MASTER OF ARTS IN ECONOMICS

SEMESTER-II

ECO-2.3: ECONOMICS OF AGRICULTURE

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AUTHOR

A.N SADHU & AMARJIT SINGH

EDITED BY:- GHANASHYAM JENA

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A.N SADHU & AMARJIT SINGH

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ECO.2.3: ECONOMICS OF AGRICULTURE

BRIEF CONTENT

Block No.	Block	Unit No.	Unit
1	Role of Agriculture in economic development.	1	Introduction to Agricultural Economics , Agricultural Production and resource use: Production functions, returns to scale
		2	Resource allocations under competitive conditions. Resource substitution of factor relationship
		3	Cost and supply curves factor combination and solution techniques under uncertainty system of framing.
		4	Choice of product, relationship among product and adjustment of production and resource use to uncertainty.
2	Principle of land utilization & Agriculture Markets	5	Factors: Principle of land utilization, land and tenancy, land reform, land values and rent, land taxation
		6	Labour market, wages and employment and under employment.
		7	Capital Market, Savings and Capital formation, characteristics of agricultural credit, types of credit, sources of credit, agencies of credit, co-operative credit.
		8	Agriculture Markets: the market structure, marketing functions, marketing costs, organization of markets, co-operative marketing.
3	Agricultural price	9	Agricultural price, nature of demand for and supply of agricultural product, movements of price.
		10	Long period and short period cyclical and seasonal variations.
		11	Stabilization of price.
		12	Stabilization of price and income protection of farm wages
4	State in relation to agriculture	13	Problems in agricultural Policy, State intervention in agricultural marketing
		14	planning in agriculture
		15	International trade in agricultural commodities
		16	Commodity agreements, international programme for agricultural development.

CONTENT

Block/ Unit

1.1 Chapter

ROLE OF AGRICULTURE IN ECONOMIC DEVELOPMENT

Objectives

After completing this chapter, you will be able

- To know the basic idea about economics of agriculture.
- To define agriculture and economics of agriculture.
- To define agricultural economics.
- To know the nature and scope.
- To examine its importance.
- To examine its relationship with other sciences.
- To study the ideas developed by different economists from time to time.
- To study their models and approaches.
- To study the contribution of agriculture to economics.
- To analyse its fundamental character.
- To assess its role in economic development with reference to Indian economy.

Structure:

1.1.1 WHAT IS AGRICULTURAL ECONOMICS?

The words agricultural economics are made up of two words, *viz.*,agriculture and economics. Before we define agricultural economics as a whole, it would be appropriate to define agriculture and economics separately.

The word agriculture, since long, has been associated with the industry of basic food production, known as farming. Agriculture and farming were synonymous till farming was not commercialised and was done more or less on a subsistence basis. But after the commercialisation of the agricultural sector, production of food and fibre (farming) has become only one part of scientific agriculture. Modern agriculture has much Wider scope today and it includes the farm supply industries as well as the product-processing industries and distribution industries, too. Industries closely related to farming are known as agriculturally related industries or agri-businesses. The scope of modern agriculture has been depicted in Fig. 1.1

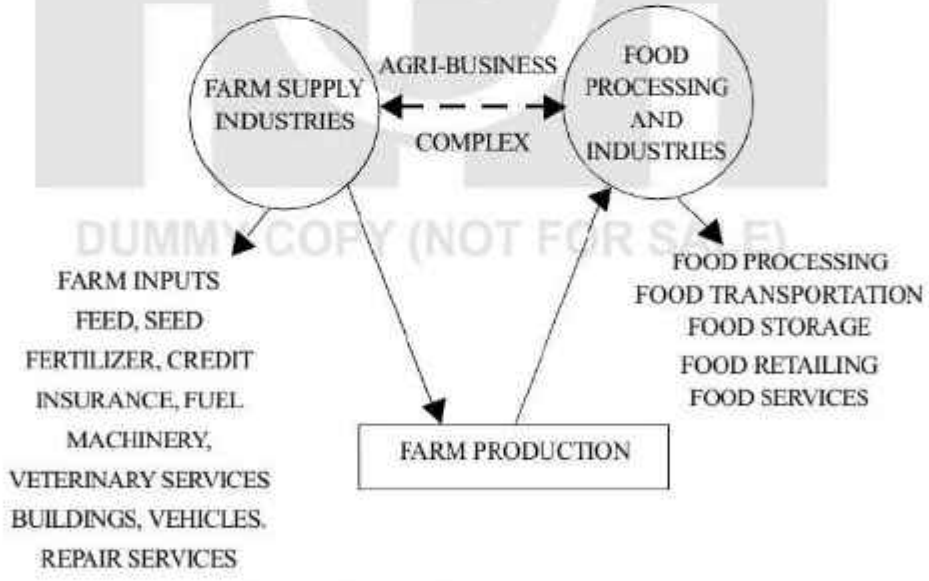


Fig. 1.1: Scope of Modern Agriculture

Agriculture thus, may be defined as the production, processing, marketing and distribution of crops and livestock. These four activities were previously all farm-centred. However, with improvement in technology, transport and communication developments and specialisation of labour, some of these activities have moved away from farm into certain strategic control points. Modern agriculture also includes the farm supporting industries as well as product processing and distribution industries.

Economics, on the other hand, is the science of analysing the use of limited resources to achieve desired ends. It is a social science which studies how man satisfies wants through the allocation of scarce resources. The English word "economics" is derived from the Greek word *"Oekonomous"* which means "house-keeping" and one of the tasks of the housewife is of making most effective use of the resources. that are available to her, Prof. Lionel Robbins has defined economics as "the science which studies human behaviour as a relationship between ends and scarce means which have alternative uses". As such it involves,

(a) Deciding between alternative ways of using limited resources;

(b) Satisfying human needs and wants for which there are varying degrees of preferences; and,

(c) Taking into account human behaviour and decision making on the best way to use available resources.

Fig. 1.2 illustrates the general subject matter underlying the study of economics:

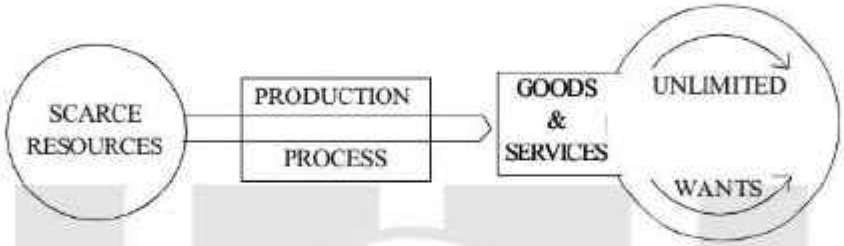


Fig. 1.2: Scarce Resources Attempt to Satisfy Unlimited Wants via Production.

The gap between what people wish to have and what they actually can afford to have is of central concern in economics. In the absence of such a gap between expectation and and achievements, the subject of economics may not have been studied at all. But in real life situations, the gap does exist and it has been the main preoccupation of economists to evolve ways and means of reducing this gap.

1.1.2 DEFINITION OF AGRICULTURAL ECONOMICS

After having discussed the definitions of agriculture and economics separately, we are now in a position to define agricultural economics. In a very simple language, agricultural economics may be defined as an applied phase of economics in which attention is given to all aspects of problems related to agriculture. It helps the farmer in deciding about what kind of food should he produce which crop should he price his products. As such, it is a social science concerned with the allocation of scarce resources among the uses associated with producing, processing and consuming the farm products. According to Prof. Gray, "agriculture economics may be defined as the science in which the principles and methods of economics are applied to the special conditions of agricultural industry."

According to A.W. Ashby, "agricultural economics is an applied science, that is, it is a methodical pursuit of knowledge of economic process and organisation in agriculture and of their results, for the purpose of stabilising, adopting or modifying, and if and when necessary, of changing their results."

Hibbard defines agricultural economics as "a study of relationships arising from the wealth getting and wealth using activity of man in agriculture." However, agricultural economics should include within its purview not only subjects directly connected with the exploitation of land but also those which indirectly influence the economic activity on the well-being of the farm population

To Jouzier, "agricultural economics is that branch of agricultural science which treats of the manner of regulating the relations of the different elements comprising the resources of the farmer, whether it be the relations to each otheror to human beings, in order to secure the greatest degree of prosperity to the enterprise."

In short, we may define agricultural economics as an applied science which is mainly concerned with economic problems that are associated with farmer's effort to make a living. Their problems as we know are numerous and varied in character but can be grouped under three main heads; (i) Production; (ii) Marketing and (iii) Financing. Thus, agricultural economics is concerned with the evolving of appropriate principles that govern the amount of land, lab our and capital, which a farmer should use to farm most efficiently. Agricultural economics is equally concerned with the forces that affect the prices of the things he buys, sells or in other words, the relation between agriculture and the rest of the economy.

As an applied science, an important role of agricultural economists is to formulate the methods, techniques and procedures by which the problems of agriculture may be tackled. This perhaps is the most difficult function which the agricultural economist is called upon to perform. Hence we may conclude by saying that "agricultural economics is an applied science and as such is concerned with the identification, description and classification of the economics problems of agriculture, to the end that these problems may be solved."

The problem of allocation of scarce means to diverse uses is perhaps more crucial in the field of agriculture than in the economy as a whole for the simple reson that land — the basis of all agricultural pursits — is highly limited in supply. The theoretical frame of agricultural economics has, therefore to be more rigorous and thought ful so as to provide a plausible kit of methods and procedures by which this most precious and limited resources is allocated among different productive activities to the maximum satisfaction of the society. Agricultural economics is, therefore, both theoretical and applied in its character. The theory of agricultural economics deals with the development of principles of resources economics and as an applied science, it deals with the development of principles of resources economics deals with the develop ment of principles of resources economics and as an applied science, it deals with he application in diverse productive activities related to agriculture.

1.1.3 SCOPE

There are a number of forces active in agriculture. Some of these forces are physical and are taken care of by physicians, chemists, geologists and soil scientists and so on. Some others are biological forces, which are studied by plant and animal physiologists, pathologists, geneticists, entomologists and bacteriologists etc. Agriculture is also faced with economic and sociological forces, which are characterised by relationships arising amongst men on account of agriculture being followed as a vocation and a way of life. It is with these relationships that agricultural economists deal. These relationships comprise of:

(i) Relationship of contact (supplementary, complementary or competitive) between the different branches of the enterprise such as the simultaneous raising of cereals and animals on the same farm;

(ii) Relationship of activity between the different means employed in the process of production as in the simultaneous employment of machinery and human labour;

(iii) Relations of value between the means employed in production and the product itself; and

(iv) Commercial relations with the people to whom farmers sell their products or from whom they buy their requirements.

"The domain of agricultural economics then covers the examination of each element of agricultural production whether in connection with anyone of the above-named relationships in particular or with several of them together, for the purpose of obtaining the greatest net profit."

It is clear from the above statement of Jouzier that he looks upon agricultural economics as (i) the science which deals with the principles underlying the coordination of all the factors involved in farming (land, labour, equipment and the various lines of production) in such a manner as will enable the farmer to secure the maximum net profits; and (ii) the art of applying these principles on a given farm.

We can thus describe the scope of agricultural economics in the words of Taylor who says, "agricultural economics deals with the principles which underline the farmers' problem of what to produce and how to produce it, what to sell and how to sell it in order to secure the largest net profit for himself consistent with the best interest of society as a whole. More specifically, it treats of the selection of land, labour and equipment for a farm, the choice of crops to be grown, the selection of livestock, enterprises to be carried on, and the whole question of the proportions in which all these agencies should be combined. These questions are treated primarily from the point of view of costs and prices."

Can we include in the scope of agricultural economics the distribution and processing of farm products after they leave the farm and the consumption of food and clothing by the urban population? The answer naturally would be "No", otherwise, steel manufacturing and automobile industries would be treated as part of mining. But this does not mean that agricultural economics has nothing to do with the problems of distribution and consumption of farm products. Indeed, it is as important for farm people to understand the economics of distribution and of consumption of farm products as it is for them to understand the economics of their farm production. They are, therefore, part of the economics of agriculture.

The scope of agricultural economics is, thus, extended to the distribution and consumption problems of farm products as well, what to distribute, among whom to distribute and on what basis to distribute, what to consume and how much to consume are, therefore, some of the important questions dealt in agricultural economics. A study of agricultural economics also includes the functioning of government in agriculture. "To neglect the public management, public aid, and public regulation as parts of the agricultural economics would be almost like leaving mechanics out of a course of physics."

To be specific, "the scope of agricultural economics can be stated to include the choice of farming as an occupation, the choice of farm and livestock, of machinery and labour, of crops and cropping system, the size of the unit of production, the grouping of the factors of production, intensity of cultivation, manuring, irrigation, soil conservation, selling of agricultural products, land system and rent, agricultural finance and rate of interest, wages and employment, prices, costs and profits, standard of living and national dividend etc."

The main problem in all the cases mentioned above is of choosing the most profitable enterprise and operating it. The task of agricultural economist is to point out what is best to do in the economic interest of the agricultural community under the given conditions.

From the above, we may conclude that the scope of agricultural economics is very vast. "Within its scope must be included every phase of a nation's activities that in any way affect the farmer in his efforts to make a living. At the farm level, agricultural economics is concerned with developing ways and means by which each productive unit may be so organised and operated, its products so disposed of and the resources so allocated to various uses that the farm may yield maximum net returns. At the sector level, it deals with those problems that emerge when farmers attempt to effect changes in farming that cannot be accomplished by individual action. Among such problems are the conservation of land, the cooperative purchase of goods and services and the marketing of farm products. Finally, agricultural economics must be concerned with solutions of those problems that require the active participation of the Government, i.e., problems connected with price control, supply of credit, international trade, etc."

1.1.4 NATURE OF AGRICULTURAL ECONOMICS

Agricultural economics is both a social science as also a natural science. As a social science, it does not differ significantly in its scope from general economics. A farmer's activities, decisions and functioning are greatly affected by society, which in turn, is equally affected by the farmer's decisions. To the extent farmer's decisions are affected by his own psychology, social institutions and religious and other taboos, his activities cannot be measured in as precise a manner as would be possible in a laboratory experiment. In this respect, agricultural economics is subject to all such influences as exist within the domain of social sciences. Economic calculations would, therefore, follow the same standards of accuracy or inaccuracy as in general economics.

On the other hand, agricultural economics as a natural science deals with a thorough examination and evaluation of scientific innovations suggested by soil scientists. In fact, agricultural economics owes its origin in the present form to agronomy itself.

Agricultural economics is essentially considered to be an applied science for the sole reason that it is the practical wisdom of an agricultural economist rather than the volume of his theoretical knowledge without practical orientation that makes the difference in agricultural pursuits. Knowledge is not to be acquired for the sake of knowledge alone but the theoretical and practical aspects have to be studied in relation to each other. By nature, the learning process in agriculture has to be such as would offer itself convincingly for use for the directive purpose of economic pursuits.

The nature of agricultural economics is unique because of the important role that nature plays in its working. In no other economic phenomenon as in agriculture is the nature so directly and strongly involved. The problem of maximisation of returns is, therefore, more complex and solution to the problem more uncertain. Varying agro climatic conditions, economic systems, soil fertility and soil capacities lead to inter-regional and intra-regional heterogeneity in the agricultural production conditions. This creates the problem of differential achievements under different geo-economic conditions. The problems of agricultural production are, therefore, multidimensional and the subject of agricultural economics has to develop in the light of these problems that it seeks to investigate and work with.

Seasonality is yet another factor that distinguishes agricultural production enterprise from other non-agricultural activities. Naturally therefore market fluctuations are more sharp and frequent in agriculture. Since the very nature of agricultural enterprise is such that it involves the whole family in its pursuit for livelihood. It differs uniquely in its organisation and institutional set-up from non-agricultural pursuits.

1.1.5 RELATIONSHIP WITH OTHER SCIENCES

It would be a grave error to infer that economics is the only science upon which the agricultural economist depends. The applied or technical agricultural sciences such as agronomy, animal husbandry and agricultural engineering contribute data showing the effect of various types of practices and equipment on output. Such information is helpful or rather indispensable to the agricultural economist in dealing with problems of production efficiency.

Again, the determination of the effect of any technical practice requires that records and complete farm accounts be maintained. For assistance in this sphere, the agricultural economist depends upon the science of bookkeeping and accounting which has developed rules and procedures by which accurate data on any phase of the farm business can be obtained.

Statistics is another science that has been used effectively by the agricultural economists. This science is helpful in supplying methods by which data regarding specific farm problems can be collected, analysed and evaluated.

Agricultural economists must also draw upon the subject method of other social sciences. The process of decision-making under uncertainties involves psychology as such as it involves economics. Sociology is necessarily involved in production and resource-use. Inter farm problems in production are partly those of community organisation and the acceptance of production policies or new techniques of production involve sociological as well as economic considerations. Political science, if it is considered from the stand point of choice and decision, likewise becomes a field of science which must be integrated with the principles of production and consumption.

Physical resources and physical sciences specify what can be produced; economics specifies how resources should be used in production while sociology, psychology, ethics and political science specify the limitations which are placed on choice through laws, customs and other expression of individual and group values.

1.1.6 NEED FOR SEPARATE STUDY

Agricultural economics is not basically a different kind of economics - a separate set of economic principles and methodology which has relevance only to agriculture. The general framework of economic theory is applicable to the business of agriculture just as much as to that of industry. The analysis of equilibrium of demand and supply, of value and price etc., is as valid in agriculture as in industry. Then if general economic principles are applicable to the agricultural sector the question arises: why should we study agricultural economics separately?

True, goals of production and the need for management decisions concerning the allocation of inputs are strikingly similar between agricultural and industrial production. However, there are substantial differences in the natural conditions under which production must be carried on and in the sociological background in the agricultural sector which demands a separate study of agricultural economics.

Firstly, agriculture is a unique industry in which the modes of life and business enterprises are combined together. This combination no longer exists in present-day industry. It is on this score that it is more influenced by sociological, political and sentimental considerations.

Secondly, another characteristic of agricultural production which distinguishes it from industrial production is that the farmer produces chiefly for his own needs. No denying the fact that in modern farming, the element of self-sufficiency has been reduced in importance but by no means has it been removed. In most underdeveloped countries, even today, farming is done on the basis of self-sufficiency.

Thirdly, many agricultural commodities are joint products like wheat and affals or mutton and wool because they are both part of the same plant or the same animal. The costs attributable to the various products cannot be separated as they often can be in industry even when several products are produced in the same plant. Thus, in agriculture, it is rarely justifiable to consider the supply of any product in isolation.

Fourthly, agriculture requires a far larger proportion of land in relation to its employment of other factors than does industry. This is responsible for an early tendency of law of diminishing returns wide scatter of production and the great importance of system of land tenure.

Fifthly, farming mostly is undertaken in small-sized units and thereby gives little scope for division of labour. Thus, large scale organisation and its benefits, typical of industry, is less applicable to agriculture.

Sixthly, unlike in the manufacturing industry, combinations are not possible in farming due to the existence of a large number of small farm holdings. This results in acute competition among farmers.

Finally, in agriculture, farmers' control over production is very limited. When production is either not controlled or not controllable, serious maladjustments are likely to occur because at times more products will be produced than are required and could be sold profitably and at other times, not enough products are available when prices are high.

1.1.7 ROLE OF AGRICULTURE IN ECONOMIC DEVELOPMENT

The process of labour absorption by the industrial sector of the dualistic economy has been exhibited diagrammatically in Fig.1.3. In the double deck diagram, Fig. 1.3(a) (upper deck) represents the production contour map of the industrial sector.

The production contour lines indexed by Q_o, Q_1, Q_2, are once again assumed to exhibit the property of constant returns to scale. The central expansionary role of the industrial sector may be symbolically represented by an expansion path through time A_o, A_1, A_2, representing a gradual expansion of the capital stock K_O, K_1, K_2, of the industrial labour force L_o, L_1, L_2, and industrial output Q_o, Q_1, Q_2.

Fig. 1.3(b) (lower deck) shows the marginal productivity of labour (MP_L). In this figure, PS represents the supply curve of labour to the industrial sector. Its horizontal portion PP_2 corresponds to the existence of the pool of redundant labour which can be absorbed by the industrial sector at a constant wage W, which is greater than W, the subsistence institutional wage. The rising portion PS curve is marked by a turning point P_2, which corresponds to the situation when redundant labour is completely absorbed by the industrial sector.

With respect to the industrial sector of the dualistic economy is reasonable to accept the customary competitive assumptions in the labour market implying that industrial entrepreneurial behaviour is characterised by profit maximisation. Under this assumption, the marginal productivity of labour takes an operational significance as the industrial demand curve for labour. For each amount of capital stock K_o, K_1, K_2 in Fig. 1.3(a), the marginal physical productivity of labour curve (MPP_L) may then be drawn in Fig. 1.3(b), that is, curves M_o, M_1, M_2. The competitive employment equilibrium positions in the labour market are consequently indicated by the intersections of these curves with the industrial supply curve, *i.e.*, points P_o, P_1, P_2.

Let us suppose that there exists a stock of real capital goods of volume K_o in the industrial sector. The equilibrium employment position is then determined by curve M_o and indicated by the point P_o Fig. 1.3(b). At this point, the industrial sector is making profit (represented by the shaded area PP_o) and the magnitude of total real wage income is Wo (OL_o P_0P). At the low level of per capita income, it is reasonable to assume that workers do not save but industrial profits (TT_o) constitute the major source of investment fumds originating in the industrial sector. .

Moreover, in determining the total supply of investment funds available for industrial capital accumulation, it should be noted that there exists a second important source, the hidden rural savings alluded to in the last section. If these savings (say) so are siphoned off to the industrial sector, then the total investment fund of the industrial sector is $II_o + S_o$, SO that the total capital stock in the next period will be $K_1 = K_o + S_o + II_o$.

With this new capital stock K_1 a new MPP_t curve is determined, M_10. This determines a new equilibrium position P_1 causing an increase in employment of labour by the amount L_o L_1. This represents an additional transfer of labour from the agricultural sector to the industrial sector as a result of capital accumulation.

In this fashion, we have shown how the agricultural sector constitutes an important source of supply of both manpower and savings for fuelling the expansion pf the industrial sector. According to the above described process, industrialisation and output growth may be viewed as a continuous shifting of the MPP_L curve to the right (M_o M_1 M_2) through time. Associated with such a shift, there must occur a continuous process of reinvestment of industrial profits

(Π_0 Π_1 Π_2) and of the channelisation of agricultural surplus (S_0 S_1 S_2) into the industrial sector in order to finance a continuous expansion of industrial capital stock (K_0 K_1 K_2). This, in turn, leads to a continuous increase in the demand for, and employment of, labour (L_0 L_1 L_2) and a continuous expansion of industrial output (Q_0 Q_1 Q_2).

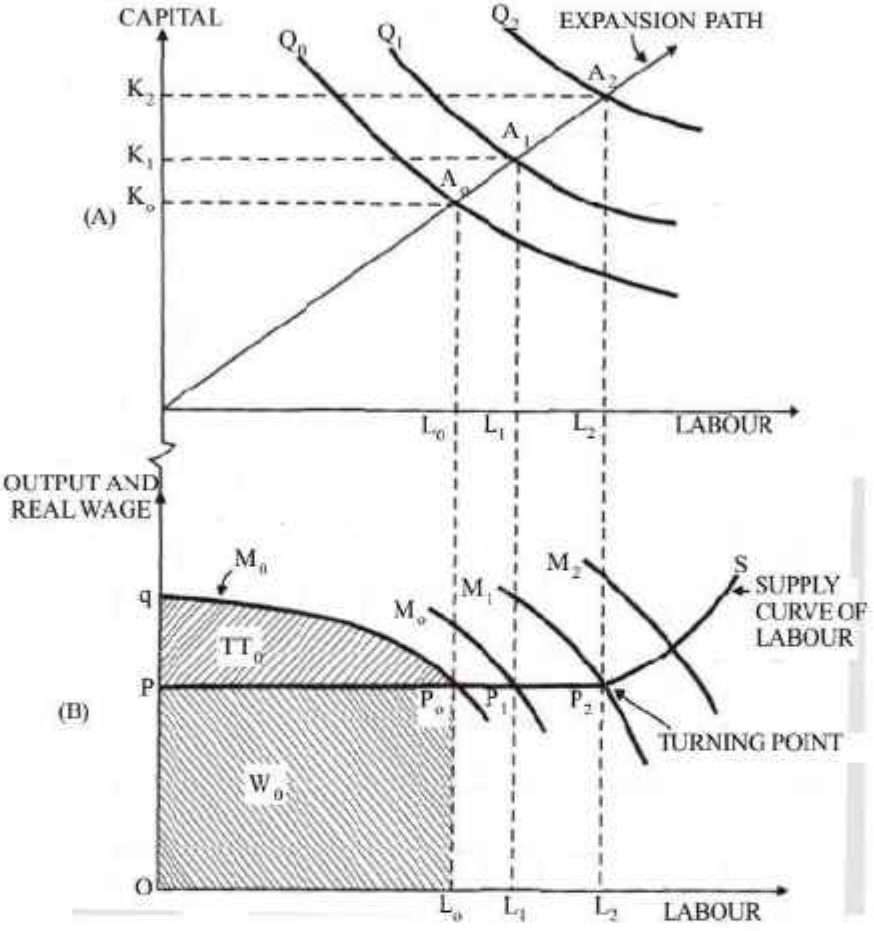


Fig 1.3

In this manner, we have briefly outlined the crucial significance of the agricultural sector in the economic development, in that it constitutes an important source of supply of both manpower and savings for fuelling the expansion of the industrial sector. Disguised unemployment in over populated economies responds to stimulants of economic growth by providing cheap labour at constant real wages for non-farm sectors. During this phase, it is plausible to improve agricultural productivity by relaxing the constant real wage assumption. The development of agriculture raises the rural purchasing power and provides a mass market for industrial goods and results in the expansion of investment opportunities.

It is, thus, obvious from the contribution of Lewis and Ranis and Fei that mobility of labour from the farm to the non-farm sector is an essential ingredient of economic transformation as well as development of agriculture.

Experience of all the developed economies indicates that due to the operation of various pull and push factors contributing to the migration of labour from rural to urban areas, the share of agricultural sector in the total labour force of the country diminishes. Consequent upon the transfer of labour from the agricultural sector, the productivity of labour and capital in the farm sector increases and this leads to an increases in the earnings of farmers. Increased earnings of farmers creats essential conditions for the adoption and absorption of new agricultural strategy, which in turn contributes to enhanced returns per acre.

It is now customary to summarise in four ways how greater agricultural productivity and production contribute to an economy's development.

(1) It helps in faster development by supplying foodstuffs to the rapidly increasing population and raw materials to other expanding sectors in the economy;

(2) The developing agricultual sectors also provides an investible surplus of saving and taxes to support investment in another expanding sectors;

(3) The rising agricultural income of the agricultural sector will raise the demand of the rural popilation for products of their expanding sectors;

(4) It can also contribute to the economic development of an economy by relaxing the forign-exchange through export or by ssaving forign exchange through import substitution.

1.1.8 PHYSIOCRATS

Early theoretical literature on the role of agriculture in economic development can be traced to as far back as the eighteenth century in the writings of the Physiocrats. Their doctrine constitutes the beginning of agricultural fundamentalism. The Physiocrats discarded the mercantilist belief that wealth and its increase were due to exchange. They transferred it to the sphere of production, the power of creating wealth and the surplus which might be available for accumulation. The central point of their analysis was the search for this surplus and they formulated three basic tenets.

The first principle of physiocracy is that agriculture is the only productive industry and consequently the source of all wealth for the economy. It was their view that only agriculture turned out a "net product" over and above its cost of production. They believe that the amount of food consumed by the workers plus what is used as seed is on the average less than the amount of produce raised from the ground. Hence, the labour in agriculture is only productive, all the other labour employed in industry and commerce is sterile because they produce no net product, but only change the form or the title to the wealth produced by agriculture. According to Turgot, "what the agriculturist's industry causes the earth to produce beyond his personal wants is the only fund for the salaries which all the other members of the society receive." The degree of higher productivity of labour which made surplus possible made its appearance in agriculture and this surplus is a gift attributable to the productivity of nature not to the productivity of labour.

The second tenet of physiocracy was the beneficial role of natural order. Agriculture, according to them, is in accordance with natural order deriving the fruits of earth as given by God, whereas the products of the art made by man who is powerless to create. The essential aspects of natural order were the right to enjoy the benefits of property, to exercise one's labour and to follow one's self-interest.

The third principle of physiocracy is *laissez-faire* policy that state should not interfere with economic activity. As agriculture only created surplus value in conformity with the benevolence of nature, any interference with the natural order will lessen its contribution. Economic liberty is necessary for agriculture to encourage the production of surplus which makes a prosperous economy possible. Thus, free trade within a nation and between nations is required.

1.1.9 ADAM SMITH

Importance of agriculture in economic development was recognised by the classical writers too. In view of the essential similarity in the political and economic climate in which Adam Smith and the Physiocrats lived, it is not surprising to find that the general outlook of Adam Smith was not essentially different from the views of the founders of the French political economy. Smith's application of naturalism, his optimism in the role of invisible hand and his attack on

mercantilism made him a great champion of *laissez-faire* than the physiocrats. Adam Smith stated that it was a mistake to retard commerce and industry for the sake of agriculture. Nevertheless, Adam Smith considered agriculture as more productive than commerce and industry, because the forces of nature labour along with man.

Adam Smith indulged in the contrast of natural generosity of farmers with the ugly self-interest of those engaged in commerce and industry, inspite of his belief in the principle of self-interest as fundamental force of society and as the chief motive in life. He also agreed that investment in agriculture was quite in accord with the general interest of society. Hence, he may be considered to be an agricultural fundamentalist.

It is now believed that Adam Smith's basic growth model refers only to the agricultural sector. Food, according to Smith, is the conditional factor in the growth of an economy. In his system, technical improvement in agriculture is the pivotal point for sparking of development in other sectors of the economy.

Let us suppose that we have a given stock of corn output from the previous year and wages paid in terms of corn are fixed. If average labour productivity is given, we can determine the produce of the present periods.

Let:-

S_{t-1} = *corn output of the previous year (or wage fund).*

w = *average wage per worker per period.*

p = *average labour productivity.*

Then $S_t = \frac{S_{t-1}}{w}.p$

We have assumed here that whole produce of the previous year has been converted into wage fund. But in actual practice, a proportion of this produce may be consumed by unproductive labourers. Let $(1 - k)$ be unproductive consumption of corn from the previous year. Then this year's corn output will be

$$S_t = \frac{(S_{t-1})K}{w}.p$$

Growth rate of the economy (g), therefore, may be defined as -

$$g = \frac{(S_t - S_{t-1})}{S_{t-1}} = \frac{p/w(S_{t-1}).k - S_{t-1}}{S_{t-1}}$$

$$g = (p/w)\ k - 1.$$

Hence, in Adam Smith's growth model, growth rate depends upon the value of p, w and k. Out of these parameters, the value of w and k are determined institutionally. Value of p depends on the stock of capital invested and the level of technology. Hence, in Smith's system, technical improvement in agriculture is the pivotal point for sparking off development in other sectors of the economy. According to Smith, when by the improvement and cultivation of land, the labour of one family can provide food for two families, the labour of half the society becomes sufficient to provide food for the whole. The other half, therefore, can be employed in providing other things or in satisfying the other wants and fancies of mankind. The creation of an agricultural surplus is sine-qua-non for generating demand for other goods and services which could be purchased with the excess supply of agricultural products. Therefore, every increase in the surplus brings about more specialisation in industry through the division of labour.

1.1.10 DAVID RICARDO

Ricardo had scientifically explained the idea of Adam Smith. Ricardo considers agriculture as the most important sector of the economy. The difficulty of providing food for an expanding population, serves as the focal point for his entire analysis. The central problem for classical economists was the analysis of the overall movement of the economy through times involving changes in population, capital accumulation and technical progress. According to Adam Smith, the objective of economic analysis was the understanding of the nature and the causes of the wealth of nations. But to David Ricardo, the principal problem of political economy was to determine the "laws which regulate the distribution of commodities among the classes of society." It was through the laws which regulate distributive shares that he was trying to build up a simple macroeconomic model of economic development.

In Ricardo's vision of economic society, there are three major groups of actors on the economic scene, *viz.*, landlords who provide land, capitalists who provide capital and workers who provide labour.

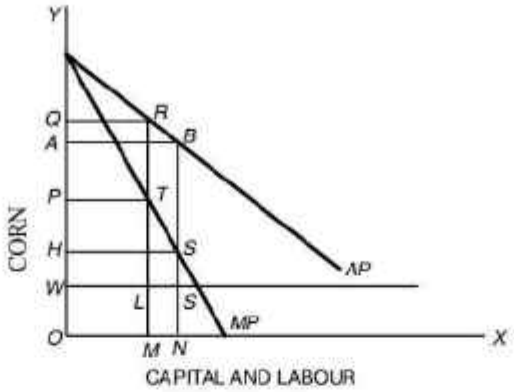
In the progress of society by means of an expansion in population and an accumulation of capital, there arises, according to Ricardo, an increasing scarcity of the most fertile types of land. In order to meet the rising demand for food, the successive employment of equal units of labour and capital on poorer grades of land (together with the more intensive use of labour and capital on better grades of land) brings diminishing returns in terms of agricultural output. As poorer lands are brought under cultivation and diminishing returns occur, competition among the capitalists for the better grades of land causes a portion of produce of the land to be transferred to the landlords in terms of rent.

The rate of wages, according to Ricardo, is determined by the cost of subsistence. His assumption is that labourers have to be paid a minimum subsistence wage (food and other necessities) if the supply of labour in the longrun is to be kept intact. This implies that, as the population grows, wage rates in money terms must rise (because foodgrains prices have risen due to the extension of margin of cultivation). This, in turn, squeezes the profit rate in agriculture and manufacturing. A lower profit rate curtails the rate of capital accumulation and in turn, the rate of growth in national income declines.

Thus, the law of diminishing returns from land dominates the economic scene and governs the fortunes of all classes. Ricardo thus, showed how shortage of land would set a limit upon the expansion of agriculture and, therefore, by implication, upon that of the economy generally.

Ricardo's thesis can be illustrated in Fig. 1.4 where *OY* measures quantities of corn and *OX* measures the amount of capital and labour employed in agriculture. The curve *AP* represents the average product of labour and *MP*, the marginal product of labour. With *OM* amount of labour employed in agriculture sector, *OQRM* total corn is produced. Rent, according to Ricardo, is difference between *AP* and *MP*. At the subsistence wage rate *OW*, the supply curve of labour WL is infinitely elastic, and the total wage bill is *OWLM*. Total profits *WPTL* are the residue after deducting rent and wages from the total produce, i.e.,

$$WPTL = OQRM - (PQRT + OWLM)$$



Total output increases with economic development and with it the wage fund also rises. This leads to a proportionate increase in the amount of labour (population) which in turn increases the demand for corn which will result in rise of its price. As agricultural operations are subject to law of diminishing return, rents continue to rise and profits, therefore, have a tendency to fall.

When amount of labour applied to agriculture sector increases from *OM* to *ON*, the total output increases to *OABN*. Out of this, *OWSN* is the total wage bill and *HABS'* is the share of rent. The share of profit falls to *WLS'N*. This implies that as economic development proceeds, real wage-rate remains at the subsistence level and profits tend to fall. Obviously the change in national income goes in favour of land-lords.

1.1.11 LEWIS THEORY OF UNLIMITED LABOUR SUPPLY

Lewis in his well known article, *"Economic Development Unlimited Supplies of Labour"* presented a two sector model and investigated the expansion of the capitalist sector as it is fed by supplies of cheap labour from the agriculture sector. According to the Lewis, under tions, prevailing in majority of underdeveloped countries, the classical assumption of unlimited supply of labour is more relevant. Due to rise in population in the countries, surplus labour exists in large sectors of economy where marginal productivity of such labour is negligible, zero or negative.

Lewis analyses the process of economic expansion in a dual economy composed of a "Capitalist" sector and a "Subsistence" sector. Outputs per head in subsistence sector are generally backward, illiterate and unskilled with the result that their average productivity is low. On the other hand, people engaged in capitalist sector are advances, literate and skilled.

The basic assumotion of Lewis, Model is that there exists surplus labour in the subsistence sector. Such labour is there either with zero marginal productivity or having marginal productivity much less than the institutional wage. According to Lewis, the surplus labour in the subsistence sector acts as a source from which an unlimited supply of labour can be drawn for the development of the capitalist sector. "In this situation, new industries can be created or old industried can be expanded without limit at the existing wage, or to put it more can be expanded of labour is no limit to the creation of new source of employment."

In Lewis model of growth, savings play a crucial role. In his model, if capitalists do not reinvest a larger and larger proportion of of their profits, neither will the total product expand nor will opportunities for employment is to increase. "The central problem in the theory of economic has previously been savings and investing 4 to 5 per cent of its National income or less, converts itself into an economy, where voluntary saving is running about 12 to 15 per cent of national income or more.

As explained above, surplus labour exists in the subsistence sector and it can be attracted to the industrial sector if it is offered a wage rate which is a little higher than the institutional wage rate prevailing in the rural areas. Capitalist wage, is generally higher than the subsistence earning in order to compensate labour for the cost of transferring and in inducing labour to leave the traditional life of the subsistence sector. At the existing capitalist wage however, the supply of labour is considered to be perfectly elastic.

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In Fig 1.2 OW is the real wage real wage rate in the capitalist sector and *WS*, the perfectly elastic supply of labour. Given a fixed amount of capital at the outset, the demand for labour, $N_1 D_1$. If OW is the current wage rate, the amount of labour employed in the capitalist sector is OL, and beyond L, workers earn whatever they can in the subsistance sector. The total product *N, PLO* in the capitalist sector will then be divided between wages in the amount *OWPL* and the capitalist's surplus in the amount WPN_1.

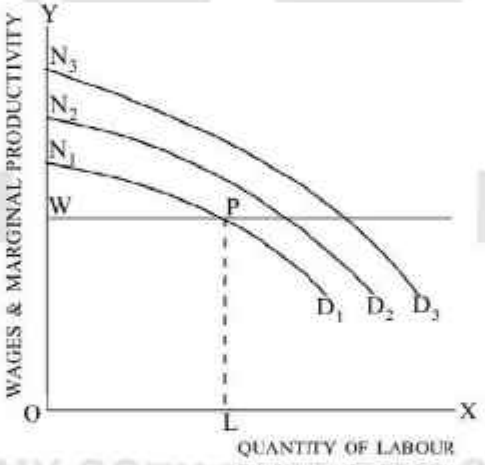

Fig 1.2

In tracing the process of economic expansion, Lewis emphasises that the key to the process is the reinvestment of the capitalist system. As the capitalist sector expands, labour is withdrawn from the subsistence sector into wage employment, the surplus then becomes even larger, there is still more reinvestment of profits, and the process continues on, progressively absorbing the surplus labour from the subsistence sector. This process has been by the outward shift of the demand for labour from $N_1 D_1$ to $N_2 D_2$ over time.

The process of capital formation, as envisaged by Lewis, comes to an end when capital accumulation catches up with population, so that there is no longer surplus labour in the subsistence sector left to be absorbed in the industrial sector. Beyond this point, real wages no longer remain constant, but instead, rise as capital formation occurs. It will now be in the interest of the producers in the subsistence sector to compete for labour since the marginal product of labour will no longer be below the institutional wage. When this point is reached, the agricultural sector is said to have been commercialised.

1.1.12 FEI AND RANIS MODEL

Attention needs to be drawn to the fact that both Nurkse and Lewis recognized the importance of agriculture in providing "wage goods" to the industrial workers. Failure to provide food could seriously limit the process of economic expansion envisaged by their models. Yet they did not seriously prescribe a clear and suitable line of action which could keep off such a danger to the process of economic development. Fei and Ranis are to careful to miss laying stress on the strategic role that agriculture is desired to play in the entire development effort.

In their view: "The strategic nature of agricultural sector in the dualistic economy is due... not only to its preponderant size but also ... to the peculiar production and consumption attached to the agricultural goods."

Unlike Nurkse and Lewis, agricultural innovations and austerity are brought to the forefront of the development effort, given due' recognition and put in their proper perspective by Fei and Ranis. The Fei-Ranis model also focuses attention on the transfer of labour from the agricultural to the non-agricultural sector as central to economic development. Major and well-recognized social problem of underdeveloped countries, according to Fei and Ranis, is the existence of the so-called over-population in its agriculture sector. This denotes the persistent pressure of population against scarce resources, mainly land and thereby leading to the worsening land-labour ratio. Classical growth model and the pessimistic conclusion of Ricardo and Malthus based on the assumption of stationary technology and the law of diminishing return in the agricultural sector has been depicted by Fei and Ranis in Fig. 1.3.

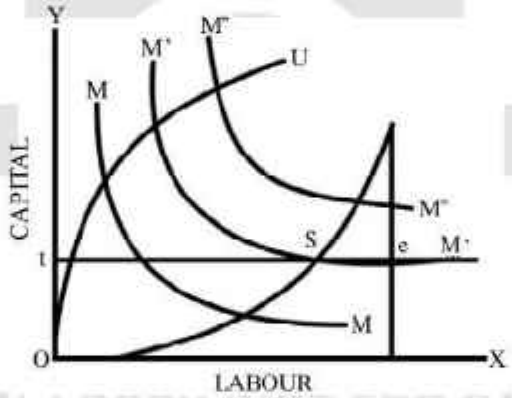

Fig. 1.3

In Fig. 1.3 the inputs used are labour and capital which have been measured on horizontal and vertical axes respectively. Production contour lines are represented by curves *M*, *M'*, *M"*...For the sake of simplification, constant returns have been assumed. Ridge lines *OV* and *OU* mark off the region of factor substitutability, e.g., below *OV*, the production contour lines become horizontal indicating that with land held constant, any further increase in labour renders that factor redundant as output can no longer be increased. If the total amount of land is supposed to be Ot, the amount of labour which can be absorbed without becoming redundant can be determined by the ridge line, ts.

Therefore, the labour utilisation ratio R = ts/ot (labour which can be employed per unit of land productively) which is the slope (inverted.) of the ridge line *OV*. The population density (number of workers per unit land) in the agricultural sector, called the endowment ratio S = te/ot. The labour force which is productive is *ts* and the surplus labour is *se*. The fraction of the existing agricultural labour force which is productive is called the non-redundancy co-efficient *T*, which is equal to:

$$\frac{ts}{te} = \frac{ts/to}{te/ct} = \frac{R}{S}$$

Non-redundancy ratio *T*, therefore, is directly proportional to the labour utilisation ratio *R* and inversely proportional to the endowment ratio *S*. It describes how favourably a given economy is endowed with arable land relative to its agricultural population under the existing conditions of production techniques.

When the amount of arable land is given, the production conditions described above can be pictured alternatively by familiar curves representing total physical productivity of labour *(TPP L)* and marginal physical productivity of labour *(MPP L)'*

Fig. 1.4(b) and 1.4(c) shows *TPPL* and *MPPL* curves respectively. It is clear from Fig. 1.4(b) that *TPP* increases at a decreasing rate when more and more labourers are added to the fixed amount of land *ot*, until it becomes horizontal at *M*. Similarly, the curve *MPPL* gradually decreases as the law of diminishing returns is making its effect felt, until at point *G*, the *MPPL* becomes zero.

In the context of Fig. 1.4(b), the non-redundancy co-efficient *T* is equal to *OQ/OP*.

From Fig. 1.4(b), average productivity *APP = MP/OP*

The institutionally detemined real wage level is set near subsistence and is related to the average productivity of agricultural labour APP_L. This is called the constant institutional wage *(CIW)*.

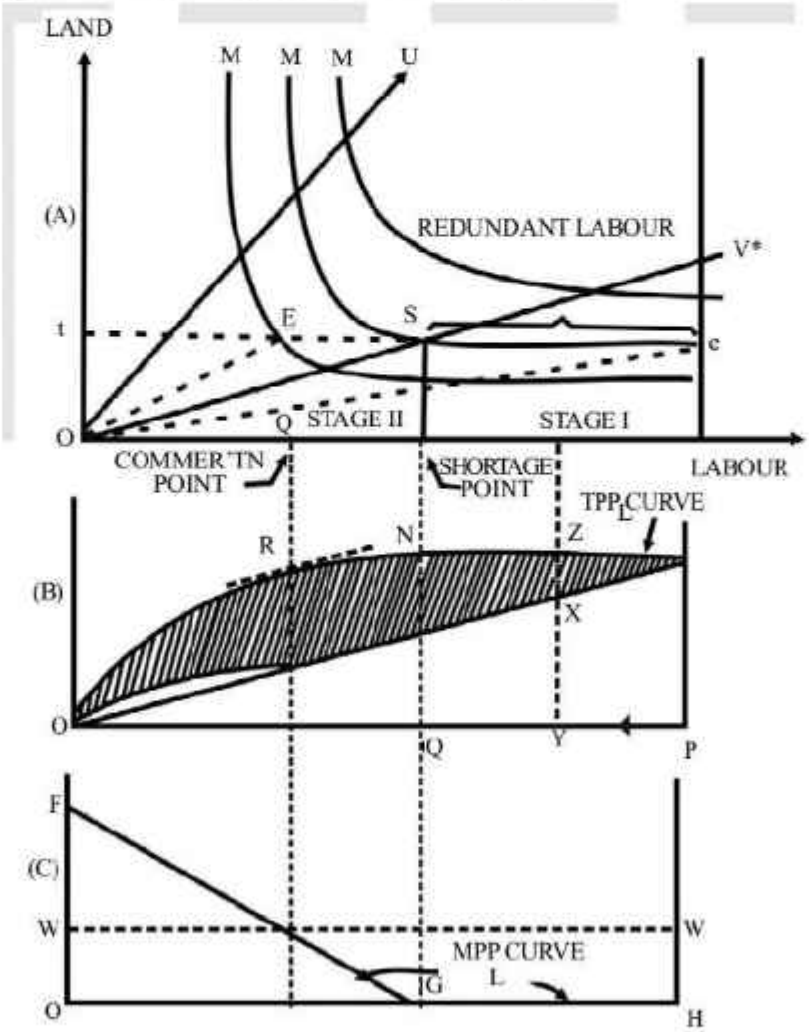

Fig 1.4

From Fig. 1.4(b), the portion of redundant labour force in the economy = PQ. If out of this redundant labour force, PY is allocated to the industrial sector, the remaining labour force in agricultural sector, produces an output of YZ units, while at constant institutional wage, its total real income is represented by XY units. The difference XZ represents the agricultural surplus. This total agricultural surplus TAS emerges as a result of the allocation of the redundant labour force PY out of the agricultural sector. Redundant labour force in agricultural sector disappears at Q and at this point, the disguised unemployed agricultural labour force disappears and commercialisation of agriculture occurs.

In order to have a total view of development process in the context of dualistic economy, we now turn to the industrial sector. The role of industrial sector is essentially related to the expansion of employment opportunities required for the absorption of the surplus labour force released by the agricultural sector and thereby a gradual expansion of industrial productive capacity and output.

1.1.13 KUZNET'S SUMMARISATION

Kunzet summarises these contributions as.

(i) The product contribution.

(ii) The factor contribution.

(iii) The market contribution.

Precisely, the most important contribution of agriculture to the economic development is that constituted by growth of product within the sector itself. An increase in the net output of agriculture, in and of itself, represents a rise in the product of the country since the latter is the sum of the increases in the net products of the several sectors. This product contribution can be examined firstly as a contribution to the growth of total net or gross product, and secondly to the growth of product per capita. Algebraic notation of the above argument is given below:

Pa = Product of agriculture sector (Sector A)

Pb = Product of all other sectors (Non-Agriculture Sector B) P = Total product

$P = Pa + Pb$

Δ = Increment in total product

Y_a = rate of growth of Pa

Y_b = rate of growth of Pb, so that

Pa^1 = Pao $(1+Ya)$, the subscripts referring to time

Pb^1 = pbo $(1+Yb)$

Then $\Delta P = Par_a + Pbr_b$ ... (1)

The equation for the share of the growth of agriculture product in the growth of total product is therefore:

$$t = \frac{P_a r_a}{\Delta P} = \frac{1}{1 + \left(\frac{P_b}{P_a} \times \frac{\gamma_b}{r_a} \right)} \quad ...(2)$$

Thus, according to Kuznetz; if at the initial point of time, the share of agricultural sector in countrywide product is 60 per cent - and if over the next decade the rate of growth of the no - A sector (rb) is four times as high as that of the

A sector (ra), the product contribution of agriculture to the growth of total product will be one divided by *[1+ (0.67 x .4)]* or about a quarter.

The product contribution of agricultre towards an overall economic development takes two forms.

These are:

(a) Provision of Wage Goods: Economic development is characterized by a substantial increase in the demand for agricultural products and failure to expand food supplies in pace with the growth of demand can seriously impede economic growth. Developing phase of an underdeveloped economy results in *(i)* increased population, *(ii)* Shifting of labour from rural areas to urban areas, *(iii)* increase in per capita income. All these changes would lead to higher demand for foodstuffs.

The annual rate of increase in demand for food is given by $D = P + \eta g$, where P and g are the rate of growth of population and per capita income and η is the income elasticity of demand for agricultural products.

As indicated by Johnston and Mellor, not only are there high rates of population growth in LDCs but the income elasticity of demand for food in these countries is considerably higher.

If food supplies fail to expand in pace with the growth of demand, the result is likely to be a substantial rise in food prices leading to political discontent and pressure on wage rates with consequent adverse effects on industrial profits, investment, and economic growth.

