and the National Agricultural Co-operative Marketing Federation of India Ltd. (NAFED) at the national level. NAFED is the apex Co-operative marketing organisation dealing in the procurement, distribution, export and import of selected agricultural commodities. NAFED is a central nodal agency of the government for undertaking price support operations for non perishable commodities such as pulses, oilseeds and for market intervention in perishable horticultural item like potato, onion, grapes, Kinnow, oranges, eggs, apples, chillies, black pepper etc. During the period from January 1997 to February 1998, market intervention was implemented for 13 items in various parts of the country. The marketing of agricultural produce through Co-operatives has registered a remarkable growth from Rs. 1950 crore in 1980-81 to about Rs. 11500 crore in 1995-96. National Co-operative Union of India (NCUI) is the apex institution of the Co-operative movement

encompassing all types of Co-operatives. It promotes and develops Co-operatives in the country, assists people in their efforts to build and expand the Co-operative sector. It imparts Co-operative education and organises training programmes for the managers and executives of Co-operatives.

Though there has been overall progress in Co-operative marketing, it has not been evenly spread in different states. While states like Punjab, Haryana and Maharashtra, have made remarkable progress, states like Andhra Pradesh, Tamil Nadu, Uttar Pradesh and West Bengal have shown a decline in co-operative marketing in certain years. The financial performance of marketing co-operatives is poor and many of them are incurring losses. Moreover the coverage of marketing Co-operative in terms of either the number of members or in terms of share in total marketed produce in the country has been quite insignificant. Further these societies are mostly confined to certain commodities like wheat, sugarcane and jute and do little business in case of coarse grains, fruits, vegetables and pulses etc. Thus the progress is unevenly distributed.

7.2 Regulated Markets : The objective of a regulated market is to protect and farmer from malpractices, reduce the marketing charges and ensure fair prices to the farmer. The number of regulated markets which was 265 in 1950-51 has increased to 7062 in 1999. A marketing committee that represents the interests of the state government, legal bodies, traders, commission agents and the farmers administers it. The task of the market committee is to fix market charges, prevent unauthorised deductions, ensure use of correct weights and measures, issue licenses to functionaries, conduct supervision and check up of proper weighing, provide reliable and upto date market information, settle disputes and punish those found guilty of dishonest and fraudulent practices.

Considerable success has been achieved in states like Punjab and Haryana. The regulated market system has proved very useful in removing fraudulent practices, standardising market practices and ensuring fair price to both the producer and the consumer. The income generated by the regulated markets in used for the development of rural infrastructure. These markets also include provisions for grading and for monitoring of prices. However the development of regulated markets and the enforcement of Agricultural Produce Act has been uneven in most states. Kerala, Mizoram, Nagaland, Jammu & Kashmir, Sikkim, Andaman & Nicobar Island, Dadra and Nagar Haveli and Lakshadweep have not yet enacted the necessary legislation for the regulation of markets. Where ever there are regulated markets, the benefits of those have gone to the large farmers who possess large marketable surplus. Moreover the management of existing regulated markets has yet to be put on a scientific basis.

7.3 Grading and Standardisation : Grading and Standardisation of agricultural commodities has been carried out by the government to

encourage farmers to grow good quality of crops and also to induce consumers to identify and pay the right price for the goods. For this the government has passed the Agricultural Produce (Grading and Standardisation) Act to facilitate the issue of certificates of grading for various commodities. Under this provision grading stations has been established for commodities like ghee, flour, eggs, etc., and standards have been laid down for 162 agricultural and allied commodities. The graded goods are stamped with the seal of Agricultural Marketing Department—AGMARK which not only enjoys the benefits of a wider market, but also commands better prices. There is an emphasis on strengthening of the existing Agmark laboratories and opening up of new regional laboratories in various places. A Central Quality Control Laboratory has been set up at Nagpur and eight other regional laboratories have been established to test the quality and purity of agricultural products applying for the government's Agmark. The government is further streamlining quality control enforcement, inspection and improvement in grading.

7.4 Warehousing Facilities : Proper warehousing facilities for agricultural products is of great importance in enhancing the bargaining power of the farmers and in preventing distress sale. The farmers can get loans from Co-operative societies and commercial banks on the security of goods kept in godowns. The government has taken some important steps towards provision of such facilities. The Central Warehousing Corporation was set up in 1957 with the purpose of constructing and running godowns and warehouses. The State Warehousing Corporations have been set up for the same purpose. Food corporation of India (FCI) has constructed its own network of godowns. The combined storage capacity with all these public agencies is about 43 million metric tonnes. Rural godowns with a storage capacity of about 1.2 million metric tonnes have also been built up (Agrawal, 1999).

7.5 Uniform and Standard Weights : The Standard Weights Act was passed in 1933 to promote the use of standard weight. The Central Government adopted the metric system of measures in 1958 to introduce uniformity in weights.

7.6 Dissemination of Market Information : The government has made arrangements for collection and dissemination of information about agricultural products. Daily prices of important agricultural products are being broadcast from regional stations of All India Radio. Weekly trends on market prices are broadcast by AIR and Doordarshan. Market intelligence reports giving information on stocks, market arrivals, sales, prices, etc. are displayed in a number of markets all over the country. The newspapers also publish agricultural prices on a daily or weekly basis.

7.7 Market Inspections, Research and Training : The Government of India set up the Directorate of Marketing and Inspection to

:

(i) Promote grading and standardisation of agricultural and allied products.
(ii) Regulate market practices.
(iii) Provide training facilities for personnel.
(iv) Promote market extension.
(v) Undertake market inspection, research and training and
(vi) Implement Meal Food Products Order, 1973.

The Directorate has specified the grades for 162 agricultural commodities and enforced compulsory quality control before export on as many as 4 agricultural commodities. A Central scheme for development of infrastructure facilities in selected regulated markets is being implemented.

7.8 Stabilisation of Prices : The government announces minimum support prices and procurement prices for various agricultural commodities in accordance with the recommendations of the Commission for Agricultural Costs and Prices. The Food Corporation of India purchases the agricultural commodities from farmers at remunerative prices. These are then sold to the consumers through the public distribution system at low prices.

7.9 Transport Arrangement : The government has taken a number of steps to increase the length of surface roads, route length of railways and shipping tonnage. However the number of villages connected with all weather roads is still very small at 46%. Much remains to be done in areas such as planning, construction and maintenance of rural roads, loading and unloading facilities of the railways, proper linkages between road transport and railways, etc.

7.10 Marketing Surveys : The government has conducted various surveys on the problems of marketing of agricultural products and services and published the findings of these surveys. These surveys also give suggestions for the improvement of the agriculture marketing system.

7.11 National Institute of Agriculture Marketing was established in 1988 to provide teaching, training and consultancy programmes for augmenting the agricultural marketing infrastructure of the country.

8. Summary

The structure of the agriculture market shows that the markets are increasing in size. The centre price of the country's market mechanism is the private trade. While the unorganised section of the market is larger than the organised section, the share of the organised section is increasing. Despite the large size, localised monopolies or oligopolies are found.

The evaluation of the Indian agricultural marketing system on the efficiency criteria reveals that except in case of pricing efficiency in regard to the inter relationship between prices prevailing in different markets at a

given point of time, the existing agricultural marketing organisation has much scope for improvement both in terms of operational efficiency (i.e. marketing margins which is the difference between what the final consumer pays and what the producer gets) and the distributive justice efficiency (i.e. equality of services to all types of producers and consumers).

To deal with these problems, the government has adopted a number of measures to improve the system of agricultural marketing such as the establishment of regulated markets, construction of warehouses, provision for grading and standardisation of product, standardisation of weights and measures, daily broadcasting of market prices of agricultural crops on All India Radio, improvement of transport facilities etc.

These measures would be of great help in informing the marketing system. It is imperative that this package of programmes is speedily extended to cover all the agricultural goods and all the farmers. Necessary infrastructure needs to be created at all the rural haats and their linkages with national markets established. Grading and Quality control aspects need to be given more attention. The price support policy needs to be effectively implemented. Agricultural market research should receive adequate support from the government both at the centre and the state levels. There is a need to develop the network of transportation facilities throughout the country. Increase in the number of regulated markets and efficient management of existing regulated markets is the need of the hour. In the area of co-operative marketing societies, greater representation of small and marginal framers and more diversification in the activities of the societies is urgently needed. Lastly, the establishment of multipurpose societies which link various activities such as production, storage, sale etc., is required. Such societies would look upon all the requirements of the farmers in an integrated way especially those related to agricultural processing, credit and marketing facilities.

9. Key Words

Co-operative Marketing—organised sale of farm products on a non-profit basis in the interests of the producer.

Distress sale—sale of agriculture produce at lower prices by the farmer to repay old debts or to fulfil certain contracts previously undertaken.

Marketing Margin—is difference in the price paid by the consumer and the price received by the producer.

Regulated markets—are markets set up as per the Agricultural Produce Act to eliminate unfair practices and ensure remunerative prices to producers.

Lesson No. 1.3

Diversification of Indian Agriculture

1.3.1 Introduction

In agriculture where the farmer normally produces on hisfarm , all those crops that can be produced on his farm, under the given agro-climatic conditions, the crop mix can be in varying ratios, on different farms. Many other factors, besides the climate and the nature of soil too, are responsible for such a varied crop mix. Size of the farm, customary production, family requirements, follow my neighbour policy, extent of available irrigation facilities, conditions of tenancy if the farm is being cultivated by a tenantetc., are some of such factors. Under such conditions, ingeneral, addition of altogether a new crop to the existing crop mix, becomes rather difficult: and in most cases, the process of diversification, in fact, will simply imply a diversion of resources, mainly land, from a particular predominant crop to other crops or the diversion of more resources to those crops which at present, occupy, not too significant a position in the overall crop mix. This is how the term 'diversification of cropping pattern', is being interpreted in India at present.

1.3.2 Objectives of the lesson

In this lesson we will study about diversification in agriculture, instruments as incentives and disincentives and diversification in India.

1.3.3 Diversification of agriculture

Besides changes in the cropping pattern on afarm, there is another way to diversify agriculture. It is to shift the existing resources being used on the

farm or bring in additional resources, to start or expand enterprises in the sub-sectors, allied to agriculture, *i.e.,* animal husbandry, fishery and forestry sub-sectors.

1.3.3.1 Objectives of **diversification of agriculture**

The main objectives of diversification of agriculture are as follows:

(i) To meet uncertainty in agriculture

In literature on agricultural economics, the most important objective of diversification of agriculture,in the narrow sense, has been described to meet yield uncertainty on a farm. This type of diversification normally takes the form of a change in cropping pattern through the addition of some new crops or in the area under some existing crops.

Diversification of cropping pattern is not aimed at only reducing yield uncertainty. Sometimes, the farmer diversifies the cropping pattern in order to meet price uncertainty also. The production of a crop always involves waiting. Major inputs are used at the beginning of sowing season. Some other inputs are used during the course of production, at different intervals. And the crop is nurtured to mature at some later point of time, the farmers move through this whole course of production without any knowledge about the prices that the crop will fetch when it is ultimately brought to the market for sale. There is, thus a complete uncertainty about the ultimate prices of various crops at the time, these are sown. Occasionally, the farmer diversifies his crops to meet such a price uncertainty.

(ii) Diversification due to change in demand for agricultural commodities

Many a time, due to some reasons, the consumption pattern of the population can undergo a change. For example, a change in the consumption pattern of the Indians has been noticed during the last few decades. Not only, more and more people are turning non-vegetarians, but also they have started preferring processed agricultural products toagricultural primary products. Progressive urbanisation and globalization are considered to be the main reasons for such a change. Such changes in the consumption pattern, often lead to a change in the demand for certain agricultural commodities which in turn lead to the diversification of agriculture. Indian history provides us with another extremely glaring example of diversification of agriculture due to an increase in the demand for cotton during 1760s. In 1760, civil war broke out in America. Supply of cotton from America for the British Textile Industry was totally cut-off. England turned to India for its supply. Liberal loans were offered by the exporters to the Deccan farmers, through the medium of village money lenders, for bringing as much area under cotton as possible. India experienced a cotton boom for the period, the civil war continued in America.

The Indian Agriculture was diversified, though only temporarily.

(iii)Availability of an improved technology, favouring a new cropping pattern

In a dynamic agriculture, crops which are relatively less remunerative, at one time, come to occupy the position of most favoured crops for production at some other time, due to the availability of a new production technology for such crops. This too, can prompt a change in the cropping pattern. In India, for example, successful introduction of BT cotton in agro-climatic regions suitable for this crop, is expected to reduce the area under some competing crops like maize and rice.

(iv) Diversification for saving the natural resources

A sustainable agricultural development always implies a development which is born eco-friendly and resource saving. The process of development should be such as would allow not only the present generation to enjoy the fruits of development, but also ensure that the next generation too is able to enjoy similar benefits, if not more, flowing to it through the development of the economy. From that angle, a reckless use of exhaustible natural resources by the present generation for production needs is to be avoided. In the present context, excessive use of ground water is an example in point. It has been found that in certain parts of India, for example, in the Punjab (and in Haryana too), as a result of the excessive area of land being brought under rice and wheat, the ground water table has gone too low. The cost of pumping out the water has gone up and asa result, the production of these crops has become less profitable. It is feared that if area under these crops is not immediately reduced, a situation may eventually appear when it may become totally unprofitable to produce wheat and rice (in fact, even any other crop) in these areas, due to extremely high cost of pumping out the ground water. Accordingly, suggestions have been made that in the Punjab at least, half of the areas under wheat and rice should be shifted to other crops, in order to avoid excessive use of ground water. This is nothing but a suggestion for diversification of agriculture in the state.

(v) Diversification of agriculture, as a part of the national development policy

Sometimes, even when a farmer, on his own, does not want any further diversification of crops on his farm, the Government of the day tries to encourage diversification of agriculture, both in the narrow sense as well as in the broad sense, because it feels that such a diversification is in the national interest. Under the new economic policy, India has started

encouraging exports of various commodities (including agricultural commodities) for growth purposes. The Government is encouraging production of certain crops like vegetables, fruits, and flowers, and products of the animal husbandry, fishery and forestry sub-sectors for increasing the Indian exports.

Sometimes diversification has been recommendedas a measure to increase the overall employment in the agricultural sector. Not only does this imply an expansion of the sectors allied to agriculture, but also a shift from crops using less labour to crops requiring relatively greater amount of labour, *e.g.,* shifting from foodgrains to vegetables (except potatoes).

Of late, diversification of agriculture has been suggested for another purpose also. It has been felt that there is an ample possibility of replacing fossil fuel by bio-fuel. Ethanol that can replace fossil fuelto a great extent, is produced from sugarcane, beet and maize. Coconut palm and Soyabeanare the other agricultural commodities that can be used to produce bio-fuel., Governments of some developed countries have already started using some of these commodities for producing bio-fuel, may be, some other countries too, follow suit in the near future.

1.3.3.2 The Instruments of incentives and disincentives

An important point needs to be noted in thisregard. It is that thedistinction between incentives and disincentives used for diversification is not very sharp. Almost the same measures are used for creating incentives or disincentives involved in bringing about the desired diversification. Only the objective for which these measures are used, undergoes a change.

Following are some of the important measures used as signals for the farmers to change their production pattern in the way desired by the Government.

(a)Income Support Scheme. Under this scheme, the Government offers monetary assistance to those farmers who change the area under a particular crop in the desired direction. The amount of assistance depends upon the extent of change in the area under the given crop. If this amount is paid to the farmer for reducing the area under the specific crop, it acts as a disincentive. On the other hand, if is meant to prompt the farmer to bring more area under a specific crop, it acts as an incentive.

(b)Minimum Support Price System. Thissystem can also be used as an incentive ordisincentive needed for diversification of agriculturein the desired

direction. For example, when forpersuading farmers to reduce the area under aparticular crop, the system is so manipulated that theproduction of all other crops, becomes moreremunerative when compared with the production ofthe crop in question, it will act as a disincentive. If
on the other hand, the minimum support pricemechanism is so manipulated that the productionof the crop whose area, the government wants toincrease, distinctly becomes more profitable whencompared with the production of other crops, thesame system will serve as an incentive.

(c) Increase or decrease in the subsidiesprovided for various inputs used specifically forvarious crops *e.g.,* **seeds.** Similar changes can also
be made in subsidies meant for different sectors, allied
to agriculture.

(d)Imposition or increase in cess on the production of specific crops OR decrease or abolition of cess on specific crops. The same procedure can be followed for various sectors, allied to agriculture.

(e)A relative increase or decrease in the rates for an input supplied by the government, when used for specific crops. For example, the government can raise the canal water charges for rice production when compared with such charges for other crops when it wants that the area under this crop should go down. Similarly, it can reduce the charges for the production of a particular crop when compared with the rates charged for all other crops if it wants the area under this crop to increase.

(f) Special bonus on the supply of crops whose cultivation needs tobe increased, or on the products of the sectors allied of agriculture whose production is to be increased. The bonus will serve as an incentive for diversification in the desired direction. Reduction in the bonus or its complete abolition for the supply of a crop or a product of a sector allied to agriculture will serve as a disincentive. However, the bonus system can be manipulated to serve as a disincentive only if the bonus is being already given in respect of the concerned crop or the product.

(g) Contract farming: At present, contract farming is being considered as one of the important instruments for promoting the diversification of agriculture. However, we must note that it is a contract between the farmer and a private party and not between a farmer and the government. Further this contract is meant to induce the farmers to increase the output of certain crops or products rather than decrease them.

In contract farming, generally a multinational corporation or some other big manufacturing company enters into a contract with individual farmers to supply it with a particular amount of the crop or another agricultural commodity of a certain quality which it undertakes to purchase at a price specified in the contract. There is a provision of penalties if the contract is breached by any of the parties. One additional advantage of these contracts is that the private parties, needing the specific agricultural commodity not only often provide the farmers with new technology for its production, but also sometimes even arrange for financial help to increase the productivity of the specified agricultural commodity on their farms.