(b) Provision of Industrial Raw Materials: Economic history of most of the advanced countries will show that the agro-based industries were first to develop in such countries. These industries which draw their basic raw material from agricultural sector will flourish only if a continuous supply of such raw material is made available to them. In the first phase of industrialisation of an economy, agrobased industries get priority firstly because it is easier to produce raw materials in the agricultural sector. And secondly such industries can be started with traditional technology. It is also easy to shift labour from agricultural sector to such factories. To conclude, the industrial development in the initial stages requires that more of its raw materials have to be produced in the agricultural sector.

1.1.14 AGRICULTURAL FUNDAMENTALISM

A group of thinkers (Barker, Wilson Barsodi and Humphries, etc.) have commonly held the orthodox view that agriculture is par excellence a fundamental industry.

They support this contention with the explanation that agriculture being the producer of basic food for the human beings is the basis of existence of the human race. Besides, it produces raw materials for many industries and also is an important constituent of trade. Hence, it is a foundation of manufacture as well as commerce.

Adam Smith in his *Wealth of Nations* took vigorous exception to the physiocrats' notion that agriculture is the only productive activity, but still he ranked agriculture as the highest in wealth-creating powers.

T.R. Malthus, in his first essay on population, which appeared in 1978, laid a very pronounced emphasis on agriculture. The fate of capitalistic economy, according to Ricardo, purely depended upon the yield rate in the agricultural sector.

Henry Carey and his father, Mathew Carey, though strong exponents of industrialisation, still affirmed the overwhelming importance of a prosperous agriculture.

To these beliefs that agriculture is the basic industry, and any philosophy that may be invented to go with it, Dr. S. Davis of the Food Research Institute, in an essay published in 1935 gave the name, "Agricultural Fundamentalism."

This view has been challenged by another group of modern thinkers. T.S. Davis, who is one of the most popular representatives of this group is of the view that "the wealth and welfare of nations depend upon many complex conditions. Today, agriculture is not uniquely basic and the prosperity of a nation depends largely on other factors than the work of those who till the soil".

This view has been supported by the argument that with the progress of any society, the relative importance of agriculture had always declined.

Both the above views stand poles apart. A more balanced view has been taken by the economists like Karl Brandt, H.R. Tolly and P. Chew who assign the agricultural sector a status equal to that of other sectors of economy. K. Brandt holds that, "farmers are a vital part of the arterial system of circulation through which flow the goods and services of the national economy. The nation depends on properly functioning farms as an important source of primary materials, food and fibres, yet the farms cannot be treated as an independent object of policies, nor can they be made prosperous in emancipation from the remainder of the economy. Nor can the conditions creating mass unemployment and decreased output in cities be cured by maintaining or restoring economic well-being to the farmers alone."

A still better explanation has been held by the writers like Shultz, W.W. Wilcox and others. They believe that there is interdependence and close relationship of the various sectors of economy. In this connection, Wilcox says, "when we say that it is any sense more a generator of income in modem society than other occupations, we fail to understand the true nature of other occupations, we fail to understand the true nature of modem economic society....."

An efficient agriculture made up of farm families with a high standard of living and a high buying power per person contributes much towards a high national income and the economic "well-being of the nation, but the same can be said for each of the other groups.....it is impossible to say which is most important in modern economic society."

1.1.15 ECONOMIC DEVELOPMENT AND DECLINING IMPORTANCE OF AGRICULTURE

In the developing countries which are predominantly agricultural, the share of agriculture in national income is quite substantial. As the country starts developing, there is gradual decline in the contribution made by agriculture to national income. As the economy grows and, industrial sector develops, two things happen (1) importance of the agricultural sector as the one which initiates and sustains economic growth starts declining; and (2) importance of agriculture sector as the premier sector of production also starts declining.

At the higher stage of development, as industrial sector develops, its dependence on the agricultural sector for the provision of the various factors of production as well as raw materials declines. Industrial sector starts generating its own savings and thus capital begins to be supplied by the industrial sector itself. The dependence of industrial sector for agricultural raw materials also declines since new technology makes it possible to develop mining industry, and many mining based industries come into being. Similarly, need for labour also is cut down since capital intensive technology replaces labour intensive technology.

With the development of the economy, Agriculture sector also loses its importance as the main source of national income. In the most highly developed countries, the contribution of agricultural sector to their national income has declined to very low level as is clear from the Table 1.1.

Table.1.1

Country	*Percentage of Working Population Engaged in Agriculture*	*Percentage of Gross Domestic Product (at factor cost) Originating from Agriculture*
Canada	5.2	3.4
Denmark	8.3	5.7
France	8.4	4.6
Japan	9.7	3.4
UK	2.7	2.0
USA	3.6	1.6
India	55.4	31.4

Source: U.N. Statistical Year Book.

Prof. Edward Nissan in his recent study1982 has tried to show this fact by providing a simple empirical mesurement for various countries. He has drawn data from various World Bank document (1984-92). Prof. Nissan has adopted the World Bank division of the countries into (i) low income, (ii) lower-middle income, (iii) Upper-middle income, and (iv) high income, according to levels of income.

1.1.16 NISSAN'S MODEL

Edward Nissan has tried to measure the magnitude of change of the non-agricultural sector to the agricultural sector with the help of a procedure suggested by Ghatak and Ingersent (1984).

Let P_n and P_a be the gross products of the agricultural and the non-agricultural sector respectively. Then P_n/P_a is a measure of the magnitude of the non-agricultural sector compared to the agricultural sector. Let the symbol "0" and "1" stand for two distinct periods of time. The magnitude of change in the ratio of the non-agricultural sector to the agricultural sector over this period is approximated by:

$$\Delta (P_n/P_a)=(P^1_n/P^1_a) - (P^0_n/P^0_a) \quad ....(1)$$

To discover the meaning embodied in equation (1) assume that the period "1" corresponds to *t* years after an initial period "0." Then:

$$P^1_a = P^0_a (1 + ra)t \text{ and } p^1_n = p^o_n (1 + v_n)t$$

Where ra and rn are the average annual growth rates between the two periods of time. By substitution and simplification in (1)

$$\Delta (P_n/P_a)= pon [(1 + rn)t - (1 - ra) t]/[(P0a(1 + ra) t] \quad ....(2)$$

Equation (2) is of same help in deducing relationship between the agricultural sectors and non-agricultural sectors. For instance, the magnitude is determined by initial ratio (P^0_n/P^o_a), and the compound growth of the two sectors $(1 + r_n)t$ and $(1 + r_a)$. If rn > ra and P^o_n/P^o_a is relatively large, then the magnitude of change is positive and large.

The major points of interest in this study are the ratio (P_n/P_0) and the magnitude of change $\Delta (P_n/P_a)$ over a period of time. For purpose of comparisons, three periods of time were chosen i.e., 1965, 1984 and 1990. Results of computations of the ratio's P_n/P_a are presented in Table 2.3 which tells for each country how many folds larger the non-agricultural sector is than the agricultural sector. Some countries display small magnitudes in 1984 or 1990 or both than in an earlier period.

From Table1.2, the largest change was witnessed by Hong Kong and Singapore where the ratios in 1984 and 1990 of almost 100 are the largest than those in 1965. For United States and the United Kingdom the ratio increased from 33 in 1965 to 49 in both 1984 and 1990.

Table 1.2 summarises information from Table 1.2 and shows for each year the mean of (P_n/P_a), expressed as (x), the standard deviation (s), the co-efficient of variation (cv) obtained as (S/X) and the minimum and maximum of observations of each of the four groups of economies. As evident from Table 2.2 a systematic change in the average X is apparent both in the direction of time from 1965 to 1990 and in the direction of economies from low income to high income. In both directions the average magnitude (P_n/P_0) increases-exactly what is expected from economic development theories which proclaim that the agricultural sector shrinks overtime as compared to the other sectors for every country. These theories also hold that as the income rise, the importance of the agricultural sector diminishes.

Table: 1.2

Magnitude of Non-agricultural Sector to Agricultural Sector (PaPa)

Country	1985	1984	1990
Low Income Economies			
Bangladesh	0.69	1.06	1.63
Benin	0.89	1.33	1.70
Burkina Paso	0.90	1.35	2.13
Burundi	0.61	0.72	0.79
Central African Rep.	1.17	1.54	1.38
China	1.56	1.78	2.70
Egypt Arab Rep	2.48	4.05	4.83
Ethiopia	0.72	1.08	1.44
Ghana	1.46	0.94	1.08
Guinea	0.37	1.44	2.54
Country	1985	1984	1990
Honduras	1.50	2.70	3.35
India	1.13	1.86	2.23
Indonesia	0.70	2.85	2.70
Kenya	1.86	2.23	2.57
Liberia	2.74	1.78	1.70
Madagascar	2.23	1.38	2.03
Malawi	1.00	1.70	2.03
Mali	1.04	1.17	1.17
Mauritania	2.13	2.30	2.85
Myanmar	1.86	1.08	-
Niger	0.59	2.06	1.78
Nigeria	0.91	2.70	1.78
Pakistan	1.50	3.17	2.85
Sierra Leone	1.94	1.86	2.13
Sri Lanka	2.57	2.57	2.85
Sudan	0.88	2.03	2.03

Tanzania	1.11	0.72	0.70
Togo	1.22	3.55	2.03
Zambia	6.14	5.67	4.88
Lower-middle Income Economies			
Algeria	5.67	15.67	6.69
Chile	10.22	15.83	10.11
Colombia	2.37	4.00	4.88
Congo	4.26	13.29	6.69
Costa Rica	3.18	3.76	5.25
Cote D'Ivoire	1.78	2.57	1.13
Dominican Rep	2.81	5.60	4.88
Ecuador	2.77	6.21	6.69
El Salvador	2.45	3.76	8.09
Jamaica	9.00	15.83	19.00
Jordan	10.11	11.50	11.50
Mauritius	5.25	6.14	7.33
Morocco	3.35	4.85	5.25
Nicaragua	3.00	3.13	3.76
Panama	4.56	10.11	9.00
Papua New Guinea	1.41	1.97	2.45
Paraguay	1.73	2.85	2.57
Peru	5.67	11.38	13.29
Philippines	2.85	3.00	3.55
Senegal	2.96	4.88	3.76
Syrian Arab Rep.	2.45	4.05	2.57
Thailand	1.86	4.00	7.33
Country	1985	1984	1990
Tunisia	3.55	5.67	5.25
Turkey	1.94	4.21	4.56
Yemen Arab Rep.	1.08	3.21	4.00
Zimbabwe	4.56	6.14	6.69
Upper-middle Income Economies			
Brazil	4.26	6.69	9.00
Greece	3.13	4.56	4.88
Korea Rep. of	1.63	6.21	10.11
Libya	19.20	49.00	-
Mexico	6.07	10.22	10.11
Saudi Arabia	11.38	32.67	11.50
Uruguay	5.67	6.14	8.09
Venezuela	13.43	13.29	15.67
Yugoslavia	3.35	5.73	7.33

High-income Economies			
Australia	9.10	13.29	24.00
Austria	10.11	24.00	32.33
Belgium	18.80	32.67	49.00
Canada	19.00	32.00	24.00
Denmark	11.50	19.00	19.00
Finland	5.67	13.29	15.67
France	13.29	24.00	24.00
Germany	32.33	49.00	49.00
Hong Kong	49.00	100.00	100.00
Italy	8.09	19.00	24.00
Japan	10.11	32.33	32.33
Kuwait	99.00	99.00	99.00
Netherlands	24.00	24.00	24.00
Norway	11.50	24.25	24.00
Singapore	32.33	99.00	100.00
Spain	5.67	13.28	15.67
Sweden	15.50	32.33	32.33
United Kingdom	32.33	49.00	49.00
United States	32.33	49.00	49.00

Note: Computations from equation (1)

1.1.17 ROLE OF AGRICULTURE IN INDIA AND ITS CONTRIBUTION

A flourishing agricultural sector is far more important for the development of Indian economy, since farming is less a business than a tradition in India. Even at this semi-industrialisation stage, about 60 per cent of its population still lives in the rural areas and directly or indirectly depends on agriculture for its livelihood. There has been a consistent decline in growth of the agriculture sector since 1990 onwards as compared to the eighties. On an average it was 4 per cent per annum during the eighties which came down to 3.2 per cent during the nineties and 2 per cent between 2000-2005. Growth in real value of foodgrains production has been an abysmal -3 per cent during the nineties and -5 per cent during 2003-04. This may have serious implications on the nutritional status and food security in India.11 The growth in agriculture sector though per cent. The per capita availability of cereals and pulses, therefore, witnessed a decline during this period. The consumption cereals declined from a peak of 468 grams per capita per day in 1990-91 to 412 grams per capita per day in 2005-06, indicating a decline of 13 per cent during this period. The consumption of pulses declined from 42 grams per capita per day (72 grams in 1956-57) to 33 grams per capita per day during the same period. Further, most of our traditional industries on whose products depend our bulk of foreign trade and foreign earnings draw their raw material from this very sector. It is the surplus generated by this sector that would help Indian economy to reach the "Golden stage," since the total savings fund is made up of savings from the industrial sector and savings from the agricultural sector, i.e., $I = S_i + S_a$

where I = total saving fund.

S_i = savings from the industrial sector.

S_a = savings from the agricultural sector.

Si is the function of profits generated by the industrial sector, which in turn depend upon the extent of demand created for industrial products by the agricultural sector. If the agricultural sector remains underdeveloped and fails to generate a matching demand for industrial products, profits will fall and we will soon be approaching a stage termed as "stationary state" by classical writers. Hence, the whole burden of increasing investment falls on the agricultural sector, so that:

$$S_a = TAS - f_a - i_a'$$

where, TAS is the total agricultural surplus,

f_a is the farmer's consumption of agricultural goods,

I_a is the farmer's consumption of industrial goods.

From above equation, S_a can be increased if we increase the total agricultural surplus, TAS and F_a and I_a could be maintained at the same old level. f_a and I_a can be maintained at the old level by the adoption of certain monetary and fiscal measures by the government. TAS on which depends our surplus and which in turn would initiate a process of development can be augmented only if we could increase the productivity of our agricultural sector.

We can, thus, say that in the absence of a developed agricultural sector, the base for "take-off" into a mature economy would be weak and Indian economy characterised by widespread disguised unemployment and a high rate of population growth, is expected to remain in a pitiable condition.

The role that the agricultural sector is playing in India at present can precisely be discussed under the following heads:

1. Share of Agriculture in National Income: The share of agriculture in national income is a crucial indicator of the role that agriculture plays in the economic development of a country. As the country rides on the wheels of progress, the relative contribution of agriculture in national income declines with the country becoming more and more prosperous. The expanding non-agricultural sector diverts surplus manpower from agriculture to industry and the improvements in agriculture enable a smaller number of people to produce for a larger population. With advanced agricultural technology, agricultural products are produced even for exports. To the extent, therefore, the share of agriculture in national income declines, it marks a better level of economic advancement. On the other hand, agriculture is the single large contributor to national income. Therefore, a progressive agricultural sector means a higher level of national income and consequently, a higher level of economic development.

The Indian economy is still predominantly agricultural, about a half of the country's national income is derived from agricultural and allied activities which absorb nearly three-fourths of its working force. This has been shown three-fourths of its working force. This has been shown in Table 1.4

Table 1.4
Share of Agriculture in Gross Domestic Product

(At 1980-81 prices)

Yere	National Income ₹ (crores)	Agricultural Income ₹ (crores)	Agricultural Income as % of Total National Income
1970-71	90,426	35,930	39.7
1980-81	1,22,42	42,466	34.6
1990-91	2,12,253	60,991	28.7
1995-96	2,74,209	68,517	24.9

Two facts are being revealed from Table 1.4. One, agriculture and allied industries contribute significantly a high share of the national income. Second, as hinted above, the share of agriculture in national income has been decreasing steadily. The fact that agriculture is contributing the largest share to the national income is evident from Table 1.4.

Table 1.4 clearly shows that agriculture even in recent years is by far the most importatant contributor to the national income, through under the impact of industrilisation, its share has been declining gradually. Its share which stood at 58.9 per cent in 1950-51 has declined to 39.8 per cent in 1983-84 while the share of industries which was 14.9 in 1950-51 has risen to 21.8 per cent in the same period.

2. Supplier of Substantial Food and Fodder: The importance of the agricultural sector in India can be borne out from the fact that this sector supplies us the necessities of life. Today, Indian agriculture is feeding about 100 million people, besides supplying other necessities of life. India's food production crossed the mark of 200 million tonnes in 1999-2008.

The agricultural sector is also providing all the fodder that is needed to sustain our livestock whose number runs into several crores. About one-fourth of the total world's-cattle population live in India. The total number of all sorts of live-stock such as cattle population sheep, goats, horses, ponies, camels, etc., was estimated to be 45 crores in 1999-2000. The agricultural sector provides a variety of fodder to feed this large number of various types of animals.

3. Agriculture as a Source of Livelihood: Agriculture has a greater role in economic development in the less developed countries as it provides livelihood to a vast majority of people living in the country. This figure is not significant in terms of percentages only, but more so in terms of absolute numbers. The agricultural sector provides livelihood to about three-fourths of the Indian population, that is, seven out of every ten persons in India depend on agriculture. At the turn of the century, 71.5 per cent of the total labour force was engaged in agriculture and this situation has not changed until now. According to the 1991 Census, 69 per cent of the working force was still engaged in the primary sector. This indicates that inspite of rapid industrialisation in the country, the primary sector is still the main sector providing employment opportunities to the majority of the workers and has thus, acted as a big hock absorber. This fact reflects the importance of agriculture and lesser development of other sectors of the economy.

4. Agriculture and Provision of Employment: Indian agriculture is of considerable importance in so far as it offers enormous scope of alternative employment. Past experience shows that the development of large industries has not helped significantly in absorbing the unemployed labour force. It has been estimated that since 1971, the labour force has increased by about 35 million. Of these, about 25 million have been absorbed in agriculture and 9 million in non-agricultural activities.11 Thus, the agricultural sector has absorbed a bulk of the additional labour force, though many must have got low intensity employment and consequently low incomes Agro-industries and agro-processing industries hold a great promise for employment in our country. Forestry, fishery and animal husbandry can also be developed on a large-scale and considerable employment can be generated for the rural youth.

5. Agricultural and Industrial Development: The role of agriculture in industrial development can hardly be over looked. In fact, agricultural progress is normally a prerequisite for industrial development. In a relatively closed economy, one of the most important preconditions of industrial expansion is the achievement of a rate of increase in agricultural productivity which exceeds the concurrent rate of increase in the demand for food. Rising agricultural productivity supports and sustains industrial development in several important ways. First, intermits agriculture to release a part of its labour force for industrial development while meeting the increasing food needs of the non-agricultural sector.

Second, it raises agricultural incomes, thereby creating rural purchasing power needed to buy new industrial goods.

Finally, it enables agriculture to supply the major wage-good (food) of industrial workers at prices favourable to the profitability of new industry.

In fact, all growth models for surplus labour countries have underlined the importance of agriculture for developing the industrial sector in the initial stages. Agriculture supplies manpower and raw materials to industries and provides a wide market for industrial products. In India, most of our leading industries depend on agriculture for their raw materials. Cotton and jute textiles, sugar, vanaspati, and plantations all directly depend on agriculture. There are a number of other industries whose dependence on agriculture is direct. These may include hand pounding and husking of rice, crushing of oil, weaving of handloom and khadi cloth etc. Still other industries like paper, leather and tanning, matches, chemicals etc. depend on allied activities of agriculture like forestry, animal husbandry, fisheries etc. It has been estimated that the industries which draw their raw material from the agricultural sector contribute nearly 50 per cent of income generated in the manufacturing sector in India.

6. Role of Agriculture in the Field of International Trade: Indian agriculture has been a net earner of valuable foreign exchange for the country. Agricultural goods like tea, sugar, oilseeds, tobacco, spices etc., constitute the main items of exports of India. Agricultural exports constitute a major portion of India's exports and accounted for 50 per cent of the exports at present. This percentage will increase considerably if exports of jute manufactures and cotton textiles, whose 65 per cent of production cost is accounted for by raw jute and raw cotton, are included in agricultural exports.13 This has great significance for India's economic development because increased exports help the country to pay for increased imports of oil, machinery and raw materials.

Another important thing about agricultural exports is that while they earn a substantial share of foreign exchange, they do not drain it away through imports. As compared to manufactures, imports required for the agricultural sector have been much less. Besides, agriculture also contributes to national savings and capital formation.

We thus conclude that the agricultural sector occupies a central place in the national economy. The manner in which it contributes to the economic development of the Indian economy can be seen from the chart below:

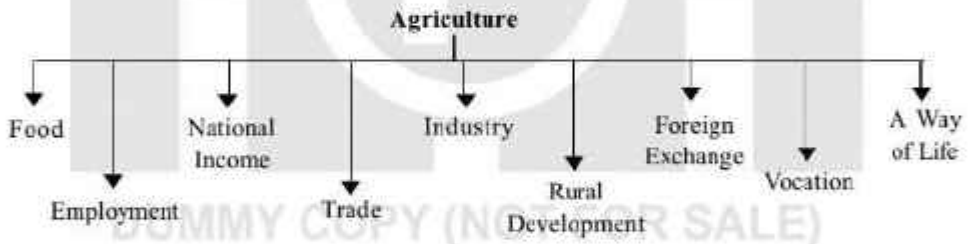

Fig: 1.4

It is evident from the above chart that agriculture is the backbone of the Indian economy and development of this sector deserves to be accorded a very high priority in any scheme of resource-utilisation for general economic development. General economic development will require agricultural development either to proceed or to go hand in hand with it. Indian Planners have already learnt a lesson during the second and third Five Year Plan periods. It has been proved from the experience of Indian planning that failure of agricultural sector to deliver goods would spell disaster to the entire planning process.

1.1.18 SUMMARY

Agricultural economics can be examined as a combination of two words. Agriculture and economics that spells out the managing of agricultural economics in itself. Agriculture as a branch of study deals with production, processing, marketing and distribution of crops and livestock along with the improvement of technology, transport, communication and specialization of labour. Economies as a branch of social science is defined as a relationship between unlimited

ends limited means having alternative useand and examines how to maximize the resources to satisfy maximum human needs.

Agricultural Economics is an applied economics in the field of agriculture to examine its purposeful way.

Its scope ever expanding. Its relationship with other branches like physiological, biological social sciences reasonably speaks its nature, wide scope and immense importance in the field of agricultural study. It shows that it is a clear combination of natural and social sciences. That is the reason why agriculture and industry are interdependent and complementary.

In the field of social science it speaks many things to provide its great importance. It justifies way we the need a separate study and research work in the agricultural sector, it plays a major role in the economic development of a country as a source of food and fodder, employment, trade market development, industrial development, food security, and great contributor to national income.

Economists from the very early age to modern age have given various models of agricultural development, they have examined its contribution of economic development of industry and economy has deemed the role of agriculture. But in reality agriculture is the fundamental of the economic development.

1.1.19 SELF ASSESMENT QUESTIONS

1. Define and explain the nature of scope and importance of agricultural economics.
2. Examine the relationship of agricultural economics with other branches of study.
3. Examine the role agriculture in economic development.
4. Why do we need a separate study on agriculture?
5. Critically examine the Lewis theory of unlimited labour supply.
6. Critically Examine Fei & Ranis model.
7. Examine the declining importance of agriculture in economics of development.
8. Give a note on the contributions of agriculture to economy.
9. Critically examine the Ricardian analysis of agriculture in economics of development.
10. Assess the role of agriculture of Indian economy.

Key Words

1. **Agricultural Productivity**: The efficiency and output of agricultural activities per unit of input (e.g., land, labor, capital, technology). Increasing productivity is crucial for economic development as it leads to higher yields and profitability.

2. **Land Reform**: Policies aimed at redistributing land ownership and improving land tenure systems to enhance agricultural productivity, reduce rural poverty, and promote economic development.

3. **Agribusiness**: The integration of various agricultural activities, including production, processing, distribution, and marketing, into a coordinated system aimed at generating profits and adding value to agricultural products.

4. **Sustainable Agriculture**: Farming practices that aim to meet current food production needs without compromising the ability of future generations to meet their own needs. It emphasizes environmental conservation, resource efficiency, and social equity.

5. **Rural Development**: Policies and strategies aimed at improving the living standards and economic opportunities in rural areas, often through investments in agricultural infrastructure, education, healthcare, and other essential services.

6. **Market Access**: The ability of farmers to sell their products in domestic and international markets. Improving market access often involves reducing trade barriers, improving transportation infrastructure, and promoting market-oriented agricultural policies.

7. **Value Chain**: The sequence of activities involved in bringing agricultural products from the farm to the consumer, including production, processing, storage, transportation, and marketing. Enhancing value chain efficiency can lead to increased agricultural income and economic development.

8. **Technology Transfer**: The dissemination of agricultural knowledge, skills, and technologies from research institutions or developed countries to farmers in developing countries. Access to appropriate technologies can significantly improve agricultural productivity and contribute to economic growth.

9. **Subsistence Agriculture**: Farming primarily for the purpose of feeding oneself and one's family, with little surplus for sale in the market. Transitioning from subsistence to commercial agriculture is often seen as a crucial step in economic development.

10. **Agricultural Diversification**: The process of expanding the range of crops, livestock, or agricultural products produced on a farm or within a region. Diversification can reduce risks associated with dependence on a single crop or commodity and enhance income opportunities.

1.1.20 Reference:

1. Land Economics-Renne

2. Progress of Land Reforms-U.N.O

3. Economics of Agricultural Production and Resource Use-Heady

4. Economic Organisation of Agriculture-Schultz

5. Introduction to Economics of Agriculture-Black

6. Economics of Agriculture-Cohen

7. Introduction to Agricultural Economic Analysis-Bishop and Toussiant

8. Agricultural Credit-Belshaw

9. Agricultural Price-Thompson and Foots

10. Readings in Agricultural Development (Ed.)-Khurgo

11. Agriculture in Economic Development (Ed.)-Eicher and Witt

12. Readings in Agriculture-Pramit Choudhury

13. Agricultures in an Unstable Economy-Schultz

14. Agricultural Price and Income Policy- Schultz

15. Marketing of Farm Products-Shepherd

1.2 Chapter

AGRICULTURAL PRODUCTION, UNCERTAINTY AND RESOURCE USE

Objectives

After completing this chapter, you will be able:

- To study resources, product or factor-product relationship
- To study the functional relationship between input and output.
- To analyse different types of production function
- To read and analyse homogeneous production function.
- To assess with the relationship between increased input to increased output reference to constant returns to scale.
- To examine constant elasticity of substitution and input-output production function.
- To assess the difference between risk and uncertainty
- To examine the impact of probability of risk factor on agricultural production.
- To explain the risk as a cost.
- To assess the relationship between uncertainty and subjective production yield and technical uncertainty.
- To study the degree of uncertainty in agricultural production.
- To examine and find solution for minimising the uncertainty.
- To study how to adjust production and resource use to uncertainty.

Structure:

1.2.1 INTRODUCTION

Most production enterprises witness disturbances in the short period. The sources may be varied, the extent may be different, but the disturbances do occur. Farm enterprises are among those where such disturbances are frequent. Risk and uncertainties are more pronounced in agriculture as the laws of nature have an upper hand in these enterprises. Crop enterprises are subject to fluctuations from year to year on account of erratic variations in monsoons and damages due to insects, diseases, storms and other such things. In a similar manner, livestock enterprise is also subject to risk and uncertainties as the output of this enterprise too is mostly influenced by laws of nature which are outside the control of the farmer. These risks and uncertainties are permanent phenomena in agriculture and a farmer is always faced — with the problem of taking suitable action against these. To the extent the farmer succeeds in minimising risk and uncertainty, he succeeds in maximising his returns. Before we discuss the course of action which a farmer should adopt to meet risk and uncertainty, it would be proper to briefly define these two terms — risk and uncertainty.

Production is a process whereby certain goods and/or services are used create goods and/or services of a different nature. Production is the name given to the process of conversion of certain inputs (resources) into a consumable form. Farm production likewise refers to the producing of food, fibre and livestock by using several different kinds of inputs. Land is used by the farmers as a factory which helps them produce the desired crop. To this manufacturing plant (land) labour and capital are added to cultivate, plant and harvest the crop. When considered necessary, fertilizer is also added by the farmers. Water. may either be provided by rainfall or by artificial irrigation methods. Application of all these inputs results in the desired crop (output). The crops so produced are, in turn, consumed by the population, fed to animals which produce meat, milk, eggs and many other livestock and poultry products through complex biological processes.

Agricultural production economics is, thus, concerned with the quantitative relationships which are basic to production processes in agriculture. "These relationships take the form of input-output patterns, and the various types. of interactions among the individual inputs themselves and among the products which contribute to the output. It is also concerned with levels of factor costs and product prices and with the nature of production patterns which allow the attainment of certain desired optima, like profit maximisation or cost minimisation," The subject matter of production economics covers

all agricultural problems that fall under the scope of resource allocation and marginal productivity analysis. The farmers as a production economist are hence concerned with any phenomena which have a bearing on economic efficiency in the use of agricultural resources.

We have seen in the three preceding chapters that there are three main factors of production, *viz.*, land, labour and capital at the disposal of the farmer. It is the job of the farmer to use these three inputs in combination on the farm. In doing so, the farmer has to perform two distinct functions. In the first place, he has to act as entrepreneur or proprietor of the farm business and is responsible for farming the general policy or plan on which his business and his system of farming is based. In the second place, he has to act as chief executive or farm manager and is responsible for the administration of that plan. These both functions of the farmer are concerned with the fundamental problem of ascertaining and adopting the optimum combination of land, labour and capital at the disposal of the farmer. Under any given set of circumstances, the optimum combination is that which will enable the farmer to obtain the maximum financial output for the minimum financial input from his farm as a whole.

Production decisions facing the individual farmer are of three types:

(i) Farmer may wish to produce a certain amount of a given product having a certain amount of resource to use. He will have to decide what is the most profitable amount of resource to use in the production of a commodity.

(ii) Having a certain combination of resources, he may have to decide the most profitable combination to use to produce a specific amount of a given output.

(iii) Having a certain combination of resources, he is also faced with the problem of choosing the most profitable mix of products to produce.

The first question is sometimes referred to as Resource-Product or Factor-Product relationship. It explains how the various factors of production are converted into final farm products. Under resource product relationship, we take into account the most elementary economic problem, i.e., when only one variable resource is used in combination with other resources fixed at some level for the production of one product.

The second question explains the most profitable combination of resources to produce a specific amount of a given output. This may be called as Resource-Resource or Factor-Factor relationship.

The third question, generally referred to as product - product relationship, is concerned with the determination of what crops to grow or which livestock to breed and in what combination, given a certain amount of resources.

In order to provide answers to these questions, the farmer will take the help of product function analysis, with which this section will mainly be concerned.

1.2.2 PRODUCTION FUNCTION

Total yield or output varies with the quantities of inputs used in the production process. The farm manager has to decide upon the amount of production and the amount and kinds of inputs to be used, because production does not vary evenly as inputs are fed uniformly into the production process. The production function implies the relationship between physical outputs and physical inputs used by a farm firm. Production function relationship can be expressed algebraically as follows:

$$Y = f(X_1 X_2 X_3 \ldots X\eta)$$

where Y stands for the quantity of farm output $x_1, x_2, x_3 \ldots x_n$ stand for quantities of factors $x_1, x_2, x_3 \ldots x_n$ This equation shows that total farm output Y depends upon the quantities x_1' x_2, x_3 XII of the factors x_1, x_2, x_3 XII respectively. This

equation clearly shows that there exists some relationship between output Y and the quantities of input $x_1, x_2, x_3 \ldots x_n$ etc. But it fails to tell us the specific form which this relationship will assume. This unspecified relationship has been denoted here by the letter *f*. This function becomes specific if we could find out the value of output Y when the values of the independent variables $x_1, x_2, x_3 \ldots x_n$ are given.

When the farmer is considering the question of how much nitrogen fertilizer to use in com production, he may consider the other inputs as given or fixed in specific kind and quantities. In this case, we say that:

$Y = f(x_1, x_2, x_3 \ldots x_n)$

Where Y = output of corn

x_1 = variable fertilizer input, and

$x_2, x_3 \ldots x_n$ = fixed inputs.

The above function, however, does not state by how much the output of Y changes as it consequence of change in variable input. In order to express the quantitatives relationship between inputs and output, the production function has to be expressed in a precise algebraic equation as $Y = a + bx$ (say) which shows that there is a constant relationship between application of nitrogen (the only factor input in this case) and the amount of corn produced.

Production function is, thus, a "technical relationship between input and output. As long as technology remains constant, the production function remains unchanged and indicates the greatest output from a given input mix." It is mathematical relationship describing the way in which the quantity of a particular product depends upon the quantities of particular inputs used. It indicates the manner in which the farm firm can substitute one input for another without reducing the total amount of output and also the manner in which the farm firm can substitute one output for another without altering its total average of inputs. "Production function", according to A. Koutsoyiannis, "is a purely technical relation which connects factor inputs and outputs. It describes the laws of proportion, that is, the transformation of factor inputs into products at any particular time period. Production function represents the technology of a firm of an industry, or of the economy as a whole. It includes all the technically efficient methods of production."

Some economists assert that the production function analysis belongs to the domain of engineering as it exhibits purely technological relationships between physical inputs and outputs. But Prof. Stigler does not agree with this view. According to him, "If we take account of activities such as selling, settling strikes anq anticipating future styles of product, it is clear that large segments of what we mean by technique are matters of business knowledge and talents, not to be acquired in the best engineering schools". The production function is in fact "the economist's summary of technological knowledge".

The conventional procedure in a production function study is to predict the total output curve as a regression equation. The marginal products for factor inputs can then be predicted singly by computing the derivative of the product *Y*, with respect to the resource inputs X_1 and X_2 under consideration.

Suppose we have a production function

$$Y = aX - bX_1^2 + cX^2 - dX_2^2 + eX_1X^2$$

the marginal physical productivities can be derived by taking the partial derivatives of the production function with respect to X_1 X_2 inputs.

$$\frac{\partial Y}{\partial X_1} = a - 2bX_1 + eX_2 = MPP\ X_1 \qquad \ldots (1)$$

$$\frac{\partial Y}{\partial X_2} = c - 2dX_2 + eX_1 = MPP\ X_2 \qquad \ldots (2)$$

By equating (1) and (2) for marginal products to zero simultaneously solving for X_1 and X_2 gives the input levels where output Y may be maximum provided that the rate of change in marginal physical productivity is negative. In order to derive the maximum total yield, the input levels can be substituted in their appropriate places in the original equation.

1.2.3 TYPES OF PRODUCTION FUNCTION

Economists in the past had formulated numerous algebraic equation forms, which can be used in deriving production functions. No single production function can be used to characterise agricultural production under-all environmental conditions. The algebraic form of the function and the magnitude of its co-efficient will vary with soil, climate, type and variety of crop or livestock, resources being varied, state of mechanisation, etc. Hence, the problem before the farmer economist is to select that algebraic form of function which appears or is known to be consistent with the phenomena under investigation. Accordingly, many economists and engineers have discovered several production functions in the course of empirical studies undertaken in the field of agriculture in Europe and the USA. In the following pages, we shall discuss some commonly used production functions.

There are two types of input-output relations or production functions. The first type of production function concerns itself with the short-run period when quantities of some inputs are kept constant and the quantity of one input (or quantities of a few inputs) are varied. Input-output relation of this kind forms the subject matter of the law of variable proportions. Secondly, input-output relations are studied from a long-run approach when all inputs can be varied. This forms the subject matter of the law of returns to scale.

1.2.4 HOMOGENEOUS PRODUCTION FUNCTION

A homogeneous production function is a function such that if each of the inputs is multiplied by k then k can be completely factored out of the function. The power v of k is called the degree of homogeneity of the function and is a measure of the returns of scale.

Suppose, we have a function.

$X_o = f(L, K)$

and we increase both factors of this function by the same proportion a, such that the resulting new level of output X^* is given by

$X^* = f(a^L, a^K)$

If a can be factored out, the new level of out X^* can be expressed as a function of a (to any power w).

$X^* = a^W f(L, K)$

$X^* = a^W X_o$ ... *Since* $X_o = f(L, K)$

This kind of production function is known as homogeneous and in case 'a' cannot be factored out, the production function is known as non-homogeneous. In a more general form, a homogeneous production function can be expressed as:

$Ym^K = (mx, my)$

Where m is any real number and K is constant. This function is homogenous of Kth degree. If K is equal to one, then the function becomes homogeneous of th~ first degree. If K is equal to 2, then the function becomes homogeneous of the second degree and yields increasing returns to scale. If on the other hand, K is less than one, the function yields diminishing returns to scale.

It may be noted that if the production function is linear and homogeneous, all the isoquants in this case would be exactly similar in shape as shown in Fig. 2.1 and expansion path of the farm-firm would be a straight line through the origin.

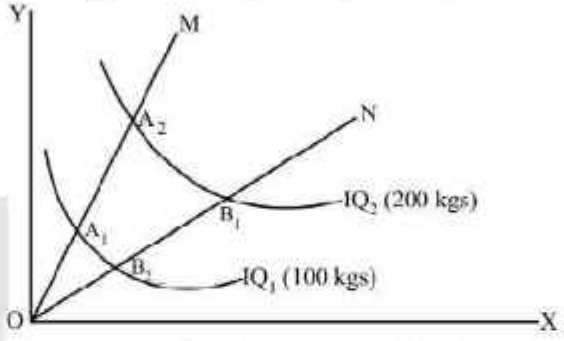

Fig. 2.1

In the above figure IQ_2 is simply a II) magnified version of IQ_1 showing double the output. If a straight line OM is drawn from the origin which intersects the isoquants IQ_1 and IQ_2 at points A_1 and A_2 respectively, then in a linear homogeneous production function, the slope of the curve IQ_1 at Al must be equal to the slope of the curve of the IQ_2 at point A_2. In this sense, the curves must be parallel when seen Arom of the origin.

1.2.5 PROPERTIES OF LINEAR HOMOGENEOUS PRODUCTION FUNCTION

This type of production function shows some important properties which are as follows:

(1) If we are using two inputs, capital and labour, then average product of either input depends upon the proportion in which inputs are combined.

Proof

Suppose $Q = f(L, K)$ is a linear homogeneous function. Multiplying each variable of production function by I/L, we get:

$$Q/L = f\left(\frac{L}{L}, \frac{K}{L}\right) = f\left(1, \frac{K}{L}\right)$$

Whereas Q/L is the average product of labour:

$$\text{So, } AP_L = f(1, K/L) = f\left(\frac{K}{L}\right)$$

Thus we prove that average product of labour depends upon the capital-labour ratio.

Similarly, multiply $Q = f(L, K)$ *by* $1/K$

We get $Q/K = f(L/K, K/K) = Q/K = f(L/K, 1)$ *So* $AP_k = f(L/K, 1)$

$= f(l/K)$

That means that average product of capital depends upon the capital-labour ratio alone.

(2) The partial derivatives $\frac{dR}{dQ}$ and $\frac{dQ}{dR}$ (Marginal Product of either input) are the functions of the ratio of capital to laboui' (K/L)

Proof: From above we have:

$QL = f(K/L)$

Multiply the above equation by L, we have:

$Q - LF(K/L)$

Partially differentiating the above expression w.r. to L, we get

$$\frac{dQ}{dL}\ dQ/ = d/dL\ [LF(K/L)$$

$$= F(K/L) + LF'(K/L)\ \frac{d(L/K)}{dL}$$

$$= F(K/L) + LF'(K/L)\ (-KL^{-2})$$

$$= F(K/L) - LF'(K/L)\ \frac{K}{L^2}$$

$$= f(K/L) - K/L\ F'(K/L)$$

Similarly, we can prove that $dq/dk = F'(K/L)$

Hence expressions so obtained for dx/dL and dx/dk reveal that both

are the function of the variable (K/L) i.e., the ratio of capital to labour.

(3) If production function is homogeneous of degree one, the marginal productivities of labour and capital are homogeneous of degree zero i.e., they remain unchanged for proportionate change of both the inputs.

(4) The linear homogeneous production function satisfies the Euler's Theorem which states that the total product is completely exhausted by the sum of factor payments, that is

$$\frac{\partial Q}{\partial L_x} + \frac{\partial R}{\partial K_x}\ K - Q.$$

From above we know' that:

$dQ/dL = F'(K/L) - (K/L) F'(K/L)$ and $dQ/dK = F'(K/L)$

If we substitute these in above equation, we get:

$= L F(K/L) - (K/L) F'(K/L) + F'(K/L) K = Q$

$= LF(K/L) - KF'(K/L) + Kp'(K/L) = Q$

$= ZF(K/L) :: Q$

$= F(K, L) = X$

Hence proved:

L and K may adopt any value, Euler's theorem will hold because,

$L\ dQ/DL + K\ aQ/dK$ = x is an identity)

1.2.6 SPECIAL TYPE L.H.P.F. — COBB-DOUGLAS P.F.

The Cobb-Douglas production function is based on the empirical study of the American manufacturing industry undertaken by Paul H. Douglas and C.W. Cobb. It is a liner homogeneous production function of the first degree. It takes into account only two input factors labour and capital, for the entire output of the manufacturing industry. The Cobb-Douglas function. assumes that the logarithm of the total output of the economy is a linear function of the logarithms of the labour force and the capital stock:

$$Log\ Q = K + p\ Log\ l + q\ Log\ C,$$

which can also be written as:

$$Q = a\ L^p\ C^q$$

where Q is the output, L the quantity of labour employed, C is the quantity of capital employed, and *'p'* and *'a'* are positive constants (and $p < 1$).

This is a homogeneous linear production function, implying constant returns to scale, when the

$$p + q = 1$$

condition, which is sometimes assumed to be fulfilled, but which has also been found to be true or approximately true when the co-efficients were derived from empirical data. Accordingly, the Cobb-Douglas function is often written as:8

$$Q = a\ L^p\ C^{1-p}$$

where Q is output, L is amount of labour, C is capital employed, and a and p are positive constants where $p<1$. In the production function solved by Cobb-Douglas, the share of labour to an increase in manufacturing industry was $^3/_4$ and that of capital $^1/_4$. Thus, the CobbDouglas production function in which:

$$Q = a\ l^{3/4}\ C^{1/4}$$

Shows constant returns to scale because the total of the values L and C is equal to one (3/4 + 1/4 = 1). In order to prove it, let us increase the quantities of labour and capital by g times. Then output would be:

$$\text{Given P.F.} = \quad Q = a L^{P} C^{(1-p)}$$

$$\text{Now} \quad Q = a (gL)^{P} (gC)^{1-P}$$

but because $g^{P} g^{1-P} = g$

$$\therefore a (gL)^{P} (gC)^{1-p} = g^{P} g^{1-p} a L^{P} C^{1-p}$$

$$= g [a L^{P} C^{1-p}]$$

$$= gQ.$$

Properties of Cobb-Douglas Production Function

(1) Often the function is used in the form:

$$Q = A L^{\alpha} - K^{-\beta}$$

In this special case where $\alpha + \beta = 1$, the function shows constant returns to scale. In other words, it proves the validity of Euler's theorem.

In terms of log, Cobb Douglas Production can be stated as:

$$Log X = Log A + \alpha Log L + \beta Log K + Log \mu$$

$$\therefore 1/X \; dX/dL = \frac{\alpha}{L}$$

$$or \; \frac{dX}{dL} = \frac{\alpha}{L} X$$

$$or \; MP_{L} = \frac{\alpha}{L} X$$

$$TPL = MP_{L} . L = \frac{\alpha}{L} . X . L = L = \alpha X$$

$$Similarly, \; \frac{1}{X} \frac{dX}{dK} = \frac{\beta}{X}$$

$$\frac{dX}{dK} = \frac{\beta}{X} . X$$

$$\text{or} \quad MP_{K} = \frac{\beta}{X} . X$$

$$TP_{K} = MP_{X} . K = \frac{\beta}{K} . X \; K = BX$$

$$So \; that \; TP_{L+K} = \alpha X + \beta X$$

$$= X(\alpha + \beta)$$

So if $\alpha + \beta = 1$ then $TP_{\alpha+\beta} = X$ Which proves identity.

(2) Elasticity of substitution is equal to one:

Proof:

We know that elasticity of substitution

$$= \frac{\%\text{ change in factor quantity ratio}}{\%\text{ change in factor price ratio}}$$

Since the rate of technical substitution (RTS)

$$= dK/dL = MP_L/MP_K = P_L/P_K = R$$

The elasticity of substitution between two factors is equal to:

$$\sigma = \frac{d \log (K/L)}{d \log R}$$

$$\sigma = d(K/L)\ (K/L)\ \frac{dR}{R}$$

where K/L = factor quantity ratio and

R = *factor price ratio* P_K / P_L

From our function, one takes the partial derivatives of X with respect to L and K respectively as:

$$X = AL^{\alpha} Ku^{\beta}$$

$$dX/dL = AK^{\alpha - 1} K^{\beta} u$$

$$\frac{dX}{dK} = \beta AL^{\alpha} K^{\beta - 1} u$$

Now $$R = dX/dL/d_X/d_K$$

$$= \frac{\alpha AL^{\alpha-1} K^{\beta} u}{\beta AL^{\beta} K^{\beta-1} u}$$

$$= \frac{L}{\beta}(K/L)$$

$$R = \frac{\alpha}{\beta} d(K/L)$$

Hence

$$\frac{dR}{R} = \frac{\frac{\alpha}{\beta} d(K/L)}{\frac{\alpha}{\beta}(K/L)}$$

$$= \frac{d(K/L)}{(K/L)}$$

So that

$$\sigma = \frac{d(K/L)}{(K/L)} / \frac{d\left(\frac{K}{L}\right)}{K/K} = 1$$

The unitary elasticity of substitution guarantees that relative income shares of capital and labour are constant for any changes in relative supplies of capital and labour.

(3) The function yields diminishing returns to each input. Consider input "L" (Labour)

$Q = AL^{\alpha} K^{\beta}$

$dQ/dK = \alpha' AL^{\alpha-1} K^{\beta}$

$a^2Q/dK^2 = \alpha (\alpha - 1) A - L^{\alpha - 2l} K^{\beta} > 0$

Since α is +ve fraction, $(\alpha - 1)$ is negative. Thus the rate of change of the marginal product of input labour is negative and MP_L declines.

(4) α and β shows the output elasticity co-efficient for inputs labour and capital.

The output elasticity s is defined as the ratio of the relative change in output over a relative change in an input. In formula, the output elasticity of factor labour is:

$$\sigma_L = dQ/Q \frac{dL}{L} = dQ/dL. \frac{L}{Q} = L/Q$$

Substituting the values of dl/dL and Q from above (3) into the output elasticity formula we have:

$$\sigma_L = dQ/dQ.L/Q = \frac{\alpha AL^{\alpha-1} K^{\alpha}}{AL^{\alpha} K^{\beta}} = \alpha$$

Clearly, the same procedure holds good for capital.

(5) α and β show the relative distribution shares of inputs labour and capital.

The relative distributive shares of input labour is given by

$$= \frac{dQ/dL.L}{Q}$$

Substitution the values of dQ/ dL and Q into this expression, we have

$$\frac{dQ/dL^{L}}{Q} = \frac{\alpha AL^{\alpha-1} K^{\beta}}{AL^{\alpha} K^{\beta}} = \alpha$$

(6) Expression path generated by the Cobb-Douglas Production function is linear and passes through the origin.

Originally this function was applied to industry but later on it began to be applied to agriculture also. It was K. Kamiya of Tokyo University who is in 1943 applied this function to agriculture. In the original C – D function we take $\alpha + \beta = 1$. However, this restraint was removed by Karniya and v.alues of α & β were determined independently of each other. Now-a-days C – D function has been extensively applied to agriculture and in majority cases, the restraint of $\sigma + \beta = 1$ has been given up. Moreover the number of factors included in the production function is no longer confined to only labour and capital. In modem times, many inputs are being taken as independent variables and the function is expressed as:

$$Y = ax_1^{\sigma} x_2^{\beta} x_3^{\gamma} \ldots.$$

Geometrical expression of C–D production function depends on the number of inputs used and the sum of the co-efficients α and β. For example if only one input is used and the value of co-efficient in one, then the emerging function $y = ax^{1.00}$ will be a straight line passing through the origin as shown in figure.

If the emerging function is of the type $Y = ax^{1.00}$, we will have progressively rising curve, starting from the origin as shown in Fig. 16.2. If happens to be less than one *i.e.,* .75 and friction becomes $Y = ax^{.75}$, the expression will be represented by a rising curve, professively moving towards a maximum as shown in the figure.

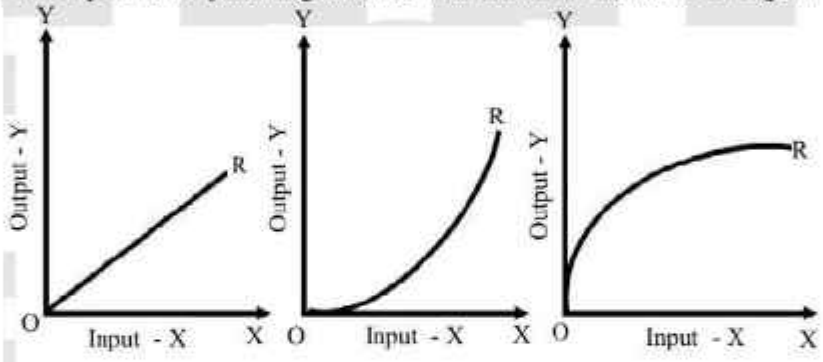

Fig.2.2

Single Varible Cobb-Dougles type Function with $\alpha = 1$

Single Varible Cobb-Dougles type Function with $\alpha > 1$

Single Varible Cobb-Dougles type Production Function with $\alpha < 1$

1.2.7 CONSTANT ELASTICITY OF SUBSTITUTION

This new function, like the Cobb-Douglas, has a constant elasticity of substituting. Unlike the Cobb-Douglas, however, its elasticity of substitution is not constrained to be unity. The function is known as the constant elasticity of substitution production function and includes the Cobb-Douglas as a special case.