At this stage, we will like to emphasise one important point. It is that the diversification of agriculture that is brought about through contract farming need not be the same as is desired by thegovernment. It is solely the decision of the multinational company as to which crop, priority is to be accorded. In case, such a decision is also in line with policy of the government, it is only accidental. The multinations company is bothered only about promoting its own interest. It is not concerned with how the diversification affects the interests of others.

1.3.4 Objectives of diversification of agriculture in India

At present, diversification of agriculture in India is being pleaded mainly on two bases. These are as follows:

(a) Diversification for saving ground water

Oneof the major states in the green revolution belt, *i.e.,* Punjab has made a proposal to the central government to induce farmers in the state to reduce the area under paddy crop. In the Punjab, paddy has become one of the major crops after the green revolution. Its excessive production has resulted in the gradual depletion of ground water. As a result of the continuous use of ground water, the water table has gone very low. As a result, the cost of pumping out ground water has increased enormously. The profits of the farmers who are producing paddy have gone down considerably. It is being felt that that if the water table continues to fall, a time may eventually arrive when despite the availability of atechnology to pump out ground water, the production of rice in the state may be completely stopped due to the inhibiting costs of pumping out the ground water. Even the production of other crops may then suffer. Further, the state government also feels that in the present situation, excessive dependence of paddy production on groundwater is against the principle of sustainable agricultural growth which demands that

the future generations should at least be able to enjoy the same amount of benefits from growth, as the present generation is getting. Paddy production, for the present, must therefore, at least, partly give way to the production of some other crops in order to save ground water. And for this purpose, the Punjab Government has asked the central Government to provide an income support of Rs. 12500 per hectare to those farmers who shift their land from under paddy to some other crop. The Punjab Government feels that such a support will compensate the concerned farmers for the loss that theywill suffer for shifting to some less remunerativecrop. On its own part, it has so far mainly confined itself to publicizing the need for reducing area under paddy.

(b) Diversification of agriculture for increasing exports of agricultural commodities

As indicated earlier, the government of India too feels that increase in exports of Indian commodities can serve as an engine of growth for the economy. The Government has therefore taken various measures for increasing exports of various commodities. So far as the agricultural commodities are concerned, the Government feels that there is a vast international market for fruits, flowers and vegetables (both in raw and in processed form) and for the products of the animal husbandry, forestry and fishery sub-sectors. The increase in the exports of such commodities, obviously needs an increase in their production. As such, the government is not only keen to encourage diversification of crop production in favour of fruits, vegetables and flowers but also the production in the three sectors allied to agriculture.

1.3.5 Effectiveness of incentives and dis-incentives for diversification, with special reference to India

The government of each country faces many problems and difficulties in introducing a further change in the production pattern which the farmers themselves have already adopted in their own interest. We in the paragraphs that follow will be discussing these difficulties and problems as faced only in diversifying agriculture in India for the two objectives stated above. No doubt, quite a number of these problems are likely to be faced by many other countries as well.

Problems faced in the process of diversification of agriculture, as demanded by a particular state *(eg.* by Punjab), in order to save natural resources of that state *(Le.*, ground water).

At the outset, we must note that even when diversification of agriculture for preserving natural resources were a part of the policy of the Central Government, there would have been a plethora of problems which the

national government could face during the course of its implementation. In the present context, however, the situation becomes still more complex. It is the regional government that wants diversification of agriculture in areas under its jurisdiction, but at the same lime, it wants the Central Government to provide it with financial support forachieving its own objective. As we shall see later, such a situation where the Central Government is asked to provide financial assistance for encouraging diversification of agriculture only in a particular region of the country, creates some additional problems for the Central Government. We discuss all these problems in their totality. These problems and difficulties can be discussed under the following heads.

(i) Income support scheme and its effectiveness

For reducing the area under paddy, through which the Punjab Government wants to save ground water, the State Government has demanded an income support, at a flat rate, for those farmers who implement such a suggestion. However, at the ground level, this scheme is likely to be ineffective because of the following difficulties.

(a) Misuse of the scheme. It is obvious that when attempts are made by the Government to wean away the farmers from the cropping pattern which was the most remunerative from their point of view, through an income support policy, they will try, on the one hand, to stick to the existing cropping pattern which is most remunerative from their point of view, and on the other hand, try to get the maximum out of the income support policy of the Government. The only way to achieve such contradictory objectives is to seek the connivance of the government officials through falsification of cultivation records maintained by the government officials. corruption will thus be the obvious result. While the official records will show that the farmers have fully responded to the incentives and directions of the government, the ground situation will change only marginally. As per rules,Patwari the main functionary of the revenue department, will be monitoring and recording the changes in the cropping pattern, in response to the income support scheme. And if we go by the views of Neale, he is the most corrupt functionary in the department.

(b) Small farmers and the income support scheme. In the developed countries, though the income support scheme has encouraged corruption as it is likely to do in India, still the farmers in general have also, at the same time, satisfactorily diversified their cropping pattern in response to income support scheme. The one factor that encouraged the farmers to accept the scheme was the large size of their land holdings. In India, on the other hand, the size of

holdings is very small. The rather small size of thefarms in India will prove to be a serious hurdle for diversification of Indian agriculture. The production on small farms is mainly meant for meeting domestic needs, particularly of foodgrains for the family and fodder for the cattle. There is generally no production of non-foodgrain crops. The Punjab's scheme of diversification requires such farmers too, to reduce the area under foodgrain crops which they might hesitate to do. The small and marginal farmers will show a still greater hesitation to reduce the area under foodgrain crops because a major section of such farmers is already a net buyer of foodgrains, As a matter of fact, the small and marginal farmers will have to incur abnormally high cost of marketing for disposing of the non-foodgrain crops (which, unlike the foodgrains, they must sell) as the amount of crops to be sold by every one of them will be quite meagre, In fact, the small farmers will suffer an additional loss through diversification because of another reason. While they will sell the non-foodgrain crops at the wholesale rate, they will re-purchase the foodgrains sometime later at a retail price. This way of sale and purchase will result in an additional cut in the income support they will otherwise get when compared with the large farmers. The diversification of agriculture, away from paddy and wheat in Punjab will thus, in general be confined to the large and medium farmers who constitute only 37% of the total farming community in that state.

(c) The income support, at a flat rate per hectare, as is the case with the present scheme, if introduced for promoting diversification, in fact, would put a premium on inefficiency. The producers of rice or wheat who have a low yield of wheat or paddy, on their farms, either because of the use of a poor technology, or inadequate resources or simply because of habitual indifference to cultivation are likely to benefit relatively more from such a scheme when compared with other farmers. Obviously, such farmers will suffer much less loss by giving up paddy or wheat production when compared with more efficient or more serious farmers.

(d) An income support scheme for promoting diversification, based upon a flat rate, has also the potential of distributing its benefits in an uneven way, over the farmers operating in different regions of the state, when they replace paddy and wheat with the next best crops, as determined by the soil and climatic conditions of these regions. The producers for whom, the next best crops have a very low profitability, due to the nature of the soil and climate, will benefitless from the income support than those for whom, the next best crop has a relatively higher per hectare profitability. This is simply because much of the income support extended to the farmers of the first category will be

used up only in compensating them for the relatively greater loss that they suffer because of producing rather a low productivity crop.

(e) There is another way also by which the income support scheme based upon a flat rate per hectare, will provide unequal benefits to the farmers of the state. Productivity or paddy and wheat is different in different parts of a state. In such a case, the producers of these two crops in the relatively higher productivity parts of the state will benefit less from the income support scheme than the producers of these crops in low productivity zones because in the case of the latter, the loss per hectare through reducing the area under wheat or paddy will be relatively less than that suffered by the former category of farmers.

(f) According to the government of Punjab, once the new cropping pattern stabilizes, the income support will be withdrawn. This however, is only a pious wish. If the new cropping pattern has been brought about by various allurements, there seems to be no reasons to presume that the farmers will not revert to the old cropping pattern when the income support allurements are withdrawn. As a matter of fact, there is every possibility that, as the time passes and the costs of production of other crops *OR* the market prices of wheat and rice go on rising (as is the present trend), the demand for an increase in the income support for shifting to crops, away from wheat and paddy, may come up. This is because, as a result of these changes, the shift of production from paddy (or wheat) to other crops will involve a greater loss of income for the farmers when compared with the original situation.

(ii)Inefficacy of a discriminatory change in the price support system

Discriminatory change in the minimum support prices against rice (and wheat) can be the other instrument that can be used to bring about the desired diversification of agriculture in the Punjab. As the minimum support price system is administered by the Central Government, the Punjab Government can request it to change the price policy against rice and wheat.

No doubt, under normal circumstances, adiscriminatory minimum support price system will affect the cropping pattern in the desired direction. However, at present, two serious difficulties are likely to be faced in effecting the necessary changes in the cropping pattern though the minimum price support system.These are as follows.

(a) Firstly, the cropping pattern on farms operated by small and marginal farmers will not be affected by any discriminatory price policy. In general, the

production on their farms is sufficient only to meet the domestic needs of the farmers. The marketable surplus on their farm is negligible. They are, so to say, almost completely off the market, and, therefore, remain almost insensitive to price changes.

(b) Secondly, after the setting up of the World Trade Organisation, the minimum support price system has lost (or will lose in the times to come) its importance so far as its influence on the domestic market prices is concerned. After the removal of all quantitative restriction on the import of various commodities, the market prices of agricultural commodities in the country are likely to be determined by the international prices of these commodities. In such a situation, it is obvious that that the role of a minimum support price will only be to ensure that the prevailing market prices of the crops in the domestic market do not result in a loss to the producers and such, should never fall below their cost of production.

As a matter of fact, there is another problem in using the discriminatory changes in minimum support prices to prompt a change in the cropping pattern. We shall discuss this difficulty while examining the impact of diversification of agriculture, on food security of India.

(iii) Administrative problems

Even if the implementation of Income Support Scheme does notlead to any corruption or falsification of records, or of violation of any rules, maintenance of up to date records of cultivation itself will be a huge task. It will be extremely difficult to keep a proper record of the changes in cropping pattern and that too, for every agricultural season for every year for determining the amount of payment to be made under the Income Support Scheme. Such an extra administrative burden will be there so long as the scheme continues. And, as we have indicated above, if once the scheme is introduced it will not be easy to withdraw this scheme. It will be there for a long time to come.

(iv) Loss to the State of Punjab and Haryana due to diversification

These states are likely to suffer in the following way.

(1) There is no doubt that the agriculture of the states of Punjab and Haryana which are suggesting diversification of agriculture away from rice and wheat will suffer. The resource allocation will move away from what the farmers of these states consider to be the best, after taking the costs and benefits of the existing cropping pattern. Even when the farmers will stand compensated for the loss incurred by them due to producing crops other than rice and wheat because of the income support scheme, still the contribution of agricultural

sector to the grass domestic product of these states will definitely go down due to inefficient resource use.

(2) The marketable surplus of foodgrains for the industrial sector in these states, will obviously go down. The industrial development of these states can thus suffer. And it may be noted here that we do not have in mind, the higher cost of foodgrains that may ultimately raise the overall cost of production of industrial products in these states. The cost of agricultural raw materials which are likely to be produced in larger quantity after diversification may fall, and, as such, there may be only a negligible net rise in the overall costs of various industrial products. We have, on the other hand, in mind, the physical shortage of foodgrains which the agricultural sector will now be able to spare for the industrial sector. We are of the considered view that at the physical level, wage goods (foodgrains) play a role that is totally different from the one played by the agricultural raw materials. Physical shortage of one cannot be compensated by the physical abundance of the other. One feeds the man while the other feeds the machine.

(v) Effect of introduction of income support scheme in the Punjab and Haryana, on other state

If the scheme regarding income support for diversification of agriculture is introduced in the Punjab and Haryana, but is financed by the Central Government, it impact is likely to be felt by the other states of the country. Such a scheme will bring forth the reaction of other states in two ways.

(a) There are many other states which are surplus states so far as the production of rice andwheat, especially of the former is concerned. These states also, like Punjab and Haryana, contribute to the central pool. These states can also come up with an offer to reduce the area under rice and with a demand for income support.

(b)When, as a result of diversification, the production of crops, other than that of wheat and rice, increases in the states of Haryana and Punjab, atleast a part of these crops is likely to be sold in other states. As such, their prices are likely to fall in other states. Income of the producers of such crops in other states will therefore fall. Under these circumstances, either these states will not allow the producers of Punjab and Haryana to sell these crops in their territories or these states will come up with a demand for some sort of income support for the producers of such crops. And the central Government will not be able to resist such a demand if fairness is the main basis of its decisions.

1.3.6 Observations/Problems

Diversification of agriculture for meeting uncertainty, always implies inefficient allocation of resources

For the present purpose, we shall take up the case of uncertainty in yield only.

However, before proceeding further, a further elaboration of the meaning of 'yield uncertainty in agriculture' will be quite in order. The decision of a farmer to sow a particular crop is influenced by two major expectations. Firstly, his decision about the production of a particular crop is influence by its yield under normal circumstance. Higher the normal yield of a crop, greater will be the temptation to sow that crop. Secondly, though the farmer knows about the yield of the crop under normal circumstances, he also knows that that generally, the circumstances surrounding the production of a particular crop are never normal. The rainfall can be above or below normal. There can be floods, diseases, cyclones, locust invasion or some other adverse happenings which may bring about unfavourable changes in the crop yield. The frequency as well as intensity of these changes are totally uncertain. As a result, the farmer in order to save him himself, from the influence of these happenings, takes some measures. Diversification of cropping pattern, as explained above, is one such measure.

In the light of the foregoing narration, when we say that diversification, in order to avoid uncertainty in crop yield, leads to inefficient allocation of resources, we imply a comparison between two situations, vis, the one when the crop grows under normal circumstances and the second when the farmer in order to avoid major loss in his income because of the operation of some unfavourable circumstances (which in fact, may or may not appear) actually diversifies his cropping pattern. We can explain the difference in two types of resource allocation as follows.

A rational farmer, under normal circumstances *(i.e.,* when there is complete yield certainty), will always produce a particular crop to such an extent, with the resources available with him, that his profits from its production are maximized. Or, in terms of the principles of resource allocation, we can say that all his variable resources for producing various crops on his farm have been optimally allocated. On the other hand, if the yield of various crops is uncertain and the farmer apprehends a fall in his total income, his object of resource allocation itself undergoes achange. It is no longer to maximise his profits. Now he plans his resource allocation in such a way that loss due to yield uncertainty is minimised. For this purpose, he diversifies his product mix. It is obvious that crop mix will no longer will be the same as be would have got when there was complete certainty in yield. In other words, under these circumstances, the crop pattern does not remain optimal. And, as a result, his overall profits will be lower when compared with the situation when the crops had been produced under completely normal circumstance. As we feel that a diagrammatic illustration is likely to offer a still better explanation, we may use the following diagram for the purpose.

A diagrammatic explanation

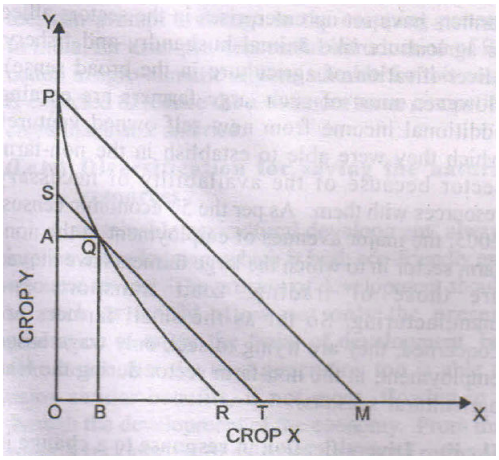

Fig. 1. Impact of diversification of cropping pattern on income

Initially, suppose that the farmer can produce only two crops namely X and Y on his land which is fixed in supply. Further suppose, for the sake of simplification, that he can produce any one of these two crops or their combination with only one variable input, and the amount of the variable input possessed by the farmer is also fixed. For the present exercise, we also presume that the production of both the crops follows the law of increasing marginal productivity to the variable input.

In the first instance, we also assume that there is complete certainty about the yields of the two crops. The prices of the crops are assumed to be given.

If with these assumptions, we draw theproduction possibility curve for crops X and Y (**crop** X being shown on X-axis and crop Y on Y-axis), we shall get the production possibility curve PQR which will be convex to the origin O. Lines PM and ST are the two iso-revenue lines. These two lines are parallel to each other because these have been drawn on the basis of the same prices of crops X and Y. Line ST, being lower than the line PM represents a lower amount of total revenues obtained by the sale of a combination of two crops produced by the farmer.

In the light of the curvature of the production possibility curve and the slope of the iso-revenue lines, it is evident that the farmer would be able to maximize his total revenue and therefore, his total profits from a given amount of the

variable input, if he produces only one crop, *i.e.,* Y, its amount being equal to OP. This will take him on the highest possible iso-revenue line which happens to be the line PM, in the present case.

Now suppose, the farmer is not at all certain about the yield of crop Y. On the other hand, crop X is disease as well as drought resistant but at the same time, is less remunerative. This is clear from the fact that that the farmer has chosen crop Y instead of crop X in order to maximise his profits (if there is complete certainty about crop yields). Though the farmer has some fears about the stability of the yield of crop X also, still he feels that crop X will give him some income even under the worst circumstances.

As a result, by virtue of his wisdom, experience or simple intuition, the farmer diversifies his cropping pattern, and shifts a part of his land as well as variable input away from crop Y and decides to produce OB amount of crop X also. Shifting of resources to the production of crop X results in a reduced production of crop Y. Its production now falls to OA.