This function was used by Swann and Solow in 1956, but the function was popularised by Arrow, Chinery, Minhas and Solow, in their joint article. In its general form, it may be written as:

$$Q = A[\alpha_1 K^{-\beta} + \alpha_2 L^{-\beta}]^{-h}$$

$$[-A > 0; \alpha_1 > \alpha\, 0, \beta > 1]$$

where Q is output, L is labour, K is capital, A is efficiency parameter α_1 is capital intensity factor co-efficient and α_2 is labour intensity coefficient, 13 is the substitution parameter and is related to the elasticity of substitution, and h

represents the degree of homogeneity of the function or the degree of returns to scale, C.E.S. function consists of three variables Q L, and K, and five parameters A, α_1 α_2 β and *h*. The elasticity of production in this function is given by h and the value of the elasticity of substitution (σ) is $1/1 + \beta$ which is constant but not necessarily equal to Unity.)

1.2.8 INPUT-OUTPUT PRODUCTION FUNCTION

Input-output production function is a general equilibrium type of function which provides a framework within which the relationships between processes - due principally to the flows of single use intermediate goods between processes - may be described and investigated. This approach is based on the general equilibrium model of Leon Walras 14 (1874). Samuelson ascribes its origin to Walras predecessors, the Physiocrats and Quesnay's Tableau Economique. The analysis in its modem form has been presented by W. W. Leontief and its main purpose was to show the inter-industrial structure of production.

This analysis visualizes the economy as consisting of a large number of sectors and industries, each of which produces an output, part of which caters to the final demand while the other part becomes the input of the various sectors and so contributes to their respective outputs. In addition to using each other's outputs as inputs, each sector also uses inputs of the original factors of production. Accordingly, an input-output table shows, for a given period, both the inflow to each sector of the inputs, of original factors of production and other sectors' outputs and the outflow of each sectors' output to final buyers and other sectors. Table 16.2 shows a very simple example of such a table.

Table 2.2
Annual Money Flows

(in Million)

Industry	1	2	Final Outputs	Gross Outputs
1	$3.2	$4	$8.8	$16
2	$8.2	$6	$6	$20
Original factor inputs	$4.8	$.10		

In Table 2.2, all the flows have been expressed in terms of money, with each row showing the different outputs, and each column the different inputs of a particular sector.

Technical production co-efficient can also be calculated from the above figures. When each input is divided by the total gross output of the sector, whose input it is, one can calculate the technical production co-efficients.

These co-efficient show, for each output and the industry producing it, the amount of each input the industry needs to produce one unit of its output. Such co-efficients derived from Table 2.2 are depicted in Table 2.3.

Table 2.3
Technical Production Co-efficient

Industry	1	2
1	0.2	0.2
2	0.5	0.3
Original factors	0.3	0.5

The input-output table, therefore, tells us how inputs are actually combined by a country's different industries. If fixed production co-efficients are assumed then this table also shows the cost of an additional output in terms of:

(1) Additional inputs required by the industry;

(2) Repercussions on other industries that produce some of these additional inputs; and

(3) The additional utilization of primary factors of production by all the industries directly and indirectly involved in producing the additional output.

Input-output production models have played a significant role in explaining the inter-industrial production relations. This model has bridged the gap between Walrasian dis-aggregative analysis and Keynesian highly aggregative analysis. By dividing the economy into a finite number of production sectors, it is possible to work out the estimates of equilibrium level of output required to be produced by each production section of an economy.

1.2.9 GRAPHIC RE-PRESENTATION OF LINEAR & NON-LINEAR RELATIONSHIPS

Linear and non-linear relationships can also be depicted through graphs.

Linear Relationship Graphs

Linear and non-linear relationship can also be depicted through 2.3 (a) and (b).

The lines *OP* and P_1P_2 in *Fig. 2.3* (a) and (b) show positive and negative relationships respectively between input X and output Y. The rate of change in one quantity in response to the change in the other is depicted by the slope of the line. Higher the slope, faster would be the change and vice versa. OP has a positive and P_1 P_2 has a negative slope. As we go on increasing input X, a resultant increase occurs in output Y. This is illustrated by the following example:

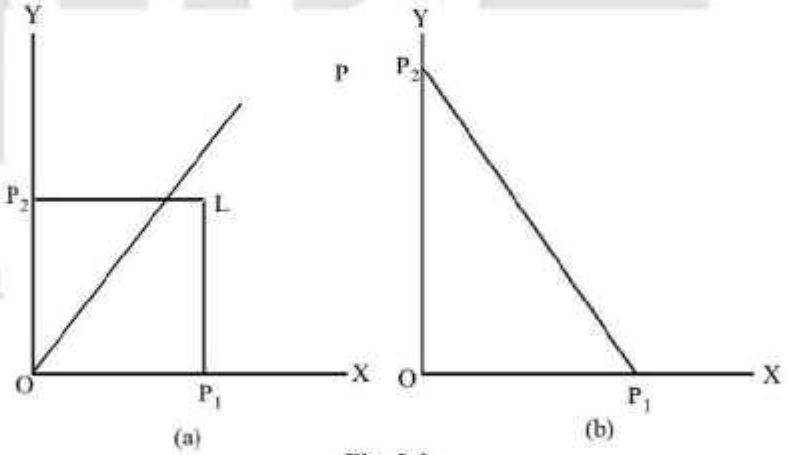

Fig. 2.3

X:	0	1	2	3	4	5
Y:	10	7	6	4	2	0

On the other hand, P_1 P_2 demonstrates that as we go on increasing input X, there occurs a decrease in output Y. This phenomenon may also be exhibited by the illustration given below:

X:	0	1	2	3	4	5
Y:	10	8	6	4	2	0

Such a relationship may have theoretical validity but in practical business, such a relationship is not rational. Situations of gradually declining outputs with increasing inputs are not unknown in production relations but the highest output at zero input is certainly an absurd proposition.

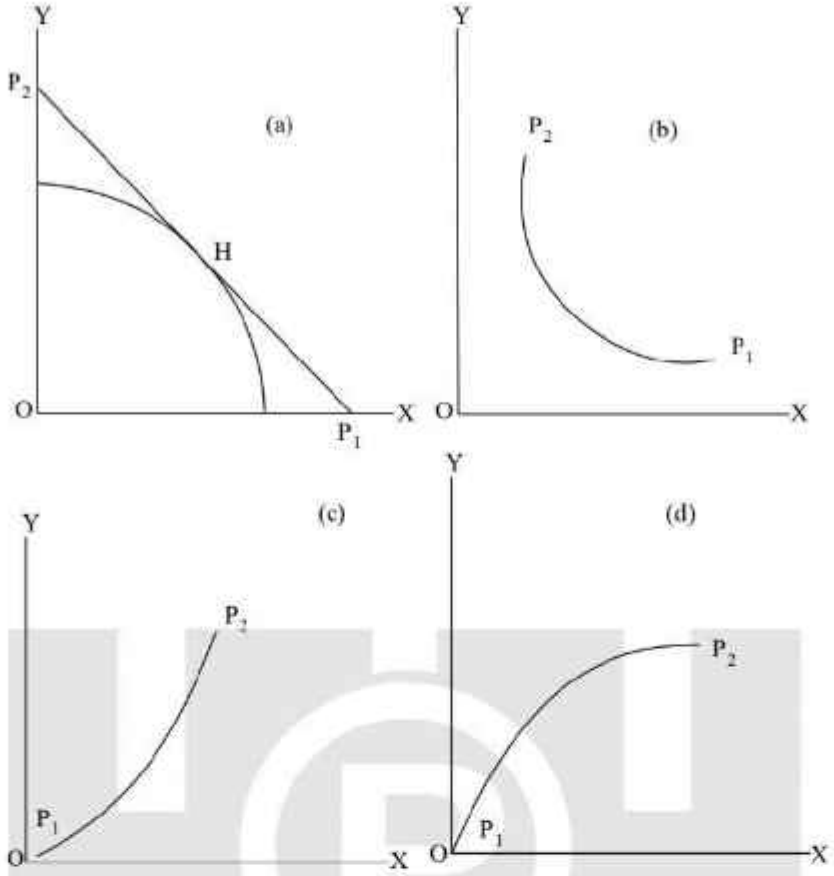

Fig. 2.3 Monotonic Curves

Non-linear Relationships Graphs

The curves depicting non-linear relationships are not straight lines and, therefore, can assume different shapes. It is because of this reason that classification of non-linear relationships becomes a difficult task. We will confine our discussion here only to a few classes of non-linear relationships which are more usually used in farm management and agricultural production analysis.

1.2.10 RISK AND UNCERTAINTY

Agricultural former is faced with two types of eventualities which have bearings on the plans for the future. One of them is risk and the other is uncertainty.

Risk refers to variability outcomes which are measurable empirically or in quantitative manner. The outcomes for each particular outcome can not be predictable. It is only necessary that the probability of outcome or loss can be established for a large number of cases.

Uncertainty refers to future events where the parameters after this probability distribution cannot be determined empirically. It involves the making of decisions both less than perfect knowledge about future. Uncertainty is not predictable. It is always present there on the cave of this future beyond the measurement or a farmers anticipation.

1.2.11 RISK AS A COST

Risk as insurable but uncertainty cannot be insured. Risk is insurable in an actuarial value. Reforcement can be added to the concept of risk. Risk has some predictable value. Risk of a farmer can be calculate, can be measured and can be controlled. Pure risk does not have impact of a nature to affect decision making and resources use. Since pure risk involves complete knowledge the mean and model outcome, the range dispersion outcomes, losses and gains which grow out of risk phenomena can be corporated into the forms cost schedule and have the bearing on the decision making Risk relates to variability phenomenon which can be corporates into costs. It does not after decision making from conditions of equilibrium. It is uncertainty which gives risk to the need for an entirely different framework for decision making and resources administration.

1.2.12 UNCERTAINTY AND SUBJECTIVE PREDICTION

But uncertainty a subjective prediction cannot be told told. It is purely unpredictable. Producer anticipates the image of a future which may be a question mark. It cannot be quantities or very few predictable. It is just a venture onto the dark future what cannot be predictable by the producer which acts more frequent on the agricultural activity. Uncertainty for a farmer is a single valued expectation.

1.2.13 THE DEGREE OF UNCERTAINTY

Uncertainty is purely a subjective phenomenon and is peculiar to the heterogeneous minds of individuals. Each Individual cannot be ascertained to the same result. The uncertainty is characterised by the nature of expectations which each entrepreneur must formulate as a basis for his plans. In agricultural sector it is very difficult to make a difference between risk and uncertainty and the measurement of their degrees of happening. It in quite uncertain and unpredictable to show risk factor uncertainty factor and of uncertainty is important for the farm planning but depends upon the parameters of probability which can estimate relatively. Degree of uncertainty may be measured from the yield or price expectations but cannot be foretold. This degree of uncertainty is just to be calculated on expectations only. Further it has relation with the degree of belief. Uncertainty can be based on the degree of belief which spells many thing about its measurement.

1.2.14 TYPES OF UNCERTAINTY

In farm production, the farmer is faced with a number of uncertainties. These uncertainties are brodaly classified as (i) On-farm uncertainities and (ii) Off-farm uncertainities.

The former pertains to production, farmer's own stock of resources, family labour, etc. The latter pertains to markets and prices, technology, government policy and institutions. However, in a general farmework, uncertainties in farm production are classified as under:

(i) Resource Uncertainty: This relates directly with the resources that go into the process of production such as land, labour, capital and management. The farmer may be uncertain about a piece of land he may have to lease-in or lease-out. There may be labour uncertainties due to sickness, non-availability or the terms of contract. Capital uncertainties may also be there. The loans may not be forthcoming the way he expects; seeds, fertilizers, equipment such as tractors may not be timely available. He may falter on his management resulting in uncertain returns. The uncertainties do not arise only when the farmer is a receiver, these can also be there when he is a giver. He may not be able to rent out land, dispose of his surplus resources such a labour, capital, equipment and so on.

(ii) Production Uncertainty (Yield Uncertainty): This type of uncertainty is an important aspect of agricultural production and arises due to imperfect knowledge. Farm production is subject to seasonal fluctuations. Nature plays a dominant role in this regard and sources of variation are beyond the control of man. There can be uncertainties in rainfall. It mayor may not come in time. It may be scanty or excessive. It may not be spread over evenly. Sometimes weather changes may occur. Seasons, particularly relating to sowing and harvesting may set in early necessitating adjustments unexpectedly. The weather may so behave that insect and pest attacks become frequent or it may so happen that these are repelled.

Political decisions may be taken unexpectedly. Restrictions are imposed on some enterprises, some enterprises may be banned altogether, yet some may be encouraged. Social gossips, taboos and superstitions also cause uncertainties in farm production.

(iii) Technological Uncertainty: Uncertainty in the role of production technology is significant in the long-run. Technology and natural factors lead to significant variations in input-coefficients. Technological advances cause heavy uncertainties in agriculture than elsewhere. A new method may be developed, a new combination of practices may be shown to be more profitable, a new fertilizer combination may come up, new methods of intercultural operations may be focussed, new disease and pest controls may be developed. All these necessitate prompt adjustments in the farmer's production plan.

(iv) Price Uncertainty: Price uncertainty of inputs and outputs is quite important in any production plan. Product price uncertainty is more important than the factor price uncertainty. The variations in input prices may be adjusted to some extent because all inputs are not purchased or used up at once. On the other hand, output prices uncertainty is more serious because outputs become known only with a time lag.

Product-prices fluctuate widely owing to inelastic demand on the one hand, and fluctuating uncontrolled supply, on the other. Since there is a time-lag between initiation and sale of agricultural output, there is every likelihood that demand and supply conditions may change during this period causing considerable uncertainty to the farmer. Crops with a longer gestation period are subject to still more uncertainties. Government policy to encourage a particular production-mix forces him to make sudden changes in prices and change the relative profitability of various farm enterprises.

(v) Institutional Uncertainty: Farm production also faces uncertainty on account of the conditions of tenure, functioning of credit agencies, actions and outlook of farmers. Any change in conditions of tenure can cause great variations in farm production. Any changes in institutional finance can similarly lead to unpredictable variations in farm production. Farmer's own outlook can become a source of variation in agricultural production.

1.2.15 REASONS OF AGRICULTURAL UNCERTAINTY

Under agricultural system uncertainty is a frequent phenomenon. It happens because:-

(i) Physical visibility
(ii) Yield variability
(iii) Variability in farm commodity prices
(iv) Changes the production and decisions making
(v) Factor price variability

1.2.16 ADJUSTMENT OF PRODUCTION AND RESOURCES USE TO UNCERTAINTY

Planning under uncertainty is a very difficult phenomenon. Complete planning cannot be possible to come over the uncertainty. Still the management decisions are made under plans are not consistent. With expectations. Entrepreneurs adopt that plan which can be possible to adjust with uncertainty. They accept to when they accumulate adequate in farmings and reduce subjective uncertainty. When factor appears more certain for action, then plan of production roll depends on the amount of uncertainty which attaches to anticipations of future press and yields. Few people are rolling to act early in a rash manner when they are highly uncertain. Plans tend to be cautions. The course of action which should be followed by the entrepreneur in conditions is not only by the nature of his expectations but also by the surrounding entrepreneurial framework. The managers of identical expectations may view similar uncertainty but their approaches shall be different.

Adjustment decisions of a farmer depends upon the ends of production. Conditions of efficiency can never be attained in an environment of uncertain prices and production. It is also influenced by this psychology of the individual farmer. Some farmers have high risk preferences some do of have preferences for risk. Capital stock of an individual farmers makes him bold certain hence risk coveriong follow. Uncertainty gives risk to immediate ends. Which are cost in a short run planing. Survival is the only one intermediate end of the agricultural firm. It is not an calculaed end. So farmers should accumulate better knowledge in plan perspective to survive the uncertainty & make the best resources use to achieve maximum return to cover this risk.

1.2.17 PRECAUTIONS FOR UNCERTAINTY

A farmer takes different steps to safeguard him self against risk and uncertainty. To what extent he takes such precautionary steps will depend upon his equity share, the size of farm enterprise and the family responsibilities. If a farmer owns all the assets and resources in a farm business, the chances of risk are very low and as he shifts from this position to borrowing more funds, the chances of risk increase directly with it. The willingness and capacity to take increased risk is positively associated with the size of the enterprise and capital employed. The farmer in the low capital and equity group places great emphasis on present income. He has thus the highest time discount. The fanner's family responsibilities also affect his capacity to take risks. Similarly, the nature and extent of off-farm incomes also has an impact on the farmer's ability to take risks. Above all, farmer's own psychology influences his capability of risk taking or risk aversion. In general, the safeguards which a farmer takes against risk and uncertainty are discussed below.

1. Diversification: It refers to producing more than one crop or allotting farm resources to more than one enterprise. Diversification tends to reduce income variability. Under specialised farming, even one lean year is sufficient to ruin a farmer financially. Diversification also enables him more and fuller utilization of resources. For this purpose, he may wish to raise crops and livestock enterprise together. Mixed farming is more effective in reducing variability in farm production.

Diversification can be achieved in two ways. First, he may allocate additional resources to an enterprise in which he is not engaged in already. Second from among the existing resources, he may divert a part of them to produce different products. This type of diversification is treated as more important and realistic. Diversification is introduced as a measure against risk and uncertainty by handling two aspects of income variability, viz., variability of income over the full span of production and variability of income in a single year. Enterprise combinations are arranged in such a way as to generate income flows at different times of the year in order to reduce the income variability. A farmer may combine dairy enterprise with crop enterprise to achieve such an objective even though he may be knowing that dairy enterprise is low yielding. Different crops are raised with varying degrees of maturity to reduce income variability within a season.

For diversification over the entire period, the variability is measured by the variance of the time-series.

2. Flexibility: The farmer should always plan in such a way that the farm plan is flexible. He should be in a position to shift readily the resources from one enterprise to another in order to achieve better returns if there is a likelihood of market conditions becoming more favourable towards one enterprise in relation to the other. The short duration crop enterprises such as vegetables cereals and pulses are examples of a flexible apporoach. Similarly, dual purpose animals enterprise also shows flexible farm planning. For example, rearing of sheep is a dual purpose enterpise. If the market is unfavourable for wool, sheep can still be marketed for meat.

3. Liquidity: An estimated rupee's return several years later is certainly less than a rupee at present or in the near future. Possible or likely changes in wages, costs and prices make a future return highly uncertain. Therefore, every wise farmer must keep adequate liquidity in terms of cash-in -hand to meet any calamities or misfortunes that may befall him in the future.

4. Selecting More Reliable Enterprises: Different agro-climatic conditions make, some enterprises more reliable than others. One can determine such variability by studying past data on prices, yields, costs returns, profits, etc. Those crop enterprises whose coefficient of variation is low are stable than those whose coefficient of variation is high. It is a general phenomenon that those crops where coefficient of variation is low are less risk-prone but comparatively less remunerative as well. The farmer in order to avoid uncertainty may prefer such enterprises to high yielding ones. Reliability tests are also applied by examining the range within which returns lie. A definite range over a larger period is more stable than over a small period. Similarly, a smaller variability range is more reliable than a longer one.

5. Crop Insurance: Crop insurance is an important means of protecting farmers against elements of risk and uncertainty in crop production and stabilizing farm income. Crop insurance provides benefits to the farmers such as security against failure of crops, creditworthiness and confidence to take risks.

6. Capital Rationing: The farmer should ration his investment among different crop and equipment. He often faces the problem of indivisibility of capital. He cannot purchase half a tractor or he may have to purchase bullocks with bullock cart or may have to invest in bullock shed.

1.2.18 SUMMARY

Production means creation of utility, i.e., goods and service. It is a process by which certain outputs are converted into consumable forms. Agricultural farm production thus refers to the producing of food, fodder and livestock by using different types of inputs. Production function refers to the functional relationship between inputs (like land, labour, capital and technology) and output. Production decision on agriculture is taken by the farmer depending upon his resources and use. Production function may be of different types on the basis of time, homogeneity, linearness etc. In agriculture it deals with short run & long run production function. Linear homogeneous production is the most common production function relating to constant returns to scale.

In this class Cobb-Douglas P.F. is the popular C.R.S. Production function ($Q = {}^{a}L^{p}C^{q}$). It is also related to constant elasticity of substitution, overall production function reflects the fundamental functional relationship between input and output. All these production functions are empirically derived from the field or agriculture. Hence production function is an inevitable part of the economies of agriculture where it happens to operate everyday. Production functions provide the scope for optimisation of agriculture and guides the farm decisions.

A farmer is faced with two types of eventualities which have bearings on plans for the future, they are risk and uncertainty.

Risk refers to variability or outcomes which are measurable of an empirical or quantitative manner. It is the factor which affects the psychology of the farmer.

Uncertainty is always present when knowledge of the future is less than the perfect and is prone to game theory of probability. Future is uncertain and can not be determined, it is away from the parameters of measurement. Degree of uncertainty varies. Uncertainty is a purely subjective phenomenon it offers the farm activity to a large extent.

Uncertainty is specially reflected by price, yield, technological, tenurial, and generated from physical variability change on production decision, farm commodity price, factor price. and so take The best way to overcome such eventuality is to adjust production and resources use.

Precautions take choice of products, process of production, farm and crop insurance, money contract lessening variability of production must be taken to reduce the effect of uncertainty.

1.2.19 SELF ASSESSMENT QUESTIONS

1. Define and Explain Production function.
2. What do you mean by Linear Homogeneous Production Function? Explain with suitable diagrams.
3. Examine Cobb-Dougles production function and properties.
4. Write short notes on
   (i) Input-output production function.
   (ii) Constant elasticity of substitution.
   (iii) Monotonic and non-monotonic relationships.
5. Distinguish between risk and uncertainty.
6. Explain the degree of uncertainty in agricultural production. How can it be measured?
7. Examine the major types of uncertainties faced by the farmers. How can it be measured? Or How do the farmers try to adjust their production and resource use to uncertainty?
8. What are the precautions to be taken by the farmers to minimise the impact of uncertainty?
9. What do you mean by flexibility? Discuss different types of flexibility.

Key Words

1. **Crop Yield**: The quantity of agricultural produce (such as grains, fruits, or vegetables) harvested per unit of land area. Increasing crop yield is a primary goal of agricultural production to ensure food security and economic viability.
2. **Livestock Production**: The rearing and breeding of animals for various purposes, including meat, milk, eggs, and fiber. Livestock production contributes significantly to agricultural output and provides essential protein sources for human consumption.
3. **Mechanization**: The use of machinery and equipment in agricultural operations to improve efficiency, reduce labor requirements, and increase productivity. Mechanization includes activities such as plowing, planting, harvesting, and post-harvest processing.
4. **Irrigation**: The artificial application of water to crops to supplement rainfall and ensure adequate moisture levels for plant growth. Irrigation systems can range from simple techniques like furrow irrigation to advanced methods such as drip irrigation.
5. **Fertilization**: The application of nutrients (such as nitrogen, phosphorus, and potassium) to soil or plants to enhance crop growth and productivity. Fertilizers can be organic (e.g., compost, manure) or synthetic (e.g., chemical fertilizers).
6. **Pest Management**: Strategies and techniques employed to control pests (such as insects, weeds, and diseases) that can damage crops and reduce yields. Pest management practices include biological control, chemical pesticides, crop rotation, and integrated pest management (IPM).
7. **Genetic Modification**: The process of altering the genetic makeup of plants or animals to introduce desirable traits, such as increased resistance to pests, diseases, or environmental stresses. Genetically modified organisms (GMOs) are controversial but can offer potential benefits in agricultural production.
8. **Agroforestry**: A land use system that integrates trees and shrubs with crops and/or livestock production. Agroforestry practices can enhance soil fertility, provide shade and windbreaks, and diversify agricultural outputs.
9. **Organic Farming**: A production system that avoids the use of synthetic pesticides, fertilizers, genetically modified organisms, and growth regulators. Organic farming emphasizes soil health, biodiversity, and ecological sustainability.
10. **Post-harvest Handling**: Activities involved in preserving and preparing agricultural products for storage, transportation, and consumption after harvest. Post-harvest handling practices include cleaning, grading, packaging, storage, and transportation logistics.

1.2.20 Reference:

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2. Progress of Land Reforms-U.N.O

3. Economics of Agricultural Production and Resource Use-Heady

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5. Introduction to Economics of Agriculture-Black

6. Economics of Agriculture-Cohen

7. Introduction to Agricultural Economic Analysis-Bishop and Toussiant

8. Agricultural Credit-Belshaw

9. Agricultural Price-Thompson and Foots

10. Readings in Agricultural Development (Ed.)-Khurgo

11. Agriculture in Economic Development (Ed.)-Eicher and Witt

12. Readings in Agriculture-Pramit Choudhury

13. Agricultures in an Unstable Economy-Schultz

14. Agricultural Price and Income Policy- Schultz

15. Marketing of Farm Products-Shepherd

1.3 Chapter

FACTOR-PRODUCT RELATIONSHIP IN SHORT RUN AND LONG RUN

Objectives

After completing this chapter, you will be able:

- To study the change in output in relation to change in input period during a given of time.
- To study the functional relationship in short run and long run.
- To examine the productivity concepts during this periods.
- To study input-output relationships under two conditions like when all factor are fixed and others are variable, some are variable.
- To study and measure factor productivity.
- To explain the principle of variable proportion and returns to scale and their operation.
- It aims at explaining the best level of resource use.
- It aims at explaining the various stages and possibilities of two production function.
- To focuss on the factor-product relationship and its applicability to agricultural economics.
- To provide solution for the farmers to achieve optimum utilisation of their resources.

Structure:

1.3.1 INTRODUCTION AND DEFINITIONS OF DIMINISHING RETURNS

The question of production function is very much connected, with the law of variable-proportions. The principle of production, i.e., the amount of a resource that should be used and consequently the amount of the product that should be produced is directly related to the operation of Law of Diminishing Returns. This law explains how the amount of the output changes as the amount of one of the inputs is varied, keeping other inputs as fixed.

The law of variable proportions which is a new name given to old classical concept of "Law of Diminishing Returns" has played a vital role in the history of economic thought and occupies an equally important place in the modem economic theory. Assume that a firm's production function consists of fixed quantities of all inputs (land, equipment etc.) except labour, which is variable input. When the farmer expands output by employing more and more labour, it alters the proportion between fixed and the variable inputs. The law of variable proportions also known as law of diminishing returns can be stated as follows:

"When total output or production of a commodity is increased by adding units of a variable input while the quantities of other inputs are held constant, -the increases in total production become, after some point, smaller and smaller."

The law has been defined by other economists as follows:

"If equal increments of one input are added, the inputs of other production services being held constant, beyond a certain point the resulting increments of product will decrease, i.e., the marginal product will diminish."

— (G. Stigler)

"As the proportion of one factor in a combination of factors is increased, after a point, first the marginal and then the average product of that factor will diminish."

— (F. Benham)

"As more and more of some input, i is employed, all other input quantities being held constant, eventually a point will be increased where additional quantities of input, i, will yield diminishing marginal contributions to total product."

— (Baumol)

"If the input of one resource is increased by equal increments per unit of time while the inputs of other resources are held constant, total product output will increase, but beyond some point, the resulting output increase will become smaller and smaller.

— (Leftwich)

To explain the law more dearly, let us take an example of a farmer who has got many acres of land, building, equipment etc. He has now to make the decision regarding the number of workers he is going to hire for the coming crop season. In reaching this decision, the farmer will keep an eye on the physical productivity of labour on the farm. Table 3.1 contains a hypothetical example of a production function with labour as a variable input.

Table 3.1

Output at Wheat in Physical Units from Five-Acre Land

No. of	*Total Workers*	*Marginal Product*	*Average Product*	*Product*
1	100	100	100	
2	220	110	120	Stage I
3	270	90	50	
4	300	75	30	
5	320	64	20	Stage II
6	330	55	10	
7	330	47	o	
8	320	40	(-) 10	Stage III

In Table 3.1 if the farmer hires only 4 labourers during the season, his total product from the farm would be 300 units. If instead of 4, he lines 5, the product will increase to 320 and so on. The data contained in the first two columns of this table predict the production function. The 3rd and 4th columns have been derived from the first two columns.

The 3rd column shows average product per worker on the farm and is obtained by dividing column 2nd by column 1st. The 4th column contains marginal product and is obtained by substracting the total product produced by employing Xn -1 workers from the total product produced by employing Xn workers, i.e., marginal product of 3rd worker would be 270 - 220 = 50 units.

A close look at Table 3.1 reveals that both average product and marginal product increase in the beginning and then decline. Of the two, marginal product drops off faster than the average product. Total product is maximum when the farmer employs the 6th worker; nothing is produced by the 7th worker and its marginal productivity is zero, whereas marginal product of 8th worker is -10; by just creating a crowd, the 8th worker not only fails to make a positive contribution but leads to fall in the total output.

Production function with one variable input and the remaining fixed inputs is illustrated in Fig. 3.1.

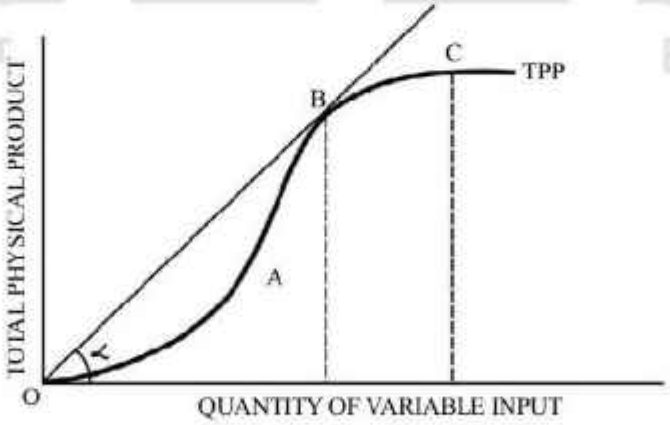

Fig: 3.1

In Fig: 3.1 total production rises from zero at an increasing rate up to point. A (the total product curve TPP is concave upward up to point A). Beyond A, output continues to rise but at a decreasing rate until it reaches a maximum, at point C. Point A on the production function, where the total product stops increasing at an increasing rate, is called the point of inflection. B indicates the point of maximum output. Beyond point B, the total product curve slopes downwards.

From the foregoing discussions, we conclude that there can be three types of input-output relationships in the production of a commodity when only one input is varied and the quantities of all other inputs are kept constant. These are:

(1) Constant marginal rate of returns (constant productivity)
(2) Decreasing marginal rate of returns (decreasing productivity)
(3) Increasing marginal rate of returns (increasing productivity)

1.3.2 CONSTANT MARGINAL RETURN FUNCTION

For the fertilizer input. Production function denoting constant or linear returns is shown in Fig. 3.2. Constant productivity or constant returns the true if all units of the variable factor which are applied to the fixed factor result in equal additions to the total output of the product. The relationship between factor input and product output is then termed as linear. For example if fertilizer applied at the rate of 0, 5, 10, 15 and 20 kgs. per acre, results in yields of 0, 10, 30 and 40 quintals of rice respectively, constant productivity is realised for the fertilizer input. Production function denoting constant or linear returns is shown in Fig. 3.2.

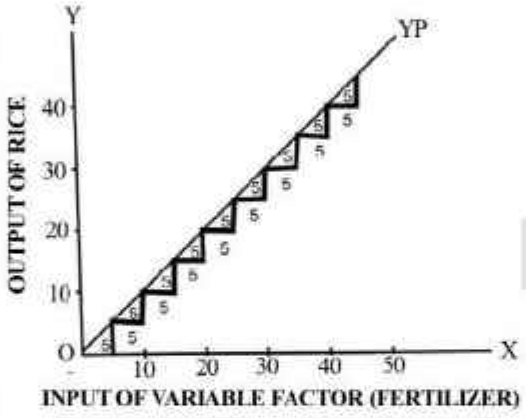

Fig. 3.2

In Fig. 3.2 the output (rice) has been depicted on the Y-axis while the variable input fertilizer is depicted by X-axis. The resulting curve Y is a straight line and the production function is said to be linear. Constant returns are shown by the triangles, the horizontal side of each triangle corresponds to an input of 5 kgs. of fertilizer the vertical side shows corresponding addition to output of rice of 10 units. This relationship can also be expressed as:

$$\frac{\Delta Y_1}{\Delta X_1} = \frac{\Delta Y_2}{\Delta X_2} = \ldots\ldots \frac{\Delta Y_n}{\Delta X_n}$$

In terms of algebraic equation, this production function can be expressed as $Y = a + bx$.

This kind of relationship does not generally exist when inputs per acre or per animal are intensified. Constant productivity is seldom found when only one factor is varied with respect to all other factors in agriculture.

1.3.3 DIMINISHING MARGINAL RETURNS FUNCTION

Diminishing marginal returns function or diminishing productivity of the variable factor exists when each additional unit of input adds less to total output compared to the previous unit. Diminishing returns are realised, for example, if the first input adds 25 units to total output, while the second adds 20 units, the third adds, 15 units, the fourth adds 10 units, and the fifth adds 5 units and so on. This is illustrated in Fig. 3.3.

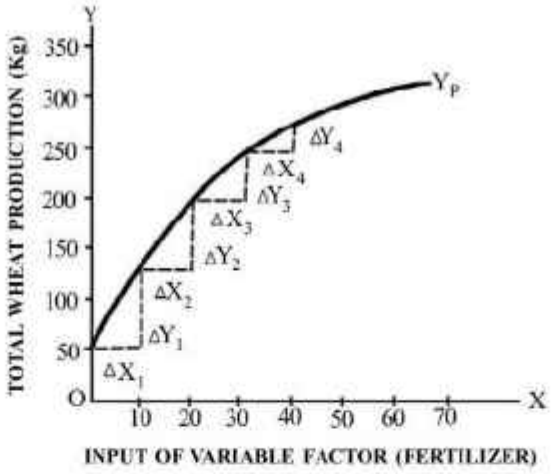

Fig. 3.3

As seen in Fig. 3.3, the curve Yp is concave to the' X-axis. This relationship can also be expressed as:

$$\frac{\Delta Y_1}{\Delta X_1} \tilde{n} \frac{\Delta Y_2}{\Delta X_2} \tilde{n} \ldots\ldots \frac{\Delta Y_n}{\Delta X_n}$$

Since $\Delta X_1 = \Delta X_2 = \Delta X_n$, Hence the ratio $\Delta Y/\Delta X$ goes on decreasing as we apply more units of input.

This law is applicable in almost all practical situations of agriculture production. To land, it applies both in its intensive as well as extensive forms. The application of additional unit of labour and capital to a piece of land or raising the proportion of land to doses of labour and capital causes diminishing returns. It is due to the diminishing returns in agriculture that world food production could not be expanded in proportion to the increase in population.

The phenomenon of diminishing marginal returns has played a crucial role in shaping the classical theory of production. In fact, writers like Malthus, Ricardo and their contemporaries based a number of their ideas on the phenomenon of diminishing returns. The situation of diminishing returns, though not valid under certain exceptional cases, has universal applicability in all production processes and hence exerts a significant impact on theorising several laws in economics.

1.3.4 INCREASING MARGINAL RETURN FUNCTION

Increasing returns to a single factor exist when each sucessive input of the variable resources adds more to the total product than the previous input. Increasing factor returns are illustrated in fig. 3.4 by the curve *Yp*.

The curve Yp in Fig 3.4, is convex to the X-axis. The tringles in this figure illustrate returns; while the return from the first unit of input is say 2Y1' and so forth. Each additional of the variable factor adds more to output than the previous unit. This relationship can be expressed as:

Since $\Delta X1 = \Delta X2 = \ldots \Delta X3$, the ratio $\Delta Y/VX$ will go on increasing as more and more units of input are added.

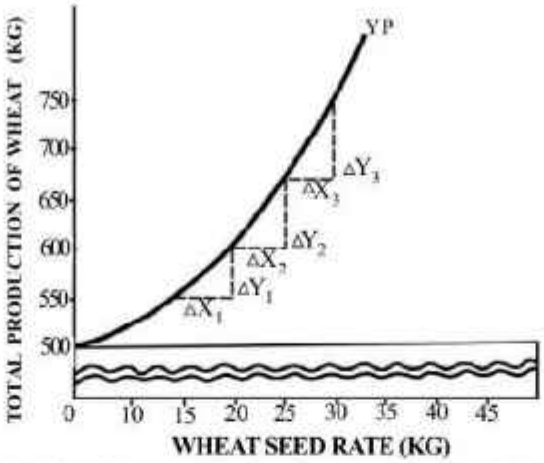

Fig. 3.4 Physical production function Indicating Increasing Returns to a single factor

1.3.5 MEASURING FACTOR PRODUCTIVITY

We express the factor productivity in two ways:

1.Average physical Product = $\frac{\text{Output}}{\text{Input}} = \frac{X}{Y}$

2. Marginal physical product = $\frac{\text{Aditional Output}}{\text{Aditional Input}} = \frac{\Delta Y}{\Delta X}$

In Fig 3.5 we express input along the X- axis and output along the Y- axis. Therefore, AB is the output corresponding to input level of OB.

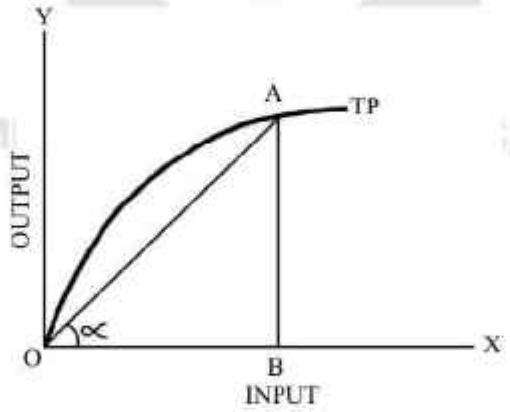

Fig. 3.5

At this level, APP is measured by the ratio AB/OB. But we know AB/OB is also the tangent of the angle a. which is derived by drawing a line from the origin through At this level, APP is measured by the ratio AB/OB. But we know AB/OB is alos the tanget of the angel α which is derived by drawing a line from the origin through point A on the production function. Therefore, APP = tan α. In Fig. 3.6 point C has chosen because it is at this point that tan α. is maximum.

Marginal productivity (MPP) has been measured in Fig. 3.6.

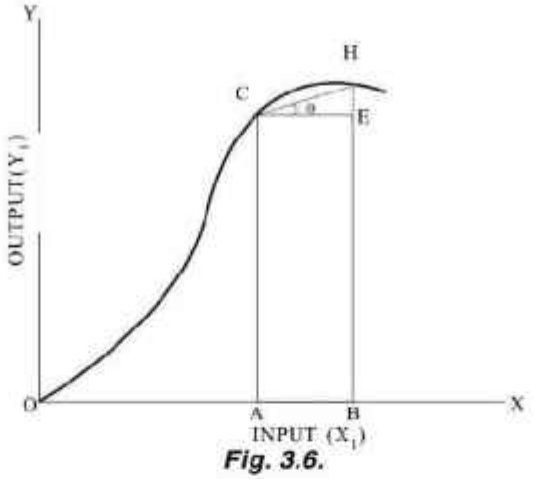

Fig. 3.6.

If the distance *AB* represents one unit of input, *MPP* can be measured by measuring HE. Here *MPP* =*HE/CE* = tan Ø, which indicates the slope between the points C and H. If we assume that units of input are very small, such that *CH* coincides with the curve itself, MPP value is the slope of the curve at that point.

Fig 3.7 has been drawn with derived MPP and APP curves.

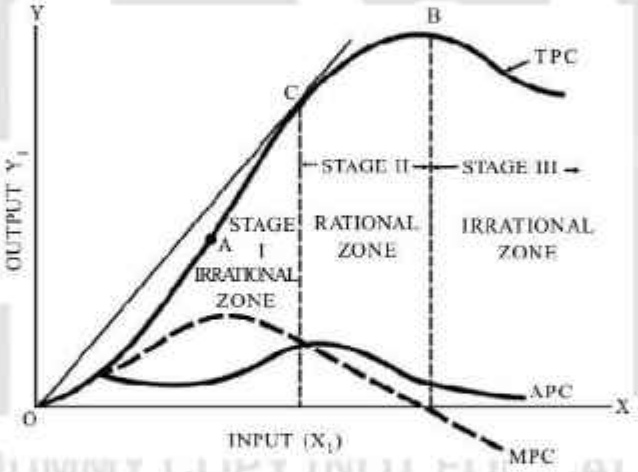

Fig 3.7

In Fig 3.7, it is noted that so long as *TPP* rises at an increasing rate, *MPP* is also rising and production function curve is concave upwards. Beyond point A, *TPP* is increasing but at a diminishing rate. Corresponding to *TPP, MPP* starts declining. *TPP* achieves its highest level at *B*, at further which point MPP falls to zero. Beyond this point, if variable input is further increased, *TPP* will fall absolutely in which case *MPP* becomes negative.

MPP starts declining from the inflexion paint *A* and it intersects the *APP* curve at *D*, the. point of maximum value of *APP*. This intersection indicates the equality of *MPP* and *APP* at maximum *APP*.

1.3.6 THREE STAGES OF PRODUCTION FUNCTION

The relationship between average product and marginal product, thus, can be reduced to three propositions as fallows:

(1) In the beginning, total physical product *(TPP)* rises at an increasing rate, average and marginal products also increase but *MP* rises at a faster rate than *AP*. Production function in this part is concave upwards.

(2) When average product attains maximum value and is constant, marginal product is equal to it.

(3) Beyond the paint af maximum value, average product starts falling but marginal product falls mare than average product.

We can sum the above relationship thus:

When AP is rising, MP rises mare than AP;

When AP is maximum and constant, MP becomes equal to AP; When AP starts falling, MP falls faster than AP.

Likewise in Fig. 3.7 the relation between input and output can be divided into three stages. Stage 1 is Characterised by an increasing product per worker. Two workers produce mare than twice as much as one worker. Increasing returns to scale are reaped due to indivisibility of factors of production. By indivisibility, we mean that the fixed inputs like machinery, management, finance, etc. are not available in very small sizes. When the supply of variable factor is increased in the initial stages, we get increasing returns because fixed factors are made to work to their full capacity. Since the concept of indivisibility is considered vague, modern economists have attributed increasing return to the economies of scale and specialisation.

In stage 1, the production function continues to rise up to the level of input at which the average productivity is at a maximum. In this stage the marginal productivity remains always higher than average productivity. To maximise his profit, the farmer can continue to increase variable factor as long as the average productivity is increasing.

In stage 2, the total product curve continues to increase but at a diminishing rate. Stage is extended upto a point where total product reaches maximum but marginal productivity equals zero. This stage is known as the stage of diminishing returns as both average and marginal products of variable input continue to fall during this stage.

In stage 3, the total product is declining. In this stage, the farmer is incurring greater costs, as he is utilizing more of the variable input, but is simultaneously receiving less output.

Our farmer who is concerned with profit maximisation would find two of the above stages 1st and 3rd as irrational. In stage I, though the farmer is faced with increasing returns, yet the farmer can increase his' profit only by switching to stage 2 in which the total product is still rising. For profit maximising farmer to produce in stage 1 is thus irrational.

Stage 3 similarly is irrational. In this stage, the farmer will be incurring greater costs as he is utilising more of the variable factor, but is simultaneously receiving less returns because each additional unit of variable input results in a decline in total output.

We, thus, conclude that for a profit maximising farmer, the level of resource use occurs in stage 2. Regardless of factor cost and product price, the chosen level of input application should be somewhere in the range between maximum APP and zero MPp.

The small farmer, who has limited funds and as a consequence, may operate in a range of increasing returns to capital, is, however, not an irrational producer. The central problem here is one of capital limitations rather than ignorance. The small-scale farmer often can only maintain production in stage 1 if he is to produce at all since he does not have enough resources to extend production into stage.

1.3.7 REASONS FOR INCREASING RETURN

Increasing returns take place because in the beginning, the quantity of fixed factor is abundant relative to the quantity of the variable factor, and when more and more units of variable factor are added to the constant quantity of fixed factor, it is used more intensively and effectively. This causes the production to increase at a rapid rate.

Still another cause of increasing returns to scale comes from higher degree of specialisation, as Adam Smith pointed out two centuries ago. When there is a sufficient quantity of the variable factor, it becomes possible to introduce division of labour which leads to higher productivity and more production.

1.3.8 REASONS FOR DIMINISHING RETURN

As doses of the variable factor are increased, we will soon reach a stage where the returns are maximum. But beyond this point, additional doses of variable factor will yield diminishing returns because the fixed factor then becomes inadequate relative to the quantity of the variable factor. In other words, after the point of inflection, contribution to production made by the variable factor becomes less and less because additional units of variable factor have to work with less and less fixed factors.

The phenomenon of diminishing returns, like that of increasing returns, is closely related to indivisibility of fixed factors. In general indivisibility means that equipment is available only in minimum sizes or in definite ranges of size. There will be a level of employment of the variable factor at which indivisible fixed factor is being fully utilised. At this point, average product happens to be maximum. Any further increase in the variable factor beyond this point of optimum level will result in diminishing returns per unit of variable factor. Had there been perfect divisibility in the case of fixed factors, the optimum proportion between fixed and variable factors could have been achieved in every case. Prof. M.M. Bober rightly remarks, "Let divisibility enter through the door, the law of variable proportions rushes out through the window".

In the view of Mrs. John Robinson, diminishing returns occur because the factors of production are imperfect substitutes for one another. She remarks, "What the law of diminishing returns really states is that then is a limit to the extent to which one factor of production can be substituted for another, or in other words, that the elasticity of substitution between factors is not infinite. If this were not true, it would be possible, when one factor of production is fixed in amount and the rest are in perfectly elastic supply, to produce a part of the output with the aid of the fixed factor and then when the optimum proportion between this and other factors was attained to substitute some other factor for it to increase output at constant cost."

1.3.9 REASONS FOR NEGATIVE RETURNS

Negative returns take place due to the fact that the amount of the variable factor becomes too excessive in relation to the fixed factor with the result that fixed and variable factors get in each other's way and cause the total output to fall instead of rising. The proverb "too many cooks spoil the broth" aptly applies to this situation. The situation in stage 3 is such that the total output will tend to increase if we decrease the supply of variable factor. As in stage 1, the marginal product of the fixed factor is negative due to its abundance in relation to the variable factor,' in stage 3, the marginal product of variable factor becomes negative due to its abundance in relation to the fixed factor.

1.3.10 RETURNS TO SCALE

We have so far explained the behaviour of output with one variable input. We can now drop this assumption and take case of a farm firm which in the long-run can expand production or scale of its operation by using more of all inputs - more labour, more equipment and more land.

When all inputs are increased equal proportions and the scale of production is expanded, our farmer can experience three types of situations. If the increase in output is proportional to the increase in the quantities of inputs, returns to

scale are said to be constant. For example, if a 20 per cent increase in all inputs, at a time, leads exactly to 20 per cent increase in output, ft is a case of constant returns to scale. If instead, the increase in output is more than proportional, returns to scale will increase. And if the increase in output is less than proportional, returns to scale will decrease.

Returns to scale is a long-run phenomenon which offers an. opportunity to the production manager to increase the employment of all factors of production by a given percentage according to market and resource feasibilities. Variations in the scale of operation is less complex a problem in manufacturing as compared to agriculture but nevertheless it is a possibility in both. Factor individsibilities restrict the scope of frequent variations in the scale of production. If, however, doubling or trebling of the employment of factors of production is contemplated, one may as well set up a new establishment and such a possibility can exist in farming if land is available so that including land, all factors undergo a change by an equal amount. Possibilities of output increasing by more than, equal to or less than proportionately can always exist depending upon the nature and stage of variation.

1.3.11 THE BEST LEVEL OF RESOURCE USE

We have seen above that if production is to proceed it will pay the farmer to produce somewhere within stage 2. But the question arises, where or what is the most economical level of input application? In order to answer this question, we will have to take into consideration the relevant prices and costs. By introducing these elements, the curves *APP, TPP* and *MPP* will be converted to *AVP* (Average Value Product), *TVP* (Total Value Product), and *MVP* (Marginal Value Product). This can be done simply by multiplying the physical quantities by the appropriate price unit.

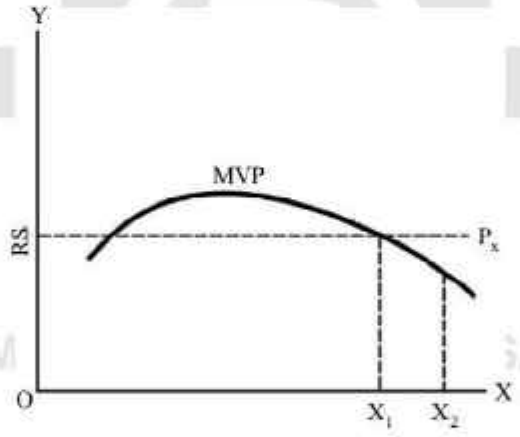

Fig. 3.8

As seen in Fig. 3.8, MVP declines throughout stage 2, but nevertheless, it will pay our farmer to intensify production so long as the MVP of the input is greater than the cost of a unit of input.

The farmer will reap the maximum profit at a level of input where the cost of marginal unit is just covered by the value of the additional product (MVP) which it produces. In Fig. 17.8, this condition is satisfied at XI units. Beyond this level, say at X2, MVP is below the price of the factor suggesting the farmer to withdraw some units of input factor.

Algebraically, the optimum input level is where:

$$MVPx = Px \text{ or } \frac{MVP_x}{Px} = 1 \qquad ...(1)$$

Since MVP = MPP multiplied by a constant price

Py equation 1 can be written as

$MPPx \times Py = Px$ ...(2)

Dividing equation (2) by P_y, we obtain

$$MPPx = \frac{P_x}{P_y}$$

$$\text{Since } MPPx = \frac{\Delta Y}{\Delta X}$$

The above equation can also be written as:

$$\frac{\Delta Y}{\Delta X} = \frac{P_x}{P_y}$$

Which is to say that the marginal rate of transformation of X into Y must equal the inverse price ratio.

With a little knowledge of elementary calculus, we can express the above result as:

$$\frac{Lt}{\Delta X - O}\left(\frac{\Delta Y}{\Delta X}\right) = \frac{dY}{dX} = \frac{PX}{PY}$$

which means that the slope of the production function must equal the inverse price ratio.

1.3.12 ELASTICITY OF PRODUCTION

The elasticity of production refers to the percentage increase in output as compared to the percentage increase in input and can be denoted by the symbol E_p and can be computed as:

$$E_P = \frac{\Delta Y/Y}{\Delta X/X} \text{ or } \left(\frac{\Delta Y}{Y}\right).\left(\frac{X}{\Delta Y}\right) \text{ or } \left(\frac{X}{Y}\right).\left(\frac{\Delta Y}{\Delta X}\right)$$

The analysis will become more clear with the help of the following example:

Fertilizer Doses (X)	Total Yield Attributable to Fertilizer (Y)
o	o
1	103
2	174
3	223
4	257
5	281
6	298
7	308

It is evident from the above example that as the input (fertilizer) increases from 1 to 2 total output increases from

103 to 174. It means that against 100 per cent increase in input, the output has increased, only by 71.9 per cent. Therefore, $E_p = 71.9/100 = .72$. Similarly, between the second and third unit of input, the elasticity of production is calculated to be 0.56. In the case of elasticity of production, the following points need attention:

(1) A production function with an elasticity of 1.0 throughout indicates constant returns. This indicates that 1 per cent increase in input is always accompanied by a 1 per cent increase in output.

(2) The elasticity is more than 1.0 up to the maximum average product where it becomes 1.0.

(3) It is less than 1.0 between the maximum average product and the maximum total product.

(4) It becomes less than zero as the total product declines.

(5) When the elasticity of product is 1.0, marginal and average products are equal.

(6) A production function for which the elasticity is less than 1.0 throughout all ranges of input indicates diminishing returns of the nature as in Fig. 3.3.

1.3.13 SUMMARY

Production function is very much connected with the factor product relationship in the long run and short run. These two functions are the variable proportion and Returns to scale, the law of variable proportion examines the shor trun factor production relationship under variable proportional combination of fixed and variable factors, this analyses the relationship on three fundamental stages like increasing returnd, decreasing returns and negative returns respectively.

Factor, product relationship reveals the productivity of a factor. It shows the return of a factor in the production functions which may be expressed in terms of diminishing marginal return, constant marginal return or on increasing marginal return. Increasing marginal return refers to the higher rate of return in relation to proportionate change in outputs. Diminishing marginal return to less than proportional increase in total output in relation to increase in inputs. Constant marginal returns refer to equal proportionate change in output in relation to proportionate change in input.

$$CRS \rightarrow \frac{\Delta Y_1}{\Delta X_1} = \frac{\Delta Y_2}{\Delta X_2} = \ldots\ldots\ldots\ldots = \frac{\Delta Y_n}{\Delta X_n}$$

$$DRS \rightarrow \frac{\Delta Y_1}{\Delta X_1} \rangle \frac{\Delta Y_2}{\Delta X_2} \rangle \ldots\ldots\ldots\ldots = \frac{\Delta Y_n}{\Delta X_n}$$

$$IRS \rightarrow \frac{\Delta Y_1}{\Delta X_1} \langle \frac{\Delta Y_2}{\Delta X_2} \langle \ldots\ldots\ldots\ldots = \frac{\Delta Y_n}{\Delta X_n}$$

The law of variable proportion and returns to scale are two vital principles of production revealing the functional relationship between input & output in every field of economic activity. The law of variable proportion was very specific to agriculture in initial finding but now it has wide application. Similarly, returns to scale is a very important principle that explains the factor product relation and enables the producer to find his optimum decisions. These principles reveal ground reality of their operation and make the producer conscious about the application of input and return to it. Economics of scale and Diseconomics of scale and examine the operation of these two principle.

Key Words

1. **Fixed Inputs**: Inputs that cannot be varied in the short run, such as capital or land. These inputs constrain the level of output production in the short term.
2. **Variable Inputs**: Inputs that can be adjusted or varied in the short run, such as labor or raw materials. Changes in variable inputs can affect the level of output produced.
3. **Total Product (TP)**: The total quantity of output produced by a given combination of inputs in the short run.
4. **Marginal Product (MP)**: The additional output produced by employing one more unit of a variable input while keeping other inputs constant. It indicates the rate of change in total output with respect to the change in the quantity of the variable input.
5. **Average Product (AP)**: The total output produced per unit of the variable input. It is calculated by dividing total product by the quantity of the variable input.
6. **Variable Inputs**: In the long run, all inputs become variable, meaning that firms can adjust the quantities of both labor and capital to optimize production levels.
7. **Isoquant**: A curve representing all possible combinations of inputs that yield the same level of output. Isoquants show the various trade-offs between labor and capital in production.
8. **Marginal Rate of Technical Substitution (MRTS)**: The rate at which one input can be substituted for another while keeping output constant. It is the slope of an isoquant and indicates the rate at which the firm is willing to substitute one input for another.
9. **Returns to Scale**: The relationship between the scale of production and the resulting increase in output. Returns to scale can be classified into three types: increasing returns to scale, constant returns to scale, and decreasing returns to scale.
10. **Expansion Path**: A curve that shows the optimal combination of inputs as the scale of production changes in the long run. It illustrates how the firm adjusts its input mix in response to changes in output levels.

1.3.14 SELF ASSESSMENT QUESTIONS

1. Explain the factor-product relationship or input-output relationship in agriculture.
2. "The law of diminishing return is due to imperfect substitutability of factors of production" -Discuss.
3. Explain the law of variable proportion with the help of suitable diagram.
4. "Principle of diminishing return is a matter of logical necessity whereas the principle of increasing return is a matter of empirical evidence" - Examine.
5. Define the concepts of increasing marginal return, constant marginal return, diminishing marginal return."
6. Examine the principle of returns to scale.
7. Explain the law of variable proportion with the help of iso-quants and examine its applicability to agriculture
8. Examine the operation of returns to scale in field of agriculture and farm size in particular

Key Words

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1.3.15 Reference:

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2. Progress of Land Reforms-U.N.O

3. Economics of Agricultural Production and Resource Use-Heady

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5. Introduction to Economics of Agriculture-Black

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7. Introduction to Agricultural Economic Analysis-Bishop and Toussiant

8. Agricultural Credit-Belshaw

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11. Agriculture in Economic Development (Ed.)-Eicher and Witt

12. Readings in Agriculture-Pramit Choudhury

13. Agricultures in an Unstable Economy-Schultz

14. Agricultural Price and Income Policy- Schultz

15. Marketing of Farm Products-Shepherd

1.4 Chapter

RESOURCE SUBSTITUTION AND FACTOR-FACTOR RELATIONSHIP AND PRODUCT-PRODUCT RELATIONSHIP

Objectives

After completing this chapter, you will be able:

- To study the relationship between factors of production.
- To examine the application of various factors in agricultural production process.
- To study the substituability between factors of production.
- To examine the factor combinations and their productivity.
- To find out the marginal rate of technical substitution among various factors to determine the level of output.
- To study and analyse the input combinations with the help of iso-quants or equal product curves.
- To know the properties of indifference curves in production function.
- To determine the least cost combinations of factors of production and to derive the optimum factor combinations and producers equilibrium.
- To derive the optimum expansion path and its applicability in agriculture.
- To examine optimum resource allocation for multiproduct multi-input farm.

Structure:

1.4.1 FACTOR-FACTOR RELATIONSHIP

In production process, factors of production generally substitute for each other. In case of cattle feed, barley can well be substituted for maize. Similarly, substitution can take place between hired labour and family labour. This substitution not only takes place within similar factors but even within dissimilar factors as well. We very well know that a machine is a substitute for labour, and in many countries suffering from labour shortage, this kind of substitution has taken place.

Agricultural production can be raised either by increasing the doses of fertilizers or extending the cultivated land area. In this case, fertilizer is a substitute for land.

On the other hand, there are some factors which cannot be used unless some other factors are not present. For example, neither tractors

nor bullocks can be employed to till the land without labour input. A profit maximising farmer will seek to minimise his cost of producing a given agricultural product or to put it in another way, he will maximise his output for a given level of outlay. What particular combination of factors of production our farmer will choose will depend upon two things, viz: *(i)* technical possibilities of production, and *(ii)* the prices of the factors used for the production of a particular product.

Technical conditions of production facing the farmer may be rigid or flexible. They are said to be rigid if an exact quantity of each productive factor is needed to produce a given output. But in most cases, technical conditions of production allow certain freedom of choice. For example, as already mentioned, the farmer can increase his production either by increasing the quantity of fertilizer input or by increasing land. But this kind of substitution cannot go beyond a limit. If the farmer goes on increasing the supply of fertilizer input, keeping land as fixed, a time will come when the additional supply of fertilizer will not add to his production.

1.4.2 ISO - PRODUCT CURVES - GRAPHIC REPRESENTATION

A production function with two variables which are substitutable for one another within limits can be represented by a family of isoproduct curves or isosoquants, sometimes also known as production indifference curves. It is the locus of all combinations of X_1 and X_2' which yield a specified output level. For a given output level, farmer's production becomes

$$q^{O} = f(X_1 X_2)$$

Where q^{O} is a parameter. The locus of all the combinations of X_1 and X_2 which satisfy the above equation forms an isoquant.

Let us suppose, the farmer can produce a given output of wheat, say 50 quintals by employing anyone of the following alternative combinations of two factors, labour and capital.

Table 4.1

Labour	Capital	Output (wheat)
1	+10	50 quintals
2	+7	50 quintals
3	+5	50 quintals
4	+4	50 quintals

If this iso-product schedule is plotted on a paper we get an isoproduct or equal product curve as shown in Fig. 4.1. The amount of labour has been depicted on the *X-axis* and the amount of capital along the *Y-axis*. AB is the iso-cost curve which shows all the alternative combinations which can produce 50 quintals of wheat.

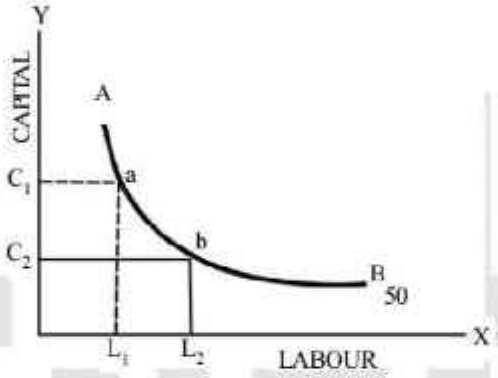

Fig. 4.1

Point a on the curve shows that 50 quintals of wheat can be produced by C_1 of capital and L_1 units of labour. Point *b* shows that the same output can be produced with C_2 amount of capital and L_2 units of labour. In Fig. 4.2. an iso-product map has been depicted which shows a set of four equal product curves which represent 50 units, 100 units, 150 units, and 200 units of wheat output respectively.

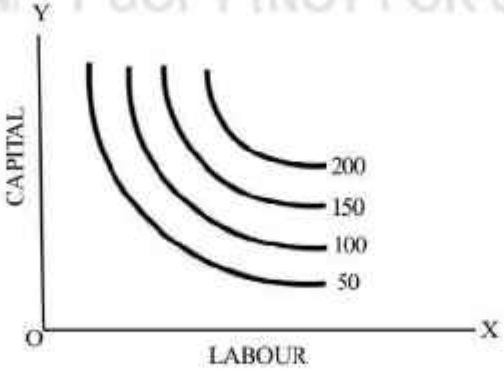

Fig. 4.2

The shape of the isoquant will depend upon the extent of substitutability of the two inputs. In case the two inputs are perfect substitutes, the shape of the isoquant would be a straight line: in case they are good substitutes, the isoquant would be slightly curved and convex to the origin; in case the factors are poor substitutes, the isoquant will have a steep curvature. If the two input factors are to be used in a fixed proportion i.e., they are absolutely non-substitutable, isoquants are right angles as shown in Fig. 4.3(a),(b),(c), and (d) respectively.

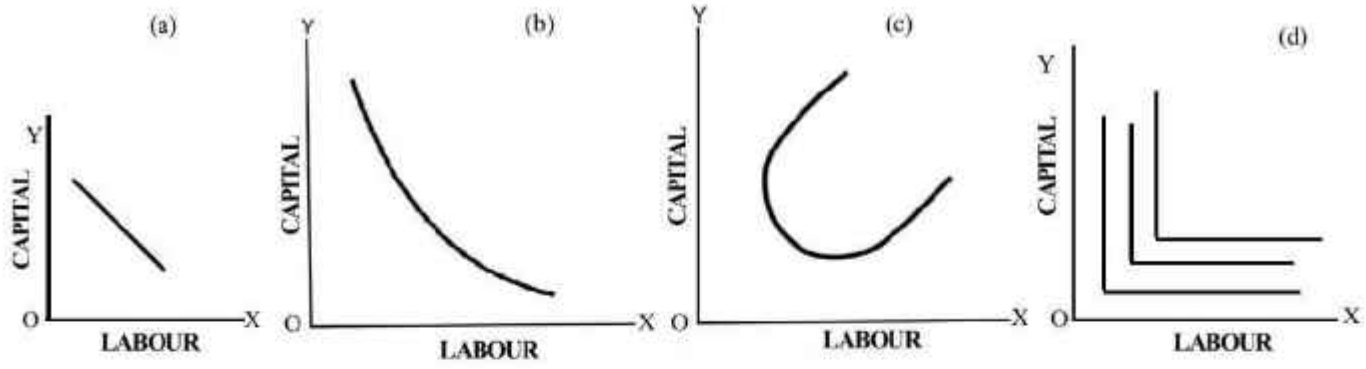

Fig. 4.3

There are, thus, three broad categories of such combinations of inputs:

(1) Fixed proportion combination of inputs,

(2) Constant rate of substitution, and

(3) Varying rates of substitution.

1. Fixed Proportion Combinations

Certain products can be produced only if inputs are mixed in a fixed proportion at all levels of production. The product contour under fixed coefficients is of the type as shown in Fig. 4.3.

There is only one combination of resources for producing the quantity of product represented by the contour LS. A product output of 100 units requires an input *OK* of resource X_2 and OM of resource X_1 If input of X_2 is increased to *OI.* while X_1 is held constant at *OM*, the output remains at 100. Hence both X_1 and X_2 are limitational factors since output is limited by the input of either.

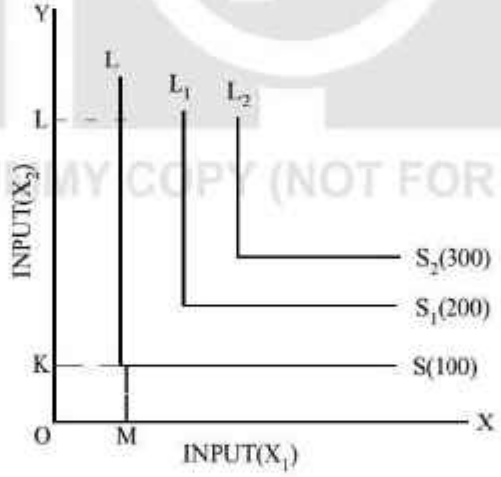

Fig. 4.4 Inputs which Combine in Fixed Proportions

2. Constant Rate of Substitution

Perfectly substitutable factors replace each other at a constant rate, regardless of the level of output or of the proportion in which the factors are combined. Examples of this are family and hired labour, homegrown and purchased grain and two different brands of some seed or fertilizer which are basically identical. Two inputs which substitute at constant rate are shown in Fig. 4.5.

In Fig. 4.5, the factor substitution rates are constant because when product is held constant at one level, one unit increase in X_1 always results in one unit decrease in X_2. Constant substitution rates can further be illustrated in the example given in Table. 4.2.

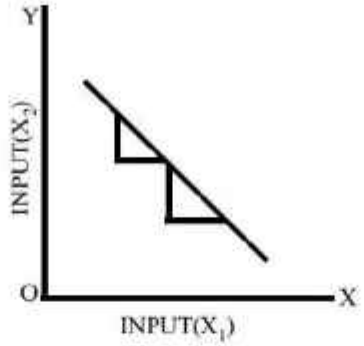

Fig. 4.5
Inputs which Substitute at Constant Rate

Table 4.2

Iso-product Relationship Indicating Constant Rate of Substitution with Output Fixed

	X_1	X_2	ΔX_1	ΔX_2	$\frac{\Delta X_2}{\Delta X_1}$ (MRS)
1	0	50	5	10	2
2	5	40	5	10	2
3	10	30	5	10	2
4	15	20	5	10	2
5	20	10	5	10	2
6	25	0	5	10	2

In Table 4 .2, the substitution ratio is constant throughout all combinations of the two factors. Substitution at a constant rate is, however, one of the extremes in factor - 'factor relationships.

3. Varying Rate of Substitution

In most cases of input combinations, factors substitute for each other. at diminishing rates because the factors of production are incomplete substitutes for each other. For example, the marginal rate substitution of hay for grain becomes smaller and smaller as hay continuously replaces grain, with milk output remaining constant. In other words, increasingly greater quantities of hay are required to offset or replace each successive decrement in grain input. The shape of isoproduct curves in such cases is the convexity towards the origin as shown in Fig. 4.6.

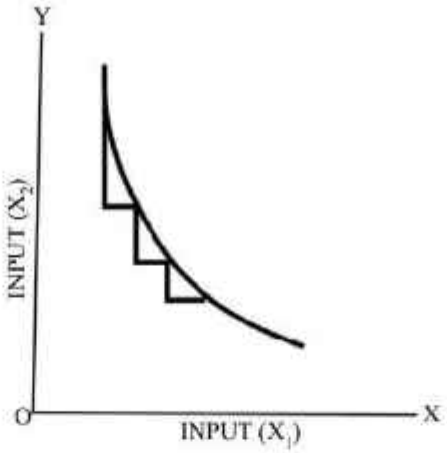

Fig. 4.6
An Illustration of Decreasing Rate of Substitution

1.4.3 PROPERTIES OF ISO – PRODUCT CURVES

Isoquants or equal product curves normally possess properties which are similar to those generally assumed for indifference curves. The following are the important properties of isoquants:

(1) An isoquant curve is negatively inclined. This property signifies that when the quantity of factor X is increased, the quantity of factor Y must be reduced, in order to maintain the same level of output.

(2) An isoquant curve does not cross or cut the higher or lower isoquants. If the two equal product curves, say, one corresponding to 30 units of output and the other to 40 units of output cross each other; they will then have a common factor combination corresponding to the point of intersection. This would mean that some factor combination which can produce 30 units of output according to one isoquant can also produce 40 units of output according to the other equal product curve. This seems quite absurd. How can the same factor combination produce two different levels of output, while techniques of production remain the same.

(3) Isoquants are convex to the origin. The degree of convexity of the isoquant indicates the relative ease otherwise with which one factor can be substituted for the other while the total output remains same. This is because of the diminishing marginal technical rate of substitution of one input for another along an isoquant when we move from left down to the right.

1.4.4 MARGINAL RATE OF TECHNICAL SUBSTITUTION

As noted above, an equal-product curve represents all those input combinations which are capable of producing the same level of output. We have also noted that the substitutability among the factors is limited and in order to produce a given output, when the less of one factor is used, a greater amount of the other factor will have to be associated with it so as to keep the output level same. Accordingly, isoquants in Fig. 4.6 have been drawn with a downward slope through part of their range to indicate the fact that when less of one factor is used, a greater amount of the other factor will have to be associated with it. In fact, the substitution of one factor for another will not only become more difficult as it is pushed further and further; there usually is an absolute limit to it, beyond which further substitution becomes impossible. At this point the isoquant becomes parallel to one of the axes, representing the fact that beyond this point an increased use of one factor will not increase output at all even when the quantity of the other factor is not varied further but kept constant. Hence, the points where the isoquants become parallel to the axis show the limits within which substitution is possible" If all those points beyond which the isoquants become parallel to the axes are joined together, we get ridge lines which show that in between them, economically feasible units of capital and labour can be employed to 50,100,200 units of wheat as shown in the Fig. 4.7.

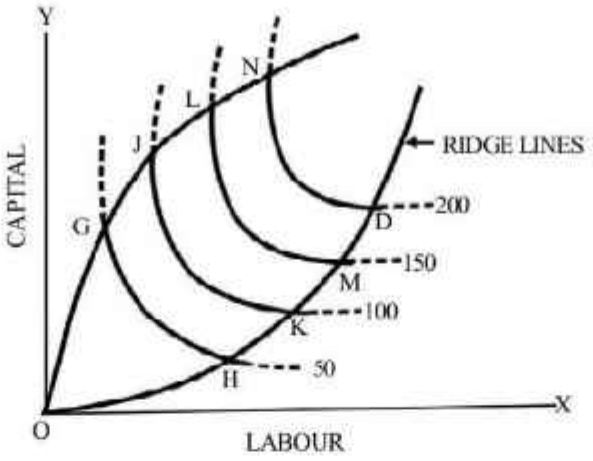

Fig. 4.7

In between the ridge lines, the isoquant curves show the different combinations of capital and labour which can produce a given level of output. The slope of isoquants within the ridge lines shows the rate at which one factor can be substituted for another without altering the amount of output. The rate at which labour can be substituted for capital in the production of wheat, without changing the quantity of output is known as marginal rate of technical substitution. The marginal rate of technical substitution between factor Land C, MTSLC, expresses the rate at which C can be substituted for L in the production of A without changing the quantity of output. Let there be a small movement on the isoquant PP1 from G to H as shown in Fig. 4.8.

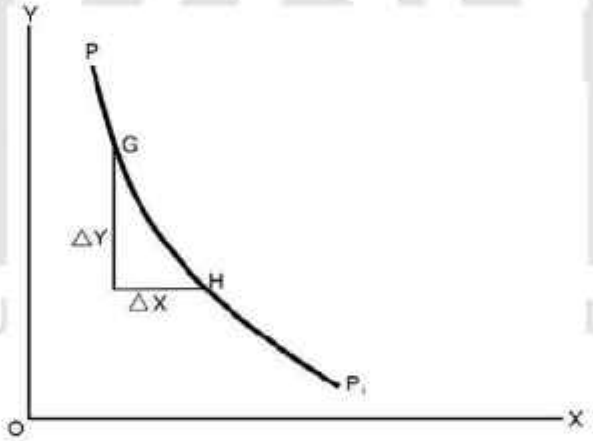

Fig. 4.8

In this movement a small amount of factor Y, say, ΔY has been replaced by a small amount of factor X say ΔX, without any change in output. The slope of isoquant PP_1 at point G is, therefore, equal to $\Delta Y / \Delta X$. The slope of isoquant at a point can also be known from the slope of the tangent drawn on the isoquant from that point. In the Fig. 4.8 TT_1 is the tangent drawn at point G on the isoquant curve PP_1

The slope of the tangent to a point on an isoquant is the rate at which X_2 must be substituted for X_2 (or X_2 for X_1) in order to maintain a corresponding output level. The negative slope defines the rate of technical substitution, so that:

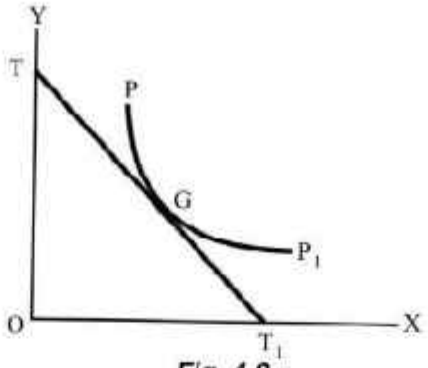

Fig. 4.9

$$RTS = \frac{dX_2}{dX_1}$$

The slope of the tangent TT1 is given by OT/OT1. We can, therefore, say that the marginal rate of technical substitution at point G is equal to OT/OT1.

Since by changing the factor composition, the outut remains the same along the isoquant, the loss in physical output from a small reduction in factor Y will just be qual to the gain in physical output from a small increment in factor X.

Accordingly, loss of output = gain in output

$$\Delta Y.\ MPy = \Delta X.\ MPx$$

Where MPy and MPx are marginal physical products of factor Y and X respectively.

$$\frac{\Delta Y}{\Delta X} = \frac{MPx}{MPy}$$

But = $\frac{\Delta Y}{\Delta X}$ Marginal rate of technical substitution.

$$\text{MRTSy} = \frac{MP^x}{MP^y}$$

This suggests that the marginal rate of technical substitution is also equal to ratio of the marginal physical products to two factors.

1.4.5 OPTIMUM FACTOR COMBINATION

Iso-cost Lines

From the above analysis, we have seen that the farmer can produce a given output of wheat with several factor combinations. But our profit maximising farmer will prefer to produce this output with the optimum or minimum cost factor combination. In order to achieve this least cost combination of factors of production, the farmer must know the prices of these factors. The prices of factors are represented by the iso-cost lines. An iso-cost line shows the quantity of either factor and combination of both factors which can be purchased for a given cost. This has been illustrated in Fig. 4.10.

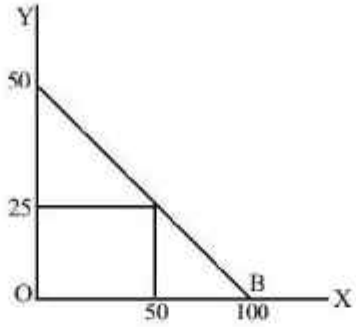

Fig. 4.10
Iso-cost Line

If we assume that the cost of factor Y is ₹ 2 per unit and of factor X is ₹ 1 per unit, our farmer having ₹ 100 at his disposal can either purchase 100 units of X or 50 units of Y or any combination of factors represented by C point on the iso-cost line ab.

The iso-cost line is defined by the cost equation:

$$C = (r)(k) + (W)(L) \quad ...(1)$$

where W = wage rate and r = price of capital services. The slope of the iso-cost line is equal to the ratio of the prices of the factors of production:

$$\text{Slope of iso-cost line} = \frac{W}{r}$$

Proof: A

If we assume the total cost outlay of the farmer to be C and the total amount is spent on capital equipment, the maximum amount, the farmer can buy of this factor is:

$$OA = \frac{C}{r}$$

If the total cost outlay is spent on labour, the maximum amount of this factor the farmer can purchase is:

$$OB = \frac{C}{w}$$

The slope of the iso-cost line is

$$\frac{OA}{OB} = \frac{c/r}{c/w} = \frac{w}{r}$$

The equation of an iso-cost line can be found by solving equation for K:

$$K = \frac{C}{r} - \frac{w}{r}$$

K is a linear function of L with C/r as the vertical axis intercept and (-) w/r as the slope of the iso-cost line.

1.4.6 LEAST COST COMBINATION – ARITHMETICAL CALCULATION

The problem of least-cost combination of factors refers to a farmer getting the largest volume of output from a given cost outlay on factors when they are combined in an optimum manner. Three methods can be used to find a solution to the cost minimisation problems.

(1) Simple Arithmetical Calculations

A simple way of determining the least-cost combination is that we calculate the cost of all possible combinations and then choose the combination which gives the minimum cost. In such calculation, we need data on the prices of inputs used. Assume a dairy farmer with two variable inputs, feed (X_1) and labour (X_2). The problem facing the farmer is to use inputs Xl and X2 in such proportions that for any given output, the cost outlay on X_1 and X_2 will be as small as possible. Assume that the price of X_1 is 0.75 per unit and of X_2 is Re. 1.0 per unit and there are nine combinations of inputs which can produce 100 units of the output. The total outlay on each combination can now easily be determined as shown in Table 4.3.

Table 4.3

Computation of Least-cost Combination of Two Inputs for Producing 100 units of Output

X_1	X_2 (px_1 =.75)	$PX_1 X_1$ (px_2 = Re.1.00)	$PX_2 X_2$	Cost
10	44.0	7.500	44.00	51.50
20	27.0	15.00	27.00	42.00
30	17.0	22.50	17.00	39.00
40	12.0	30.00	12.00	42.00
50	8.6	37.50	8.60	46.10
60	7.2	45.00	7.20	52.20
70	6.0	52.50	6.00	58.60
80	6.0	60.00	6.00	66.00
90	7.0	67.50	7.00	75.50

We notice from Table 4.3 that with a small amount of one resource, it takes a rather large amount of the resource to keep production constant. What combination of the two resources would be most profitable? Table 4.3 shows that 10 units of XI combined with 44 units of X2 would cost the farmer ₹ 51.50. But if X2 is reduced by 17 units and Xl is increased by 10 units, the resulting cost would be ₹ 42.00. Substituting 10 more units of Xl for 10 units of X2 further reduces the cost to ₹ 39.50. However, it will not be profitable to continue this substitution process further at the existing prices since the rate of substitution is diminishing rapidly. In Table 4.3 the least cost combination is 30 units of Xl used with 17 units of X2 when the cost would be minimum at ₹ 39.

This arithmetical method, though simple, may not be helpful in locating the true least cost combination because many combinations found on the isoquant to the right or to the left of the point may be left unconsidered.

1.4.7 GRAPHIC – EXPLANATION

The overall picture of the least-cost combination with two variable inputs can be presented in Fig. 4.11 which depicts both the isoquants as well as iso-cost curves. The parallel lines *ab, cd, ef* and gh are factorcost or iso-cost

curves. The slope of ab indicates the price of X_1 in terms of X_2 and all points on ab represent the same total cost. The greatest total output that can be produced from an outlay represented by the iso-cost line ab is determined by the point of tangency T between ab and an isoquant, in this case an output of 50. Thus, the lowest total cost at which 50 units can be produced is by using Op units of X_1 and O_q units of X_2.

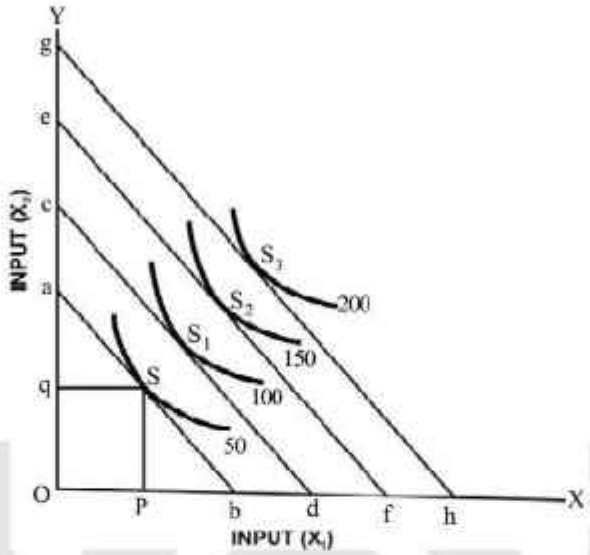

Fig. 4.11

Thus to achieve his aim of locating the least-cost combination of the two factors, the farmer must go to a point of tangency between an iso-quant and an iso-cost, because it is at this point that a given iso-cost comes into contact with the highest isoquant (maximum output at minimum cost) and a given isoquant comes in contact with the lowest iso-cost curve (given output at the minimum cost). We know where the isoquant is tangent to the iso-cost curve, the slope of the isoquant and iso-cost will be equal. The slope of the iso-cost line is equal to -py/px and the slope cf isoquant is equal to - MPP_y / MPP_x. So when both isoquant and iso-cost curves are tangential, we nave- $P_y / P_x = -MPP_y / MPP_x$

Minus sign will get cancelled on both sides, so we have:

$$\frac{MPP_y}{MPP_x} = \frac{P_y}{P_x}$$

or

$$\frac{MPP_x}{P_y} = \frac{MPP_x}{P_x}$$

In other words, the economic combination of factors is achieved when the return from the marginal rupee spent on one factor is equal to the return from the marginal rupee spent on the other factor.

Equation (1) may also be written as:

$$\frac{1}{Px_1} \cdot \frac{\Delta Y}{\Delta X_1} = \frac{1}{Px_2} = \frac{\Delta Y}{\Delta X_2} \left\{ Since\ MPPx = \frac{\Delta Y}{\Delta X} \right\}$$

We can assume that two ΔY's are equal, making it possible to divide both sides of the equation by ΔY to obtain.

$$\frac{1}{PX_1} \cdot \frac{\Delta Y}{\Delta X_1} = \frac{1}{Px_2} \cdot \frac{1}{\Delta X_2}$$

or $$PX_1 X_1 = PX_2 . X_2$$

$$\frac{\Delta X_1}{\Delta X_2} = \frac{PX_2}{PX_1}$$

But the ratio $\Delta X_1/\Delta X_2$ is called the marginal rate of substitution of X_2 for X_1. So another way of stating the necessary condition is that the marginal rate of substitution of the resources must be equal to their inverse price ratio.

1.4.8 ALGEBRAIC METHOD

The equation (2) above provides the procedure of finding leastcost combination using the algebraic method. It can be calculated by computing:

(a) Marginal substitution ratio = $\frac{\Delta X_1}{\Delta X_2}$

(b) Price ratio = $\frac{PX_2}{PX_1}$

(c) By equating both, we have:

$$\frac{\Delta X_1}{\Delta X_2} = \frac{PX_2}{Px_1}$$

or $$PX_1 . DX_1 = DX_2 . DX_2$$

So at the point of least cost combination, $PX_1 . \Delta X_1$ should be equal to $PX_2 . \Delta X2$. At any point where $PX_1 . \Delta X_1$ exceeds $PX_2 . \Delta X_2$ the cost of production could be reduced by increasing the use of X_2 and decreasing the use of X_1 because the additional cost incurred for increasing X_2 would be less than the cost of replaced units of X_1.

The fact that many decisions in agricultural production revolve around more than two variable factors does not negate the conditions under which cost or resource outlays are minimised. The principle can well be extended to any number of factors. If a production process can employ three substitute recources X_1, X_2 and X_3 the minimum costs for a given output are realized when:

$$\frac{\Delta X_1}{\Delta X_2} = \frac{PX_2}{Px_1}$$

$$\frac{\Delta X_3}{\Delta X_2} = \frac{PX_2}{Px_3}$$

$$\frac{\Delta X_3}{\Delta X_1} = \frac{PX_1}{Px_3}$$

(4) Expansion Path

We may now study how the farmer will change his factor combinations as he expands his output, given the factor prices. The prices of the two inputs (X_1 and X_2) are indicated by the slope of KL isocost line as shown in Fig. 4.12. The other three iso-cost lines K_2L_2, K_2L_2, K_3L_3 represent successively increasing levels of outlay on the two inputs.

If the farmer chooses to produce the output level denoted by isoquant P_1, then it will choose the factor combination Q_1 which minimises cost of production. If he now decides to double his output to P_2, the lowest cost combination of factors would be determined by the point of tangency between iso-cost K_1L_1 and the isoquant P_2, that is, combination Q_2 in the figure. If the input prices remain unchanged, that is, the slope of the iso-cost lines remain unchanged, the lowest cost combinations of the factors X_1 and X_2 as the farm output is increased, will be traced through the tangency points Q_1, Q_2, Q_3, and Q_4. The line DC joining these minimum cost combination points is known as the expansion path or isocline. It indicates the lowest cost combination of variable factors of production for successive output levels. It also indicates how the relative proportions of the factors change as output is increased.

1.4.9 DIFFERENT TYPES OF RELATIONSHIPS

Farm products may have different relationships to each other. These basic product-relationships can be: joint products, complementary, supplementary and competitive products. Before we discuss the profit maximisation product combination, it would be appropriate if an introduction to these product-relations is given.

Joint Products

Joint products are produced through a single production process. One of the products cannot be produced alone but must be accompanied by one or more products. All agricultural products are mostly joint products. For example, wheat and straw, mutton and wool, corn and stocks, hogs and manure are produced jointly. The case of joint products is depicted diagrammatically in Fig. 4.1.

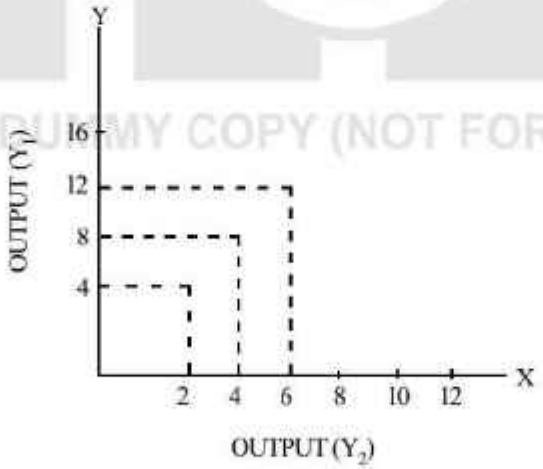

Fig. 4.12 Production Possibilities for Joint Products.

For short period analysis, joint products may be treated as a single product. But in the long-run, adjustment can be made in the combination, say of mutton and wool, by selecting alternative breeds of sheep, if the price of one product is higher than that of the other.

Complementary Enterprises

Two products are technically complements to each other when an increase in output of the one, with resources held constant in amount, also results in an increase in output of the other.2 For example, forage serves in a complementary capacity to grain in many areas. The hay crop adds nitrogen and organic matter to the soil and increases per acre grain yields far enough to give a greater total grain crop from feweracres. Within limits, therefore, both grain and forage crops can be increased together as we shift land and labour from grain to hay. Complementary relationship has been depicted in Fig. 4.13.

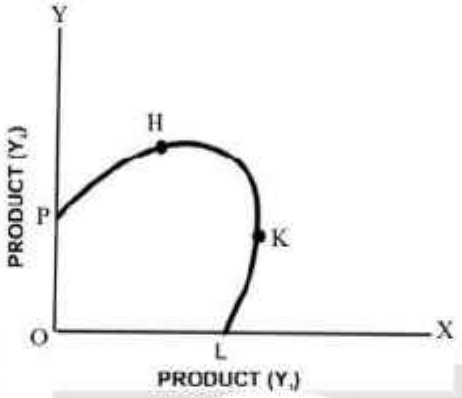

Fig. 4.13 Production Possibility Curve Showing Complementary Relationship

In Fig. 1.9.2 the range of complementarity is from point P to H and from point K to L. Thus, we find that two enterprises are never complementary over all possible combinations of the two. The complementary relationship always gives way to competition. If we extend forage far enough in the rotation, grain production must eventually decline. However, as long as two products remain complementary, we should try to rearrange our resources in the direction of one which provides this relationship.

Supplementary Relationship

This relationship exists when, with resources constant, output of one product can be increased without gain or sacrifice in another product. For example, a small poultry enterprise is supplementary to the other enterprises on many farms. Dairying is also a semi supplementary enterprise in many farming regions. Fig. 4.13 shows supplementary enterprise relationship.

Competitive Relationship

Competing products are those which compete for use of the farmer's resources. With limited resources at the disposal of farmer, all crop and livestock enterprises become competitive at some point. With two competing products, the use of resources to produce more of one necessitates a sacrifice in the amount of the other product. When the two products are competitive, they may substitute at a constant rate or increasing rate.

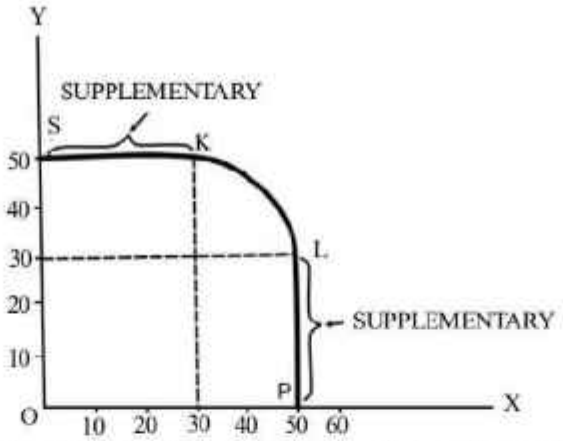

Fig. 4.14 Production Possibilities and Range of Supplementary Enterprises

Constant Rate of Substitution

Two crops would substitute for each other at constant rate if an increase in one necessitates the same decrease in the quantity of the other. This relationship has been depicted in Fig. 4.4.

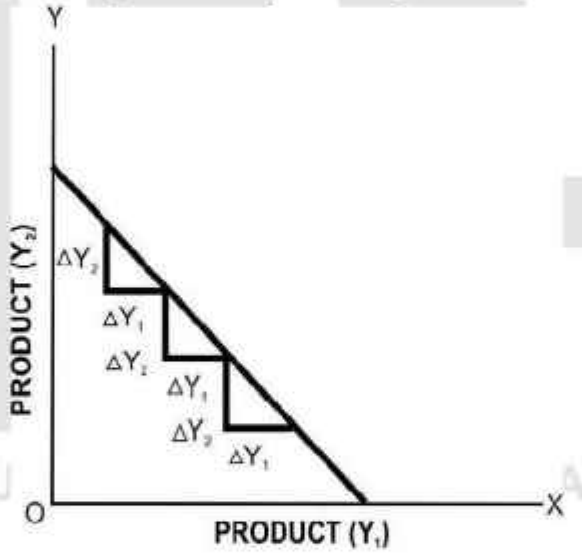

Fig. 4.15 Competitive Products Substituting at Constant Rate

This relationship may be true only in the short period and under constant rate of substitution, it pays to specialise in the production of only one product depending upon the relative prices of two products.

Increasing Rate of Substitution

Increasing rate of substitution refers to a situation where an increase in one product requires greater and greater sacrifice in terms of the other product that can be produced within the same resource mix. For example, rice and maize will substitute at an increasing rate for capital and labour. When more land is brought under rice, there will be greater and greater need to decrease maize acreage in order to release capital and labour for rice production. This relationship has been shown in Fig. 4.15.

It is evident from Fig. 4.15 that as the production of Y_2 increases in equal units (ΔY_1), production of *Y* decreases by larger and larger amounts.

Restatement of Enterprise Relationships

All relationships discussed above may now be expressed in a summary form :

Marginal rate of substitution	Enterprise relationship
$\Delta Y_1/\Delta Y_2$ or $\Delta Y_2/\Delta Y_1$ < zero	...Competitive
$\Delta Y_1/\Delta Y_2$ or $\Delta Y_2/\Delta Y_1$ = zero	...Supplementary
$\Delta Y_1/\Delta Y_2$ or $\Delta Y_2/\Delta Y_1$ > zero	...Complementary

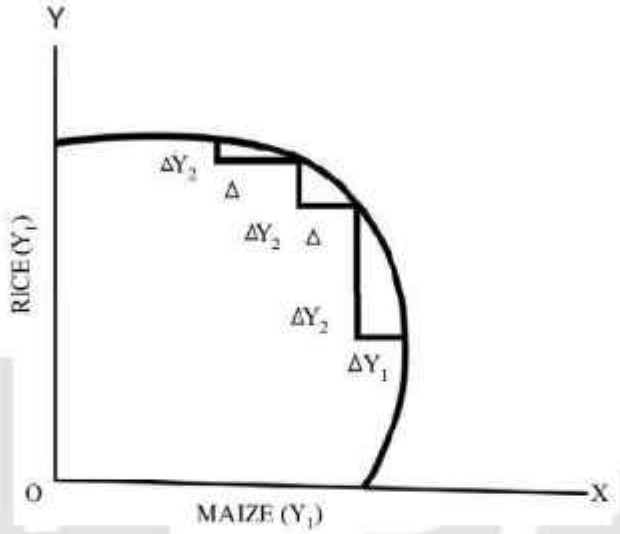

Fig. 4.5 Increasing Rate of Substitution

1.4.10 PRODUCTION POSSIBILITY CURVE

The production possibility curve (or transfomation or iso resource curve) describe the bundles of products which can be Produced with a set of given inputs. In order to fully understand the concept, let us take the help of an example. Let us suppose the seasonal production possibilities for the farm are those as shown in Table 4.1.

Table 4.1
Production Possibilities of Rice and Maize

Possibilities	Output of Rice Y_1	Output of Rice Y_2
A	0	150
B	125	125
C	225	50
D	250	0

If the hypothetical data contained in the Table 4.1 are diagrammed in Fig. 4.6, we get a curve FE, which may be called the farm's seasonal production possibility curve.

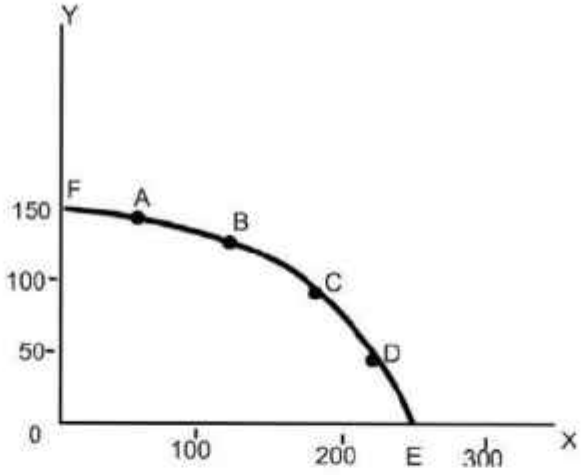

Fig. 4.6 Production Possibility Curve

As is evident from Fig 4.6., if all the resources are diverted to the production of Y_2, 150 units of Y_2 will be produced and no Y_1. On the other hand, if all resources are diverted toward the production of product Y_1, then 150 units of Y_1 will produced. But these are two extreme production possibilities. In between these two, there will be many other production possibilities such as *A, B, C, D*. As the farmer moves from production possibility *F to E*, it withdraws some resources from the production of product Y_2 and devotes them to the production of Y_1. Thus, our farmer, with the given resources, can produce more of one product only by cutting down the production of the other product.

The shape of the production possibility curve is concave to the origin, its slope being greater at C than at B. This means that as the output of Y_1 is increased, the sacrifice of Y_2 output becomes larger and larger. The concavity of the curve signifies increasing opportunity cost of one output in terms of the other. For each additional unit of Y_2 output sacrificed, the gain in Y_1 output becomes smaller and smaller.

1.4.11 ISO-REVENUE LINE

Before the farmer can decide about the profit maximising product combination, he must take into account the total revenue based on the prices of two products. If we assume the selling prices of two outputs Y_1 and Y_2 to be PY_1 and PY_2' the total revenue of the farm firm will be

$$TR = Y_1 \cdot pY_1 + Y_2, PY_2$$

The total revenue of the firm can be depicted by a straight line *TR* as shown in the Fig. 4.7.

Straight line *TR* is knows as the iso-revenue line or price line and may be defined as the locus of product combinations that will earn the same revenue. The slope of the iso-revenue line is given by:

$\frac{PY_1}{PY_2}$ because the slope of the line $TR = \frac{OT}{OR} = \frac{Y_2}{Y_1}$ and

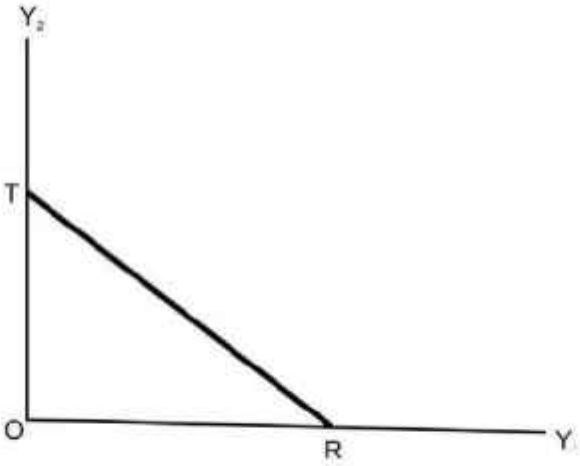

Fig. 4.7 ISO-revenue line

since $Y_2Py_2 = Y_1.Py_1$

$$\frac{Y_2}{Y_1} = \frac{Py_1}{Py_2}$$

1.4.12 OPTIMUM COMBINATION OF TWO PRODUCTS

The problem before our farmer now is the determination of the most profitable resource allocation when two or more products are being produced. The problem is to determine the best combination of products for a given outlay of resources or the best use of resources for a given combination of products. The simple method to find out the optimum level of two products is to calculate the total net revenue which the farmer can derive from different combinations and choose the one which brings him the highest returns. The data in Table 4.2 can be used to demonstrate the solution to this problem. The prices of two products Y_1 and Y_2 have been assumed to be ₹ 7 per kg. and ₹ 10 per kg. respectively.

Table 4.2

Determination of the Most Profitable Combination of Two Levels of Resource Use

Product relationships when 1000 units of X is used

Product Y_1	Product Y_2	ΔY_1	ΔY_2	$PY_1 \cdot Y_1$	$PY_2 \cdot Y_2$	Total Revenue
		₹	₹	₹		
0	78			0	780	780
10	76	+10	2	70	760	780
20	72	+10	-4	140	720	860
30	67	+10	5	210	670	880
40	61	+10	-6	280	610	890
50	48	+10	-12	350	480	830
60	28	+10	-20	420	280	700
70	0	+10	-28	490	0	490

It is evident from Table 4.2 that the combination of 40 units of Y_1 and 61 units of Y_2 yields the maximum revenue to the farmer (₹ 890). This method, however, is not workable because there are numerous combinations of the output that exist along the production possibility curve and the calculation of total revenue resulting from each combination is very difficult, rather impossible, It would be useful, therefore, to use graphic and algebraic methods to determine the best possible combination.