It is clear from the diagram that point Q which represents the new combination of crop X and Y, (which the farmer has produced to meet uncertainty in crop yield), falls on the iso-revenue line ST which is lower than the iso-revenue line PM. It is thus obvious that that introduction of a new crop in the crop mix, *{i.e.,* diversification of cropping pattern) with a view to reducing the impact of uncertainty in yield of crop Y results in an inefficient allocation of resources and thus reduces the income of the farmer.

In the above exercise, we have assumed that marginal productivity of the variable input when the farmer produces any crop, is increasing. Such an assumption ensured that if the farmer wanted to diversify his cropping pattern, he could do so only by adding altogether a new crop to the existing crop mix which, in fact, consisted of one single crop. We could carry on the same exercise by assuming the diminishing marginal productivity of the variable input when used to produce any of the two crop. However, in that case, meaning of diversification will undergo a change. It will simply mean a change in the ratio in which the two crops are produced after diversification. This is so because, even in the original resource allocation, only a combination of two crops will ensure the maximum profits. This, in turn, is due to the fact that in this case, the production possibility curve will be concave to the origin and the point of tangency between the highest achievable iso-revenue line and this production possibility curve will always show the production of two commodities (and not one, as was the case above).

Diversification of agriculture V/S diversification of employment

For some time past, most of the farmers in India have been resorting to the diversification of an altogether different type. It is generally a diversification of employment, rather than the diversification of agriculture proper. The cost of cultivation has started rising. As a result, the profits from crop cultivation have started falling. In order to make up for the falling incomes, most of the farmers have started searching for new avenues of additional income. No doubt, a few of the large farmers have set up enterprises in the sectors allied to agriculture like animal husbandry and fishery, (diversification of agriculture in the broad sense). However, most of such large farmers are earning additional income from new self-owned ventures which they were able to establish in the non-farm sector because of the availability of necessary resources with them. As per the 5th economic census, 2005, the major avenues of employment in the non-farm sector in to which the large farmers have moved are those of trading, road transport, and manufacturing. So far as the small farmers are concerned, they are trying to seek only wage based employment, in the non-farm sector during the lean agricultural seasons.

1.3.7 Conclusion

A very important additional measure is called for if the proposed diversification of agriculture is to be achieved. Almost all the commodities originating in the agricultural sector and sectors allied to agriculture whose production as well as exports are to be increased, are extremely perishable in nature. Even when the soil and climatic conditions are quite suitable for the production of these crops/ commodities, it may be difficult to bring more area under them (or increase their production in the sectors allied to agriculture) simply because the necessary infrastructure for their production or disposal, is not available. These commodities need special arrangements for their preservation and processing, like a chain of cold storages, a rapid transport system from farm to the market and existence of industries engaged in the processing of fruits and vegetables, and of the products of animal husbandry and fishery sectors. In case, these facilities are not available, the desired diversification of agriculture may fail to take place.

Not only is there a difference in the measures necessary for implementing the present scheme of diversification, even the impact of such a diversification on the economy is likely to be different. Though misuse of incentives and the consequent corrupt practices are likely to accompany this scheme as well, there are good chances that the danger posed to the national food security will be less when compared with the earlier scheme.

1.3.8 Short answer type questions

Write short notes on the following:

1. Diversification
2. Diversification in India
3. Reasons of diversification in agriculture
4. Instruments as incentives and disincentives

1.3.9 Long answer type questions

1. What do you mean by diversification in agriculture? Explains the reasons for diversification.
2. How the instruments in diversification acts as incentives and disincentives?
3. Explain the problems in diversification of agriculture.

Lesson No. 1.4

Farm Mechanisation in Indian Agriculture

1.4.1 Introduction

Agricultural inputs can be broadly divided into land, labour, mechanical inputs and bio-chemical inputs. Labour includes both human and bullock labour. Mechanical inputs include implements and machinery used in various agricultural operations. Bio-chemical inputs consist of seeds, fertilizers, manure, insecticides, water etc.

Mechanisation of agriculture means the use of power driven or power operated machines for various farm jobs which otherwise are being performed by human and animal power. The term 'mechanisation of agriculture' is used in a wider sense and covers not only tillage, harvesting and threshing operations but also irrigation, haulage of farm produce and farm requisites such as seed, manure, feed etc., on the farm as well as from the farm to the marketing places and from markets to farms, crushing of sugarcane, churning of milk, grinding and mixing of feed and spraying of crops, etc.

It may also be noted that mechanisation of agriculture may be either partial or complete. Mechanisation of agriculture is complete when all the farming operations are carried out with the help of machines whereas it is partial when some of the farming jobs are performed by machines and some others, by animal or manpower.

1.4.2 Objectives of the lesson

In this lesson, we shall study the mechanisation in the field of agriculture.

1.4.3 Need of Farm Mechanisation

India is an agricultural country and, its agriculture, at present, accounts for about 18% of the total Gross Domestic Product. For stepping up the rate of economic development, no doubt, it is essential to develop both the sectors

i.e., agriculture and industrial sectorsbut the development of agriculture generally precedes the development of industry because its underdevelopment generally acts as a limiting factor for industrial development. Mechanisation will help the development of agriculture in the following ways.

(i) Time schedule of sowing and harvesting

Better Agricultural Yield as a result of timely completion of agricultural operation.For better yield, sowing as well as harvesting of the crop should be done at the proper time otherwise it is likely to be considerably reduced. The biological element involved in agricultural production makes the sowing and harvesting schedule of various crops rather tight. Sowing or reaping of a crop at a time, outside the time schedule relevant for it, will only result in lower output. Machines help us in keeping to the time schedule of sowing and harvesting.

With the help of an example let us explain how tight time schedule is good for better yield. Sowing of desi wheat requires a particular climate. It should be cold and moist. In India, this type of climate is experienced only during the month of October and November when the moisture of the preceding summer and cold at the starting winter mix up together. In September, it is moist but rather hot. In December, it is cold and dry. The sowing period is thus quite short and can be fully utilised only if the sowing operations are mechanised. Similar is the case with the harvesting of wheat. It is ripe by the beginning of April. Before the beginning of June, it must be harvested, threshed and stored otherwise the rains may destroy it. Here again the harvesting period (needs a hot but dry season) at the disposal of the farmer is obviously limited. Use of machinery will help in the utilisation of this period in the best possible manner. And, when due to some emergency, the period of sowing or harvesting of a particular crop is to be considerably squeezed, only the use of machines will enable the farmer to carry out these operations in time. Machines can work faster, continuously and for longer hours. These do not get tired easily.

(ii) Multiple Cropping

In India, population pressure is continuously rising and fertile land is limited, to raise agricultural production, multiple croppingshould be done. Farm mechanisation helps in multiple cropping. In multiple cropping, the period available for sowing the next crop is rather limited. Therefore, some farm operations are to be expedited. For example, unless the standing crop is harvested expeditiously, it is not possible to prepare the land for the next crop. And in case, harvesting of one crop is somewhat delayed, then sowing of the next crop is to be completed within less than the usual span of time. Both of these operations can be performed more expeditiously if machinery is used.

If, at present, in many parts of the country, two crops are being raised on the same field in one year, it is mainly because of tubewell irrigation and tractor ploughing i.e., with the help of machines.

(iii) Reclamation of Land

In India, there are vast tracts of land infested with rooted weeds. There is a great urgency of reclaiming such lands to increase production of both foodgrains and raw materials. Such lands can be reclaimed only if machinery is used for the purpose.

(iv) Soil Conservation

Besides reclamation, there are other operations like drainage and soil conservation involving contour bunding, terracing and ridging which can be carried on more successfully with the help of machinery. These operations, too, will add to the agricultural production.

(v) Use of sub-soil water

For agriculture rainfall is pre requisite but in India it is a gamble of monsoon so dependence of sub soil water rises. An extensive use of sub-soil water for irrigation purposes can be made only with the help of poweror diesel driven pumping sets. Such a use has become important because the supply of surface water for irrigation purposes has been increasing at a very slow pace.

(vi) Scarcity of labour in certain areas

Though, on the whole, India is a labour surplus economy, some parts of it suffer from a chronic labour shortage. Rajasthan and M.P represent two such regions. Land has not been fully cultivated in these areas. Only mechanisation of agriculture in such regions can overcome the adverse effects of labour shortage.

(vii) Relief to Men and Animals

Some agricultural operations are extremely strenuous. Therefore, men and animals cannot work effectively on them for long hours. It also, at times, results in the non-completion of farm operations in time. Farm machinery, besides helping to complete various agricultural operation in time, also relieves the man and animal from many strenuous jobs such as reclamation of weed infested lands, digging and carrying of earth for bunding, ploughing etc. The quality of life of the farmers will also improve if they have more leisure at their command.

1.4.4 Case against mechanisation of agriculture

The case against mechanisation of agriculture is equally strong in India. Here are some factors which stand in the way of farm mechanisation in our country.

(i) Small size of the Land Holdings

The size of the holding which is extremely small, stands in ways of farm

mechanisation in India. Even these small holdings are not at one place but are scattered over various places. Nobody will normally buy a tractor to cultivate a farm of size varying between two to three acres.