1.4.13 GRAPHIC METHOD

The maximum return combination of output can be found out with the help of production possibility curve and iso-revenue line. Suppose the amount of resources at the disposal of the farmer is such as is denoted by the production possibility curve PP1 as shown in Fig. 4.8.

The farmer will choose a product combination lying on this production possibility curve which maximises its revenue. Farmer in this case will produce a combination of Y_1 and Y_2 as indicated by the point *h*; in so doing, he maximises his total revenue because h is on the highest attainable iso-revenue line. At point h the highest iso-revenue line is tangent to the production possibility curve. The level of revenue represented by *ER* is not attainable with the resources upon which the production possibilities curve is based. The level of revenue represented by *AB* is attainable but our rational farmer will not produce at points *L* or *K* because he can move to a higher iso-revenue curve *CD*. At point h where the production possibility curves is tangential to the highest iso-revenue curve, the two slopes (the slope of the iso-revenue line and the slope of the production possibility (curve) are equal. At this point, therefore, the marginal rate of transformation is equal to the price ratio since the slopes of the production possibility curve and iso-revenue line are equal at the tangency point. Thus at this point:

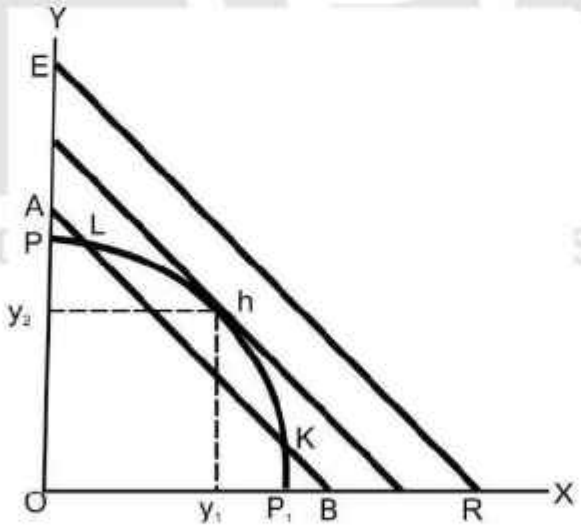

Fig. 4.8 Selection of Optimum Combination of Two Competing Products.

$$MRTy_1y_2 = \frac{Py_1}{Py_2}$$

Where pY_1 represents price of good

Y_1 and PY_2 is the price of good Y_2

As resources at the disposal of farmer increase, he may wish to expand his output. The pattern of expansion which should be followed can be indicated by the expansion path as shown in Fig. 4.9

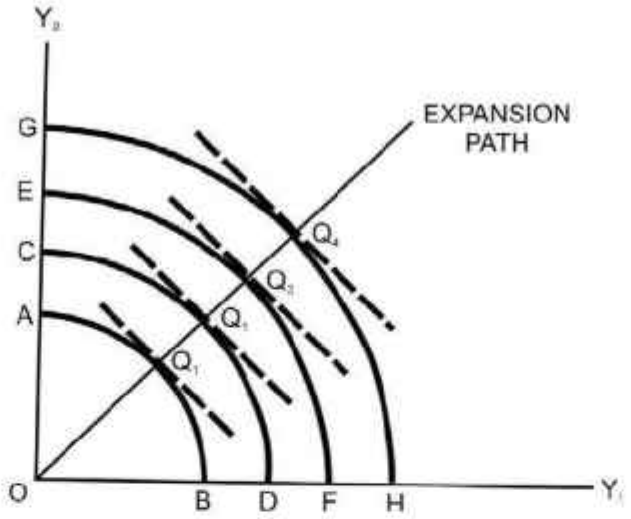

Fig. 4.9 Expansion Path with the Iso-revenue Lines and Production Possibility Curve Tangency Points

The expansion path is derived by joining all the points of tangency between the broken iso-revenue lines and the production possibility curves.

1.4.14 ALGEBRAIC METHOD

The farmer will optimise his position by maximising his profits subject to a given production possibility curve. We have already noted that the optimum combination of outputs for the farmer is attainable at a point where the iso-revenue line is tangent to the production possibility curve and at this point, the marginal rate of transformation of outputs equals the ratio of their prices.

Mathematically, we can write the total revenue function as

$$R - Y \,.\, pY_1 + Y_2 PY_2 \qquad ...(1)$$

and the cost function as

$$C = f(Y_1, Y_2) \qquad ...(2)$$

because C will be the function of the ,goods to be produced.

Profit function can then be set as

$$M = R - KC \qquad ...(3)$$

where K is an undetermined Lagrangian multiplier.

Substituting from (1) and (2) in (3) we get:

$$M = Y_1 \,.\, PY_1 + Y_2 \,.\, PY_2 - Kf(Y_1, Y_2) \qquad ...(4)$$

Maximisation of M implies that

$\partial M / \partial y_1 = 0$ and $\partial M / \partial y_2 = 0$

Differentiating (4) partially with respect to Y_1 and Y_2

$\partial M / \partial y_1 = Py_1 - Kfy_1 = 0$ .....(5)

$\partial M / \partial y_2 = Py_2 - Kfy_2 = 0$ .....(6)

Where $fy_1 = \partial f / \partial y_1$ and $fy_2 = \partial f / \partial y_2$

Solving (5) and (6) for K, we have

$fy_1 / fy_2 = Py_1 / Py_2$

Which shows that $MRTy_1Y_2$ should be equal to PY_1/PY_2 in order to maximise profits or to choose the optimum combination of Y_1 and Y_2.

1.4.15 APPENDIX

The equilibrium conditions of the farmer can be studied under two heads:

(i) Maximisation of output subject to a cost constraint; and

(ii) Minimisation of cost for a given level of output.

Case 1: Maximisation of output subject to a cost constraint (Financial constraint)

We assume that for the farmer —

(a) Production function is given:

$X = f(L,K)$, and

(b) Factor price wand r for labour and capital respectively are given.

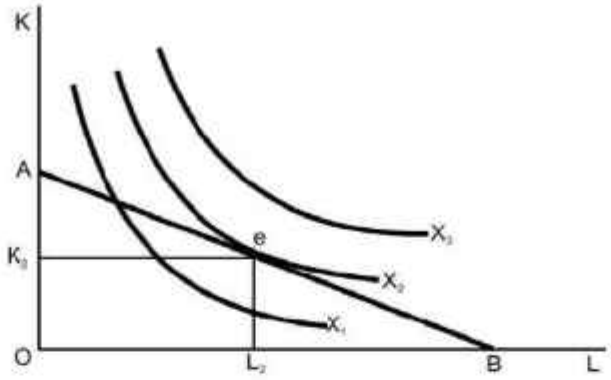

Fig. 4.10

In Fig. 4.10,. the maximum amount of output that the farmer can produce, given the cost constraint, is X_2 defined by the tangency of the iso-cost line, and the highest isoquant at point *H*. At this level of output K_2 amount of capital and L_2 amount of labour will be utilised for prices *w* and *r*. Higher levels of output are desirable but cannot be obtained due to the cost constraint. All other points either on *AB* or below it lie on a lower isoquant than X_2. Hence X_2 is the maximum output our farmer can produce under the above assumptions.

The conditions for equilibrium of our farmer are:

(a) Slope of isoquant = Slope of Iso-cost.

$$or \quad \frac{MP_L}{MP_K} = \frac{w}{r} = \frac{\partial X}{\partial L} \frac{\partial X}{\partial K} = MRS_{LK}$$

(b) The isoquant must be convex to the origin.

If this condition is not fulfilled, say, the isoquant is concave at the point of tangency with the iso-cost, the point of tangency does not describe the point of equilibrium (see Fig. 4.10)

In Fig. 4.10 input X_2 can be produced with a lower cost at, say, h_1, which lies on a lower iso-cost curve *h*.

1.4.16 MATHEMATICAL DERIVATION

The above equilibrium condition may be mathematically derived by applying calculus and solving a "constraint maximum" problem.

Maximise $X = f(L, K)$

Subject to $\overline{C} = wl + rk$ (cost constraint)

The above problem can be solved by using Langrangian multipliers. This can be solved as follows:

Constraint can be written as

$\overline{C} - wl - rk = 0$

Let this equation be multiplied by λ, which is Langragian multiplier:

$\lambda (\overline{C} - wl - rk) = 0$

The form of "composite" function, therefore, is

$$\phi = X + \lambda (\overline{C} - WL - rK)$$

Maximisation of the ϕ function implies maximisation of output. The first condition for the maximisation of ϕ is that partial derivatives of ϕ, with respect of k, l and λ). equal to zero.

$$\frac{\partial \varnothing}{\partial L} = \frac{\partial x}{\partial L} + \lambda(-w) = 0$$

$$\frac{\partial \varnothing}{\partial K} = \frac{\partial x}{\partial K} + \lambda(-r) = 0$$

$$\frac{\partial \varnothing}{\partial \lambda} = c - wL - rK = 0$$

Solving the first two equations for λ we obtain:

$$\frac{\partial x}{\partial L} = \lambda w \quad or \quad \lambda = \frac{\partial x/\partial L}{w} = \frac{MP_l}{w}$$

$$\frac{\partial x}{\partial K} = \lambda r \quad or \quad \lambda = \frac{\partial x/\partial k}{r} = \frac{MP_k}{r}$$

The two expressions must be equal thus:

$$\frac{\partial x/\partial L}{w} = \frac{\partial x/\partial k}{r} \; or \; \frac{MP_L}{MP_k} = \frac{\partial x/\partial L}{\partial X/\partial k} = \frac{w}{r}$$

Hence our farmer will be in equilibrium when the equates the ratio of the marginal productivities of factors to the ratio of their prices.

The second-order conditions are:

$$\frac{\partial^2 x}{\partial L^2} < 0 \text{ and } \frac{\partial^2 x}{\partial K^2} < 0$$

These conditions are sufficient for establishing the convexity of the isoquants.

Case 2: Minimisation of cost for a given level of output.

In this case, our farmer wants to produce a given output (say, wheat) with the minimum cost outlay.

In Fig. 4.11. we have a single isoquant X denoting quintals of wheat the farmer wants to produce. Corresponding to this isoquant, we have a set of iso-cost curves which have been drawn parallel because factor prices w and r have been taken to be constant.

The farmer will be producing the desired output X of wheat by employing the co~bination of *K* and *L* determined by the point of tangency of the *X* isoquant with the lowest iso-cost line. (Fig. 4.11).

Points below h are desirable since they show low costs but the required output cannot, be produced. Points above h show higher cost of producing the required output.

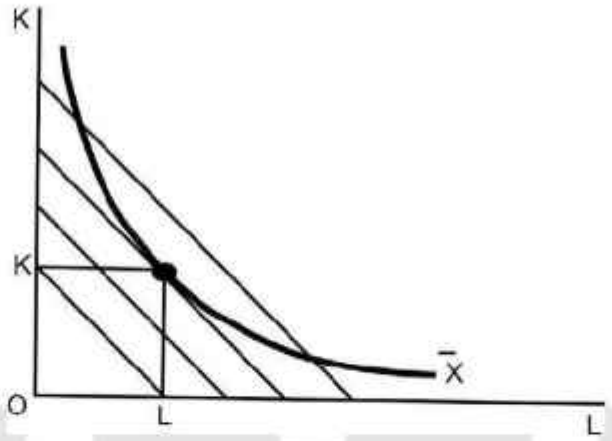

Fig. 4.11

The conditions for equilibrium, therefore, are the same as in case I, that is, equality of the slopes of the isoquant and the iso-cost curves, and convexity of the isoquant.

Mathematical Derivation

Minimise $C = f(x) = wl + rk$

subject to $X = f(L, K)$

Rewriting the constraint in the form

$X - f(L,K) = 0$

Multiplying the constraint by Langrangian multiplier, we have:

$\lambda (\overline{X} - f(L, K) = 0$

Forming the "composite" function,

$\phi = C - \lambda (\overline{X} - f(L, K)$

$\phi = (WL - rk) - \lambda (\overline{X} - F(L, K)$

Taking partial derivatives of ϕ *w.r* to L, K and λ and equating to zero we have:

$$\frac{\partial \phi}{\partial L} = w - \lambda \frac{\partial f(L,K)}{\partial L} = 0 = w - \lambda \frac{\partial \phi}{\partial L}$$

$$\frac{\partial \phi}{\partial K} = r - \lambda \frac{\partial f(L,K)}{\partial K} = 0 = r - \lambda \frac{\partial \phi}{\partial K}$$

$$\frac{\partial \phi}{\partial \lambda} = \left[x - f(L,K) = 0 \right]$$

From the above, we obtain,

$$W = \lambda \frac{\partial X}{\partial L} \quad r = \lambda \frac{\partial X}{\partial K}$$

Dividing through these expressions, we find

$$\frac{w}{r} = \frac{\partial X / \partial L}{\partial X / \partial K} = MPS_{L,k}$$

This condition is the same as in case I.

1.4.17 GENERAL CONDITION FOR OPTIMUM RESOURCES ALLOCATION

We have discussed equilibrium conditions for factor product, Factor-factor and Product-product relationship separately. We should, however, not conclude that these three relationships are independent of each other. These in fact represent three facets of the same equilibrium. There is one basic single condition for optimum allocation of resources from which rest of the equilibrium conditions have been derived.

We have observed in case of factor product relationship that a farmer should use so much of the given input that the marginal value product of the input is equal to the price of the input. In other words, the use of input X should be extended upto a point where:

$$\frac{\text{Marginal value product of X}}{\text{Price of X}} = 1$$

In case of Factor-factor analysis too, we have reached the similar condition. The necessary condition for cost minimisation is:

$$\frac{MVPX_2}{PX_2} = \frac{MVPX_1}{PX_1}$$

In Product-product analysis, farmer maximises his revenue when following condition is satisfied:

$$\frac{\text{MVPX}_1 \text{ in Producing Y}_1}{\text{Price of X}_1} = \frac{\text{MVPX}_2 \text{ in Producing Y}_2}{\text{Price of X}_1}$$

Now let us suppose, our farmer is using two inputs X and Yand is producing two outputs A and B. The general condition of equilibrium for the farmer will be:

$$\frac{\text{Marginal value productivity of X in Producing A}}{\text{Price of X}}$$

$$= \frac{\text{Marginal value productivity of X in Producing B}}{\text{Price of X}}$$

$$= \frac{\text{Marginal value productivity of Y in Producing A}}{\text{Price of Y}}$$

$$= \frac{\text{Marginal value productivity of Y in Producing B}}{\text{Price of Y}}$$

$= 1$

If the above condition is satisfied, the farmer would produce the two commodities at the lowest total cost, would make maximum total revenue and accordingly earn maximum total profit. The above given general condition can, however, be extended to cover more products as well as more input.

1.4.18 OBJECTIVE FUNCTION

Max: ₹ 400 × acres under rice + ₹ 800 × acres under cotton.

Resource Constraints and Resource Requirement Matrix

Resources	*Availability Level* *Rice (per Acre) x Cotton (per Acre)Y*	*Resource Requirements*	
(1) Land	500 (acres)	1	1
(2) Labour	128	16	32
(3) Cash (₹).	3,200	800	400
Return to Fixed Form Resource (₹)		400	800

The total revenue function may be written as follows:

$Z = 400X + 800Y$

Where Z is total revenue and X and Y stand for Maize and Cotton respectively.

The total revenue function is called the objective function because it expresses the objective of the farmer.

The farmer, in purshing the goal of maximum revenue has to face several constraints. We distinguish two types of constraints, technical constraints and non-negative constraints.

Technical constraints are set by the State of technology and the availability of factors of production. These constraints show that the quantities of factors which will be absorbed in the production of the commodities cannot exceed the available quantities of these factors. In our example, the technical constraints are the following three :

$1x + 1y < 5$

$16x + 32y < 128$

$800x + 400y < 3200$

The non-negative constraints express the fact that the production of the commodities cannot be negative since negative quantities do not make sense in economics. The level of production of anyone commodity can either be zero or positive.

Hence:

X>O

Y>O

From the above functions, the linear programming problem may formally be stated as follows:

Maximise Z = 400X + 800Y(Objective function).

Subject to $IX + IY \leq 5$

$16X + 32Y \leq 128$ [Technical constraints]

$800X + 400Y = 3299$

$X \geq 0$ [non-negative Constraints]

$Y \geq 0$

Graphical Solution:

Based on the above data, production possibility lines a curve can be drawn as shown in Fig. 4.12

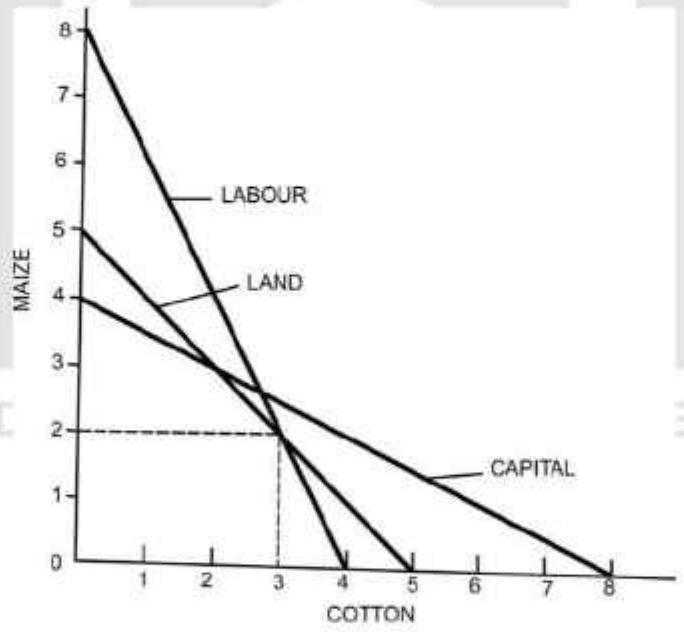

Fig. 4.12 Production Possibility Curve with More than One Input

The farmer can either grow 5 acres of rice or cotton or some combination of both - A line joining the 5 acres points on both the axis will show land maxima. Similarly, in case of labour, he can either

Produce 8 acres of rice $\left(\frac{128}{16}=8\right)$ or 4 acres of cotton $\left(\frac{128}{32}=4\right)$ or any combination within these limits. The labour maxima is depicted by the line joining these two points. In the same manner, we can a draw line showing capital maxima $\left(\text{Rice}\ \frac{3200}{800}=4 \text{ and Cotton } \frac{3200}{400}=8\right)$

From these three intersecting lines, we can draw a possible production possibility curve ABCD. Any combination of Cotton and rice on this curve is possible. In order to find out the optimum combination. We draw iso-revenue line based on returns to fixed resources.

The point of tangency between production possibility curve and iso-revenue line will indicate the optimum combination of two crops.

1.4.19 SUMMARY

In agricultural production process various types of factors are used and various types of products are produced. Farmers face the challenge of choice of a perfect combination to achieve optimum production. Every producer aims at producing the maximum return from his avail resources. Factors of production substitute each other through imperfectly.

Iso quants or equal product curves represent the given level of output for various combination of factors.

The combinations of inputs are

1. Factor proportion combination of inputs
2. Constant rate of substitution
3. Varying Rates of Substitution

Iso-quant that refers to the locus of various combination of inputs yielding the same or a particular level of outputs shows the negative slope and higher ISO quant means higher level of output it is an expression of marginal rate by technical substitution between factors of production.

A producer achieves equilibrium when finds the combination of factors of production. That be reaches when slope of the slope of isoquant

$$\text{Slope of the Iso cost line} = \frac{\text{Price of Labor}}{\text{Price of Capital}} = \text{MRTs}_{LK}$$

This is the basis for the least cost combination by achieving

(i) Minimum cost for a given level of output

(ii) Maximum output for a given level of cost

Product - product relationship explains basic relationships among the various products.

Production possibility curve or transformation curve or Iso resources curve is the bundles of product which can be produced with a set of given outputs.

Tangency between production-possibility curve and Iso-revenue lines determine the optimum combination for two products.

All the relationships and (Factor-factor, factor-product, product-product) explain the general condition for optimum resources-allocation.

1.4.20 SELF ASSESSMENT QUESTIONS

1. Define Iso-quants and explain their properties.
2. Examine combination of inputs through Iso-product curves.
3. Define and explain marginal rate of technical substitution in production.
4. Examine how does a producer achieve equilibrium via optimum factor combination through the expansion path.
5. Discuss the basic relationship between various product.
6. Define production possibility curve. Examine how the optimum combination of product can be achieved.
7. Explain the equilibrium conditions for a farmer through least cost combination.
8. Examine the general conditions for optimum resource allocation for multiproduct multi-input farm.

Key Words

1. **Land-Labor Relationship**: The interaction between land and labor inputs in agricultural production. This relationship examines how changes in the quantity and quality of land and labor affect agricultural output.

2. **Land-Capital Relationship**: The interplay between land and capital inputs in agricultural production. It involves analyzing the utilization of capital-intensive technologies and investments in land improvement to enhance agricultural productivity.

3. **Labor-Capital Relationship**: The interaction between labor and capital inputs in agricultural activities. This relationship explores how mechanization, technological advancements, and labor management practices impact agricultural efficiency and output.

4. **Substitution Effects**: The ability of one factor of production to substitute for another to maintain or increase output levels. For example, labor-saving technologies may allow for the substitution of capital for labor in certain agricultural tasks.

5. **Complementary Factors**: Factors of production that are used together to enhance productivity. In agriculture, land, labor, and capital often exhibit complementary relationships, where the efficient utilization of one factor depends on the presence and effective deployment of another.

6. **Factor Intensity**: The relative importance of different factors of production in agricultural activities. Different crops and farming methods may exhibit varying degrees of land, labor, and capital intensity based on factors such as crop type, technology adoption, and market conditions.

7. **Factor Mobility**: The ease with which factors of production can move between different uses or locations. In agriculture, factor mobility influences decisions regarding labor allocation, land use, and capital investment, impacting overall agricultural productivity and efficiency.

8. **Factor Productivity**: The efficiency with which inputs are transformed into outputs in agricultural production. Factors such as technological innovation, skill levels, and resource management practices affect factor productivity and ultimately agricultural performance.

1.4.21 Reference:

1. Land Economics-Renne

2. Progress of Land Reforms-U.N.O

3. Economics of Agricultural Production and Resource Use-Heady

4. Economic Organisation of Agriculture-Schultz

5. Introduction to Economics of Agriculture-Black

6. Economics of Agriculture-Cohen

7. Introduction to Agricultural Economic Analysis-Bishop and Toussiant

8. Agricultural Credit-Belshaw

9. Agricultural Price-Thompson and Foots

10. Readings in Agricultural Development (Ed.)-Khurgo

11. Agriculture in Economic Development (Ed.)-Eicher and Witt

12. Readings in Agriculture-Pramit Choudhury

13. Agricultures in an Unstable Economy-Schultz

14. Agricultural Price and Income Policy- Schultz

15. Marketing of Farm Products-Shepherd

1.5 Chapter

COST CURVES AND SUPPLY CURVES

Objectives

After completing this chapter, you will be able:

- To study the cost outlays of various productive services directly related to the laws of production
- To study the effect of varying the level of an input upon the total costs & cost per unit of output.
- To study the different types of cost per unit of output.
- To analyse which costs needs to be increased.
- To asses its relationship with proper maximisation.
- To study and derive the supply curves & their role on the production.
- To study the role of supply on the production process.

Structure:

1.5.1 DEFINITION OF COST

In large areas of the world, agricultural production is mostly a private business carried on in millions of farms. Efforts to promote agricultural progress to meet rising demand for its products, generated by the rapidly growing population, therefore, must be persuasive and must work through market forces. Price policy, therefore, is an important instrument for providing a boost to stagnant agriculture. In this connection, Theodore Shultz states,

"Since there is as yet no known way of organizing and integrating the production activities of numerous farmers among each other and with the rest of the economy except by a system of prices, the requirements of an efficient system of prices should have been high on the agenda."

The amount of change in agricultural production which is brought about by the farmers as a consequence of change in prices of agricultural products is known as supply response. Thus, the function of the factual change in per acre production of agricultural crop with respect to the change in its market price is known as the crop acreage response.

Farmer's response to price changes may be (i) direct positive price response, (ii) inverse price response, and (iii) insignificant price response. In theory, the producers are expected to act rationally to realise their goals. Working on this hypothesis, the farmers, in order to achieve a net income maximisation goal, must provide a positive response to price changes. According to Schultz, "The rate at which farmers who have settled into a traditional agriculture accept a new factor of production depends upon its profit with due allowance for risk and uncertainty and in this respect the response is similar to that in modern agriculture." He further states, "The doctrine that in poor countries farmers either are indifferent or respond perversely to changes in prices is patently false and harmful price policies based on it always impair the efficiency of agriculture".

Dealing with the question of supply response in underdeveloped agriculture, many studies have been undertaken both in the country and abroad. Dantwala, Schultz, Falcon and Raj Krishna have defended positive responsiveness of total production to price and other economic incentives. "On the other hand, economists who claim that price elasticity of supply in underdeveloped agriculture is zero or negative include O.R. Olson, Khatkhate and Kasum Nair."

In order to understand the exact behaviour of farmers to price changes, help is generally sought from empirical studies. For conducting empirical studies which measure supply response to price changes, two approaches have generally been followed

(1) Constructive Method Approach

This approach involves derivation of supply functions from available data and information relating to production functions and individual behaviour. Using this approach, some empirical studies have been conducted abroad but there is no such study on Indian agriculture attempted so far.

(2) Statistical Analysis of Time-Series Data

T3with respect to supply behaviour of agricultural produce using multiple regression method include Rao and Jai Krishan, Robert W. Herdt, D. Romesh and Raj Krishna,

Different Approaches To Study Supply Response

As already mentioned above, many empirical studies have been conducted to study the supply response in agricultural sector. These studies have made use of different methods. A brief introduction of these methods now follows:

(1) Simple Ratios and Link Relatives

The method of simple ratios is very simple. In this method, price and area or output are converted into index numbers and then the price index of previous year is related to the current year area or output index.

In the second method, use is made of relative data. The farmer can be expected to choose that crop, the. price of which has increased more than the price of others. Between the two crops, the area under each may be expected to increase in response to an increase in the price of the substitute. The ratio of supply of the two crops can thus be expected to increase in response to an increase in the ratio of their prices.

Relative prices and area and output are then transformed into link or chain relatives. This is done by expressing the relative price and area or output as a percentage of the preceding years. In case the prices of the preceding year and the area or output in the current year are moving in the same direction, area or output is said to be responsive to price changes. The rate of change can be expressed as so many index points or percentages.

In a slightly mbre advanced method, the ranks of changes in prices and acreage of different crops during the two periods are examined.

(2) A Simple Regression Model

Supply response hypothesis can also be tested with the help of simple regression analysis, the formula of which is :

$$A_i, t = ai + b_i P_i' t - 1 + i, t.$$

where, A_i, t = *Area in acres under crop in year t;*

$Pi\ t - 1$ = *Price in rupees per quintal of crop i in year t - 1;*

ai = *Regression constant;*

b_i = *Regression co-efficient;*

i, t = *Error term in regression for crop i in year t.*

In this model, the main assumption is that all other factors excepting price are held constant. The only factor which influences the area under a particular crop is its price lagged by one-period.

Regression analysis can also be expressed in terms of exponential model or Cobb-Douglas type production function:

$$A_i, t = a_i P_{i,} t_{-1,} i, t.$$

This function is linear in log values of both the variables and error term. Taking log, the equation can be written as:

$$log\ A_i, t = log\ a_i + b_i\ log\ P_i\ .\ t_{-1} + log\ i, t.$$

Some other algebraic forms such as Quadratic etc. can also be used depending upon the nature of observed data.

Nerlovian Model

Many of the empirical studies conducted to measure supply response to price have used the Nerlovian model. Narlove made an exercise to estimate the elasticity of supply of corn, cotton and wheat in the U.S.A. His work primarily dealt with the role of farmer's expectation of future prices in shaping their decisions as to how many acres they should devote to each crop. In his model, Nerlove has related expected normal price to past observed price.

While making production-decision in response to changes in economic environment, a farmer is faced with a number of constraints. It is very rare that he is able to make 100 per cent adjustment in response to various economic stimuli. Particularly in agriculture, which is subject to weather uncertainty or which is undergoing changes, in production technology, such constraints become still more severe. Under such conditions as are prevailing in most of the developing countries, the adjustment lag model is considered appropriate for measuring farmer's response behaviour.

The Nerlovian type model depicting the farmer's behaviour in its simplest fonn assumes that long-run supply. A_t to be related to P_t (the price) in a simple linear manner.

A standard version of this model is:

(1) $A_t = b_1 + b_2 p_t^* + b_3 Y_t + b_4 R_t + b_5 T + U_t$

(2) $P_t - P_{t-1} = b_1 (P_{t-1} - P^*_{t-1})$

(3) $A_t^* - A_{t-1} = b_t (A^*_t - A_{t-1})$

where,

A_t^* = *Desired acreage in time t ;*

A_t = *Actual acreage;*

P^*_t = *Expected relative price;*

P_t = *Actual relative price;*

Y_t = *Actual yield per acre;*

R_t = *Rainfall (average) or some other weather index; and*

T = *Trend variable.*

Equation (1) relates to the factors influencing the desired area. Equation (2) is the price expectation equation and equation (3) represents a partial supply response for a variety of crops.

After Nerlove, most of the empirical studies have been conducted making use of the Nerlovian model but with some modification.

Behrman has examined the Nerlovian dynamic total supply response model, using the area. planted in a crop of concern as the dependent variable, presuming the area planted to be a better index of planned production in the given conditions.

Raj Krishna, in a paper published in 1963, derived the estimating equation by using the Nerlovian adjustment model :

$X_t^* = a + bp_{t-1} + Cy_{t-1} + gz_{t-1} + hw_t + U_t$ ..... *(1)*

$X_t - X_{t-1} = B\,(X^*_t - X_{t-1})$ ..... *(2)*

where,

X_t^* = *Standard irrigated area expected to be planted;*

X_t = *Standard irrigated area actually planted,*

P = *Price relative of the crop;*

Y = *Relative yield of the crop;*

Z = *Total irrigated area under all crops;*

W = *Rainfall;*

U = *Error term;*

B = *Nerlovian co-efficient of adjustment.*

Raj Krishna asserts that if the non-price variables are correctly specified, it is possible to obtain significant net regression co-efficients and elasticities of price. It cannot be outrightly believed that in less developed countries, output is irresponsive to price changes nor can any general verdict be passed in this respect. However, the responsiveness of output to price varies between crops and regions.

Factors Affecting Supply Response of Agricultural Commodities in Under- developed Countries

There are many factors which affect supply response of agricultural commodities and price is only one of the factors. Irrigation facilities rotation of crops, rainfall and other weather conditions, availability m fertilizers and insecticides, seeds and many other factors influence the decision of the farmer in allocating the area to a particular crop. It is generally assumed that agricultural producers are economically rational and they respond positively to the price Stimulus. This proposition which is more true in developed countries like the USA and other Western European countries is not so easily accepted in the agricultural sector of underdeveloped economies. In underdeveloped countries, the production oriented price support policy does not necessarily bring forth an increase in output of food grains and that the reverse may often be the case. In the underdeveloped countries, agricultural pursuits are not taken as.a profession, rather as a way of life. There are many factors which affect supply response of farmers of underdeveloped countries which are discussed below.

1. **Size of Holding:** Farmers who own and cultivate small holdings devote a larger portion of the holding to foodgrains so as to meet their minimum subsistence requirement."Real difference between a small farmer and a large farmer lies not in their ignorance or knowledge of market forces but in their vulnerability. A large farmer can afford to take risk in regard to variation in income from his land after his consumption requirements are met. But with the small farmer, the situation is different. Smaller the peasant, higher the proportion of land he uses for the production of foodgrains, higher the risk he runs in shifting from foodgrain cultivation to the cultivation of commercial crops."
2. **Differential Productivity:** Sometimes, the productivity differentials are so large that the effect of small price changes is not noticed at all. Prof. Dantwala rightly says that "for some commodities, relative price change has to be quite substantial so as to reverse the relative profitability of the competing crops.
3. **Price Stability:** Price stability also influences the area under a crop. A ratior,al farmer would prefer to earn a low income but a stable one rather than take the risk of allocating the area to such crops whose prices fluctuate considerably. Profit maximisation is not the sole aim of the farmer. The very survival of the farm household is more important.
4. **Weather Conditions:** Weather, in particular rainfall, is a significant factor in supply response of farmers. In the wake of uncertain rains, farmers prefer to sow low income-yielding crops if these are drought resistant. On the other hand, farmers who receive assured water supply can enjoy greater freedom in planning production in response to price changes.
5. **Rotational Crops:** Rotation of crops also sometimes limits the farmer's freedom to allocate resources in response to price changes. "Unmindful of price changes, the farmer will like to rotate crops so that fertility of soil may be restored and essential chemical components of the soil are not exhausted by continuous repetition of the crop.

1.5.2 DIFFERENT CONCEPTS OF COST

The term cost generally, refers to the outlay of funds for productive services. Cost outlays for productive services are directly related to the laws of production; their structure is determined by the nature of the production function as well as by the level of prices and the nature of the market for productive services. Costs, like production functions, relate to a specific time period and include the value of the resource service transformed into ,product in this single period rather than the value of the resource itself.

Further, the economist's concept of cost differs from that of the accountant; this is a difficulty because the layman's concept of costs tends to be closer to that used in accountancy. The accountant is primarily concerned with paid-out costs, such as wages, seed bills, purchased feed and so on. The economist is, however, also interested in, what we may call imputed costs. These are costs such as the farmer's own labour, feed for livestock grown on the farm, and so on which are not covered by any monetary transaction, and yet do represent a use of real resources, which might have

been used to produce something else. Such costs can most easily be measured by estimating the monetary cost of the factors concerned if they had, in fact, been bought or hired.

The term "cost" is used in many senses. A terminological clarity is, therefore, essential to distinguish amongst them and to know when to use which.

Real Costs and Money Costs

The real costs of production (a philosophical concept) were defined by Alfred Marshall as, "the exertions of all the different kinds of labour that are directly or indirectly involved in making it together with the abstinences or rather the waiting required for saving the capital used in making it". But modern economists rarely employ this term; instead, they accept cost in money terms. Money cost of product for the farmer would mean the aggregate money expenditure incurred by him on the various items entering into the production of a farm commodity. The concept of real cost though of little significance in the analysis of price is more important from the social point of view. The real cost of a farm product would be the efforts and sacrifices undergone by the farmer in producing that commodity but the main difficulty with this concept is that efforts and sacrifices are subjective phenomenon and this cannot be subjected to accurate measurement.

Social Costs and Private Costs of Production

Another concept of cost which has become popular in recent times is social costs or opportunity costs. If by using a bundle of resources, X commodity is raised on the farm, the social cost of raising this commodity will be commodity Y which has been sacrificed. If a farmer raises paddy instead of maize, the social cost of raising paddy will be the amount of maize sacrificed in the process. It is also known as alternative or opportunity cost of production.

Private cost of production refers to the individual farmer and would include explicit costs (actual money expenses directly incurred in raising a farm commodity plus the monetary estimates of implicit costs). Implicit costs are the money value of those inputs which are supplied by the farmer himself. In the implicit cost, we may include money value of managerial services of the farmer, interest on his invested capital and rent on his own land. We may here distinguish between accounting costs and economist cost.

Economist Cost = Accounting Cost (Explicit Cost) + Implicit Cost.

A farmer would earn economic profit only if he is earning revenue in excess of the total accounting and implicit cost.

Fixed and Variable Costs

There are some inputs or factors which can be readily adjusted with the change in the output level. Thus, a farmer can readily employ more labour, more chemicals or more seeds without much delay if he has to expand production of a particular crop. These factors or inputs which can be readily varied in response to a change in output are known as "variable factors". On the other hand, there are certain input factors, such as land machinery, building etc. which cannot be varied early in the short period.

Corresponding to the distinction made between variable and fixed factors, economists draw a line between variable costs and fixed costs, the addition of which gives the total cost.

Fixed costs are those costs that do not change as output changes. These are independent of output and are a fixed amount which must be incurred by a farm firm in the short-run, whether the output is small or large. They will be maximum when output is zero and their incidence will go on decreasing as output is extended beyond the zero level. In the long-run, however, all costs become variable because more opportunities exist to arrange all the factors of production, including plants and machinery. A tax on land, for example, would be treated as fixed cost of production. A farmer pays

the same property tax if he raises 150 quintals of paddy on his land or leaves it fallow. The costs that are fixed include unpaid farm labour, taxes, depreciation, insurance, interest on borrowed capital and some maintenance repairs. Fixed costs on an Indian farm for a period of one year include.

(i) Land revenue or land rent;

(ii) Interest on investment in equipment and livestock;

(iii) That part of depreciation on buildings, machinery and livestock that does not vary with their use but results from the passage of time alone;

(iv) Insurance on buildings, equipment and livestock;

(v) Wages of labour hired on a year-round basis;

(vi) Cost of all family labour employed on the farm; and

(vii) Maintenance cost of farm work animals.

Variable Costs

Farming expenses which are a function of farm output are known as "variable costs". There will be no variable costs if a farmer decides to leave his land idle for a year. These costs, therefore, change with the quantity of production. These costs include payments such as wages paid to hired labour, the price of seeds, fertilizers, pesticides, fuel and power used, expenses incurred on transport and the like. Since variable costs are a function of output, total variable costs increase with the level of farm production. Variable costs play an important role since they help the farmer decide how much he should produce or whether he should produce at all. If the farmer is to carry on the production of a particular commodity, the variable cost must be less than the selling price. Variable costs on a typical Indian farm include.

1. Cost of current supplies such as seed, feed, fertilizer and water;
2. Labour hired occasionally;
3. Hired machines and other services;
4. Current repairs replacement which vary with the use of building and equipment; and
5. Interest on current investment.

1.5.3 DIFFERENT ELEMENTS OF COST (TC, TFC, TVC, AC, AFC, AVC, ATUC, MC)

Though we have divided the total cost of production into two broad categories of variable costs and fixed costs, there are seven cost concepts derived from the production that are used in economic analysis. They are:

1. Total Cost (TC).
2. Total Fixed Cost (TFC).
3. Average Fixed Cost (AFC).
4. Total Variable Cost (TVC).
5. Average Variable Cost (AVC).
6. Average Total Unit Cost (ATUC).
7. Marginal Cost (MC).

Table 20.1 provides hypothetical cost date illustrating the relation ship among the various cost concepts.

Table 5.1 Hypothetical Cost Data Illustrating the Relationship Among the Various Cost Concepts

Unit of Output	*Total Cost (TC) Rs.* ₹	*Total Fixed Cost (TFC)* ₹	*Total Variable Cost (TVC)* ₹	*Average Total Unit Cost (A TUC)* ₹	*Average Fixed Cost (AFC)* ₹	*Average Variable Cost (AVC)* ₹	*Marginal Cost (MC)*
0	50	50	0	-	-	0	
1	58	50	8	58.00	50.00	8.00	8.00
2	65	50	15	32.50	25.00	7.50	7.00
3	71	50	21	23.67	16.67	7.00	6.00
4	76	50	26	19.00	12.50	6.50	5.00
5	81	50	31	16.20	10.00	6.20	5.00
6	87	50	37	14.5	8.33	6.16	6.00
7	94	50	44	13.42	7.14	6.28	7.00
8	102	50	52	12.75	6.25	6.50	8.00
9	111	50	61	12.33	5.55	6.77	9.00
10	124	50	74	12.40	5.00	7.40	13.00

We may briefly discuss the above terms.

Total Cost (TC)

Total cost of production are made up of total variable costs and total fixed costs. Total costs also include both the explicit and implicit costs. Explicit costs are those expenses which the farmer makes in buying seeds, fertilizers, manure and other inpu ts and services directly. These also include the cash wages paid by the farmer to the hired labourers. Implicit costs, on the other hand, are imputed value of the farmer's own resources and labour. Total cost can be stated as an explicit function of the level of output plus the cost to the fixed inputs:

$$C = \phi (q) + b$$

where C = total cost

q = output

b = fixed costs.

Total Fixed Cost (TFC)

As already explained, total fixed cost represents the sum of expenditures which will be incurred, irrespective of the level of output. It is evident from Table 10.1 that whatever has been the level of output (from zero to 10), fixed cost has remained the same, say ₹ 50.00.

Average Fixed Cost (AFC)

Average fixed cost is the total fixed cost divided by the number of units of output produced. Therefore,

$$AFC = \frac{TFC}{q} \text{ or } \frac{b}{q}$$

Where q represents the number of upits of farm output produced.

Total Variable Cost (TVC)

These costs correspond to those factors of production whose supply is variable in the short period and change with the output. These costs are also referred to as "prime costs," "special costs" or "direct costs" .

Average Variable Cost (AVe)

Average variable cost can be calculated by dividing total variable costs by the number of units of output produced. Therefore,

$$AVC = \frac{TVC}{q} \text{ or } \frac{\phi(q)}{q}$$

As is evident from Table 5.1, average variable' cost starts falling as soon as production is extended from zero to normal capacity output due to the law of increasing returns. But once normal capacity is achieved, average variable cost starts rising beyond that point because of operation of the law of diminishing returns. This has been depicted in Fig. 5.1.

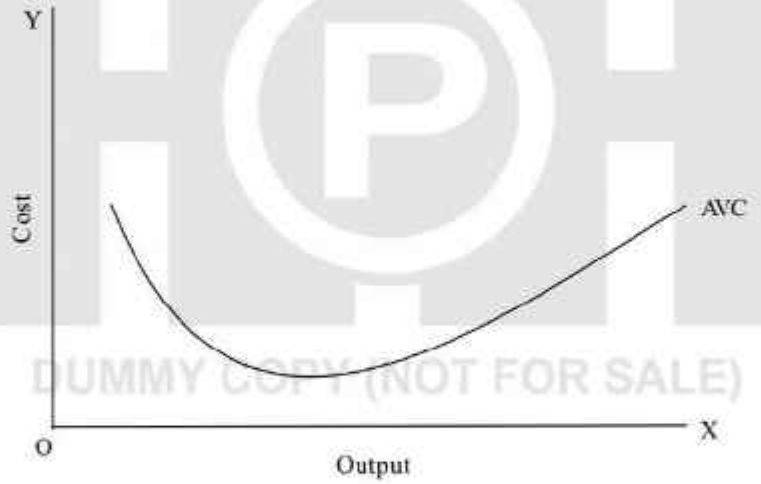

Fig. 5.1 Average Variable Cost Curve Average Total Cost (ATe)

Average total cost can be calculated by dividing the total cost by the number of units of output produced.

$$\left(ATV = \frac{\text{Total Cost}}{\text{Output}} \right)$$

$$\left(ATC = \frac{TC}{Q} = \frac{\phi(q) + b}{q} \right)$$

Since total cost is made up of total fixed cost and total variable cost, the average total cost is also the sum of average variable cost and average fixed cost.

$$ATC = \frac{TC}{Q}$$

Since, $TC = TVC + TFC$

$$ATC = \frac{TVC + TFC}{q}$$

$$= \frac{TVC}{q} + \frac{TFC}{q}$$

$$= AVC + AFC$$

Marginal Cost (MC)

Marginal cost is the addition to the total cost by the last unit of outpuL It is the addition to the total cost of producing n units instead of n-l units. Symbolically,

$$MC_n = TC_n - TC_{n-1}$$

Since marginal cost is the change in total cost as a consequence of adding one more unit, it can also be written as:

$$MC = \frac{\Delta TV}{\Delta q} \text{ where } \Delta TC = \text{increase in cost}$$

Δq = increase in output Marginal cost Marginal cost is the derivative of total cost with respect to output:

$$MC = \frac{dc}{dq} = \phi'(q)$$

Since fixed costs do not vary with output, marginal fixed costs are always zero. Therefore, marginal costs are necessarily marginal variable costs, and a change in fixed costs will leave marginal costs unaffected. For example, the cost of producing few more vegetables by farming a given amount of land more intensively is not affected by the amount of rent paid for the fixed amount of land. We can prove it with the help of simple algebraical illustration:

$$MC_n = TC_n - TC_{n-1}$$

$$= (TVC_n + TFC) - (TVC_{n-1} + TFC_{n-1})$$

but $TFC_n = TFC_{n-1} = K$

Therefore, $MC_n = (TVC_n + K) - (TVC_{n-1} + K)$

$$= TVC_n - TVC_{n-1}$$

Hence marginal costs are independent of the size of fixed costs.

Marginal cost plays an important role as it helps the farmer in deciding whether to continue production or not. The farmer will be willing to extend production so long as the revenue receipts from the last unit produced will be higher than the added cost incurred on this additional unit.

1.5.4 RELATIONSHIP BETWEEN COST CURVES AND PRODUCTION

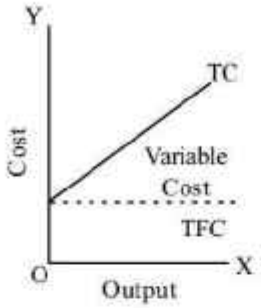

Fig. 5.2

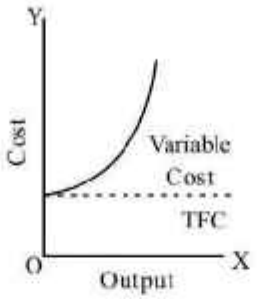

Fig. 5.3

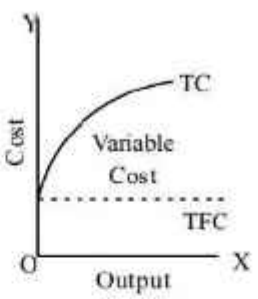

Fig. 5.4

The exact nature of the total cost curve depends on the nature of the production function which underlies it. Fig. 5.2 shows the total cost curve for a linear production function. The portion below the dotted line is the total fixed cost while that lying above is the total variable costs subject to constant marginal productivity. Fig. 5.3 represents the total cost function where the factor-product relationship is one of diminishing marginal productivity. Fig. 5.4 illustrates the cost components of a production process, reflecting increasing returns throughout.

A generalised cost function which includes a range both of increasing and decreasing returns is shown in Fig. 5.5. In this case, total costs increase at (1) a decreasing rate over the range of outputs consistent with increasing returns on the production function, (2) an increasing rate over the range of output defining decreasing returns on the production function. Point R on total cost curve is the inflection point, inpicating the change in TC rate of increase on the production function.

Total Cost Curve

Derivation of total cost curve from total fixed costs and total variable costs is depicted in Fig. 5.6. In Fig. 5.6 output is measured on the X-axis and cost on Y-axis. Since total fixed cost remains unchanged whatever the level of output be, TFC curve is parallel to the X-axis. On the other hand, TVC curve rises upward showing that as

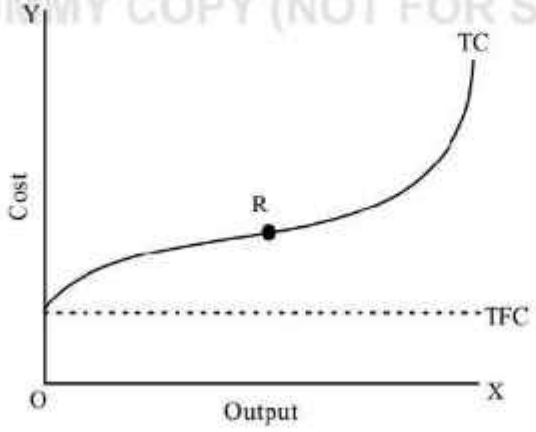

Fig. 5.5

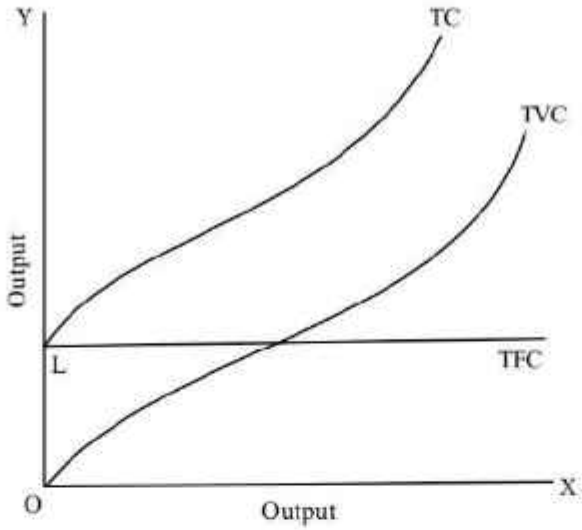

Fig. 5.6

the total output increases, the TVC curve will rise upward. TVC starts from the origin showing that at zero output. TVC will be nil. But in the figure, TC has started from point L on the Y-axis showing that even if no output is produced, a farmer will have to pay fixed costs to the extent of OL.