(ii) Possibility of Unemployment

The mechanisation of agriculture will lead to unemployment of agricultural workers. India is already facing a serious unemployment problem and mechanisation will add to the existing army of the unemployed. People who lose their jobs due to mechanisation of agriculture, can not be absorbed in non-agricultural occupations on a large scale.

(iii) Shortage of Fuel

India is facing shortage of petrol and diesel and is spending a huge amount of foreign exchange for importing these products every year. Farm machinery will require petrol and diesel. The oil bill will, therefore, increase manifold. As such, India cannot afford oilbased machinery for farm production. As a matter of fact, oil prices in the international market, in general, have been rising every year, at a high pace. This will almost continuously increase the cost of operation of oil based machinery in agriculture.

(iv) Poverty of the Farmers

A majority of Indian farmers is too poor to purchase farm machinery. Farm machinery which at present is being manufactured in the country, is quite costly and, therefore, beyond the purchasing capacity of most of the Indian farmers. The question of complete farm mechanisation, therefore, does not arise.

(v) Illiteracy of the Farmers

Farm machinery requires mechanical knowledge on the part of farmers. But Indian farmers are mostly illiterate and do not possess any mechanical know-how. In case, farm machinery is handled by inexperts, it would result in too much wear and tear.

1.4.5 The objections against mechanisation examined

From the above analysis, one may conclude that the case of farm mechanisation is rather weak in India. However, it is not so. Most of the objections raised against mechanisation are unfounded and can be met easily. For example, so far as the argument regarding poverty of the farmers is concerned, it may be pointed out that we have a network of banks throughout the length and breadth of the country which can provide credit to the farmers for purchase of farm machinery. Thus, finance is no problem and those who want to buy farm machinery can get it easily either from commercial banks or from land mortgage banks or regional rural banks. They can return these loans, by and by out of their increased income.

Argument concerning smallness of holdings has been countered by a

suggestion to encourage cooperative farming. In fact, the small farmers even when they have not formed a cooperative farming society, need not purchase the machinery. The Government can start tractor stations and other such institutions which supply only the services of machinery on rental basis to the farmers. This will not only reduce the need for heavy investment on the part of the small farmers in machinery but will also introduce some flexibility in the cost structure of the farmerssomething quitedesirable from the point of view of facing uncertainly in agriculture.

A very important argument against mechanisation is that it will create unemployment. This argument, too, has been contested by many economists on various counts. In the first instance, it is pointed out that some machinery may displace bullock labour rather the human labour. A tube well is such a machine. Further, at the same time, it creates more demand for causal labour. Again, unemployment will appear only if other things remain unchanged in the agricultural sector. If adoption of high-yielding varieties of crops requiring more labour for using fertilizers and insecticides and for irrigation purpose, accompanies mechanisation, the unfavourable influence of mechanisation on rural employment may be more than neutralised. This is what some of the latest studies on rural employment show. Machinery may also help double cropping and thus necessitate the use of more labour.

The use of machinery helps in the reclamation of waste land and as a result, a new and permanent source of employment in the agricultural sector comes into existence.

Again, it is pointed out that the fear that mechanisation of agriculture will result in unemployment is well founded only if complete farm mechanisation is adopted. Taking the prevailing situation in the country into consideration, neither it is desirable nor is it feasible to adopt complete farm mechanisation. There should only be a partial mechanisation of Indian agriculture. Partial mechanisation will obviously result in smaller displacement of human labour. It will be easier to adjust such labour in farm machine manufacturing industries, transportation, servicing etc. Regarding the displacement of bullock labour, as a result of mechanisation, there are no two opinions. Reduction of cattle population is necessary because huge cattle population is a drain on the land and capital resources of the country.

The argument that mechanisation of agriculture would create unemployment was, no doubt, quiterelevant in the pre-independence era, when not only agricultural sector but the industrial sector also, was stagnant. However, in

the present situation, the argument has lost much of its force.The unemployment generated, if any, due to mechanisation of agriculture is not of permanent nature. Reclamation of land and multiple cropping (both made possible) through the use of machinery and the labour using nature of high yielding variety of crops have, created additional demand for labour. If, according to Bergmann, all labour displaced by the use of machinery in the agricultural sector is not reabsorbed in that very sector despite reclamation of land, increase in the labour requirements of high-yielding variety crops and multiple cropping, the unabsorbed displaced labour can be employed in the non-agricultural sector which is also now developing and which, in fact, partially owes its own development to the growing agricultural sector.

An objection against mechanisation of Indian agricultural has been raised on the ground that the Indian farmers lack mechanical knowledge. But, for operating farm machinery, one requires very little mechanical know-how and it can be imparted to farmers in a short period. Farm Universities have been entrusted with the job of training farmers and they have been organising 'Farmers Training Courses' and young farmers have been trained in the art of handling farm machines.

Still another serious objection against farm mechanisation is that there is a shortage of petrol and diesel in the country and that the expenditure incurred on imports of oil is already too high. But this should not stand in the way of partial mechanisation, especially that connected with stationary agricultural operations like threshing, pumping out ground water, crushing of sugarcane, etc. Machines for these operations can be run by electric power also and the supply of electric power in some stated is quite satisfactory.

In the light of preceding discussion, we feel that quite a few of the objections against mechanisation of agriculture in India are either unfounded or can be met if some suitable measures are undertaken (e.g., cooperative farming for increasing the size of the farm or the use of machinery through hiring). For reducing the adverse effects of mechanisation on employment, we further suggest that we go in for partial mechanisation of agriculture. Complete mechanisation can be confined only to weed infested areas, to state farms and to large farms. Small farms can be content with partial mechanisation only. This is what we find in the Punjab. In the Punjab, on small farms, ploughing, sowing and harvesting is done by man and animal power whereas irrigation, threshing and crushing of sugarcane is generally done by machines by small farmers and provision of machinery suitable for small farms, will also be helpful.

1.4.6 Progress of mechanisation in India

The mechanisation of agriculture in India is under way. Indian farmers have started using agricultural machinery in farming operations, such as tractors for ploughing, seeding, haulage etc., electric motors and diesel engines for irrigation and threshing, spray implements for spraying pesticides and harvesters for wheat and rice harvesting. Table 1 shows the progress of the use of some important agricultural machinery in India.

(a) Two Phases of Mechanisation of Indian Agriculture

Historically, at the time of independence, agriculture in India was almost non-mechanised. No doubt, the pros and cons of mechanisation of Indian agriculture were a matter of discussion for various committees and commissions concerned with development of Indian agriculture even before independence.

The First Phase: The land reforms, introduced in India, during 1950s initiated a process of mechanisation of Indian agriculture. However, mechanisation of agriculture was not for developmental purposes. The production function for agriculture was still static. Non-traditional inputs like high-yielding varieties of seeds, fertilizers etc. were not available. According to Schultz, even the community developmental programme which aimed at motivating the people to participate in the development process in the rural areas failed to produce results because the non-traditional inputs were not made available to the farmers. Mechanisation, too, in the absence of non-traditional complementary inputs, was not likely to help in the development of agriculture. But this fact could not stop the use of some machinery during 1950s. As a matter of fact, this phase of mechanisation was not aimed at increasing agricultural production. Most of the observers of the Indian scene at that time, were of the view that mechanisation of agriculturewas not due to the keenness of the farmers to increase agriculture output. Rather, it was with a view to turning out the erstwhile tenants from the land under their possession (lest they should manage to become the owners of this land) that the landowners introduced machinery on their farms. Contemporary literature on land reforms gives enough evidence about the large scale eviction of tenants from the land they were cultivating and about their conversion into landless agricultural workers. Self-protection rather than the prospective prosperity was the main motive force for the land owners, for mechanising their farms during the fifties and early sixties. Tractor was the main machine used for this purpose. It was used mainly by the large farmers.

Tubewells (operated the help of Electric or diesel pumpsets) too were installed by the large farmers during the first phase of mechanisation. But these generally appeared after they were able to evade the land reforms.However,

rest of the progress in mechanisation in this phase was based, mainly, upon the use of improved manually operated equipment.

The Second Phase: A more powerful push for mechanisation of agriculture and that too, for development purposes was provided by the adoption of the new seed-cum fertilizer technology which brought about the green revolution in India during the 1960s. Use of fertilizers necessitated a controlled supply of water for the farmers. Demand for tubewells and therefore for diesel and electricity driven pumping sets thus, increased. Multiple cropping necessitated use of tractors for timely sowing of crops. Mechanical threshers and harvesters, unheard of during the Fifties, appeared after the green revolution, due to increase in production. Many other power operated machineslike centrifugal pumps, seed drills, disc harrows and sprayers began to be used. Power driven machinery, and not the manually operated one, as was generally the case in the first phase, was, thus, now needed for increasing agricultural production by completing various agricultural operations in time, and not for evading land reforms. The land owners, in fact, by this time had already made necessary adjustments for evading these reforms.

The pace of mechanisation of Indian agriculture was quite rapid after the green revolution. This was bound to be because machinery is basically an instrument for increasing production and it will be freely used if its use can add to production. In the period preceding the green revolution, pace of mechanisation was slow simply because the production function in agriculture at that time was rather static and the need for some type of machinery was felt, mainly by large farmers, for some non-productive purposes, i.e., to eject their tenants from the land owned by the former.

After green revolution, while large farmers added to their existing set of machines, most of the medium farmers, too, purchased machinery for the first time for their farms. In fact, a study about Punjab, conducted in the early eighties found that even the small farmers were having some minor agriculture machinery like pumping sets. And all this was done because it added to the income of all category of farmers.

The fact that mechanisation of Indian agriculture was at a more rapid pace after green revolution is clear from the Table (Table 1).

TABLE 1 Important AgriculturalMachinery in Use in India, (in '000)

S. No.	Description	1951-52	1961-62	1966-67	1972-73	1982-83	1987-88	1991-92	1997-98	2002-03
1.	Electric pumpsets	26	160	415	1618	3581	4518	6404	7299	8448
2.	Diesel engine pumsets	83	230	471	1546	3296	11665	45774	70938	72374
3.	Tractors for agriculture	8.6	31.0	54.0	148.2	518.5	738.4	1221.8	1861.3	2361.3
4.	Powers crushers	21.3	33.3	45.1	87.2	120.8	151.2	335.0	592.2	626.3
5.	Threshers	N.A.	N.A.	N.A.	205.8	963.7	1274.9	2187.0	2789.8	N.A.
6.	Combined Harvesters	N.A.	N.A.	N.A.	2.1	40.6	114.1	281.0	356.8	N.A.

Source: (1) Directorate of Economics and Statistics, Ministry of Agriculture Government of India.
(2) Deptt. of Animal Husbandry, Fishing, Ministry of Agriculture.

Let us look at the progress of mechanisation of Indian agriculture during the period 1951-83. The year 1966-67, i.e., which divided this period into two equal halves, is also the year indicating the start of the green revolution in India. It is clear from the table that during the first, i.e., the pre-green revolution period, out of the total addition to machines during the whole period of 1951-83, only 11% of power driven pumps, 13% of diesel engines, 9% of tractors and 24% of power crushers were procured by the farmers. The balance was procured only after the green revolution started. The fact that it was the new seed-cum-fertilizer technology which encouraged mechanisation is further confirmed when it is pointed out that pace of mechanisation has been found to be still more rapid in Punjab, Haryana and U.P., the three leading states lying in the green revolution belt when compared with other states of the country.

(b) Mechanisation of small farms:

A recent study has revealed another interesting trend in mechanisation of agriculture in India, so far as the green revolution belt is concerned. It is that even the small farmers have started using machinery on their farms. We have already pointed out that many of the small farmers in the Punjab own minor machinery like diesel engines. So far as more costlymachinery like a tractor is concerned, it is obvious, they cannot purchase it. So, in this case, they have resorted to the practice of hiring in its services, either from the large farmers or from some other institutions. This procedure not only reduces, for the small farmers, the cost of mechanising their farms but also gives more flexibility to their cost structure-something quite useful for facing uncertainty in agriculture.

(c) Over mechanisation of small farms.

Even small farmers (owning two hectares of land, have been found to own tractors. And, they have purchased these tractors with loans, obtained from outsides sources. If crop failure happens, they do not have income to repay the loans and then they got debt trapped.

d) Role of the Government in Encouraging mechanisation of Agriculture

The Government has helped mechanisation of agriculture in various ways. It has taken interest in the production and distribution of agricultural machinery as well as in providing finance for its purchase and also the necessary training facilities for its use. For example, Agro Industries Corporations have been set up in most of the states as state sector undertakings. The corporations are mainly engaged in the distribution of tractors and other agricultural machinery, setting up of machinery hiring centres and repair workshops and supply of other agricultural inputs. Many Agro Service Centres have been set up to provide much needed service for repairing the machinery, to the farming community in rural areas.

These centres also often organise field demonstrations for machinery.The government has taken special steps to popularise improved manually operated implements in those areas where power was the major constraint.The Government has set up six regional machine testing and training institutes in the states of A.P., Assam, Haryana, Tamil Nadu, Rajasthan and M.P for purposes of testing agricultural machines as well as for training personnel to test such machines. So far, about 1.2 lakh persons have been trained at these institutes since they were set up.

Besides, more than 20 institutions (generally Agricultural Universities) have been authorised to test agricultural machinery.

1.4.7 Question with short answers

Write short notes on the following:

1. Farm mechanisation
2. Need for the farm mechanisation
3. Multiple cropping
4. Benefits of farm mechanisation.

1.4.8 Questions with long answers

1. What do you mean by farm mechanisation? Explain the desirability of farm mechanisation.
2. Explain the benefits of farm mechanisation.
3. Explain the progress of farm mechanisation in India.

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Agricultural Price Policy

Price mechanism plays an important role in the optimum allocation of resources, optimum distribution of national income and stabilization of income output and employment. It is the level of price inflation and deflation—which brings instability in the economy. Throughout the World, governments have tried to manipulate prices so as to influence level of output in agriculture and for the overall development of the economy. Economic history of U.S.S.R. shows that how U.S.S.R. government tried to mobilize surplus from agricultural sector keeping prices of agricultural products very low. Now a days it is felt that compulsion is not always necessary for the transfer of surplus. Agricultural development itself may bring down the prices of agricultural products which in turn may help in the reduction of cost of production in manufacturing and industry. Not only this agricultural sector contributes in different ways for the development of the economy i.e. through the supply of food grains, agricultural raw materials, capital and labour and the expanded market for industrial goods.

Manipulation of prices of Agricultural products as well as of inputs can help in achieving all the objectives laid down. Objectives of the Agricultural price policy in a developing economy are as follow :

1. To assure remunerative prices to the farmers

For encouraging the adoption of modern technology and investment in agriculture with a view of maximize agricultural production. This can be one of the many objectives. But the price policy may not be very effective in traditional agriculture because the traditional agriculture has a backward sloping supply curve with regard to both the aggregate production as well as the marketed surplus. It is said that the response of supply as well as of demand to price changes in agriculture may not be so responsive as these are in industries. There is one important difference between the demand for agricultural goods and industrial goods. Demand for agricultural products like food grains, sugar, oil seeds, vegetables, fruits etc. is income-inelastic i.e. demand for agricultural products does not increase as and when income increases. Similarly, when the prices of agricultural goods fall, consumption will not greatly expand nor will it greatly contract if food prices rise. Thus, a low price elasticity and income elasticity indicate that demand for agricultural products is insensitive because (i) food is necessary for life, the changes in its price does not effect demand and (ii) with a rise in income, people spend relatively more income on industrial products.

Moreover as Mellor[1] says that traditional agriculture is a technologically stagnant and highly labour oriented agriculture—that neither the aggregate agricultural production not the marketed surplus will increase, when prices of agricultural products increases. However, price policy may be quite effective in a technologically dynamic low capital intensive agriculture.

2. To fulfil the production targets

The other objective of the price policy may be to maintain an appropriate relationship between prices of competing crops as to fulfil the production targets in respect of different commodities commensurate with the rise in demand. For example, with the increase in population there may be need to increase the production of both the foodgrains and pulses and also of cotton. To achieve this objective a price parity is required to be maintained. If government fails to achieve this parity there may be disproportionate increase in area under one crop or the other. Parity between prices of individual agricultural commodities and general agricultural prices can be seen through the following formula.

$$\frac{\text{Price Index of all individual argicultural commodity}}{\text{Price index of all agricultural commodities}} \times 100$$

This parity helps in the adjustment in crop mix for the purpose of achieving targets of production for different crops.

3. To achieve a balance between economic interest

An other objective of the Agricultural price policy may be to maintain a balance between the economic interests of producers and consumers i.e. to reduce the margin between the producer's price and the consumer's price. This objective is generally achieved through the fixation of maximum and minimum prices. This objective is very difficult to achieve because the Agricultural Price Policy in an under developed country must ensure :-

(a) incentive for widest adoption of improved technology and for the maximisation of production.
(b) must encourage optimum utilization of land.
(c) must aim at ensuring as near as possible a balance between supply demand for various crops.
(d) must not effect the prices of exports and imports, and
(e) the affect of the agricultural price policy on other sectors of the economy, especially with reference to wages, cost of living, industrial cost structure etc., should also be kept in view.

4. To ensure reasonable relationship between Agricultural and Industrial Sector

Another objective of the Agricultural price policy may be to ensure a reasonable relationship between (i) the prices of foodgrains and non food grains and (ii) between Agricultural Commodities and manufactured

commodities so that the terms of trade between two sectors of the economy do not change too sharply against one another. This can be seen through the following formula :-

$$\frac{\text{Price Index of all agricultural commodities}}{\text{Price Index of all manufactured commodities}} \times 100$$

5. To accelerate the growth of output as a whole

Another objective may be to ensure faster growth rate in agriculture. For this remunerative prices are supposed to be paid to agriculturists and prices of agricultural goods are kept deliberately high. This can be seen through the following formula :

$$\frac{\text{Price index of all agricultural commodities}}{\text{Price index of farm inputs}} \times 100$$

But there are many difficulties in maintaining higher prices of agricultural goods.