A verage total cost curve has been depicted in Fig. 5.7 A TC is the Sum of AVe and AFC. Average Fixed Cost is maximum when production is zero but starts falling steadily as production is increased. Average variable cost starts falling as soon as production is extended beyond zero to normal capacity output due to the law of increasing returns. But once normal capacity is achieved, A VC will start rising beyond

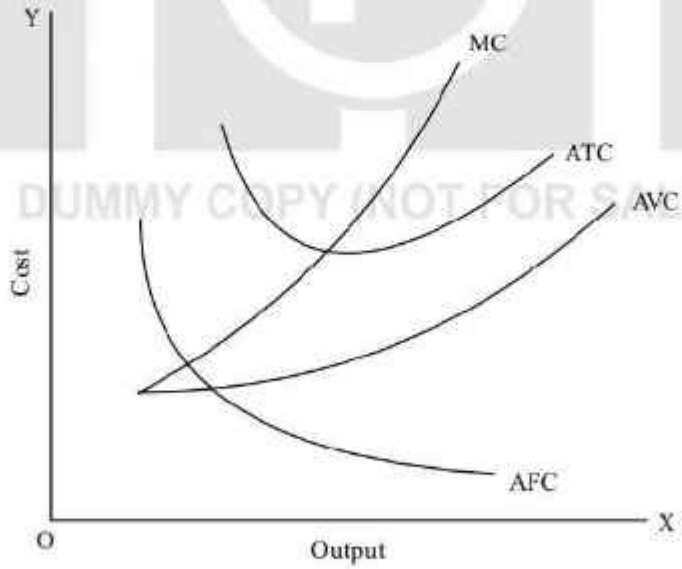

Fig. 5.7

that point because of the operation of the law of diminishing returns. The vertical distance between the average total cost curve and the average variable cost curve, at any point, measures, of course, the amount of fixed costs per unit. As expected, this distance diminishes as output rises, showing that the fixed costs are getting spread over more and more units of the product.

It is often helpful to obtain an algebraic expression of costs as a function of output e.g.; if e denotes total cost and X output, the total cost curve in Fig. 5.7 might be given as:

$$C = ax^3 - bx^2 + cx + d/x$$

Where a, b, e, and d are fixed numbers. Then average and marginal cost would be:

$$\frac{C}{X} = ax^2 + bx + c + d/x$$

$$\frac{dC}{dX} = 3ax^2 - 2bx + c$$

It will be seen that the constant d, the level of fixed costs which are independent of the level of output, disappears when we take the derivative of the total cost function to obtain marginal cost because a change in fixed costs does not affect marginal cost.

1.5.5 REVENUE RELATIONSHIPS

The revenue of a farm together with its costs determines profits reaped by the farmer. Mter having some knowledge of cost concepts, it is necessary now to study the concept of revenue since farmer's profit will be equal to the difference between its total revenue and total cost.

The term "revenue" refers to the receipts obtained by the farmer from the sale of certain quantities of farm products at various prices. The revenue concept relates to total revenue, average revenue and marginal revenue.

Total Revenue

It refers to the total amount of money that the farmer receives from the sale of his products, i.e., the gross revenue. This will vary with the farmer's sales. So we write,

$$TR = R(q)$$

Where TR is total revenue, q is total production over some period of time.

Total revenue is obviously equal to the quantity sold multiplied by the selling price of the commodity, i.e.,

$$TR = q \cdot p,$$

Where p is the price unit.

Average Revenue

It is calculated by dividing total revenue by the number of units sold, i.e.,

$$AR = \frac{TR}{q} = \frac{q.p}{q} = p$$

Evidently, the average revenue is the price of the product. So we write.

$$AR = p$$

From above relationship, it follows that the curve which relates average revenue to output is identical with the demand curve that relates price to output.

Marginal Revenue

It is the change in total revenue resulting from an increase in the rate of sales per period of time by one unit.

In general,

$$MR_n = TR_{n-1}$$

Under competitive conditions as they exist in agriculture, the amount of product which is sold by one farmer has no important influence on the market price. Since there are a large number of buyers and sellers, the farmer will receive the same price per unit whether he sells 100 quintals or 1,000 quintals of grain. In other words, each unit product sold adds the same amount to the total revenue or gross income. Accordingly, the total revenue curve for an individual farmer is of the general form presented in Fig. 5.8.

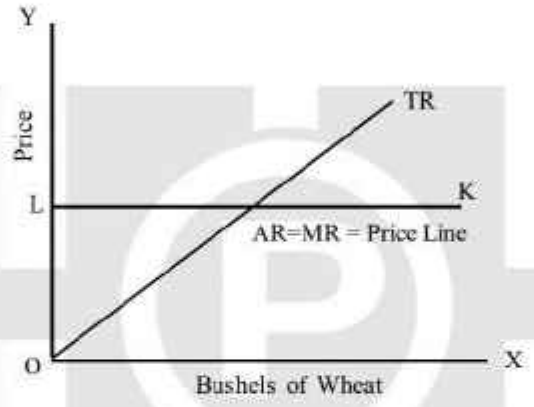

Fig. 5.8

The curve TR is linear indicating that each quintal of grain sold adds the same amount to the gross revenue.

Since the total revenue curve is linear, it can be proved arithmetically that both average revenue (AR) and marginal revenue (MR) are identical and constant at the market price as shown by the line LK in Fig'. 5.8. The price curve in this case will be horizontal to X-axis and MR will be equal to AR.

Graphically, the marginal revenue is the slope of the total revenue curve at anyone level of output. If demand curve for a farm commodity is linear, it is obvious that in order to sell an additional unit of X, its price must fall. Since the whole output will be sold at a new lower price, the marginal revenue will be equal to the price of the extra unit sold minus the loss from selling all previous units at the new lower price.

$$MR = P_{n+1} - (P_n - P_{n+1})\, Q_n$$

Where Qn is the quantity sold before the fall in price. It clearly shows that MR is smaller than the price, provided $[(P_n - P_{n+1}) = \Delta P]$ is positive and Qn is positive. Mathematically, the MR is the derivative of the total revenue (TR) function:

$$MR = \frac{d(TR)}{dQ} = \frac{d(PQ)}{dQ}$$

or $$MR = P + Q = \frac{dp}{dQ}$$

In case the demand curve is linear, its equation is:

$$Q = b_o - b_1 P$$

Solving for P,

$$p = a_o - a_1 Q$$

Where $$a_o = \frac{b_o}{b_1} \text{ and } a_1 = \frac{1}{b_1}$$

Substituting P in the total function, we have:

$$TR = PQ = a_o Q - a_1 Q^2$$

MR is then $$MR = \frac{d(TR)}{dQ} = a_o - 2a_1 Q_3$$

which shows that MR curve starts from the same point (ao) as the demand curve, and that MR is a straight line with a negative slope, twice as steep as the slope of the demand curve.

1.5.6 PROFIT MAXIMISATION

The farmer will reap maximum profits at a point where marginal revenue will be equal to marginal cost (MR = MC) The reason is evident; marginal revenue and marginal cost indicate additions to total revenue and total costs respectively. Hence, it pays the farmer to produce one more unit of output as long as the marginal cost is less than marginal revenue. In doing so, he is adding less to total costs than is added to total revenue. Production of one more unit is always unprofitable if marginal cost is greater than marginal revenue since more is added to total costs than is added to total revenue.

Thus, for a profit maximisation output, we may state two important rules.

Rule I. Farmer should not produce at all j.f the total revenue from selling the produce does not equal or exceed the total variable cost;

Rule II. Assuming that it pays the farmer to produce at all, it will be profitable for sum to expand output whenever marginal revenue is greater than marginal cost and to keep expanding output until marginal revenue equals' marginal cost.

These two rules can also be expressed in terms of three important conditions for the profit maximisation behaviour of the farmer. These conditions are:

1. For a given output to be the profit-maximising output, it is necessary that total revenue is equal to or greater than total variable costs. Or, in other words, it is necessary that average revenue (price) be equal to or greater than average variable cost.
2. For a given output to be the profit-maximising output, it is necessary that at that output MC = MR.
3. For a given output to be the profit-maximizing output, it is necessary that for slightly smaller output MR > MC, and that for slightly larger output MC > MR.

The above conditions can be depicted graphically. Under the competitive conditions as they exist in agriculture, the farmer is a price taker and hence cannot influence the market price. As such the total revenue curve is linear and both average and marginal revenue curves are identical and constant at market price as we have already drawn in Fig. 5.8 Conditions (2) and (3) have been graphically presented in the Fig. 5.9

In Fig. 5.9 output Oq_2 is a profit-maximising output because as output is increased up to Oq_2 each additional unit produced is adding more to revenue than to the cost. If we extend our output beyond Oq_2 each successive unit of output will add more cost than revenue. Marginal revenue is also equal to marginal cost at output Oq_1 but Oq_1 is not profit maximizing output because if output is extended beyond Oq_1, MR > MCwhich is contrary to the condition (2). Hence, only output Oq_2 satisfies condition (3).

We can also derive rules of profit-maximisation mathematically using elementary calculus.

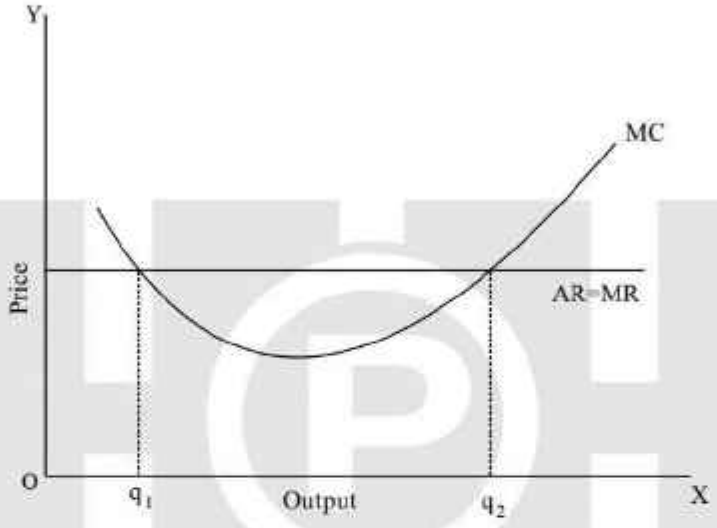

Fig. 5.9

Condition I

Profits π are defined as follows:

$$\pi = R - (FC + VC)$$

Where R = Total revenue

FC = Total fixed cost

VC = Total variable cost.

If the two conditions production and no production, are depicted by p and n respectively then it pays the firm to produce if

$$\pi p \geq \pi_n$$

If the firm does not produce, then Rand VC are zero and the profit condition (2) becomes

$$R - FC - VC \geq 0 - 0 - FC$$

or $R - FC - VC \geq - FC$

or $R \geq VC$

or dividing both sides by Q we get price ≥ A VC

Condition II

$$\pi = R - C$$

but both revenue and costs are the function of output and sales, so that

$$R = R(Q) \text{ and } C = C(Q)$$

Thus we have

$$\pi = R(Q) - C(Q)$$

Condition of profit maximisation implies:

$$\frac{d\pi}{dQ} = R'(Q) - C'(Q) = O$$

$$= R'(Q) = C'(Q)$$

But these derivatives stand for marginal revenue and marginal cost respectively, so that

$$MR = MC$$

Condition III

In order that we have a maximum and not a minimum for profits, the necessary condition is

$$\frac{d^2\pi}{dQ^2} = \frac{dMR}{dQ} - \frac{dMC}{dQ} < O$$

$$\frac{dMR}{dQ} < \frac{dMC}{dQ}$$

which means that the algebraic value of the slope of the marginal cost curve must exceed at the point of intersection, the algebraic value of the slope of the marginal revenue curve.

1.5.11 SUMMARY

Every production decision is affected by cost of production. Any rational farmer analyses cost of production to assess his profit. Every agriculturalist aims at reducing the cost to maximise his profit.

Cost refers to the outlay of funds for productive services these are directly related to the laws of production.

Cost may be money cost i.e. expressed on terms of money and real cost i.e the efforts and sacrifices involved on the process of production.

Fixed cost refers to outlay of a farmer on the fixed inputs. It is a short run cost. Variable cost refers to the outlay spent on variable factors of production.

On the quantum basis cost can be Total cost, Average cost and Marginal cost which may very depending upon time factor.

Cost of production has a relationship with revenue, which may be total revenue, Average revenue & Marginal revenue Both revenue determines profit maximaisation.

Equilibrium of a farm can be achieved by maximising profit

which can be MC=MR

& slope of MC > slope of MR

Shape or the cost curves vary depending upon the traditional and modern way of analysis and the time period. But normally AC is of U-shaped.

Supply curve shows the volume of products a producer can supply at different prices. Supply curve is an important concept in the theory of production and the agricultural farmer gets benefits regarding supply of his products. Supply curves is helpful to determine the equilibrium of the peasants. This is also vitally responsible for price-determination.

1.5.12 SELF-ASSESSMENT QUESTION

1. Explain the shapes of short run cost curves and the relationship between Ac and MC curves.
2. Explain the derivation of long run average cost curves.
3. Derive long-run total cost and short run cost curves.
4. Derive various cost curves and examine their relationship.
5. Discuss the various concepts regarding average cost and marginal cost.
6. Establish relationship between production function & cost curves.

Key Words

1. **Total Cost (TC)**: The total expense incurred by a firm in producing a given level of output, including both fixed and variable costs.
2. **Fixed Costs (FC)**: Costs that do not vary with the level of output produced in the short run, such as rent, insurance, and depreciation.
3. **Variable Costs (VC)**: Costs that change with the level of output produced, such as raw materials, labor, and utilities.
4. **Marginal Cost (MC)**: The additional cost incurred by producing one more unit of output. It is calculated as the change in total cost divided by the change in quantity.
5. **Average Total Cost (ATC)**: The total cost per unit of output produced, calculated by dividing total cost by the quantity of output.
6. **Average Fixed Cost (AFC)**: The fixed cost per unit of output produced, calculated by dividing fixed cost by the quantity of output.
7. **Average Variable Cost (AVC)**: The variable cost per unit of output produced, calculated by dividing variable cost by the quantity of output.
8. **Supply**: The quantity of goods or services that producers are willing and able to offer for sale at various prices during a specific period.
9. **Law of Supply**: The principle that, ceteris paribus (all else being equal), as the price of a good or service increases, the quantity supplied by producers also increases, and vice versa.
10. **Market Supply Curve**: A graphical representation of the total quantity of a good or service that all producers in a market are willing to supply at different prices.
11. **Movement Along the Supply Curve**: Changes in quantity supplied in response to a change in price, while other factors remain constant.
12. **Shift of the Supply Curve**: Changes in the quantity supplied at every price level due to factors other than price, such as changes in input costs, technology, or government policies.
13. **Elasticity of Supply**: A measure of the responsiveness of quantity supplied to changes in price. It reflects how sensitive producers are to price changes and is calculated as the percentage change in quantity supplied divided by the percentage change in price.

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14. Agricultural Price and Income Policy- Schultz

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2.1 Chapter

FACTORS: LAND UTILISATION

Objectives

After completing this chapter, you will be able:

- To assess the role of land in agriculture.
- To examine different types of land and their relative importance in agriculture.
- To analyse non-agricultural uses of land.
- To study the peculiarities of land as a factor of production.
- To study the possibilities of expanding land area.
- To evaluate the changing land use pattern.
- To find relationship between land utilisation and crop pattern.

Structure:

2.1.1 INTRODUCTION

Land is the first thing that comes to mind when one talks of agriculture. In fact, it is not possible to think of agriculture without the use of land. Not that the use of land in non-agricultural pursuits is less significant but the nature of the industry of agriculture and its various processes make the use of land central to agricultural pursuits. The concept of land as used in economics is very complex and is held to stand for all natural resources. Land in agriculture may, however, be used in a restricted sense though its complex form affects agriculture in several ways. To be precise, our discussions will be pertinent to "farm land".

Land has been man's most significant input in his production enterprise and it continues to be so, more particularly in the less developed countries of the world. The size of land-holding owned by a family unit determines its economic and social position in the society. Historically, man's affluence or poverty solely depended upon his control over farm land. Traditional methods of farming enabled him to increase farm output only by cultivating more land than he did before; as owing to the static technology, the possibilities of raising output through intensive cultivation did not exist. This resulted .in man's everlasting demand for more and more land. Man's urge to possess more land has also been due to lack of alternative possibilities of employing his labour and capital. Such situations do exist even now in the poorer countries of the world where farming is the single most productive enterprise providing livelihood to three-fourths of the population. The desire for more land is also stimulated because of its permanent value, indestructibility and immovability. These qualities have tended to inflate the value of land and the prestige of its possessor.

Land is also held to be the safest form of saving and insurance against a future financial crisis. With the population rising fast, the demand for land for various uses shall ever rise and increase its value continuously. Investment in land has, therefore, all along made it a more prestigious asset than cash or other movable assets. In a similar fashion, changing technology has tended to increase land productivity considerably and made it an ever sought after asset in low-income countries. With demographic explosion on the one side and the poor employment capacity of the non-farm sector, on the other - the demand for land is bound to increase.

2.1.2 ROLE OF LAND ON AGRICULTURE

Land is the basis of agriculture. Virtually all types of production depend on land, in general, and all agricultural production depends on it, in particular. Besides being the resource for crop, fodder, and forest production, it also provides space for building cities, roads, airports, health resorts, schools, industries and so on. So far as the role of land in agriculture is concerned, it serves as the source of food and fibre production, pastures and grazing lands and forests.

Food and Fibre Production: Food production and the existence of mankind go together. 'Among the three basic needs recognised for the existence of man, viz., food, shelter and clothing, food is the most important of all. Land serves as the key resource in food production. A significant land area is, therefore, devoted to the production of food crops. Through the process of evolution, man learned to wear clothes and have shelter from rain and sun. Land plays no less a role in acting as the basic resource for fibre production and also in providing space for man to build his shelter.

Over time, not only has man's requirement for food and fibre increased, he has also sought different varieties of food. Monocultures have since given way to multiple cultures. No longer do we raise a single crop from land, a variety of crops are raised to meet the multiple choices for man's food. Cropping patterns have to be adjusted in order to ensure better returns on the one side, and greater satisfaction, on the other. Changing technologies and tastes of people have led to frequent changes in the cropping patterns all over the world. Land has very patiently obliged man by offering itself to any form of exploitation that he designed. Ever growing requirements of food, fodder and fibre have led to the intensive use of land and this often reminds us of Ricardo's memorable phrase; "the original and indestructible powers of the soil". Land never felt exhausted nor shall it ever be to meet the food and fibre requirements of mankind.

Through technological development, of course, man has been able not only to restore to the land its inherent powers but has contributed a great way to improve these powers to raise higher levels of food output from a given stock of land. The importance of land as a basic resource of food and fibre production shall increase further as mankind's requirements will increase in future.

Pastures and Grazing Lands: Land is again a key resource for pastures and grazing lands which feed a growing livestock and help improve the supply of food to man. Since grazing lands do not fall under private ownership, the productivity of such lands is low. Nevertheless these lands play a significant role in feeding millions of cattle on the earth's planet. Most of these pastures and grazing lands are found in mountains where rugged topography and severe climate tell upon the productivity of land. The productivity of pastures and grazing lands can be improved considerably by promoting permanent pasture lands. It has been observed that permanent pasture lands under private control produce several times larger cattle feed than the unmanaged pasture lands. Keeping in view the grazing requirements of cattle feed, such steps as would increase the yield of grazing lands shall have to be taken and planned right now.

Forests: Land under forests serves man in several ways, in general, and agriculture, in particular. Forest wealth plays a pivotal role in the development of a region and to agricultural enterprises.. Forests contribute to the development of a region in three important ways:

(i) As a source of timber, firewood, medicinal herbs and aromachemicals, minor forest produce and charcoal. There can also be the source of energy in terms of wind-velocity and hydrodynamic pressure. Forest areas can also be developed as scenic tourist resorts. Forests are, in particular, important to agricultural development as these help in maintaining the ecological balance, soil moisture and perennial water supply.

(ii) Forests also offer scope for horticulture, plantation orchards, inter-culture, floriculture and pasture development and as such help directly and indirectly the development of agriculture in the region.

(iii) These also help in establishing agro-forestry-based industries and handicrafts.

As a source of timber and firewood, forests play an important role in the economy. Some forests are richly endowed with commercial timber which if exploited scientifically can contribute a lot to the development of the region in terns of income and employment. Forests also offer possibilities of intensive fodder development which may provide a basis for commercially viable animal husbandry programmes. Besides timber and firewood, forests supply a large number of minor products of immense utility.

A large number of agricultural enterprises can be undertaken on the forest lands such as horticulture, plantation crops, orchards, floriculture and pasture development. Hill lands offer ample scope for agro-forestry based industries and handicrafts. Forest lands provide a large variety of raw materials for setting up a number of small industries. These may include pulp, paper and hardboards, rosin and turpentine, sports goods, pencil industry, wicker work, match industry, drug and pharmaceuticals, aroma-chemicals, furniture and a large variety of other industrial enterprises. In a situation where farming refuses to absorb more work force, what can be more ideal than to use these forest lands and their enormous potentialities to create alternative sources of employment?

The role of land in agriculture may also be examined by considering the functions of land as a factor of production in agriculture.

Land as a factor of production performs two-fold functions: Land provides space for any productive enterprise to take place and also acts as the repository of all the elements necessary for the growth of plants and animals. Providing floor space both for farming and factory is the most fundamental function that land performs. Since, however, farming requires a larger floor space compared to industry, a major chunk of land is devoted to agriculture even in the most industrialised countries. This is so because of the very nature of agricultural industry.

Secondly, land serves as a repository of physical, chemical and biological elements which are of utmost necessity for the growth of plant and animal life. Unlike industry, agriculture greatly depends upon this function of land as without these qualities, land will become barren and unproductive. This while suggesting the significance of land in farming also suggests how important is the man's involvement in not exploiting the soil qualities alone but even in maintaining them

at the desired level. In fact, one of the definitions of agriculture is given as; "the utilization of the natural fertility of the soil for the production of commodities serviceable to man". Man has an honest duty of making a genuine use of soil fertility and replenishing it before it is lost beyond repair.

The role of land in agriculture can hardly be over-emphasised as shown in the preceding sections. Land shall continue to play a significant role in farm occupations and help in meeting man's requirements in this regard.

2.1.3 NON-AGRICULTURAL USES OF LAND

Although we are primarily concerned with the land in agriculture, a discussion on non-agricultural uses of land may not be quite out of place. The non-agricultural uses of land do have a bearing upon its efficiency in agricultural use.

The urban uses of land are enormous. With the growing urban population, the demand for land for purposes of urban settlement has gone up significantly. Though in towns, lesser lands are required to construct houses, build highways, hospitals, schools and public parks, yet the spurt in urban activities has been phenomenal resulting in a sharp rise in the demand for land in recent decades. Because of non-availability of employment opportunities in rural areas, developing countries are facing an unprecedented urban ward migration which has increased the demand for land for urban uses considerably. Greater industrialisation will exert a still stronger pull towards urban migration and land for urban uses shall be in great demand.

Land is required for recreation purposes. As a natural consequence of economic development and industrial tensions, the demand for recreation is increasing fast. It will be observed that recreation industry in the developed countries of the world is expanding faster than in the less developed countries where the extent of industrialisation is still low. Growing urban population and urge for outdoor visits have tended to decrease the per capital recreation land in the world. A large area of land is put under national parks, state parks and other public parks to provide open breathing space to the suffocated urbanites and industrial workers. Similar provisions in greater quantities shall have to be made for the future. Land shall have to be provided for fishing and hunting pursuits as well.

Another use of land is for purposes of transportation. Although it takes only a small proportion of total land, its use is fast increasing and in turn is affecting the other uses of land. Transport does not only claim a part of land but increases its use and efficiency for agricultural activities. Lands have to be provided for rail and road transport which is the single most vital item of infrastructure needed for speedier economic development. The land under highways and other roads is fast increasing and so is the case with the demand for land for the purpose of airports and railway lines. With increased mobility of man, the air, road and rail traffic continue to increase at a fast rate and more land shall have to be sought for these purposes.

Land also provides refuge to wild-life. The preservation of wildlife is set forth as one of the national goals and world-wide efforts are being made to save different species of wild-life from extinction. This is a known fact that clearing of larger forest areas encroached upon the liberty of flora and fauna and threatened its growth. Some of the wildlife is already extinct or some. is on the brink of extinction and more areas of land shall, therefore, have to be enclosed for its preservation.

The use of land also arises for making provision for water reservoirs. Land is needed for the construction of dams, barrages and canals. As the demand for water both for purposes of drinking as well as irrigation is bound to increase, greater provisions of land shall have to be made for these purposes.

Finally, land have to be spared for mining production, sand dunes, bricks and other such uses as well.

2.1.4 PECULIARITIES OF LAND AS A FACTOR OF PRODUCTION

Land as a factor of production has some important characteristics not common to the other factors of production. These characteristics may be listed as under:

(1) Land is subject to the law of diminishing returns;

(2) Land is limited in supply; and

(3) Land is heterogeneous in quality.

(1) Law of Diminishing Returns: This law is one of the oldest laws: in economics. Its application in land is most pronounces. To a given piece of land, other things remaining the same, the application of additional units of labour and capital yield positive but diminishing returns for each additional unit of input. The law is founded-on-the vast and varied experience of farmers allover the world. There is a limit beyond which output per farm does not increase and this universal phenomenon is known to agriculture for centuries now. Additional units of labour and capital may give rise to higher returns for sometime but soon it happens that returns per unit of input become smaller and smaller till a stage is reached when an additional unit of labour and capital does not yield any increase in output. Beyond this stage, it will be judicious not to spend more on these inputs.

It is fairly easy to understand this phenomenon of land because if it were not so, the urge and necessity for more land would not have been there. Farmers always find it to their advantage to extend the area of cultivation rather than increase intensity of cultivation on a limited piece of land. By doing so, they succeed in reducing the incidence of the law of diminishing returns. This also explains the need for having larger areas under agriculture than under non-agricultural pursuits.

(2) Limited Supply of Land: The second unique characteristic of land is that it is limited in supply by nature. In view of the fact that land is pre-eminently subject to the law of diminishing returns, the limitedness of its supply makes the problem more serious. Compared to other factors of production which can be expanded by man, land is not capable of expansion. This characteristic of land makes it a precious factor of production in agriculture. Not only are world's land resources limited by nature, a significantly larger land area is of no use in agriculture. In India, for example, only about 45 per cent of land area is sown. In Great Britain not more than about 11 per cent of land is capable of cultivation. There are little possibilities of increasing the area under cultivation and for all practical purposes, land as a factor of production is fixed in supply.

Malthusian thinking on population and food supply was greatly influenced by the scarcity of land. He remained concerned with the uncontrolled growth of population, on the one hand, and fixed supply of land, on the other. Although the world has successfully avoided Malthusian dangers so far, the fact remains that unless the future size of population is regulated to the possible availabilities of food, mankind is bound to fall into the Malthusian trap.

(3) Heterogeneity of Land Quality: The third important peculiarity of land as a factor of production in agriculture refers to its heterogeneity in quality. Although to avoid incidence of diminishing returns, man has ever sought to bring more land under the plough, he has always faced problems on account of the poor quality of new lands. Naturally, the best lands come under the plough the first and lands of poorer quality are sought thereafter. Not only does heterogeneity arise as such, different types of soil qualities, ecological conditions, topography and other factors also lead to wide varieties in the quality of land. It is these variations that give rise to economic rent.

2.1.5 POSSIBILITIES OF EXPANDING LAND AREA

The fact that land is limited in supply is universally recognised. What then could be the possibilities of expanding land area for agricultural and non-agricultural uses? Since the world population is rising at a fast rate, the pressure on the existing land resources is mounting and adverse man-land ratios result in declining marginal productivity of labour and other inputs. Under such circumstances, poorer quality lands have to be brought under cultivation. Though these lands tend to show signs of poverty, there probably would be no escape from extending the agricultural operations to these areas. Fortunately, technological development has resulted not only in maintaining the soil qualities of land for longer durations but also in improving the quality of poorer lands. Such extensions, whatsoever their problems may be, are also subject to a limit.

Perhaps the only possibility of expanding land area is by reclamation from deserts, forests and river-ways. Such possibilities may have appeared to be enormous in the beginning but eventually when the process begins, it no longer looks like that. Obviously, such reclaimed lands will be of poorer quality, but the same have to be reclaimed to reduce pressure on the existing land resources.

As already mentioned, the reclaimed poorer quality lands can be improved qualitatively by using modern technology. Such improved technology operates in different forms. By disseminating knowledge and research findings, the system of farming may be improved to yield better results. Farm management may become more scientific and help organising low quality farms in such a way as to reap a better harvest than would ordinarily be expected. However, there have been apprehensions that modern technology is likely to widen the gap between good quality land and reclaimed poor quality land. Some of the recent works done on American agriculture have shown that modern technology has tended to harden the upper crust of land and the depth of hard crust is increasing. This further weakens the moisture retention power of the soil and impoverishes the soil quality. Under such a situation, Americans have always been feeling compelled to use bigger tractors that can dig deeper. This process is, however, increasing the gravity of the problem rather than solving it. If this is happening to the currently productive lands, what then will happen to the poor quality reclaimed lands is not hard to guess. However, the possibilities of further improvements in modern technology will always be there to subdue its negative effects.

Modern technology may also come in a big way in the development of land for agricultural purposes at a reduced cost. Tractor technology may be cited in this regard. Levelling of rugged surfaces and building roads have become not only less expensive but also timesaving. Traditionally labour-using devices have been used partly because modern technology was not known and partly because opportunity cost of labour was low. If heavy machinery has to be diverted to land development, it certainly would be at a much higher opportunity cost and to justify such a diversion, the returns from land so developed should be sufficiently high.

Reclaimed low quality lands can also be used for putting up new colonies and settlements if these areas are fully developed to suit human habitation. Modern technology can again come in a big way in this regard. Instances could be quoted from Sri Lanka and South Vietnam where modern technology helped eradication of malaria from some areas resulting in their becoming fit for human settlement. In this way, a lot of pressure on existing land resources for non-agricultural uses can be reduced significantly.

While formulating land reclamation plans, however, due consideration shall have to be shown to the cost component. Obviously, if cost involved is greater than the returns expected, such a reclamation policy may not be favoured. The important cost components are labour and capital while as in some developing countries, labour may be available in large quantities and relatively at a cheaper rate, but capital is highly scarce and cannot easily be diverted from its. current use. The opportunity cost of labour may be low, as in surplus labour countries, a lot of labour force is either idle

or engaged in low-income callings; the opportunity cost of capital, however, is very high and diverting it from its current use will certainly involve heavy costs. The high cost components on the one side and the dire necessity of reclaiming new lands, on the other, is bound to create a serious dilemma for the future planners. The cost component shall, however, have to be balanced with t4e return components before plans for land reclamation are put through. Whatever the case may be, the fact remains that land area shall have to be expanded through reclamation and plans for maximising returns from such lands shall also have to be formulated. One thing that may be noted is that reclaimed lands may create supplementary avenues of reaping benefits (such as creating more marketable agricultural surplus, earning more foreign exchange and widening the national market) which may more than proportionally compensate the costs involved in such a project.

It is also possible that some good quality lands may still be available in the less populated areas of the world as Africa and Latin America. Lands may also be released for productive purposes from such agencies as are not putting these to proper use. Some institutional changes may have to be brought about in this regard.

2.1.6 SUMMARY

Land is the primary factor of production gifted by nature with fixed supply. No agriculture can be possible without use of land. It has been man's most significant input in this production enterprise.

Land is the basis of agriculture and means of development land is the source of agricultural production land is the source of food and fibre, fodder for animals, pastures and grazing land, forest, and source of agricultural activity. It is the base of all kinds of economic activity.

Land is not only used in agriculture, but also source of non-agricultural uses. Wherever you go, land comes of use.

Now we have from productive to unproductive use, from agricultural to non-agricultural use, from forest area to residential area and so like. So land utilisation has changed.

2.1.7 SELF ASSESSMENT QUESTIONS

1. Examine the role of land in agricultural development.
2. Explain the utilisation of land in agricultural and non-agricultural use.
3. Give a note on land as a factor of production and its importance in economic development.
4. Critically examine the changing pattern of land use and its impact on the economy.
5. Do you think that the land has been misutilised and is a threat to economy?
6. Does India need a balance between agricultural and non-agricultural use of land? Is there any possibility for the expansion of land area?

Key Words

1. **Agricultural Land**: Land used for crop cultivation, livestock grazing, forestry, and other agricultural activities. Agricultural land is crucial for food production and plays a significant role in rural economies.

2. **Urban Land**: Land used for residential, commercial, and industrial purposes within urban areas. Urban land includes housing developments, business districts, factories, and infrastructure such as roads and utilities.

3. **Industrial Land**: Land used for manufacturing, processing, and industrial activities. Industrial land may include factories, warehouses, industrial parks, and other facilities necessary for industrial production.

4. **Residential Land**: Land used for housing purposes, including single-family homes, apartment buildings, condominiums, and other residential developments. Residential land is essential for providing housing options for populations in urban and rural areas.

5. **Commercial Land**: Land used for retail, office, and service-oriented businesses. Commercial land includes shopping centers, office buildings, hotels, restaurants, and other commercial establishments.

6. **Conservation Land**: Land set aside for the protection of natural habitats, wildlife, and ecosystems. Conservation land may include national parks, nature reserves, wildlife refuges, and protected areas designated for biodiversity conservation and environmental preservation.

7. **Recreational Land**: Land used for recreational purposes, such as parks, playgrounds, sports fields, golf courses, and other leisure facilities. Recreational land provides opportunities for outdoor activities, exercise, and relaxation.

8. **Transportation and Infrastructure**: Land used for transportation networks and infrastructure projects, including roads, railways, airports, ports, bridges, and pipelines. Transportation and infrastructure land plays a vital role in facilitating the movement of people, goods, and services.

9. **Mixed-Use Development**: Land that combines multiple land uses within a single development or area. Mixed-use development may integrate residential, commercial, retail, and recreational components to create vibrant, walkable communities.

10. **Land Zoning**: The process of dividing land into different zones or areas for specific purposes, such as residential, commercial, industrial, or agricultural use. Land zoning regulations govern land utilization patterns and help manage land use conflicts and urban sprawl.

2.1.8 Reference:

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2. Progress of Land Reforms-U.N.O

3. Economics of Agricultural Production and Resource Use-Heady

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5. Introduction to Economics of Agriculture-Black

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7. Introduction to Agricultural Economic Analysis-Bishop and Toussiant

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9. Agricultural Price-Thompson and Foots

10. Readings in Agricultural Development (Ed.)-Khurgo

11. Agriculture in Economic Development (Ed.)-Eicher and Witt

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14. Agricultural Price and Income Policy- Schultz

15. Marketing of Farm Products-Shepherd

2.2 Chapter

LAND, TENANCY, VALUE AND RENT

Objectives

After completing this chapter, you will be able:

- To know the concept of tenancy on agricultural land.
- To understand the system of land distribution and the farming.
- To know the concept of land reform and forms of land reform.
- To understand land tenure system and the land value and rent in relation to demand and supply.
- To know the agricultural productivity and returns to owner-farmers and tenants.
- To get idea of impact of land reform an economic development and agricultural development.
- To know the land reform in Indian economy.
- To understand the different types of tenancy reform and its impact on agricultural return.
- To know the regulation of rent and security of tenure and its effect in agricultural development.
- To know the concepts of ceiling and consolidation of landholding and its impacts on agriculture.

Structure:

2.2.1 INTRODUCTION

Among the issues that face the modern world today, none are more dangerous than those that arise out of man's relation with the natural resources and here, too, with land, in particular. Continuous agricultural development can only be expected to occur under certain conditions of agrarian structure and its speed and dimensions will depend upon the extent to which these conditions are present. For ages, the holding and the use of land has been of greatest importance for every political and economic system, and indeed is the basis of all social organisation. Land has always been given the highest esteem and importance and with rising pressure of population on land, its supply remaining same, it will continue to be a precious and scarce commodity in the rural environment. "It is the Agrarian Creed which is not a definable doctrine, but universally reflects the hopes and aspirations of countless peasant generations for a time when land will be as free as air and will belong to nobody, and, therefore, to anybody who is tilling it."

Agrarian structure refers to the manner in which man-land relationships are governed. It covers the way in which land is held and cultivated and the rights and privileges enjoyed by the different categories of people who have access to land. A tenure system which is no longer in accord with the stage of political and economic development and lacks the capacity of adjustment will inevitably contribute to instability, insecurity and uncertainty. On the contrary, a tenure system which ensures to the cultivator fair reward for his efforts will help promoting individual virtues of self-help, self-reliance, thrift and independence and at the same time the social virtues of tolerance, public spiritedness, cooperation and mutual working for common good.

The pattern of ownership of land, therefore, has to be just and rational if we are to secure growth with social justice. The ideal, land reform programme is an integrated programme of measures designed to eliminate obstacles to economic and social development arising out of defects in the agrarian structure. The objective of land reform policy should be to remove such impediments to agricultural development as arise from the agrarian structure and to eliminate exploitation and social injustice within the agrarian system so as to ensure equality of tenurail status and opportunity to all. Quite naturally, land reforms have claimed the prime attention of the governments of different countries in the schemes envisaged to combat poverty and comb out social injustice. The economically more advanced part of the Europe is largely concerned with strengthening the position of the small farmer by land consolidation, by enlargement of under-sized farms, and in some cases by land settlements. Although all the Eastern European countries have the declared aim of extending the socialised sector to agriculture in its entirety, in Bulgaria the process has almost been completed while Romania and Czechoslovakia are approaching that goal. In order to reduced landlessness or near landlessness, ceilings of holdings have been imposed in many newly developed countries notably India. Consolidation of holdings has also been carried out in many such countries.

2.2.2 CONCEPTUAL FACTS OF LANDS REFORM

The concept of land reforms has been used with different meanings and is open to a large number of-interpretations. In view of the diversities existing in different countries of the world as between agrarian strucr.ues, political and social aspects, historical conditions and economic objectives and national priorities, it is difficult to adopt a universally acceptable definition of the term "land reform" so as to cover the common elements of the diverse phenomena. Some have defined it very broadlly to include all policies relating to transformation of the agrarian economy, Philip Raup is one who uses a broad definition of the terms. United Nations in its Third Reports on the Progress of Land Reforms has talked of land reforms as "an integrated programme of measures designed to eliminate obstacles to economic and social development arising out of defects in the agrarian structure". In this way Land Reforms have been equated with a total programme of agrarian development including modification in rural credit, land division, land taxation, marketing facilities, co-operative organization, agricultural education and advisory services. This kind of broad definition has been accepted in most of

the advanced countries of Europe and more particularly in the United States. In fact, this definition originated in the United States.

In the traditional and commonly accepted sense of term, it has been used in a restricted sense signifying acquisition and redistribution of land and change in the pattern of land ownership. This narrow and restricted definition has been adopted by Warriner. To him, "land reforms mean the redistribution of property or rights in land for the benefit of small farmers and agricultural labourers."

To Hung-Chao Tai, the objectives of reforms are to attain just relationship among the agricultural population and to improve the utilisation of land. The means by which these objectives are attained are government sponsored tenurial changes. These changes encompass both redistributive programmes (land redistribution and tenancy) and developmental programmes' (co-operative farming, land settlement etc.). The former programmes seek to reallocate equitably the sources of agricultural income, while the latter aim at improvement of farming efficiency and expansion of farming areas. The major component of the concept, thus, is equity while increasing agricultural productivity. These reforms take two main forms: (1) security of tenure and rent reduction, and (2) redistribution of land among tenants.

To sum up then, the concept of land-reforms has the following components:

(a) 1. Land redistribution

2. Tenancy reforms with aim of:

(b) 1. Providing greater equity in income and wealth.

2. Increasing agricultural productivity through the implementation of.

(c) 1. Government sponsored reform legislations.

2. Legal public programme of activity?

Should we use the term land reform in its broadest sense or narrow sense? The use of the term in its widest sense may be useful as it may serve as a prescription for action. Nevertheless it is a definition of what land reforms ought to be, rather than of what it generally is. Thus if this term is used in its wider sense, it may blur the real issues.

In order to avoid substitution of the concept of a policy for the definition of a concept and for the sake of clarity, land reforms are generally defined in the sense of land appropriation and redistribution and other accompanying measures. The scope of land reforms when defined in narrow sense, therefore, would include:

(i) Abolition of intermediaries;

(ii) Tenancy reforms which include: (n) regulation of rent, (b) security of tenure for tenants, and (e) conferment of ownership on them;

(iii) Ceiling on land holdings;

(iv) Agrarian reorganisation including consolidation of holdings and prevention of sub-division and fragmentation; and

(v) Organisation of cooperative farms.

The objectives of land reforms are to achieve:

(1) Greater quality; and

(2) The efficiency of resource use.

The first objective has got two dimensions. Firstly, there may be an attempt to introduce greater equity among those holding land. The effort may be to reduce income disparities between big farmers and small farmers by redistributing the land from the former to the latter. Secondly, there may be an attempt to improve equity between farmers as a whole, whatever their tenure status may be.

The second objective of the land reforms has been well debated. A case for redistribution of land on efficiency criteria can only be built if the marginal returns over inputs vary over farms of different sizes. Many studies have shown that a smaller average size of holdings and a lower concentration of land ownership were associated with an increase in output per hectare.

Forms of Land Reforms

Land reforms as defined above, means organized action for the purpose of improving an existing system of land tenure. Depending upon the nature of change affected, the measures which are taken under the garb of land reforms may have many facets. The most obvious type of change is one in the status of the various classes of the rural population in respect of land. The second type of change is one of changes in the general pattern of distribution of the land in farming units. This kind of change would mean redistributing land by breaking down large centrally operated estates into a number of smaller farms. Another type of change seeks to improve the conditions of life of the rural people without changing the status of the cultivator or the existing distribution of land. In this class may be included, measures intended to reform existing conditions of tenancy, e.g. in increasing the security of the tenant cultivator and measures which limit or prevent the alienation of agricultural land to non-agriculturists, changes in law of inheritance to prevent undue subdivision and fragmentation, measures for continuous occupation and improved administration of common land.

2.2.3 LAND TENURE AND PRICE MECHANISM: VALUE AND RENT

One of the first requisites of agricultural production is obviously land, and' the supply of land, more particularly of land fit for agriculture, is limited. The scarcity of this factor in relation to its demand is well reflected by rising land values and rents. In old countries like India, this scarcity is a compelling factor because supply of land cannot be increased with rising demand. Taking an example £tom India, nearly 3 per cant has been added to gross sown area in 1970's. But with population growing at the rate of 2.4 per cent per annum, per capita real income by about 12.5 per cent and per capita money income by a far greater (99.5) percentage in a decade, the demand for land is bound to rise faster than its supply.

Prof. Khusro has depicted the above problem in the following diagram. (Fig. 2.1)

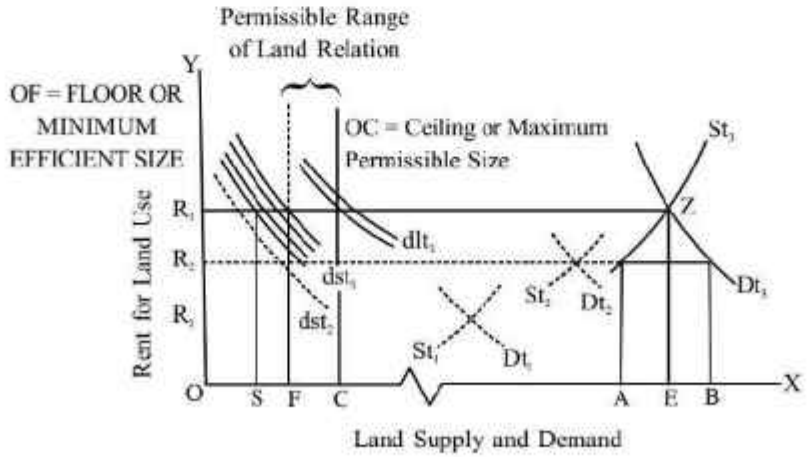

Fig. 2.1: Demand-Supply Imbalance in Land

Rising land rents may not prove burdensome if productivity per hectare increases pnri passu. But in most of the third world countries including India productivity has not kept pace with time with the result that rents as percentage of value of gross produce have been increasing and are reported to have reached levels, as high as one half to two-thirds of the value of the produces, sufficient to throw the most well organized enterprises in the world out of business.

As shown in Fig. 2.1, with the passing of time, the -successive supply curve of land St_2 St_2 and St_3 shift rightwards or downwards to some extent but the successive demand curve Dt_1 Dt_2 and Dt_3 shift rightwards or upwards at a faster rate. As a consequence, rent increases from R_1 to R_2 and R_3. At this, high rent (R_3) most of the small tenants cannot hope to lease in any land at all while others lease-in less than before. High rents, thus, have tendency to reduce the size, and, indeed, in many cases, below what might be considered as minimum and commercially feasible size. The aggregate macro-demand curve for land Dt_3 shown on the right hand side of the break in X-axis, is made up of numerous individual demand curves shown on the left hand side of the break. These micro-demand curves represent demand for land-use by numerous small and low income tenants such as ds and some large or high income tenants such as dt.

At time t_2, when macro demand for land was Dt_2 and rent R_2, small tenants' micro-demand may have been. OF and this might have been a minimum economical feasible holding. At time t_3 when macro demand for land has risen to Dt_3 and rent to R_3 the small tenants' demand curve is dst_3. But at the prevailing rent he can only afford to lease-in OS land which is, of course, less than an economically feasible holding OF. The main implication of this would be that small tenants would turn wage labourers and give rise to a tendency towards the proletarianization of the peasantry.

If in order to save this situation, rents are controlled by government's intervention, this further aggravates the problem by bringing about a disequilibrium between demand and supply. If supply of land could not be quickly augumented and rent is controlled by some legal methods, it would widen the supply and demand gap. In Fig. 2.1, if equilibrium rent were OR_3, demand and supply both equal to OE hectares. But if rent is controlled at OR_2, then at this rent supply would shrink to OA while demand increases to OB and AB would be land hunger or unsatisfied demand.

We thus conclude from Prof. Khusro's discussion that mere price control (rent control) will not give the desired results. Along with the rent control, the most important is to ration out the use of agricultural land. Land reforms policy, thus, attempts to introduce price control (through rent laws) and ration the use as well as ownership of land (through tenancy and ceiling laws).

With this type of land reforms introduced in an economy, the tenants could acquire, firstly, an economically feasible minimum of land with no fear of eviction and secondly, they have to pay controlled rent to the land owner. Both these things will result in two things in terms of macro-side of Fig 2.1 (a). Rents will be reduced to OR_2, and (b) It will prevent the withdrawal of land by land owners and the reduction of aggregate supply in the lease market to OA. At the same time, it would prevent the increase in demand from OE to OB by putting a ceiling on land.

On the micro-side, if a small tenant's holding at the high rent OR_3 had fallen to OS hectares, which is less than a sensible minimum OF, the land reforms will provide, first, the tenant would at least acquire permanent rights on OS; second, further decline in the size of his holding will be checked and thirdly, rent will be reduced from OR_3 per hectare to OR_2 per hectare and finally, he can purchase away some land from the landlord, some acreage say SF, at less than the market price. This would, thus, guarantee the tenant an economically feasible minimum of land. This could be achieved if a ceiling is fixed on large holdings at OC.

It is often asserted that a direct relationship exists between land reforms and agricultural productivity and output because land reforms result in a grater incentive to operators and in more efficient farm organisation. If agricultural production has to be increased by intensive means by adopting improved practices, land must belong to the cultivator itself. With the help of Fig. 2.2 (again borrowed from Prof. Khusro) it can well be proved that any programme of agricultural development is either to by pass the small tenants or leave them cold.

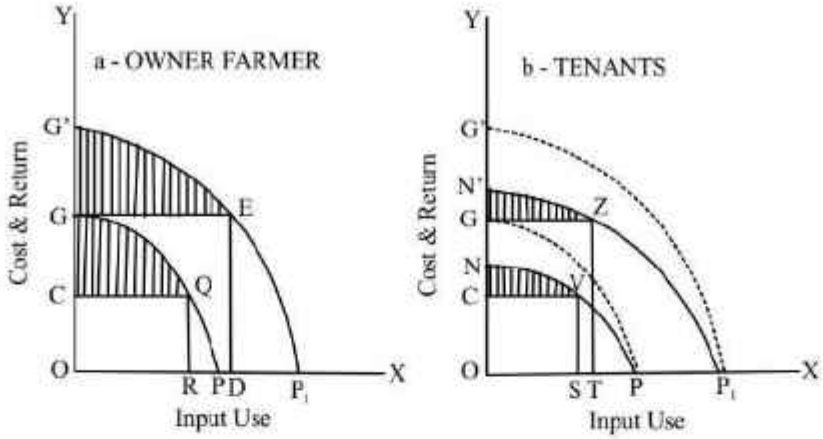

Fig. 2.2 Returns to Owner-Farmers and Tenants

Here we have two diagrams a and b, one showing the farm operation by owner farmer (figure a) and other showing operations by a tenant farmer (figure b) each with A acres of land. Inputs are assumed to be combined in fixed proportions in a package of practices with costs OC per unit of package-input. As the farmers apply more and more inputs along with X-axis, marginal gross product would fall along with the GP curve owing to fixed factor land. The owner farmer would stop using more inputs at OR when the marginal productivity is equal to marginal cost of input. His total cost would then be OCQR and total profit CGQ.

On the other hand, tenant farmer has similar cost and gross product situation but has to pay his landlord rent as a fixed percentage of produce. Applying the principle of equating marginal net produce to marginal (or average) cost, his total cost would be OCVS and his profit net of rent CNV.

Let us now suppose that both these farmers are offered a package programme for better inputs and higher production. Due to this introduction cost of production would rise from OC to OG. The marginal gross product curve would also shift from GP to G' P'.

Applying the same assumptions of profit maximisation, the owner farmer will now use OD units of inputs, his total cost would be OGED and his profit is GG' E which is greater than previous profit. This greater profit will induce him to go ahead with the new agricultural techniques.

On the other hand, tenant farmer's gross product curve will also rise to OG'P' but net of rent would .only be DN'P'. To maximise his returns, he will use OT units of inputs where his marginal net product equals marginal cost. After the introduction of new package of agricultural inputs his profit would be GNZ net of rent which is lower than his previous profit (CNV). Thus tenant farmer has no incentive to go in for new package of agricultural practices. Prof. Khusro, in this respect, writes :

"There is thus reasons for believing that a package programme such as that practised in India (IADP) may well run into trouble if undertaken in ignorance of the degree of prevalence of share-cropping tenancy and at the extent of concealed rents. This may indeed be one of the main reasons why the package programmes has so far had a less spectacular showing than expected."

Even if we assume that the net profit of the tenant farmer after the introduction of package programme of new inputs has been higher than before the fact remains that his input use per hectare and consequently his gross product per hectare would be lower than that of owner cultivator in similar circumstances. Thus private net profitability of the tenant may be maximised but since total product is less, social productivity is less than maximum.

2.2.4 LAND REFORMS AND ITS ROLE ON AGRICULTURAL DEVELOPMENT

The rising concern for the implementation of land reforms in the worl'd agriculture is based upon the insights and the belief that present tenurial systems are blocking agricultural development in many countries particularly the under-developed countries. In these countries, the overwhelming majority of the people live by agriculture and the necessary condition of economic growth and improvement of the standard of living of the masses is raising of agricultural productivity. But so long the system of tenant farming prevails in these economies, no improvement could be expected in agricultural output since "tenancy farming might reduce agriculture to the verge of ruin, rob the cultivator of all incentive to industry, and lead to a permanent depletion' of the fertility of the Soil". In fact, it is argued that the incentive of ownership will increase production and investment. Adam Smith considered large land ownership and servile tenure as "discouragement to progress" and subsequently modern theorizing paraphrased his chapter "on the Discouragement of agriculture in the Ancient states of Europe after the fall of Roman Empire" into the doctrine that, "defects in agrarian structure, are obstacles to development." In the same spirit, his follower, J.S. Mill, advocated the merit of peasant proprietorship on grounds of income equality and social welfare.

The first negative effect of tenancy farming which do not help in increasing agricultural productivity is absentee landlordism. When the landlord does not live in his estate, and is interested in merely drawing the rents and spending the amounts so received in a city, the economic justification for his existence is eliminated.

Secondly, insecurity of tenure is an obvious deterrent to any kind of long-term improvement by the tenant, particularly to investment in immovable equipment and land improvement such as irrigation etc. This is particularly true when the land-lord has an unqualified right to enhance the rent and evict the tenant. Same reasons may induce the tenant to take little interest in maintaining the fertility of the soil by good manuring or otherwise. On the other hand he would be interested in extracting from the land all that he can before he is compelled to leave the land. Such continuous neglect of land may well reduce the agricultural productivity and production.

Thirdly, due to high rent to be paid to the landlord and low productivity of land, tenant is necessarily poor. He can hardly save enough to afford any improvement which requires cash outlay. Similarly, he is unlikely to borrow in order to carry out an improvement in the land unless the return is both certain and profitable by a wide margin.

Fourthly, the tenant in traditional societies is rarely an independent entrepreneur. Even where the landlord provides nothing but land, he is likely to interfere in some way with the tenant's management of his farm and his interference may sometimes work against technological progress.

These potential defects of tenancy systems have resulted in the twofold defects: (a) that from the economic standpoint tenancy systems either fail to induce the full use of land or tend to its exploitation, and (b) that from the political and social stand point, tenancy systems tend to instability since they unjustly restrict both the economic and the personal liberty of tenant farmers. It has been brought out in recent ECAFE paper that, "in a number of countries of the region, defective land tenure system stultify the farmer's initiative for the improvement of production and decern the impact of economic plans.

Land reforms introduced by the governments are to change the property relations in agriculture and help in furthering the economic development in many ways. These reforms seek to change the owner tenant relationship in favour of tenants. Firstly, they try to regulate the tenure of lease so that tenant has security and the motivation to contribute his own or borrowed capital and his family labour towards the improvement of land. They also regulate rents so that tenant could keep himself major portion of the produce. The ultimate objective of the land reform is to abolish tenancy altogether by enabling tenants, on very easy terms, to become the owners of land themselves.

The ideal land reforms programme is an integrated programme of measures designed to eliminate obstacles to economic and social development arising out of defects in the agrarian structure. This becomes an important measure to increase agricultural production and productivity particularly in those countries where, "prevailing land system inhibits all initiatives, stifles all efforts and prevents any enlargement of inputs due to insecurity, risk renting, the practice of subletting and a feudalistic structure of land rights." AUNO Report correlates the relationship between agrarian reforms and agricultural development in following manner

1. Land Reforms and Agricultural Production: For raising agricultural production a cultivator needs two types of incentives. Firstly, he should be encouraged to work hard and to exercise a close supervision of agricultural operations. Secondly, he should be encouraged to make use of resources necessary for efficient agriculture. These incentives could be guaranteed to the farmer if agrarian structure is so changed that he is made convinced of getting full benefits from his labour and investment. Abolition of intermediate layers of landlordism, tenancy reforms and redistribution of land can mean a veritable renaissance for those who are favourably affected. With the best of material and organisational incentives, a reform measure would promote a feeling of self-reliance and progressive living on the part of the individual.

One of the major impacts of land reforms is on the attitudes and incentives of those who are favourably affected. It is often asserted that a direct relationship exists between land reform and agricultural productivity and output because land reforms result in a greater incentive to operations and in more efficient farm organisation.

Land redistribution has sometimes been opposed on the ground that agricultural productivity will be reduced if the size of operating units is reduced through redistributive measures. But historical and purely theoretical methods of analysis reveal that any land redistribution will not adversely affect agricultural production when land redistribution leads to decline in the size of agricultural holdings. Many empirical studies have revealed that a reorganisation of farming into small units through land reforms will not reduce agricultural production. On the other hand, the experience of various countries suggests that efficient use of land and supply of essential inputs can make postreform units sufficiently variable from the economic point of view.

Agricultural production is also expected to increase by redistribution of land if large farms make very little use of their land. This happens in most of third world countries where land is held as a porfitfolio asset rather than a productive input.

Another reason responsible for more intensive use of small farms is that small farmers produce partly for consumption and partly for sale. Thus these farmers are less affected by the risk of price fluctuation than is the large farmer.

2. Land Reforms and Employment: Land reforms can have a major impact on employment creation in agriculture if there is an acute misallocation of land and labour resources. Defective agrarian structure, especially maldistribution of land rights, resulting in the existence of large holding"' on the one hand and small holdings on the other, are responsible to a large extent for unemployment and underemployment of labour. Land reforms may be designed not simply to alter the distribution of wealth or of income, to improve the technological level of agricultural sector or to release productive energies but also with specific reference to rural employment problems. Farmers in a good many countries have too little land to occupy their time because much of the available land is locked away in larger estates. These reforms can be expected to increase employment by affecting a change in the size of farm operating units. There is some evidence that output per acre increases as size of farm diminishes: Additional empirical evidence is available to show that small farms have great potential for labour absorption than large farms. Data for India, Chile, Taiwan, Bolivia, Peru and Mexico can be cited to indicate that small farms absorb more labour per unit of land than do large farmers.

Land reforms can also augment the capacity of agriculture to absorb more labourers as it may give rise to greater tenure security and the incentive resulting in the intensification of cultivation practices. Japan was able to employ its growing population in agriculture by resorting to intensive land use practices including double and triple cropping until the industrial sector was large enough to relieve the pressurp on land.

3. Increasing Purchasing Power: The improvement of economic position of the cultivator by way of introducing land reforms may be achieved (1) by redistributing the existing gross returns of agriculture to the advantage of cultivator; (2) by increasing gross returns of agriculture through increased production. Successful agrarian reforms often achieve a considerable improvement of the cultivators' economic position through the combined effects of both ways. Either method should have the result of increasing the purchasing power of the cultivator. But while increased farm incomes due to greater production create additional purchasing power, increased incomes of the cultivator as a result of a mere redistribution of the agricultural income only transfer potential purchasing power from one hand to another though propensity to consume among poor cultivators is always higher.

Any increase in the purchasing power of the cultivator will be of great benefit to developing secondary and tertiary industries. If agrarian reforms are achieved by redistributing income, it can safely be assumed that a larger part of the agricultural income will buy the products and services of the secondary and tertiary industries, since large incomes of landlords tend either to be spent partly on economically unproductive purposes or hoarded.

The same argument holds good in respect of expenditure incurred on agricultural equipment subject to the qualification that the small farmer's need may differ from those of the large farmers. Small farmers may lack the capacity to buy and to use the more expensive and complicated agricultural machines. Thus, the breaking up of large estates may cause a diminution in demand for tractors and other power driven machines, but to that extent it does so, will stimulate the demand for hand tools and animal drawn machines.

It is thus expected that a well conceived system of agricultural reforms will increase the amount spent on goods of the kind that developing secondary industries can provide. The same is true of tertiary industry. Experience has been that there is an immediate strong response in rural areas to the provision of railways, bus service, etc. which is directly proportional to the increase in purchasing power.

As a corollary from above, we may say that a well conceived and efficiently applied agrarian reform programme which releases the productive energies of the people by improving the security of tenure and increasing their real income will help in speedy industrial development.

4. Increasing Savings and Capital Formation: There can be no doubt that tenurial conditions influence the volume of capital available for productive investment and the extent to which it is progressively invested in agriculture. Agrarian reform measures generally aim at redistribution of income through either redistributing the land by changing tenant farmers into owner cultivators or collective operators or by reduction of rentals. Redistribution of income not only represents a transfer of income but also of saving capacity. An adequate tenure system granting the cultivator security of tenure and of his investments will increase the efficiency of cultivator and thereby, both the saving capacity of agricultural population and the attraction of agricultural investments. In the initial stages, saving may go down considerably due to higher propensity to consume among poor peasants, but this temporary stoppage of agricultural saving may not be detrimental to general economic development since the higher consumption will benefit industry through the increased demand for manufactured consumer goods. In the long- run, however, due to higher agricultural productivity and output, higher incomes of the tenants will make possible larger savings and capital formation. Thus, we find that the relationship between land reforms and capital formation may not be direct and always positive, yet potentials of land reforms for capital formation in agriculture sector is great if these are properly planned and executed.

5. Raising of Educational Level in General: Agricultural sector generally is the main source from which a developing economy draws its labour force. Successful agrarian reforms which strengthen the economic position of rural population undoubtedly also help to develop the qualities of intellect, common sense, morale, energy, resourcefulness and prudence which are necessary to economic progress.

In view of the above discussion it may be concluded that land reform measures contribute significantly to the economic development of a country though it is not easy to demonstrate from recent quantitative information how great a contribution land reform has made to economic development. The first obstacle to be overcome by land reform is the apathy of the agricultural population brought about by inequitable land tenure arrangements, a high degree of concentration of land ownership, insecurity of tenure and exorbitant rent and miserable conditions of landless agricultural workers. This may be overcome by distributing land more equitable, but the resulting small holdings cultivated by new owners without adequate resources and technical skill create new obstacles. Thus such a programme should be followed by a series of institutional reforms required to make agriculture more efficient and productive, such as provision of technical guidance and training arrangements to provide credit and capital for agriculture and in the case of new settlements, for infrastructural facilities.

The possibilities of land reforms as an aid to agricultural development clearly have definite limitations. No amount of land reform will remove the obstacles of unfavourable soil or climate and these obstacles can be overcome, if at all, only by technical improvement in the methods of agriculture. Similarly, agrarian reforms will solve neither the problem of excessive? ressure of population on land nor such economic defects as lack of satisfactory markets for agricultural produce or of satisfactory supplies of agricultural requisites. These obstacles can be overcome by diversification of the economy as a whole in the course of several economic development.

2.2.5 MAJOR SYSTEMS OF LAND TENURE IN INDIA

From the earliest, India's self-sufficient villages constituted the hub of her rural economy based on agriculture. Land revenue was one of the main sources of state income. Collection of land revenue necessitated maintenance of some records relating to cultivation. In the 16th century, Sher Shah Suri initiated land settlement operations for assessment and collection of land revenue. This system was later on improved during the reign of Akbar when Todar Mal reorganised the entire land revenue system.

The British rulers, thus, inherited a well-laid-out land system from the Mughals. They, however, improved the system by bringing about drastic changes in it. Utilising the institution of the state as a superlandlord, the British administration modified or transformed the prevailing land tenures in such a manner as to secure the maximum revenue for the government from land tax. These changes resulted in the development of two major types of land revenue systems, viz.: (1) Zamindari system, and (2) Ryotwari system.

Zamindari System

Under the zamindari system which was introduced by Lord Comwalis in 1793 in Bengal, private landlords were created to whom government granted some but not all the rights of private property in land. A "permanent settlement" was entered into with the landlords with a view to increasing the revenue of the state. Under this agreement, the so-called landlords (known as Zamindars) were made full properietors of large areas of land and the task of collecting the rent from the farmers was entrusted to them. Thus, zamindars became the intermediaries between cultivators and the state. But, with the passage of time, the zamindari settlements made these intermediaries the owners of land thereby creating a permanent interest in land.

Zamindari settlements were of two types: viz; permanent settlement which fixed the land revenue in perpetuity and temporary settlement under which the land revenue was assessed for a period ranging between 20 and 40 years. At the time of independence, this system was prevalent in states like West Bengal, Bihar, Orissa, Uttar Pradesh, Andhra Pradesh and Madhya Pradesh.

Zamindari system as it worked in India has many defects but two most important of these which held Indian agriculture backward are listed below:

1. **Hindrance to Agricultural Development:** The system was 'a great impediment rather than an agent of economic transformation. Zamindars became parasites over the years and had absolutely no idea of how to develop agriculture. They became used to extravagance and unproductive spending with the result that no investment could take place in agriculture. On the other hand, tenants were so much oppressed and exploited that they had lost interest in investing in these lands. The result was that no improvements took place in agriculture and it stagnated for centuries.
2. **Exploitation:** Zamindari system was based on exploitation. With the increase in population and decaying rural handicrafts, demand for land increased which made it possible for landlords to charge exorbitant rents. Approximately, one-fourth of the produce was taken away by the intermediaries in the form of rent. The zamindars became the chief supporters of British imperialism in India. That is why the zamindars, being taxpayers, were placed in a privileged position as compared with the other groups of land-owners. They secured for themselves the bulk of the income derived from the semi-feudal exploitation of the peasantry.

Ryotwari System

In large parts of Mumbai and Chennai, an entirely different land revenue system was developed wherein only temporary settlements were made. In this system, the government directly dealt with the cultivators or ryots. This system came to be known as the Ryotwari system. Under this system, settlement was made separately with each peasant or holder of land or ryot, who was recognised as the proprietor with the right to sublet, mortgage or transfer by gift or sale. The ryot was protected from ejectment as long as he paid the fixed assessment to the government. The settlement of land revenue under the ryotwari system was done on a temporary basis.

This system, though apparently satisfactory, also developed many snags with the passage of time. In the absence of institutional credit agencies, moneylenders and mahajans had been granting loans to the poor peasants and soon substantial portion of land which were mortgaged with these moneylenders became their property. It has been estimated that in 1947 about 60 per cent of tillers in Gujarat became mere tenants.

A third type of land tenure called the "mahalwari tenure" was initially introduced in the United Provinces and later extended to Punjab. Under this tenure, the settlement was made with the entire village and the peasants residing there contributed, on the basis of their respective holdings, to the total revenue demand for the village. There were also other varieties of tenure arrangements of minor importance like the "malguzari" and "maktedari" tenures in the Central Provinces and Berar. They were largely variants of mahalwari settlements in the United Provinces and Punjab.

Thus, under British rule, there was a complete tranformation of the land system by which the state became the supreme landlord and the peasantry was reduced to the status of tenants. The landlords under the permanent settlement derived their rights from the state. The silent but revolutionary change made by the introduction of the zamindari system and the recognition of only a limited interest of the cultivator in the Ryotwari areas, benefitted neither the cultivators nor the government. In the permanently and temporarily settled areas, the zamindar's share was allowed to grow. He was allowed to exp'ort as much as he could be way of rent. A Lieutenant-Governor of Bengal observed in connection with the permanent settlement: "In the interval of 66 years i.e., 1793 to 1859, while the proprietary body gained in strength and prospered in wealth, village communities perished".

2.2.6 PROGRESS OF LAND REFORM DURING PLAN PERIOD

After the attainment of independence the land laws aimed at bringing the peasant and state into direct contact. In the areas where the Zamindari system prevailed, the new laws provided for the abolition of intermediaries. In areas where the Ryotwari system prevailed, the laws aimed at providing protection to tenants, the actual tillers of the land.

Since planning marked a major developmental effort in the country, it recognised the importance of agriculture in the Indian economy and the need to develop it on a sound basis. It was, therefore, nature to think of reorganizing the tenurial systems in the country. Laws were legislated to abolish intermediaries and to regulate the distribution of land. Emphasis was laid on making the tiller the real owner of land in order to create enthusiasm among the farm population to modernise agriculture and raise agricultural productivity.

Indian economic planning has laid considerable emphasis on land reforms right from the First Five Year Plan. The national land policy was enunciated in the First Five Year Plan which unequivocally declared that "the future of land ownership and cultiVation was a fundamental issue of national development". The First Plan laid down the following guidelines in relation to the tenancy problem:

(i) Village panchayats should play an important role in dealing with problems relating to tenancy. They should help actively in the work of correetting land records;

(ii) While it was necessary to safeguard the interest of small and middle owners and permit them to resume land for personal cultivation, the displaced tenants should also be ensured that they have lands to cultivate;

(iii) It was, therefore, necessary that tenants so displaced by small and medium owners should be able to obtain at least a minimum holding for cultivation;

(iv) Lands belonging to substantial owners, who met the standards of efficiency prescribed by the land management legislation, should be supervised by some organisation at the village level; and

(v) Cultivation of village wastelands should be the responsibility of the village panchayats.

The Objectives of land reforms laid down by the Second Plan were to remove impediments to agricultural production arising from the agrarian structure and to create conditions for evolving an agrarian economy with high levels of efficiency and productivity. The thinking of the planners was greatly influenced by the recommendations of the Panel on Land Reforms set up in 1955, which marked an important stage in the evolution of land reform policy. The Second Plan stressed on the abolition of landlords-tenants nexus and pointed out the large variations in the degree of practical implementation of tenancy reforms in different regions. It also referred to the large-scale eviction of tenants On grounds of resumption for personal cultivation. The plan proposed steps to impose ceiling on agricultural holdings, laid down certain gradings of resumption and reiterat~d that rents be regulated as already recommended in the First Plan.

The Third Five Year Pli.tnmerely reiterated the provisions in respect of land reforms as already outlined in the first two plans. The ideals of setting up the "socialist pattern of society" and eliminating all elements of exploitation and social injustice within the agrarian system were generally stated. In the resolution on the Third Five Year Plan adopted by the meeting of the All-India Congress-Committee in Raipur in October, 1970, it was pointed out that "it is important to remember that the land reforms are the foundations for agricultural growth. The accepted programme for land reforms all over the country must, therefore, be completed without delay."

The Fourth Five Year Plan reviewed the existing land reforms and acknowledged that there were many gaps between objectives and legislation and between the laws their implementation. The plan noted that there had been considerable leasing out of land and in view of the insecurity of the informal tenancies neither the tenants and sharecropers

nor the landowners were willing to invest in land to improve production. The plan, therefore, recommended that: (i) all tenancies be declared non-resumable, (ii) resumption cases be finalised early where already allowed, (iii) voluntary surrenders be regulated, (iv) complete security of the tenants in thek.chomestead lands be assured (v) legislation for security of tenants and sub-tenants be properly implemented and (vi) penalties for wrongful eviction be provided in law.

Following the Chief Ministers' Conference in 1970, a Central Land Reforms Committee was constituted to consider all aspects of the question relating to ceiling on holdings. Its recommendations were further examined by another high-powered "nine-member" committee. The recommendations of the Central Land Reforms Committee were considered in Chief Ministers' Conference on ceiling on agricultural holdings held in July 1972. Bya general consenus, the policy on ceiling was formulated and the "National Guidelines" were thereafter laid down which are still effective.

The Draft Fifth Five Year Plan summed up the situation and concluded that "the laws for the abolition of intermediary tenures have been implemented fairly efficiently whilst in the field of tenancy reforms and ceiling on holdings, legislation has fallen short of the desired objectives and the. implementation of enacted laws has been inadequate." In this respect the plan recommended certain immediate steps. These included: (i) speedy and effective implementation of measures recommended in the earlier plans within a firm time-bound proggramme; (ii) Prompt enachnent and implementation of ceiling provisions by the states as accepted in the Chief Ministers' Conference to bring about uniformity; (iii) redesigning the programme of consolidation which should be made effective afere ensuring security of tenure; (iv) updating records of tenancies and their maintenance; (v) gearing up of the administrative machinery and making the beneficiaries familiar with the provisions of laws and associating them with implementation through local committees. Certain policy recommendations were also made in the plan with respect to personal cultivation, leasing out, distribution of surplus land, consolidation of lands of the new allottees into compact blocks, and jurisdiction of laws in the matter of implementation of land reform measures.

The Sixth Plan noticed that more equitable distribution of land resources through programmes of land reforms has not taken place because the will to implement this policy has been sadly lacking all along. In this respect, the Plan feels that the ceiling legislation would need to be enforced more vigorously so that the programme of distribution of surplus land could be completed during the five-year period.

The Plan had also emphasised the importance of tenancy reform. In its own words: "The land should belong to the tiller and except for categories subject to disabilities, occupancy rights should be conferred on tenants and share-croppers. As a first step, the indefinite right of resumption, wherever it exists, should be extinguished. At the same time, steps should be taken to record the interests of tenants and sharecroppers in the land records. Without this, the protection available under the tenancy laws will not accrue." For better implementation of land reforms, the plan wishes to involve the beneficiaries by setting up of village committees.

Land reforms in the Seventh Plan would be looked upon as an intrinsic part of the anti-poverty strategy. Wherever laws have not been enacted by the states for securing the rights of tenants and regulations of rent, the states will be asked to take appropriate steps to enact such laws during the Seventh Plan period. In order to expedite the process, quick surveys will be orgainsed for recording and registration of tenants with maximum involvement of the local community and institutions.

2.2.7 IMPORTANT MEASURES UNDER LAND REFORM

The main objective of land reform measures undertaken after independence was the removal of such institutional and motivational obstacles as stood in the way of modernisation of agriculture and a more egalitarian social structure. The following principal measures of land reforms have been implemented in fulfilment of this objective:

(a) Abolition of intermediary tenures;

(b) Provision of security to tenants with the uitimate objective of conferring ownership rights on them;

(c) Imposition of land ceiling on agricultural holdings and distribution of surplus land to landless agricultural workers as well as small landholders;

(d) Preparation and maintenance of land records; and

(e) Consolidation of agricultural land holdings.

In pursuance of these, legislative measures have been enacted almost all over the country ever since the early 50s.

2.2.8 ABOLITION OF INTERMEDIARY AND ITS EFFECT

Immediately after independence, a high priority was given to the abolition of intermediary tenures. Congress had long ago been committed to the idea of the removal of intermediaries between the peasant and the state. Soon after winning independence, measures for the abolition of the zamindari system were taken in hand in different states. The Agrarian Reforms Committee in its report in 1949 recommended its abolition, the expropriated land to be transferred to the cultivators with limitations on his right to sublet. Accordingly, every state enacted its own legislation for the abolition of intermediary tenure on payment of compensation, and by 1954, necessary legislation was adopted in all the states. The implementation of the enacted laws has since been practically completed. Only a few minor intermediary tenures still remain to be abolished and efforts are afoot to put an end to them also. As a result of abolition of intermediary tenures, about 20 million tenants are estimated to have come into direct contact with the state. While this has not meant distribution of land to those who do not have it, it is still an important dimension of the land distribution programme in a real sense. It meant the end of insecurity for many million tenants who held under the old intermediaries with no permanent right. Large areas of privately owned forest land, grazing land and culturable wasteland are vested in the state. Compensation payable to the ex-intermediaries has been computed at ₹ 600 cores out of which, an amount of about ₹ 275 cores has been paid in cash and bonds. According to the Planning Commission figures, about 16 million acres of waste and fallow land, which have vested in the state as a result of abolition of the intermediary system were distributed among small cultivators and landless persons.

Effects of Abolition

Excessive Burden of Compensation

Abolition of intermediaries resulted in excessive burden of compensation. Since it was provided that intermediaries would be granted compensation in lieu of land taken away from them, it mounted a heavy burden on the state exchequer. It was only in a few states that revolutionary measures were adopted such as in Jammu & Kashmir, where excessive land was taken away without any compensation. Should such a thing have been done in such a measure and extended to other states is yet a debatable point and should engage the attention of the researchers, in any case, compensation provisions should have been framed more carefully.

Heavy Burden on Administrative Machinery

Land reforms aimed at abolition of zamindari system put the administrative machinery under heavy pressure. Land records had not been maintained very scientifically and a long channel that has to be passed through made it a very tedious and time-consuming process. If land reforms have met with only a limited success, that is perhaps because of inadequate administrative back-up.

Large-scale Eviction

It also resulted in large-scale eviction which caused several problems, administrative, social and legal and in some cases economic as well. Evicting a group of people without alternative avenues of livelihood amounted to transferring a malady from one section to another without any positive advatage on the whole.

Multiplication of Feudal Landlords

It may not be out of place to mention that defective implementation of land reforms policy has created more feudal lords than were abolished. The malady remained, its garb changed, it went from one section to another, from one class to another and in some cases from one community to another.

Fair Rent and Security to Tenure

There had been leasing of land on a large-scale even in areas where intermediary tenures did not exist and sub-leasing where such tenures existed. The prevailing rates of rent very high and the tenants enjoyed little security of tenure. Three important guidelines were laid down in the Five Year Plans for the reform of tenancy. Firstly, rent should not exceed. 1/5 to 1/4 of the gross produce; Secondly, the tenant should be accorded permanent right in the land they cultivate subject to a limited right of resumption to be granted to landowners; and thirdly, in respect of non-resumable land, landlord-tenant relationship should be ended by conferring ownership rights on tenants.

All states have enacted legislation for regulating the rent payable by cultivating tenants. Maximum rates of rent have been fixed at levels not exceeding those suggested in the Five Year Plans in all states except Punjab, Haryana, Jammu and Kashmir, Tamil Nadu and Andhra area of Andhra Pradesh. In Punjab and Haryana, the fair rent is 33.3 per cent of the gross produce, in Andhra State 30 per cent of the produce for irrigated land and 25 per cent for dry land. In Jammu and Kashmir, for tenants of landowners holding above 12½ acres of land fair rent is 25 per cent of the gross produce for wet land and 33.3 per cent for dry land. However, for tenants of landowners who own less than 12½ acres of land, fair rent is 50 per cent of the gross produce.

Several states have enacted legislation for conferring security of tenure on tenants. Under the existing law, the position of tenants and particularly share-croppers continues to be insecure in Bihar; Tamil Nadu, the Andhra area of Andhra Pradesh, the Saurashtra area of Gujarat, Punjab and Haryana. Provisions have been made in several states for enabling tenants to acquire ownership rights. Necessary legislation for this purpose is still to be enacted in Andhra Pradesh, Assam, Bihar, Haryana, Punjab and Tamil Nadu.

Thus, in several states, in the matter of tenancy reform, legislation falls short of the accepted policy. And what is even worse, the implementation of the enacted laws has been half-hearted, halting and unsatisfactory in large parts of the country. The legal protection granted to tenants has often been ineffective.

2.2.9 CEILING ON LANDHOLDING AND DISTRIBUTION OF LAND

The imposition of ceiling on agricultural holding is pre-eminently a redistributive measure. "Among all resources, the supply of land is the most limited and the claimants for its possession are extremely numerous. It is, therefore, obviously unjust to allow the exploitation of any large surface of land by a single individual unless other overwhelming reasons make this highly desirable." The almost compelling case of land ceiling arises from the absolute and permanent shortage of land in relation to the population dependent on it, the limited prospect of transfer of population to non-agricultural occupations and the need to step up production along with increase in employment.

The policy of imposing a ceiling would be able to make a contribution towards fulfilling the following objectives:

(i) Meeting the widespread desire to possess land;

(ii) Reducing glaring inequalities in ownership and use of land;

(iii) Reducing inequalities in agricultural incomes; and

(iv) Enlarging the sphere of self-employment.

The First Five Year Plan made a passing reference to the question of ceiling on land holdings and stated, "We are.....in favour of the principle that there should be an upper limit to the amount of land that an individual may hold". But the authors of the plan were not so optimistic about the release of sufficient quantity of land made possible by imposing ceiling on the land holdings.

The Panel on Land Reforms also made a positive recommendation for the enactment of ceiling legislation for reducing inequalities in land ownership. The committee unanimously accepted the principle that there should be an absolute limit to the amount of land which any individual may hold.

The Second Five Year Plan boldly recommended ceiling legislation for giving to the rural poor, "a sense of opportunity equal with other sections of the community". It suggested that a ceiling should be fixed at three times the family holding (capable of yielding an annual income of ₹ 1,200).

The Third Five Year Plan came out with no new and positive proposals but reiterated the position of the Second Plan.

Thus, for nearly 15 years after the attainment of freedom, ceiling on big land holdings remained both theoretically and practically, a nebulous item ,in the scheme of agrarian reforms. Even the general position taken in favour of ceiling by the plans was based only on considerations of social justice or equity, but not on grounds of increasing production and developing agriculture. In the whole pattern of development under the plans, ceiling on agricultural property remained, until about 960, only a vague politico-economic concept lurking in the background.

Ceiling laws were enacted and enforced in two distinct phases, the earlier phase covering the period up to 1972, and the later from 1972, after the adoption of "National Guidelines". As ceiling legislation is a state subject, each state enacted its own ceiling law which obviously gives room for variations. There were two units of applications, namely, the individual land-holder and family. Again, the definition of the term "family" as well as the classes of land which were exempted from the operation of ceiling laws also varied widely in the states. These legislative measures were also full of loopholes and the big landowners took full advantage of them to circumvent the laws. They resorted to partition of their holdings and fictitiously transferred them to other individuals through what is called "benami" transfers on a very large-scale in anticipation of ceiling laws with the result that very little surplus land became available for redistribution.

In August 1971, the Central Land Reform Committee made certain recommendations with a view to bringing about a measure of uniformity in the ceiling laws of the different states. In the Chief Ministers' Conference on Ceiling on Agricultural Holdings held on 23rd July, 1972, various aspects of the ceiling laws were discussed and certain conclusions were reached with regard to the level of ceiling, unit of application, exemption, compensation, distribution of surplus land etc. It was agreed that the amended ceiling laws should be enacted by 31st December, 1972, in the light of the conclusions of the Chief Ministers' Conference and that all the amended laws should be included in Ninth Schedule of the Constitution.

The ceiling legislation in the post-1971 phase has been improved, rationalised and put on a more or less uniform basis throughout the country. The ceiling limits have been considerably cut and measures to control benami transfers have been appreciably reduced, the long list of exempted categories of land have been provided for. By and large, all the states provide for ceiling consistent with these guidelines. The ceiling is applicable to family of 5 consisting of the husband, the wife and three minor children. The best category of J9nd with assured water supply and capable of yielding at least two crops a year has a ceiling within the range of 10 to 18 acres (4.05 to 7.28 hectares) taking into account the fertility of the soil and other conditions. For land having assured irrigation only for one crop in a year, the ceiling does not exceed 27 acres (10.93 hectares). For all other types of land, it has been placed at 54 acres. In special cases like desert areas and hilly areas, ceiling may be raised with the consultation of Government of India. The main problem now is that of effective implementation of the amending legislation.

Distribution of Land

So far, under the ceiling laws, 30.56 lakh hectares have been declared surplus, of which the area taken possession totals 23.86 lakh hectares. In all, 17.66 lakh hectares have been distributed to over 35 lakh allottees. Of the land declared surplus and not distributed, about six lakh hectares are involved in litigation and another six lakh hectares are either considered unfit for cultivation or not available for distribution. In the last Revenue Minsters' Conference held in October 1986, the state have agreed that whenever litigation stands in the way of distribution of surplus land, effective measures should be taken to get the cases disposed of by the concerned courts. It was felt that it would be useful to constitute land tribunals under article 323-B so that cases pending in High Courts and other Courts under ceiling laws can be disposed of speedily.

It has been noticed that in some states, the average area alloted under surplus ceiling Act land to Scheduled Castes and Schedules Tribes is much less than the allottees to other beneficiaries. This trend needs immediate correction.

If the land ceiling laws are to be effectively implemented, it is necessary to identify with a sense of urgency the "benami" "Ofarzi" and clandestine transactions in land undertaken to evade provisions of the law.

Preparation and Maintenance of Land Records

Correct and up-to-date land records are an essential precondition for effective implementation of land reform measures, particularly for security of tenure for tenants and share-croppers. It is also necessary to ensure smooth flow of credit and agricultural inputs to landholders, particularly small and marginal farmers. Land records are fairly up-to-date in Andhra Pradesh, Haryana, Jammu & Kashmir, Gujarat, Punjab, Rajasthan, Kerala, Maharashtra, Madhya Pradesh and West Bengal. In most of the states, records are updated through the annual crop register.

Under the new 20-point programme, the states have been urged to take all measures for updating land records with the utmost urgency by adopting a time-bound programme.

The Union Government is considering to initiate a centrally-sponsored scheme to assist the states in the strengthening of revenue administration and land records in the current plan. The scheme envisages expeditions completion of survey and settlement operations and preparation of land records in areas where this has not been done. The states have been asked to give priority to early completion of survey and settlement and establishing a land record system where none exists and strengthening of the existing system to ensure periodic updating of land records, and improvement in reporting system on agricultural and land-based statistics. Alongside, possil5ilities of computerisation of land records are also being exploited.

2.2.10 CONSOLIDATION OF LANDHOLDING AND IMPACT ON AGRICULTURE

Fifteen states have reported that they have enacted laws on consolidation of land holdings. Consolidation has been completed in Punjab and Haryana and is nearing completion in Uttar Pradesh, Bihar, Gujarat, Himachal Pradesh, Jammu and Kashmir and Karnataka. Madhya Pradesh and Orissa have started consolidation work. The total area consolidated till the end of the Sixth Plan was 525 lakh hectares, which is only 34 per cent of the total cropped land in the country.

A broad assessment of the programme of land-reforms adopted since independence shows that the laws for the abolition of intermediary tenures have been implemented fairly efficiently, while in the fields of tenancy reform and ceiling on holding legislation has fallen short of proclaimed policy and implementation of the laws has been tardy and inefficient. With the abolition of intermediary interests, the ownership of land became more broad-based and the erstwhile superior tenants required a higher social status.

The Task Force of the Planning Commission came to the conclusion in 1972 that no tangible progress could be expected in the field of land reforms in the absence of requisite political will. Its report also has pointed out that in no sphere of public activity, since independence, has there been as much gap between precept and practice, between policy pronouncement and actual execution as in the case of land reforms. "With resolute and unambiguous political will, all the other shortcomings and difficulties could have been overcome; in the absence of such will, even the minor obstacles became formidable roadblocks in the path of Indian land reform".

Under the various ceiling laws, 7.2 million acres of land have so far been declared surplus, 5.6 million acres taken possession of, 4.4 million acres distributed. Thus, 2.8 million acres of surplus land have not been distributed so far. Of this, 1.6 million acres are involved in litigation and 890,000 acres have been reserved for specific public purposes.

About 4.2 million acres of land were received under Bhoodan, but so far only about 1.3 million acres have been distributed. The State Governments have not taken any initiative for the development of these lands even where these are in compact blocks. Similarly, there are 16.7 million hectares of culturable wasteland in the country, the development and utilisation of which is not being monitored.

Thus the full potential of land redistribution has not been realised both in terms of covering the entire surplus that may be available and distribution of that already identified. Legal and administrative bottlenecks have led to large gaps between declaration of surplus land, taking actual possession of the land and its distribution. In order to make the land refonns a success, appropriate measures will have to be taken to reduce this gap. Reassessment of ceiling of surplus land will have to be made by the states, especially in the command areas and other newly-irrigated areas. It shall have to be objective in character and will have to be backed up by strong political will, competent and honest administrative machinery and a general social acceptability. It shall have to be aimed at maximising the overall welfare rather than transferring the control of means of production from one section to another in a way so as to provide new legal sanction to the perpetuity of the feudal system. All efforts will fail unless we mean it and pursue it with honesty of purpose.

Next only to water, land is the single largest natural resource available to mankind and it is getting scarcer and scarcer every day. The Directive Principles of State Policy enshrined in the Indian Constitution enjoin that the" ownership and control of the material resources of the country are so distributed as best to subserve the common good; that the operation of the economic system does not result in the concentration of wealth and means of production to the common detriment".

In view of the above Directive Principles and the non-availability of land to the teeming millions in rural India, its equitable distribution is the only plausible solution. In Indian 'conditions, it is only the ownership of land which can provide a minimum of social security and raise the social status of the under-privileged in the rural economy. In the years

ahead, therefore, it is essential to accelerate the pace of land reforms as part of the overall strategy to alleviate rural poverty and unemployment as well as to boost farm productivity. Indian agriculture has reached a stage where another quantum jump in production is possible only through the elimination of certain identified weaknesses in the system. In this context, the recent stress on raising productivity levels in dryland areas and the Special Rice Production Programme in the Eastern Region are significant. Farm Planning is also being reorganised on the basis of agroclimatic conditions, for which the Planning Commission has delineated 15 zones based on their resource potential. All these are steps in the right direction, but we cannot afford to forget the fact that all these programmes are conditioned by land reforms in the desired direction.

2.2.11 SUMMARY

Land reform is a major issue in the modern world today. Agricultural structure refers to the system of land-man relationship on the agricultural production. It includes the land ownership, farming regulation of rent, value of land, security of tenure and distribution of land in broad concept.

Land reforms means change in the land distribution system and rights of land in favour of small farmers and agricultural labourers in a rational manner. Important components and reform are:

(1) Land Redistribution

(2) Tenancy Reforms for achieving:
   (i) Equality in income and wealth
   (ii) Higher agricultural productivity and efficient resources use
   (iii) Regulation of rent
   (iv) Security of tenure and ownership right

(3) Ceiling in landholding to prevent subdivision and fragmentation

(4) Consolidation of landholding to prevent subdivision and fragmentation

Land reform measure aims at determining the rational structural redistribution of land on favour of an egalitarian agrarian society. It does take into account the land values and rent on the basis of demand and supply of land and the imbalance thereby. It also accounts the returns to owner farmers and tenants. Land reform plays a vital role in economic development. It tries to elimenante the negative aspects of land-man relationship in farming like the supremacy of land-lords, absentee landlordism, insecurity of tenure, high rent and traditional tenancy policy.

Land Reform brings development to agriculture by raising agriculture productivity, employment opportunity, purchasing power, saving and capital formation, eliminating insecurity of and tenure, eliminating subdivision and fragmentation, and so on.

Land Reform is an essential measure for the distribution of social justice and equality in favour of the small farmers and landless agricultural Labourers. A successful implementation brings smiles for mollons in underdeveloped and developing economies of the land.

2.2.12 SELF ASSESSMENT QUESTIONS

1. Give brief note on land reform system on agricultural system.
2. Examine the role of land reform on agricultural development.
3. Outline the relationship between land tenure and price mechanism.
4. Critically examine the distribution of rent and value in the tenancy system.
5. Examine the various land return measures implemented by the Govt. of India.
6. Asses the impact of consolidation of holding in Indian agriculture.
7. Assess the policy of ceiling on landholding. Discuss its merits and demerits. Has it been successful in India?
8. Prepare a brief note on land reform policy during plan periods.
9. Examine broad features of land tenure in India.

Key Words

1. **Land Tax**: A tax levied on the value of land owned by individuals, businesses, or other entities. Land tax is typically assessed annually and is based on the assessed value of the land, regardless of any improvements or structures on the property.

2. **Site Value**: The assessed value of the land itself, excluding the value of any improvements or buildings constructed on the land. Site value is used as the basis for calculating land taxes in many jurisdictions.

3. **Assessment**: The process of determining the taxable value of land for the purpose of levying land taxes. Assessments may be conducted by government assessors or appraisal agencies using various methods such as market value, income approach, or cost approach.

4. **Millage Rate**: The rate at which land taxes are assessed per unit of assessed land value. Millage rates are typically expressed in terms of "mills," with one mill equal to one-thousandth of the assessed value.

5. **Exemptions and Deductions**: Certain types of land may be exempt from taxation or eligible for deductions under specific conditions. Common exemptions include agricultural land, conservation land, nonprofit organizations, and government-owned land.

6. **Progressive Taxation**: A tax system in which the rate of taxation increases as the value of the taxed asset (in this case, land) increases. Progressive land taxation aims to distribute the tax burden more equitably based on the value of land holdings.

7. **Land Value Taxation (LVT)**: A specific form of land taxation that focuses solely on taxing the value of land, excluding the value of any improvements or structures. LVT is based on the principle that land values are primarily determined by factors beyond the control of the landowner, such as location and natural resources.

8. **Tax Incidence**: The distribution of the economic burden of a tax between property owners, tenants, and consumers. The incidence of land taxation depends on factors such as the elasticity of land supply and demand, property market dynamics, and the ability of property owners to pass on tax costs to tenants or consumers.

9. **Tax Assessment Appeals**: The process by which property owners can challenge the assessed value of their land for tax purposes. Assessment appeals may be heard by administrative boards, assessment review boards, or judicial courts, depending on the jurisdiction.

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13. Agricultures in an Unstable Economy-Schultz

14. Agricultural Price and Income Policy- Schultz

15. Marketing of Farm Products-Shepherd

2.3 Chapter

LAND TAXATION

Objectives

After completing this chapter, you will be able to:

- It examines land tax as a source of state revenue.
- Tax on land is the oldest form of state revenue.
- Tax on land can be broadly studied under direct tax and indirect tax.
- It studies the burden of direct tax on agriculture.
- It examines the justification of agricultural tax.
- It examines the progression in direct taxation in agriculture.
- It studies the possible alternatives.

Structure:

2.3.1 TAX AS LAND REVENUE

Land Revenue is the oldest and traditional form of revenue. It is the most important source of state revenue. Prof.Kaldor rightly remarked "The taxation on agriculture has critical role to play in the acceleration of economic development since it is the only imposition of compulsory levies in the agricultural sector itself which enlarges the supply of savings for economic development. Manu emphasised on Land and land-tax during the ancient time. During Mughalera and British period this was an important source of land-revenue. It has been realised that agricultural sector has been taxed at low rate as compared to the non-agricultural sector that creates disparity in rural agricultural sector. The country faces the problem of resources mobilisation for financing its development plans. To be independent in our investment decision it has been urgent for a country to impose tax on land & its earnings.

2.3.2 METHODS OF ASSESSMENT

The Taxation enquiry commission classifies the methods of assessment of Land tax in the following manner.

(i) ***Net Asset:*** Net Asset or economic rent can be defined as the estimated average annual surplus of a estate or group of estates remaining, after deduction of the ordinary expenses of cultivation as ascertained or estimated Odisha, Punjab, UP, MP, Himanchal Pradesh, Bihar followed this method.

(ii) ***Net produce or Annual value:*** It is described by deducting from the gross value of cultivation expenses and also making certain allowances for badreasons. This method was followed by Madras.

(iii) ***Empirical Basis:*** This method is based on the empirical data like economic background of the region, cultivated area, price change, market and communication facilities etc.

(iv) ***Rental Method:*** In this method, land Lords are responsible for imposition and receipt or rent after requisite deduction from the production.

(v) ***Capital value:*** This method adopts the value assessment of all factors, sales, mortgage etc.

(vi) ***Gross produce method:*** Under this method a certain proportion/percentage of the gross produce is fixed for collection as land revenue presently, Assam is adopting this method.

Suggestion for Improvement:

(i) Uniformity in land revenue system is highly suggestive for the better land revenue system.

(ii) Rent or land revenue needs rivision in a regular interval of time as described by the state of agricultural produce.

(iii) In case of exemption tax rate may be suitably revised for the benefit of the agricultural a farmers.

(iv) Local bodies should be authorised to levy surchage to meet financial needs.

(v) A part of the revenue (15%) should be given to the local bodies of that specific needs.

2.3.3 CLASSIFICATION OF AGRICULTURE TAX

Agriculture tax or tax on land can be broadly divided into direct tax on agriculture and Indirect tax on agriculture. Land revenue is the only important source of direct tax on agriculture. Land revenue is the common significant tax, which is now used as a means of resources mobilisation in almost all states. But question is whether such a tax procedure can be successful in reducing inequality in the distribution of income and wealth.

2.3.4 BURDEN OF DIRECT TAX ON AGRICULTURE

Burden of Land tax or direct tax an agriculture creates problem for the peasant society. These taxes are imposed by the state for the purpose of reducing income disparity and generate a pace for economic development. The very objective is to reduce inequality in the distribution of income and wealth. This tax has contributed a good lumpsum amount towards land revenue. The amount of tax collection from this source has increased. But it has created problem for the peasant society who are burdened much. Govt. has tried to make the farmers class burden free and it has been more liberal from time to time by exempting various taxes levied. But Burden of direct tax can not be shared by any body rather it has been duly relaxed by the govt. by declaring easy and economical tax payment. Burden to direct tax on agriculture spreads over the society easily as physiocrats describe it like a process of taking away blood from one point of the blood & rushing of blood to that point from other parts of the body to make equal & equilibrium distribution of blood. Similarly the burden of tax on agricultural spreads over and helps in maintaining equality by reducing inequality.

2.3.5 POSSIBLE ALTERNATIVES OF LAND REVENUE

Possible alternative can be suggested in the field of land taxation as follows:

(i) ***Progressive surcharge on land revenue:*** We can define this as a modest addition to the basic tax on land and agricultural Income. This is generally by the govt. to facilitate the progression in the taxation of agriculture by reducing the disparity. The imposition of surcharge by reducing the disparity. The imposition of surcharge on the ground reality of progression may be well-accepted but when it fails to achieve the goal it loses its identity. It takes into assessment of the agricultural income from various sources and thereby showing the regional variations in income. Though it aims at noble equality but this may not be well linked to land revenue and may fail to achieve the goal.

(ii) ***Direct Taxation on Agricultural Income:*** This can be another alternative suggested by many on the basis of agricultural incomes. This is a suitable theoretical talk to reduce income., disparity by talking away the income through tax. But it is highly difficult to differentiate the agricultural non-agricultural income what stands as a greatest hinderance on such act.

2.3.6 JUSTIFICATION FOR AGRICULTURAL TAXATION

The most favourable arguments for imposition of agricultural taxation are to attain the following objectives.:

(i) ***Principle of Equity and Justice:*** The very popular argument in favour of agricultural taxation is attai equality and justice by eradicating the prevailing in equality and injustice from the agrarian society. Every govt needs it urgently for the benefit of the peasant class and to ensure uniformity in tax principle. This aims at better agrarian structure & its economic development.

(ii) ***Creation of Marketable Surplus:*** Agricultural taxation plays crucial role in the acceleration of economic development. It is great supplier in the economy. This creates opportunity for generation of marketable surplus. Increase in agricultural taxation is justified and sought to be recommended on the ground of raising adequate marketable surplus from agricultural sector.

(iii) ***Mobilisation of Domestic Resource:*** Agricultural taxation creates opportunity for mobilisation of Resources in the domestic sector. This helps the government to mobilise domestic unused resources and less utilised agricultural resources towards high productive areas of production. This mobilisation leads to better investment in the economy.

(iv) ***New Tax goals:*** Agricultural taxation provides scope for expansion of direct tax base, thus it betters the position of the government by easing the much dependency on indirect tax. Agricultural sector provides ample scope new tax opportunity.

(v) ***Raising the level of peasantry Earning:*** In modern day economy we have large scale investments on agricultural sector thus leading to high scale earnings by the farmers. Adoption of new agricultural strategy & technology has enhanced their production and income in manifold. It needs to be taxed in the larger interest of the country and poverty stricken massess.

(vi) ***Progressiveness of Agricultural Taxation:*** Many agroeconomists agrue that agricultural taxation is a better tax for its progressive character. It is a better tax to minimise regional inequality in the society. This tax provides opportunity for better land use and development of poor peasants in the economy.

(vii) ***Balance between Agriculture & Non-agricultural Tax:*** Agricultural Taxation creates a balance between Agricultural & Non-agricultural and rectifies the regressive character of tax. It is a step towards equality between agricultural tax tax and non-agricultural tax.

(viii) ***Raising Tax Revenue:*** It is a source of tax revenue and particularly a more balanced one. Agricultural Taxation is a widespread tax phenomenon & it seems to be more impartial and rational tax. It is more neutral but adds to tax revenue. In developing economy agricultural tax contributes more.

(ix) ***Improving Production & Momentisation:*** Agricultural Tax is bound to induce the farmers to improve their productivity and enlarge production as to meet his obligations. It enhances the productive efficiency of the farmers and his capacity to self a large production as to meet his obligations. It enhances the productive efficiency of the farmers and his capacity to self a larger proportion of agricultural produce. This also adds better opportunity for adopting new and modern technology.