6. To stabilize general price level

To stabilize price level in the economy, so as to avoid inflation is another important objective of the policy. In the wake of economic development government spends in a big way for the development and diversification of industries, for the construction of roads for the development of transportation and communication, railways, irrigation projects, power generation etc. All these projects do not produce anything for direct consumption. Thus, when new purchasing power is injected and that too for mobilizing resources through deficit financing and bank money is utilized for financing such projects and inflationary situation is created in the country and if government fails to check rise in the prices of food grains, and other consumer goods causes an increase in the prices of industrial goods and a race starts between rise in cost and rise in prices. To avoid this govt. deliberately maintains a low price for agricultural goods so as to avoid further rise in prices. For this government has to formulate a price policy which may neither discourage production in agriculture nor cause an injury to the consumers. Policy to be followed depends on the situation prevailing in the economy i.e. in addition of price control government may go for rationing, subsidisation of foodgrains etc.

7. To increase the marketed surplus :

Another objective of the policy may be to induce farmers to bring more foodgrains and other raw material in the market. If it is the only objective government may allow high prices for agricultural goods but this all depends on the situation prevailing in the country. If the negative supply operates them higher prices may not induce the farmers for bringing more produce in the market. If so govt. has to go for other measures like levy foodgrains, stock restrictions, compulsory sale to the government, and linking up the supply of inputs like irrigation, power supply, fertilizers etc. with the marketed surplus etc.

8. To smoothen the prices of agricultural goods :

Another objective may be to avoid fluctuations in the prices of agricultural goods. We all know that agricultural prices are subject to wide fluctuations i.e. prices go down substantially at the time of harvest and go up in the lean period. Therefore, the objective of agricultural price policy may be to avoid these fluctuations and to maintain and stabilize the agricultural prices so as to save the farmer and to encourage him for more production.

9. To mobilize resources for Economic Development :

As has already been stated and discussed in the earlier lessons some times governments try to mobilize resources for financing plans from agricultural sectors and makes use of price policy.

10. Other Objectives :

There can be other objectives, like, to ensure relationship between prices of inputs and outputs in agriculture, to bring integration of prices in various regions, to encourage a particular cropping pattern etc.

We have listed various objectives which can be laid down for agricultural price policy but it should be kept in mind that :

(i) Success of price policy depends upon the price elasticity of supply of various crops. Greater the price elasticity of various crops, greater will be the impact of changes in their prices. It is because of the fact that production in agriculture is influenced by many factors like, fertility of land, type of cultivation, tenure system, availability of irrigation facilities, climate, size of the farm, availability of other inputs availability of credit, rainfall, nature of the crop etc.

(ii) Agricultural price policy must take into consideration its impact on other sectors of the economy. For example, to improve production in agriculture through the manipulation of prices, may escalate price in other sectors and may impinge on exports etc.

(iii) All the objectives cannot be achieved simultaneously with a specific agricultural price policy. To achieve the specific objectives, price policy has to be modified. Nature of Price policy will definitely be different in different stages of agricultural development. It will vary in traditional agriculture and dynamic agriculture.

(iv) Price policy may be negative or positive. Under the negative price policy government makes use of conceived methods of extract maximum surplus from agricultural sector so as to compel the farmer to go for more production. For example, low prices, compulsory contribution, high taxes, compulsory or levy foodgrains etc. However, under a positive policy, government gives inducement for more production, imposes less taxes, gives subsidies, and concessions in the provision of irrigational

facilities, enhances water supply, supply of power and other inputs etc. Now a days it is felt that positive price policy is more successful than the negative price policy.

(v) Price policy alone cannot achieve above objectives single handed. Action under price policy requires certain other measures such as supply of inputs, irrigation facilities and package programmes. Economists also differ about the effectiveness of the Agricultural Price policy. For example, it is suggested that if the aim is to accelerate innovation and growth of agricultural output, it would be better to subsidize package inputs than to guarantee minimum price of output. If product prices are raised, peasants may or may not take to improve cultivation. They may simply spend the extra income on consumption and government expenditure on support will be wasted. If inputs are subsidized the benefit can be availed of only if inputs are used. Input subsidization also avoid raising food and raw material prices against the growing industrial sector. Thus, both (price support and subsidization) are needed as complementary instruments of policy.

Thus, we can say that Agricultural Price Policy is a potent tool for reshaping allocation of resources and distribution of income both within agriculture and between agricultural and non-agricultural sectors. In an economy, suffering from chronic shortage of foodgrains it can further be employed to protect the consumers against unduly high prices of foodgrains and the producers against the loss of income resulting from market imperfections.

Agriculture Price Policy in India

After independence, India's agricultural price policy has moved through two distinct phases upto 1965, the government was following an adhoc type policy, marked by spells of hectic activity in years of poor crops and complete complacency in years of good crops. In 1965, however, Agricultural price commission was appointed and therefore, the subsequent period witnessed the beginning of a more stable and meaningful price policy.

Prior to the beginning of the first five year plan, two committees were appointed by the government of India who in their recommendations gave hints towards the desired price policy. In 1947, the Foodgrains Policy Committee was formed which recommended a policy of progressive decontrol, reduction of dependence on imports of foodgrains and a substantial increase in domestic production within the earliest possible time. Another committee, known as Foodgrain Procurement Committee (1950) recommended the continuation and extension of the system of rationing in the country.

During the first five year plan period, due to the relatively easy situation on the food front, the government followed a policy of complete decontrol. However, prices of agricultural products started showing a rising trend in the end of first five year plan, forcing the government to introduce partial

controls, Concerned about rising prices of foodgrains, the government appointed the Foodgrains Enquiry Committee in 1957. The committee strongly recommended the setting up of a Foodgrains stabilization organisation to stabilize the food prices. It also recommended the building up of a buffer stock, licensing of whole sale traders and fixation of minimum and maximum prices. Thus, till 1964, the agricultural price policy was more concerned with the stabilization of consumer prices and not much attention was paid to providing any incentive to the producers.

The appointment of the Jha Committee on Foodgrains Prices on August, 1964, marked the beginning of a new phase in the evaluation of price policy in India. The committee recommended the establishment of the Agricultural Price Commission to advise the government on continuous basis.

Agriculture Price Commission (APC)

The Agricultural Price Commission was set up under the chairmanship of Dr. M.C. Dantwala in January, 1965 to advice the government on price policy for agricultural commodities with a view to evolve a balanced and integrated price structure in the perspective of the overall needs of the economy and with due regard to the interests of the consumer while recommending the price policy and the price structure, the commission may consider :

(a) the need to provide incentive to the producer for adopting improved technology for maximizing production;
(b) the need to ensure the rational utilization of land and other production resources.
(c) the likely effect of the price policy on the rest of the economy, particularly on the cost of living of workers and industrial cost structure.

The APC does not follow a mechanical approach in deciding upon the price policy. While recommending a price policy for a commodity, the commission takes a comprehensive overview of the entire structure of the economy of that commodity, its demand and supply situation, costs of cultivations, export potential, price trends and the general economic health of the economy. Besides the commission also takes into account the level of administrative prices for competing crops so that a measure of inter crop price parity is achieved while recommending the price policy, the commission also suggests such non-price measures as would facilitate the achievement of the objectives of the price policy.

Along with the setting up of APC, the government took another step by setting up of food corporation of India, in 1965. The main functions of this corporation are to procure, store and distribute foodgrains. Open market operations in food grains through the agency of FCI can, if properly planned serve the twin purpose of offering price support during periods of bountiful crops and price moderation during years of scarcity.

Through APC, which was renamed Commission for Agriculture Costs and Prices in 1980, the government has employed three types of instruments

to achieve its policy objectives. One of these is with regard to the minimum support guarantee to producers so that in the event of a glut, prices are not allowed to fall below the minimum economic levels. Another aspect of the minimum support prices is that these are also used as procurement prices i.e. prices at which government buys surplus coming in the market. These minimum support/procurement prices are generally announced before the start of sowing season. These prices are fixed for major agricultural commodities. The second instrument is the fixation of issue prices at which fair price shops sell cereals like wheat, rice etc. This is intended to safeguard the interests of low income group consumers, although there is no bar on anyone including rich consumers, to buy from these distribution depots. And the third is the maintenance of prices within limits through buffer-stock operations. This is to mitigate fluctuations in prices.

Buffer-stock operations refer to buying and selling the same with the purpose of moderating price fluctuations. The buffer stock operations influence the market forces and through that the allocation of resources. It, therefore, does not damage the market mechanism, but instead makes use of it. Building up and maintaining buffer stock of food grains have been an important element of India's food policy. It is, however, being extended to cover more commodities to strengthen the public distribution system. It is clear that total stocks with the government are not meant to be used as buffer stock. Over and above the buffer stocks, the government has to keep operational stocks needed for meeting the requirements of fair price shops working as part of the public distribution system.