(x) ***Checks Tax Evasion:*** Agricultural Taxation checks tax evasion. It is agreed that tax on agricultural produce in more uniform and checks tax-evasion. It is non evasive by nature particularly incomparision to non-agricultural tax.

2.3.7 CASE AGAINST AGRICULTURAL TAXATION

(i) ***Improper Assessment:*** It is one of the major problems of agricultural taxation, because administrative personnel need adequate knowledge about the local condition, the productivity of land, proper assessment of the status of the farmers and the sources. Without proper assessment any tax cannot yield equity and justice principle of tax policy.

(ii) ***Constitutional Problem:*** Agriculture is under the state control in the constitution, hence centre can not impose tax on agriculture. That creates problem of maintaining uniformity, equity & Justice.

(iii) ***Size of Holding:*** Failure of land reform, and the false and malpractice in land records, the small size of land the majority of landholding provided limited scope for the imposition of agricultural taxation, Govt, record shows the majority of landholds have is below 5 acres or even lesser. In such a situation tax on agricultural land/ agricultural income can not yield good result at all. Sub-division and fragmentation adds woe to further the problem.

(iv) ***Non-determination of Actual Income:*** This is another vital problem of the agricultural sector & particularly in rural area & to be more specific in developing or under-developed countries actual income of agricultural farming is unknown so tax imposition cannot be rational.

(v) ***Economic Effect:*** Tax on land or agricultural income creates change in attitude and behaviour of the agricultural community, particularly it creates as imbalance between normal or ordinary behaviou between leisure & work, saving and investment. It affects the behaviour of the peasant class, their consumption production and other activity.

Tax on agriculture may not be successful in attaining equality & justice rather it is regressive by nature. It is a transitional phenemenon.

(vi) ***Loss of Rural Peace:*** Some agroeconomists feel that it destroys rural peace and creates peasant unrest, because it affects the agricultural productivity directly by creating reactionary attitude among the farmers. They feel it as an exploitation of this agricultural income.

(vii) ***Wide Fluctuation:*** This results in wide fluctuation in the output & prices which varies depending upon the tax impostion by the govt. Furthers productivity is affected due to farmers' discourageous attitude.

(viii) ***Cost of Cultivation:*** Land-Tax or Tax on agricultural produce or income or income leads to higher cost of cultivation, that may discourage the agricultural producers. Such an act may lead to decline in the productivity of agriculture.

2.3.8 INTEGRATION OF AGRICULTURAL AND NON-AGRICULTURAL INCOME

It is for the benefit of the economy and justice both agricultural and non-agricultural component of a taxpayer's income be aggregated and tax in the non-agricultural proportion be levied as if it were placed in the top sales of the aggregate income. The disparate treatment of agricultural and non-agricultural income for the purpose income tax creates a strong temptation for the assesses to masquerade their income earned otherwise as gains from agriculture so as to avoid tax liability. In India K.N. Raj Committee has suggested for the partial integration of agricultural income that scheme has been adopted by the Govt. This scheme is justified on the ground that

(i) Tax burden does not differ sharply because of the partial integration.

(ii) Assessee feels comfort regarding tax burden.

(iii) Curbs the temptation to dress up a large chunk of taxable income as income of the agricultural origin.

Hence integration of agricultural income brings harmony to the principle of taxation. But at the same time Govt. must be adequately vigilant to ensure the initial exemption allowed out of non-agricultural income and balance of non-agricultural income and balance of non agricultural income.

2.3.9 ECONOMIC EFFECT

The land value tax is a levy on the unimproved value of land. It is an advaloream tax on land the disregards the value of that building, personal property and other improvements. A land value tax a quite different in nature and differs from the property tax as it is a tax imposed on the whole value of the real estate, the combination of land, building, & improvements of the site. This tax has been widely implemented in many countries of this world like Taiwan, China, Hongkong, Singapore, Russia, Estonia, New Southwates, Mexical, Pennsylvania etc.

The value of land tax depends on the land value that can be expressed using two independent concept.

(i) The value of a particulars site of land is what fair exchange brings in terms of many during an agreed trade or transaction between two parties one of whom is the land owner. Hence LVT affects the exchange value.

(ii) The land value tax puts effects on the demand able ground rent which is its potential for use in either production or residential capacity. This also affects the capitalisation of this rent.

(iii) It also yields economic impact on the efficiency of land use by affecting the consumer surplus and producer surplus through interaction between demand and supply of land in fixed the burden of tax will fail entirely on the land owner with no deadweight loss.

(iv) Most taxes distort economic decisions. If labour, building or machinery in plant are taxed beneficial activities and enterprises and efficiency are penalised due to the excess burden of taxation. This does not apply to LVT which is payable regardless of whether or how well the land is actually used. Because the supply of land is inelastic.

(v) Necessity to pay tax encourages the land owners to develop the vacant & under used land properly or to make way for others who will. This promotes land development. This brings dilapidated intercity area to productivity use because LVT detress speculative land holding. This reduces the pressure to build in underdeveloped sites and so reducing urban sprawl.

2.3.10 CONCLUSION

To conclude the discussion, Land taxation has been a very important and critical issue of the agricultural economics. It has great importance in the field agriculture particularly in the analysis of the problems of agriculture. At its extreme, a tax on current agricultural produce is tentamounts of taxing land use and exempting non use of land. Thus if the land tax is replaced by agricultural income, there is likely to be transfer of land productive to unproductive or less efficient use & pace of improvement is likely to slacken.

2.3.11 SUMMARY

Land tax is the oldest and traditional sources of land revenue. It plays a critical role in the field of agricultural development. It influences the saving and investment in agriculture. It is in operation since the of Manu to Moderndays. Method as assessment depends in six ways of computation like, (i) Net asset, (ii) Net Produce, (iii) Empirical Basis, (iv) Rental method, (v) Gross produce.

In estimation, to maintain uniformity, equality, justice should be properly of Govt. dence. Suggestion may be made for possible alternative.

Agro economists differ in the imposition of land taxation. Some prefer for land taxation and some others argue against the imposition of tax. Further Tax committee headed by KN Raj refers to integration of agricultural income and non-agricultural income. Economic effect reveals to positive & negative consequences of land taxation. Finally it can be told that a controlled taxation on agriculture with careful treatment shall yield a better result.

2.3.12 SELF ASSESSMENT QUESTIONS

1. Define and prepare a note on land taxation.
2. Examine the case for and against tax on agricultural tax on agricultural income.
3. Examine recommendation of Raj Committee regarding additional agricultural taxation.
4. Are you in favour of levying tax on agricultural income Explain.
5. Give a note on economic effect on agricultural tax.
6. Write a note on integration of agricultural and non-agricultural income.

Key Words

1. **Land Tax**: A tax levied on the value of land owned by individuals, businesses, or other entities. Land tax is typically assessed annually and is based on the assessed value of the land, regardless of any improvements or structures on the property.

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2.4 Chapter

LABOUR MARKET (WAGE, UNEMPLOYMENT AND UNDEREMPLOYMENT)

Objectives

After completing this chapter, you will be able:

- To know the meaning of agricultural & non-agricultural labour.
- To understand the place of labour in agriculture.
- To have an idea of supply of labour and its source.
- To get knowledge about the demand for labour force in agriculture.
- To know the efficiency of farm labour and size of labour force.
- To know the quality of labour force.
- To understand the influence of technology on labour productivity.
- To know the agricultural wage and the gap between farm and non-farm wage.
- To explore the problem of unemployment and under-employment in agriculture.

Structure:

2.4.1 MEANING AND CONCEPT OF AGRICULTURAL LABOUR

Labour in agriculture constitutes one of the most important factors of production as machine and labour cannot be perfect substitutes in the agricultural production process. In spite of the significant technological advance in this sector, man will continue to be more important here than in the rest of the economy. The association of labour with agriculture is as old as the farm occupation itself. A discussion on labour in agriculture shall have to be developed in a two-dimensional format. On the one hand, man (labour) is a consumer and on the other, he is a producer. This imbalance between how much he produces and how much he consumes has always placed countries differentially. If P denotes the amount produced and C, the amount consumed, then the relationship between P and C can be expressed as:

$$D = P - C = O$$

A positive D is an indicator of a farm sector producing more than what is consumed by the farm labour force and hence the surplus can be used in the non-farm sector. Zero or negative values of D are not in tune with the process of economic development.

The supply of labour and the demand for it form yet another important line of discussion on the subject. The inequality between the supply of and demand for farm labour has led to the emergency of several development issues at different stages of economic transition. Similarly, the quality of farm labour and its characteristics play a crucial role in the agricultural sector. Sensitivity with respect to seasonal variations makes the problem of agricultural employment a complex one. All these aspects of labour in agriculture would be main issues of discussion in this chapter.

2.4.2 PLACE OF LABOUR IN AGRICULTURAL ECONOMICS

Labour is the single most factor which is of primary importance in increasing the production in traditional agriculture. The oldest production industry known to mankind is agriculture and the basic input in this production process has been human labour. At the early stage of human development, since land was abundant, increase in farm labour led to the clearing of more land and bringing it under cultivation. Hence, the volume of agricultural production was directly related to the volume of human labour and multiplication of labour units augmented the returns from this industry. Such a situation must have continued even after small urban settlements developed because farm labour in that case had not only to produce for those directly dependent upon agriculture but even for urban dwellers.

Transformation from traditional static agriculture to dynamic agriculture depended as much upon the farm labour force as on technological innovations. Many a technological innovation have been such, as would require added labour. Even with the use of increased capital, a few agricultural operations require intensification of labour such as seedbed preparation, weeding and harvesting etc. Labour, therefore, is of critical importance on agriculture whatever the stage of its development may be.

Farm labour has been a pivotal point the model of economic development, in general, and in the models of agricultural development, in particular. The history of economic transition suggests that over a long period of time, the pressure of population on land increased considerably. Land being limited, with every increase in population, the man-land ratio went on increasing and consequently remuneration per unit of labour declined accordingly till it became constant at the subsistence level since it could not go below that. In the absence of alternative employment due to non-existence or relatively small size of non-farm sector, agriculture had to absorb the shocks of additional manpower, rendering, in the process, a sizeable amount of farm labour as redundant. Development economists have done elaborate exercises to explain how this redundant labour force can be used to expand the capitalist sector and hence promote economic development of a country.

One of the significant models of economic development of a surplus labour economy is that of Lewis. It builds the development process on shifting the constant wage-earners from the agricultural sector to the non-agricultural sector at the subsistence wage and allowing the capitalists to appropriate huge profits for further investments and hence for the expansion of the capitalists sector. In this, Lewis-type models visualised double benefit from agriculture. First it serves as a supplier of cheap labour and secondly, as a supplier of food to the non-agricultural sector which in the process transfers income from the urban to the rural sector where after meeting the immediate consumption requirements, it goes into agricultural capital formation. Thus, labour plays a significant role in agriculture directly and indirectly as well.

Historical analysis of economic growth marks three distinct phases in the process of economic transformation. The first phase is when the survival of the economy is solely dependent upon agricultural employment. The sole contributor to national income is labour used in the primary sector whose productivity is undoubtedly low but has no other avenues of occupation on which to depend upon. The second phase begins with the improvement in farm productivity and development of a non-farm sector that draws labour from farms. Initially, nonfarm jobs are mainly devoted to the production of materials used on the farm. With the introduction and expansion of non-farm jobs, the conditions of living improve resulting in the increases in size and quality of labour force. This further stimulates the growth of non-farm sector and as a result, continuously drags out labour from the farm sector. This then leads to the third phase of development marked by a rapid rise in non-farm employment and a higher rate of economic growth.

It is, therefore, easy to understand the significance of the relationship between labour and agriculture in its historical perspective. Directly or indirectly, it has played a crucial role in this primary sector of production.

2.4.3 SUPPLY OF LABOUR FORCE

Supply of labour force in agriculture depends upon the size of population. In traditional static agriculture, the size of farm labour force directly varied with the size of total population. Alternative employment avenues being non-existent, an increase in population straightaway led to an increase in labour force in the farm sector and vice-versa.

In the event of farm and non-farm sectors existing side by side, the agricultural labour force depends upon the residual formed by the rate of growth of population and the rate of growth of non-agricultural employment. The state of economic transformation from traditional static to modern dynamic society greatly influenced the supply of farm labour force.

On the demographic side, we shall have to examine different theories of population growth and the factors affecting it.

2.4.4 SOURCES OF LABOUR AND POPULATION GROWTH

Theories of population growth are based on two different schools of thought - naturalistic school and sociological school. The former emphasises factors like fecundity, fertility, sterility, supply of food and physical resources, density of population and the standard of living as influencing the growth of population. Latter school of thought lays stress on institutional set-up devised by human beings and emphasises social rather than environmental factors as influencing population growth. Cultural pattern and social behaviour are considered more dominating than the natural factors.

The thought developed by the naturalistic school is founded on Malthusian theory of population growth. This theory is based on the belief that the size of population can be limited by man himself while the capacity to produce food is limited by nature. His main contention was that the rate of growth of population would always outpace the rate of

growth of foodstuffs and in order to maintain balance between the size of population and the volume of food availability, nature, will come down on population with a very heavy hand in the form of famines, pestilence, epidemics, etc. Malthus, in his thinking obviously faltered on two points, viz., on 'man's inventive competence and on his acceptability of a cultural pattern of a controlled birth rate. Malthus did not foresee the possibilities 'of a technological revolution enabling man to produce more with less land at his disposal.

On the other hand, the social school of thought believed that man, while taking decisions regarding the size of the family, shall carefully consider the place of children in family-life goals and shall, in the process, be affected by institutional set-up such as religion, social ceremonies and law, the nature and place of work of the women and parental motivation and expectations from their children. Besides, the size of population can also be regulated by formulating public goals relative to population. These goals may be so fixed as to slow down the rate of growth of population, to prevent or encourage an increase in population, to improve the quality of population and to secure a distribution of population relative to natural resources in different regions.

On the side of population growth, therefore, there is no limit to the supply of labour force to agriculture. In fact, the world is seized with the problem of over population relative to its requirement and in spite of the voluntary measures to regulate the growth of population, there appears to be no danger of short supply of labour force in the near future. Alarmed by the gravity of current trends in population growth, the suggestions for zero rate of growth are already put forth. The suitability or otherwise of such a strategy is being debated and investigated.

2.4.5 FACTORS AFFECTING POPULATION GROWTH

The size of population at a point of time depends upon the difference between births and deaths and corrected by the difference of in-migration and out-migration from that geographical territory. For the world, as a whole, the migrations are of no effect. Factors affecting population growth are, therefore, those that affect the births and deaths. Allowing for differential applicability and acceptability owing to differences in sociocultural background, religion and geography, the main factors that effect births are as follows:

(1) Marriages.

(2) Reproductive capacity.

(3) Economic conditions.

(4) Social, cultural and religious influences.

(5) Level of education.

(6) Government policies.

Marriages playa significant role as a factor affecting population growth. Three points have to be noted in this regard; number of marriages, the age at the time of marriage, particularly' of females and the divorce rate and incidence of legal separations.

Populations with legal, religious and social sanctions for remar-riages and more than one marriage with previous spouse or spouses living are prone to grow at a faster rate than other populations where these sanctions are not in vogue. Similarly, marriages at younger ages enlarge the reproductive age span and hence a higher rate of growth of population. Easy divorces and legal separations act as depressors on population growth and the extent to which the rate of growth can be limited is directly related to the intensity of these occurrences.

Reproductive capacity, that is, physical capability of couples to produce children (also known as fecundity) is an equally important factor affecting the number of births. A higher reproductive capacity with a larger reproductive span shall obviously lead to higher rates of population growth and vice-versa. Economic conditions of people are said to influence their decisions with regard to births of children. It is generally believed that better economic conditions are followed by lower birth rates. The reason being that people do not want to allow their standard of living to fall owing to the larger family size and that with better economic conditions, more time is devoted to recreation. Social religious and cultural influences also have a considerable effect on the birth rate. Societies which consider birth control and abortions etc. anti-social and anti-religious record a higher birth rate compared to other societies. Education too plays a significant role. Lastly, government can always formulate policies to regulate the birth rate. It the government is interested in checking the birth rate, it may withdraw incentives like free education to the third child, subsidized rations, free medical facilities etc. Measures contrary to these may be taken in case government wishes to increase the birth rate.

Broadly speaking, the factors affecting death rate are:

(1) Level of medical technology.

(2) Economic conditions.

(3) Infant mortality rate and expectation of life.

The level of medical technology is perhaps the single most factor influencing the death rate. Acceptability of advanced medical technology by the people is very crucial. Death rates have been reduced considerably by advances in medical research. Better economic conditions help reduce tensions on human mind and provide improved living conditions and socio-economic atmosphere. This goes a long way m reducing the death rate. Lower mortality rate among infants and older people enlarges the reproductive capacity of a society and may lead population to increase.

On the demographic side, therefore, the supply of farm labour force is directly linked with the overall size of population which, as we have seen, depends on the size of birth rates and death rates and, of course, on in-and-out migrations from a locality, country or region.

Considering the supply of farm labour force as a function of residual of population growth on the one side and growth of non-farm employment, on the other, it, shall depend upon the nature and rate of expansion of the non-agricultural sector. Further, the growth of non farm sector is likely to generate more employment and with stagnant rate of population growth, the residual shall tend to decline and hence restrict the supply of farm labour force. But note shall have to be taken of the nature of growth in the non-farm sector. If it uses capital-deepening devices, the rate of growth of employment may fall far short of the rate of growth of population and hence the residual will tend to increase and in the process, increase in the supply of farm labour force. The developing countries of the world that have chosen to expand the non-farm sector at a faster rate are exactly faced with such a problem because the non-farm sector under the compulsions of market and international standards has used more capital deepening devices and failed to generate employment at a higher rate. In any case, even when non-farm employment expands at a rate equal to the rate of population growth, the technological advances would enable the production of agricultural products at the desired levels with lesser manpower.

2.4.6 DEMAND FOR LABOUR FORCE

Demand for agricultural labour force is influenced by the size of the farm, the system of farming and the degree of technological development.

In general, it would appear that larger the size of farm, the greater will be the requirement of labour and *vice-versa*. But in practice, it does not work in that fashion always. To some extent the direct relationship between farm size and labour requirement works all right but beyond that it may turn out to be otherwise; the turning point shall, of course, demand upon the system of farming and technological development. Small farms normally require more labour for a holding of a given size than large farms practising the same type of farming.

The system of farming is equally important. Intensive system of farming would, in general, require more labour per unit of land than is required under an extensive system of farming. In the light of our earlier argument, it follows that intensively-operated small farms would require a larger amount of labour force. Farming is such an enterprise where the required standards cannot be fixed. Besides size and system of farming, there are a variety of other factors that cause variations in the labour requirements. For example, the cropping pattern, dairy and poultry farms and horticulture etc. have different labour requirements.

An acre of rice cultivation may have a different requirement of labour compared to an acre of wheat cultivation or potato cultivation and so on. Labour requirement on vegetable farms may significantly differ from that on floriculture and horticulture. Secondly, sensitivity of individual crops suddenly gives rise to more or less labour requirements during particular operations. Labour requirements for keeping livestock differ with the type of livestock kept and the system of management. There will be lesser demand for labour if cows are to be looked after in an outdoor pasture area than these are to be looked after indoors. Mechanical system of milking cows may generate lesser demand for labour than indoor hand milking system.

The nature and operational character of farming is such that precise labour requirements cannot be estimated. The services of a worker or a group of workers of different specialisations may be needed every day though not for a full day on small farms while on large farms, the situation may be different. Seasonality of agricultural employment is a very serious problem. This subjects the demand for labour to variations from one operation to another and from one seasonally more sensitive crop to another of lesser seasonal sensitivity. Shortage of labour is felt in peak seasons and labour is regarded surplus in slack seasons.

In regions where farming is predominantly dependent upon the monsoons, variations in demand for labour occur due to the nature and amount of rain recorded. If rains come on time, the agricultural operations run as scheduled and accordingly generate demand for labour on the usual pattern. Untimely rains cause variations in labour requirements as well. If, on the other hand, rains fail in a particular season, the demand for labour is completely upset and farm labour suddenly becomes redundant. On the contrary, acute shortage of labour is felt during the crop operations closely linked with rainy season.

To avoid shortages of labour and labour redundancy, farming has to be managed more scientifically and in a way so as to permit reasonable adjustments as and when required to avoid waste and overburden. Such a strategy can be worked out in two ways. The farm enterprises may be selected in such a combination so that the regular work force finds fulltime job every day and every season. Alternatively, a minimum regular work force may be maintained and supplemented by additional stock as and when required. The two approaches involve the questions of farm management and labour management.

Traditional agriculture did not pay much attention to management problems as such but relied heavily on the use of casual labour during peak seasons. With advanced levels of economic development, the casual labour disappeared owing to expansion in non-farm employment, as is the case in the developed countries at present. This stimulated the need for better farm and labour management. In the developing countries of Asia, however, casual labour is available and used during the peak seasons. But the overall considerations of farming enterprise demand that farm management be strengthened and improved for obtaining better results from agriculture. In many cases, peak agricultural operations are managed by pooling of labour force, particularly on small farms. This practice is in vogue in many Asian villages and shall continue to be there for quite sometime. Besides, labour problems are also solved by using contract labour and overtime labour. There is an advantage in using contract labour as it is selforganised and does not need permanent supervision as in the case of casual labour.

Overtime labour has a special place in agriculture owing to its peculiar nature compared to industrial production. Some of the farm operations have to be completed within a specified time dictated by nature and in such cases, longer hours of work have to be put in if casual or contract labour is not available. Cultivation of land, sowing, weeding and harvesting are such operations as would necessitate the use of overtime labour since the operations have to be completed in time. Similarly, keeping and supervising the livestock needs overtime labour because several jobs have to be done at fixed times and in a regular programme. There is, however, a limit to the use of overtime labour imposed by the physical capacity of a worker.

In these days, however, emphasis is being laid on farm management to ensure optimum-utilisation of farm labour force. Cropping pattern is so designed as to create demand for labour in one crop when it is relieved from the cultivation of another crop. Even daily adjustments are possible by combining small farms of vegetable cultivation poultry and dairy units with major crop operations. In the case of seasonality, non-farm employment is created by setting up small agrobased industrial units in the village itself.

We have, in the preceding sections, explained how the size of farm and system of farming influence the demand for labour in agriculture. We shall now turn to the third factor, viz., level of technological development. The nature of technological progress greatly influences the demand for farm labour force. The history of the developed countries reveals that technological progress in agriculture tended to reduce the demand for farm labour. The farming operations became more mechanised and displaced labour for use in non-farm sector, perhaps the Western industrialised countries and the United States were under compulsion to do so as the rates of population growth were low compared to the rates of growth of employment. Japanese experience shows that technological advancement in agriculture can be labour-intensive in character. It depends upon what input-mix and what type of machines are used on farms. Japanese developed an intermediate technology where inputs like chemical fertilizers and mini-tractors stimulated greater demand for labour rather than displacing it. New agricultural technologies result in income effect in that the efficiency of labour is increased and real income gains increase. This income effect is associated with a substitution effect. The temptation to maximise gains from new technologies, and as a result to enjoy more leisure leads to the substitution of machine for man and displaces labour from the farm. On the other hand, if it suits to avoid heavy cost of machines and their maintenance, an increased dose of labour may be put in to optimise returns from new technology through intensified agricultural operations.

There is a strong controversy going on whether new agricultural technologies have displaced farm labour or intensified its use. Ample evidences for and against this argument have been given but no definite conclusions can be drawn. The nature and level of technological progress shall, however, continue to considerably influence the demand for farm labour force.

2.4.7 EFFICIENCY OF FARM LABOUR AND ITS SIZE

The simplest measure of labour efficiency is the amount of output per worker. Productivity of farm labour is directly linked with the size of labour force, the quality of labour force and the nature and level of. technological development. Changes in the productivity of labour are connected with the process of transformation from static to dynamic agriculture.

Size of Labour Force

In a static agricultural technology, as the size of labour force increases, the marginal productivity of labour (or more appropriately of additional labour) tends to decline. This happens because land productivity does not increase owing to the static technology and farming is extensive rather than intensive in character. If technology continues to be static and labour force rises continuously, the productivity of labour is compelled to fall with the result that wages fall below minimum subsistence level and as a consequence increase the death rates and reduce rate of growth of population.

Given the nature of agricultural production function, an initial dose of additional labour input may be rewarded by more than a proportionate rise in agricultural production and average produce of labour may tend to be higher than the subsistence level. Such a situation, for sometime, provides for the maintenance of even those members of labour force whose marginal product is below subsistence level. This form of farm labour productivity is typical of many developing countries where the levels of subsistence living are quite low. Such a phenomenon may be explained by the following diagram.

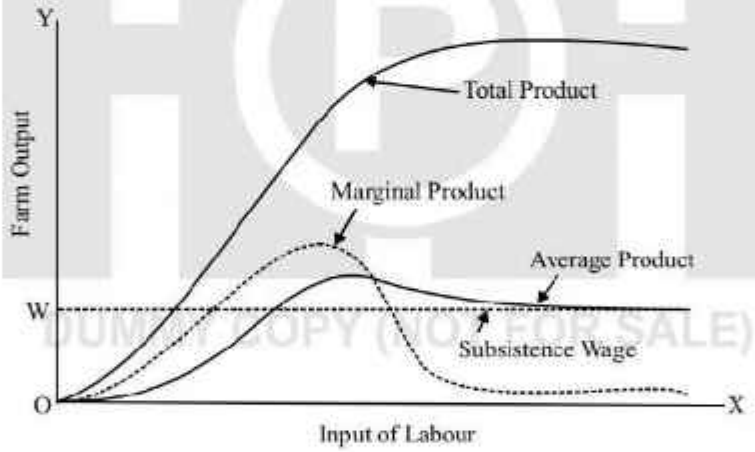

Fig. 4.1: Labour Productivity

It is evident from Fig. 4.1 that the level of subsistence living OW is relatively low and average productivity of labour is much above this level. This is particularly relevant if land productivity is high on new lands brought under cultivation by the additional labour force. But if the soil quality is poor and the possibility of extensive farming is limited, under static technology, the rise in labour force will not permit the average labour productivity to rise above the subsistence level. Such situations may often be found in the hill areas. Fig. 4.2 reflects such a situation.

In Fig. 4.2 the subsistence requirement OW is as usual low. The average productivity curve does not rise beyond OW and increases in total product are also moderate.

As agriculture sheds its static character and tends to be dynamic, changes in technology may result in the rise of the productivity of labour even when the size of labour force is increasing.

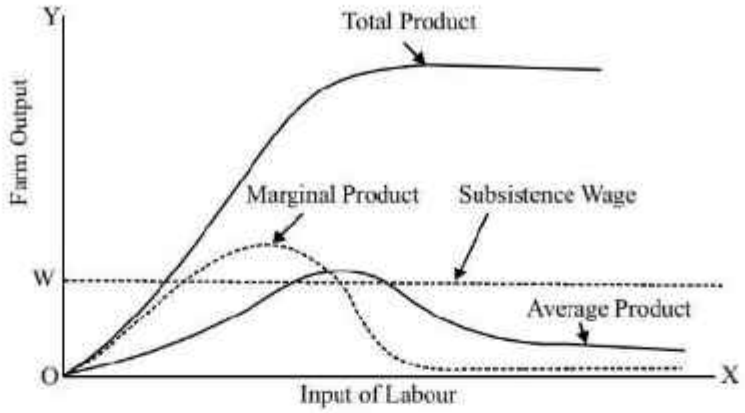

Fig. 4.2: Labour Productivity

2.4.8 QUALITY OF AGRICULTURAL LABOUR

Productivity of farm labour shall greatly depend upon its quality, both physical and mental. Physical quality of labour force refers to sound health, stamina and race characteristics. Differences in the health of labour force result in productivity differentials. Usually people living in temperate climatic conditions enjoy better health than those living in hot and humid climatic conditions. Sound health gives greater stamina to stand the odds of the occupation and to work overtime. Race characteristics are also a factor that influences quality of labour. Punjabis, for example, have shown examplary physical fitness in bringing about a revolution in farming both in Pakistan and India. On the other hand, farmers living in the rest of the country and enjoying same farm conditions have not been able to keep pace with their Punjabi counterparts.

Mental quality of labour force shall depend upon the level of education, extension services and agricultural training programmes. Education, more particularly, functional and vocational, tends to improve the management capabilities of farm labour and with the same amount of work they can achieve better rewards. Extension services are equally important to narrow the gap between the farm labour and farm scientist. Unless laboratory results are made to reach the farmer, his mental horizon cannot be widened and his capability of enhancing farm productivity cannot be explored. Agricultural training programmes have a significant effect on improving the mental health of farm labour force. Agricultural universities and other such institutions are rendering useful service in this regard.

2.4.9 TECHNOLOGICAL DEVELOPMENT AND IMPACT ON LABOUR PRODUCTIVITY

The nature and level of technological development has a great influence on labour productivity in farming. Improved methods of farming, better quality seed, fertilizers and pesticides and improved tools and implements have resulted in considerable increase in farm labour productivity. As already mentioned, Japanese methods. of cultivation are not only labour productivity enhancing but are also labour-intensive in character. Such technologies increase employment per unit of land and also increase productivity per unit of employment. Replacement of outdated tools and implements have enabled better exploitation of soil qualities resulting in increased output per unit of labour. Replacing a plough with a tractor, in particular, and hand operations with mechanical operations, in general, have enabled the developed countries to raise several times the farm output with fewer farm workers. Therefore, whether it is a labour-using and capital-saving technology, as in the Japanese case, or a labour-saving and capital-using technology, as in the case of developed west European countries and America, labour productivity can be enhanced enormously with technological development. The amount of capital with which a farm worker has to work determines the level of his productivity on different farms and in different situations.

Labour efficiency also depends upon how farm enterprises are combined, the diversification of production and supervision. Situations often arise in farming when the total work force cannot be used full time in-one single enterprise and combination of enterprises have thus to be chosen in such a way that the labour force is optimally used. The efficiency of labour will certainly be poor if such enterprise combinations cannot be worked out.

Modern agriculture has no longer remained static in character and possibilities of multiple cropping have increased owing to new seedfertilizer technology. This has also enabled the optimal use of farm labour force and resulted in better labour efficiency. Diversification of crops to suit different seasons is another way of increasing labour efficiency by utilizing the total work force for full time throug4 different seasons. The management and supervision of labour makes a given amount of labour more effective on one farm than on another. Factors like distance of the farm from the place of residence or the distance between the parcels of land also affect labour efficiency.

Agriculture differs from manufacturing industry in that it offers little possibilities of division of labour as is the case in industry. The nature of farm enterprise is such as would demand greater sense of responsibility and willingness from farm workers. Farm workers are also expected to exhibit a greater range of technical ability as a single worker may be expected to do some manual work, some mechanical work and some supervisory work as well. Skilled farm work, therefore, is not the same thing as specialised work in industry. Farmers' technical ability will depend upon his training and technological development.

Farm worker's efficiency is also affected by his family background. A worker belonging to a farm family will tend to be more efficient than the worker coming from a non-farm family as the former enjoys the benefit of his early experience and also the experience of his family. The ratio of farm family workers to hired workers coming from non-farming back ground greatly affects the efficiency of labour. Gains or losses in labour efficiency obviously depend upon whether the ratio of experienced workers to inexperienced ones is favourable or not. Besides, age distribution of the farm labour force also effects the labour efficiency.

Further, farm transport greatly increases the mobility of farm labour and makes the farm more accessible to market. Crop management is greatly affected by the introduction of tractor and other mechanical equipment. Introduction of mechanical operations in live-stock and dairying have facilitated the processes of milking, cooking and sterilizing. Technical improvements have, therefore, greatly influenced labour efficiency by pervading in all fields of farming.

The changes due to technical improvements occur in two different forms. Firstly, for the same produce, fewer hands are required and lower costs may have to be incurred than before. This directly enhances the output per unit of labour. Secondly, with the same amount of labour, a greater absolute amount of output may be realised which also enhances the output per unit of labour. Mostly mechanical improvements take the shape of labour-saving devices and may also enhance the volume of output. To this extent, the double effect of mechanical improvements raises the labour efficiency significantly.

Lastly, it may be pointed out that mechanical improvements alone do not raise labour efficiency. The other supplementary advances in the productivity of crops and livestock are equally important in this regard. Improvements in crop productivity change the ratio of output to employment and hence result in the increased labour efficiency. The same can be said about the output of livestock. The modern methods of plant nutrition and pest control, on the one hand, and the provision of better feed and breed and also control of animal diseases, on the other, have increased crop and livestock productivity to the advantage of the labour force. The efficiency of labour has accordingly increased.

2.4.10 AGRICULTURAL WAGES

The farm labour force consists of family farm workers and hired farm workers. While as family workers have not to be paid directly, wages have to be paid/to hired workers. Under conditions of static technology in traditional agriculture, farm wages in the past were determined by the subsistence theory. This theory provided for the fixation of agricultural wages in such a way as would enable the worker and his family to live on a minimum subsistence level. Even legislative and administrative measures provided for the regulation of agricultural wages on the basis of this theory. This was also the basis of the Poor Law. At present, even though the norms of farm wage fixation have changed favourably for the farm workers, these continue to be less than the wages earned in the non-farm sector.

Historically, the gap between farm and non-farm wages have been justified on the ground that a rise in farm wages results in more than a proportionate rise in non-farm wages. Even the differences in farm and non-farm enterprises accounts for the difference in wages.

Adam Smith in his Wealth of Nations explained, at length, the reasons that account for wage disparities between farm and non-farm workers. Another feature of historical character is that agriculture draws its hired manpower from the residual mentioned earlier. Throughout history, it has been a universal feature of industrial growth to use capital deepening devices due to which the rate of growth of industrial employment has always remained far below the rate of growth of population resulting in the swelling of residual. This residual has willy nilly, to depend on agriculture for its survival and hence the wages in agriculture get depressed to the extent the volume of residual increases.

At the initial stages of industrial growth, the farm sector is the only supplier of urban workers and industry feels obliged to draw this labour force out by offering higher wages. This does not immediately raise the farm wages but as the surplus manpower is exhausted, the average productivity per farm worker rises and leads to a rise in wages. This process, however, does not continue for long because with the expanding industrial sector, technological developments in industry take place which, it has been observed, tend to displace labour from industry. This restricted scope of wage employment in the non-farm sector has always kept the agricultural wages low.

In the developing countries of Asia, the problem has become all the more serious owing to the demographic explosion. With improved sanitation, public hygiene and better nutrition, the rate of growth of population has tended to be far higher than the rate of growth of industrial employment. This has, therefore, lowered the average productivity of labour in farming resulting in their wages being lower than those prevailing elsewhere. The popular governments have, however, enacted legislations providing for fair wages to farm workers. Of their own, farm workers have poor bargaining power because of lack of organisation and trade unionism relative to industrial workers and cannot get justice without state intervention. State governments have therefore, been enacting legislations from time to time to save farm labour from exploitation. These legislations provide for fixing of minimum wages, defining employment for overtime payments and part payments to be made in kind. The wages are so fixed as would enable a farm worker to maintain himself and his family in reasonable comfort and to promote his efficiency.

State legislations in the developed countries of the world have improved the status and lot of farm workers considerably. The employer has to provide for the worker's health, provident fund, accident and insurance to ensure a better deal to the farm worker throughout. These have also promoted a uniform wage structure throughout the country. An encouraging impact of these legislations has been to make less efficient employers more efficient to enable them to play better wages to their workers.

In the developing countries, the governments shall have to provide for these measures as listed above to improve the lot of farm workers.

2.4.11 SUMMARY

Agriculture in most economics is the prime source of livelihood. Labour in the vital factor of production that cannot be perfectly substituted by any factor. Labour cannot be ignored. Any person who derives the main earning by engaging himself in anykind of agricultural work in called as agricultural labour. Agricultural labour is a producer and consumer in himself.

Role of Labour in agricultural sector cannot be over emphasised and he secures the most fundamental place in the sector. Transformation of economy can bring change in the economic status but the place of agriculture remains as vital as it was. Rather Labour productivity increases under the changing scenario of agriculture to modern.

Supply of labout force is a function of the population growth and etc. Population growth is affected by the factors take birth rate and death rate. Birth rate is affected by marriage, reproductive capacity, education, moral factors, religion, social, cultural, Influences, Govt policy, natural calamity and standard of wing. Death rate is affected by medical technology economic condition, infant & material mortality rate.

Demand for labour force in determined by the size, productivity of farming, system of farming, wagerate, degree of technological development and market condition. Wage policy influnces the agricultural labour demand.

Technological development influnces the productivity of labour and system of farming. This puts impact on agricultural development and market orientation. It also affects the development of agro-industry and farm management. It grossly influences the labour efficiency and its demand.

Agricultural wage is a great determinant of agricultural development and status of agricultural labour, the gap between farm wage and non-farm wage determine the status of living of labour force and put Impact on employment.

Agriculture finds the problem of unemployment and underemployment and provides management to these labour force predominantry in underdeveloped and developing economies. Under, employment is a situation when a labour force delivers par below his efficiency because of lack of opportunity. Disguised unemployment is a situation when marginal productivity or a labour tends to be zero or near to zero. This is prevalent in agriculture.

2.4.12 SELF ASSESSMENT QUESTIONS

1. Define Agricultural Labour. Examine the role of labour on agricultural development.
2. Examine the factors influencing the demand for labour in agriculture.
3. Explain the influences of agricultural labour on agricultural development.
4. Examine the influence of agricultural labour in the productivity and development of agriculture.
5. Assess the influences of efficiency of farm labour in the economics of agriculture.
6. How does the technological development affect the wage and labour productivity.
7. Give Reasons for the differences in farm and non-farm wage. Does it hamper the labour productivity.
8. Outline the magnitude of unemployment in agriculture with special references to Indian economy?
9. Define Agricultural Labour and write notes on different types unemployment found in agriculture.

Key Words

1. **Labor Force**: The total number of people who are either employed or actively seeking employment. It includes both employed individuals and unemployed individuals who are actively seeking work.

2. **Employment**: The number of people currently working in paid jobs, either full-time or part-time, in the labor market.

3. **Unemployment**: The state of being without a paid job despite actively seeking employment. It is typically measured as a percentage of the labor force and is an important indicator of economic health.

4. **Labor Market Participation Rate**: The percentage of the working-age population (usually defined as individuals aged 15-64) who are either employed or actively seeking employment.

5. **Labor Market Segmentation**: The division of the labor market into distinct segments or categories based on factors such as skill level, education, experience, occupation, and employment status.

6. **Wage Rate**: The amount of money paid to workers in exchange for their labor services. Wage rates may vary based on factors such as skills, experience, education, demand for labor, and prevailing market conditions.

7. **Minimum Wage**: The lowest legal wage rate that employers are required to pay workers for their labor. Minimum wage laws aim to establish a floor on wages to ensure that workers receive a minimum standard of living.

8. **Labor Mobility**: The ability of workers to move between different jobs, occupations, industries, or geographical locations in response to changes in labor market conditions, job opportunities, and personal preferences.

9. **Labor Market Flexibility**: The degree to which labor markets can adjust to changes in demand and supply conditions without significant barriers or constraints. Flexible labor markets facilitate smooth adjustments in employment levels, wages, and working conditions.

10. **Labor Market Policies**: Government interventions, regulations, and programs designed to address labor market issues, such as unemployment insurance, job training programs, labor standards, and employment protection legislation.

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2.5 Chapter

CAPITAL MARKET IN AGRICULTURE

Objectives

After completing this chapter, you will be able:

- To understand the meaning of agriculture.
- To know the importance of capital on agriculture.
- To understand how capital formation influence agricultural productivity.
- To study the source of capital formation.
- To elucidate the basic principles used in decision making.
- To understand the characteristics of agriculture that influences agricultural credit.
- To classify the credit purpose wise, period wise security wise, and creditor wise.
- To estimate the requirement for agricultural credit.
- To explain the various source of agricultural credit.
- To study future role of non-institutional credit and importance of institutional credit.
- To understand the role of Cooperative credit with reference to Indian agriculture.

Structure:

2.5.1 ROLE OF CAPITAL IN AGRICULTURE

Capital as a factor of production needs no introduction. In any productive effort, capital plays a very crucial role and is the most effective factor in promoting a faster rate of growth in any industry. Capital, which is usually understood as produced means of production, is produced solely in response to economic motives and land and labour as factors of production differ from capital in that regard. It is, therefore, clear that anything that has been produced and not consumed is capital. Alternatively, capital may be defined as the" accumulated output used to increase the effectiveness of current productive activity."

Capital as a productive resource takes many different forms. It may take the form of immovable assets such as buildings, bridges, roads, etc. It may also take the form of fixtures such as machines and may also take the form of basic inputs such as seeds and fertilizers, while talking of agriculture in particular. Thus, whatever the form that capital takes, to think of a productive activity without its contribution is rather impossible. As in general production, so in agriculture, capital is of immense importance. There is hardly any agricultural activity wherein additional doses of capital would not yield more returns to a farmer either by way of increasing output or by way of reducing costs. Capital, therefore, plays a very crucial role in agriculture in particular.

In order to examine scientifically the place of capital in agricultural production, we shall describe the general format of an agricultural production enterprise. A structured agricultural production problem may be cast in the following setting: (a) Acquisition of land and its preparation for an agricultural activity; (b) Acquisition of inputs such as seeds, fertilizers, pesticides, etc. (c) Acquisition of a kit of tools and employments; and (d) Organisation of a group of workers who will man the tools and implements on land to raise the crops. The objective, as in general productive enterprises, is to maximise the crop yield in any crop season and repeat it with high targets in future. Let us now relate these phases, one by one, with capital playing its crucial role.

Given that land is a gift from nature and fixed in its supply, its acquisition involves clearing of land from the forests, deserts or water or transferring it from one hand to another. So far as the transfer of land is concerned, the need or use of capital does not come in directly though the motive of the transfer may be capital itself in the sense that two parties agree to transfer land to the party possessing more or advanced capital to raise higher yields than would otherwise be the case. In such a transfer both the parties benefit. Other than transfer of land, acquisition of land requires capital in a big way. Clearing a forest or reclaiming land from deserts or oceans is just not possible without the use of capital.

Mere acquisition of land is not enough unless it is prepared to suit agricultural operations (occupations). In this direction again, capital plays a crucial role. Land will not be ready for sowing operations till it is ploughed either with a wooden plough, an iron plough or a tractor.

Further, it is needless to state that an agricultural operation cannot proceed without the proper doses of seeds, fertilizers, water, pesticides etc. While seeds, fertilizers and pesticides etc. are a form of agricultural capital, water for fields cannot be supplied without the use of capital. It is with the help of big dams, canals, tube wells and lift irrigation schemes that more lands get irrigated and ensure better returns. Equally important is the kit of tools and implements that are used by the farmer to raise crops from the land. The nature and quality of these tools and implements which are provided by capital determines the level of achievement of a farmer. Capital also plays an important role in educating and training the farm workers which ensure more efficient farm operations and better returns.

Capital in agriculture is generally used to increase output per worker. Many studies could be quoted in support of the contention that introduction of additional capital resulted in a remarkable improvement in the productivity of farm labour. The index of output per man-hour in the United States of America went up from 21 in 1940 to 129 in 1973 in response to the increase of index of average value of productive assets per farm worker from $ 3,300 to $ 70,700 during the same period. The use of capital in agriculture has been stimulated by the adoption of new technology leading to a fall in the per unit cost of production, though, the over all capital cost per farm tends to increase. The use of capital becomes more intensive in the case of new agricultural technology as compared to the use of labour. For example, in the U.S.A. in 1972, one-third of the labour force was used compared to that used in 1929 whereas the use of mechanical power (capital) increased by the same measure.

A noticeable feature of such a shift in agricultural production is that farm sector's dependence for inputs from non-farm sector increases relatively to the inputs produced in the farm sector itself. On the other hand, it should also be noted that the productivity per worker does not merely depend on the quantity of capital per worker but also on the quality of other inputs and his personal managerial competence in organising the enterprise. Productivity differentials are, however, bound to be there since agro-climatic conditions differ from region to region.

Introduction of capital to agriculture also helps in releasing farm labour which can be utilised for developing the industrial sector of the economy. In the past two decades, the developed countries have witnessed a phenomenal rise in capital intensity in agriculture resulting in the release of labour for industry. Capital investment may, however, differ from farm to farm in relation to the farm size and also the type of crops grown. The nature of crops and the duration of a crop season are as well the determinants of the use of capital in agriculture.

As a general phenomenon, under the law of variable proportions, output can be increased in agriculture by adding more capital since capital is the limiting factor in an agricultural production process. There may, however, not be any general agreement on what kind of capital to add, when to add and in what enterprises. In any case, there is a general feeling that less developed countries lack capital to develop agriculture at a desired rate of growth. Even when there is no dearth of capital, people's attitude towards acquiring and using capital, their managerial competence and willingness determine the amount of capital to be used in agriculture and it is quite often that gaps between what is available and what is actually used are perceptible.

2.5.2 FORMATION AND CONTROL OF CAPITAL

It is often observed that capital in agriculture is not accumulated and controlled by the same agency. Accumulation of capital is done by individuals and business corporations who are in a position to save, i.e., who do not spend their entire income on current consumption and maintenance. Accumulation of capital, therefore, refers to its ownership by individuals or by groups of individuals. Control of capital, on the other hand, is related to its use on the farms. An

individual or a group of individuals may use capital without necessarily owning it. Since at the beginning of farming, it may be necessary to have a large dose of capital input than is owned by the farmer, it becomes imperative to borrow from lending agencies chosen by the farmer in the light of his requirements. When to borrow, how much to borrow and then in what form to invest, shall be the concern of the farmer himself. He, however does combine the borrowed capital with his own and uses it as if all the capital is his own.

Both accumulation of capital and its control play a pivotal role in permitting the introduction of new methods of agricultural production and determine the stage at which such an adoption is done. Farming no longer has remained a static business enterprise. It is highly dynamic and receptive to technological innovations. Gains from new technology in agriculture generate greater incentives for adoption of other improved techniques. Farmers have to act intelligently in selecting the time and type of technology so that the gains are quick and adequate. The quantum of gains, in turn, stimulates the accumulation of capital. A higher rate of accumulation of capital relative to the rate of population growth adds to the real stock of capital of a nation. This directly contributes to the growth of the economy which in turn leads to further accumulation of capital and economic growth. Thus, accumulation of capital and its use with suitable technologies does not only contribute to the growth of agriculture but to the economy as a whole.

2.5.3 SOURCES OF CAPITAL

The sources of capital in agriculture may be listed as under:

(1) Savings of landlords.

(2) Savings of farm operators.

(3) Borrowings.

(4) Transfers — By way of gifts, inheritance, social contracts, etc.

Savings

Saving decisions depend on the desire to save and the power to save. Willingness to save depends on psychological and social values, personal attitudes and expectations and family atmosphere. Capacity to save, on the other hand, is limited by the risk-taking competence and the level of personal income. In a relatively developed society there may not be many hindrances either to the desire to save or the power to save. Psychological impulses and social values are so developed as would often induce an individual — landlord or farm operator — to save. Similarly, personal attitudes of people in developed societies are so shaped as would often stimulate the willingness to save. Future expectations are so high that everyone has a strong motivation to save. Family habits, norms and approaches to issues in life playa str.ong role in the motivation of family members to withhold a part of their income from current consumption for purposes of saving. In developed societies, capacity to save is also strong and so is their risk-bearing competence. The levels of living arc high and incomes accruing to landlords and farm operators arc also high to enable them to save without adversely affecting their current levels of consumption.

The situation in underdeveloped countries is less fortunate. People in general have a firm belief in the philosophy of contentment and do not have high expectations from life. Because of poor levels of literacy and general awareness, their evaluation of the size of investment is never ambitious and their motivation to save never very strong. People often project a narrow outlook and fail to look into their future with greater optimism and as a result, never feel like saving. Psychological and social values offer extremely weak incentives to save. The limited vision of worldly possesions come in the way of people's motivation to save. In many cases family traditions are such that people often weigh current consumption more than the future expectations. The agricultural sector in underdeveloped countries is particularly very weak to shed its traditional values and approach life with greater ambitions.

As regards the capacity to save, in many underdeveloped countries, the level of saving is low because the level of income itself is low. Very often, incomes may just be enough for subsistence living. People neither have the capacity to save nor the competence to take risks. Therefore, even with changed social values, attitudes and habits conducive to saving-motivation, the savings may not come through if the level of income does not rise. Under these circumstances capital formation is very difficult because almost the entire income is spent on current necessities.

Borrowings

Capital through borrowing may come from home or abroad. Lenders will naturally be guided by the rate of interest, both at home and abroad. There will always be a stiff competition between farm operators and those who seek to invest capital in other sectors of the economy. Naturally, therefore, returns on capital in different sectors of the economy will act as a strong incentive in the competition for capital. Lenders from abroad will take their decisions under several other constraints emanating from bilateral relations, level of economic progress, current rate of growth and other political conditions based on ideology and the stand the borrower country takes on different issues in the international forums.

Primarily, the sources of farm credit are private individuals, moneylenders, commercial banks, insurance companies, government agencies, and agricultural co-operative societies. Loans are made available through anyone of the following forms.

(a) The lender directly gives loan to a farm operator on terms mutually agreed upon. Individuals in general adopt this practice and directly lend to farm operators.

(b) The lending agency makes a loan to yet another agency who in turn lends credit to the farm operators. This is an indirect method of farm credit. A farm operator may enter into an agreement with the middle agency who is responsible to repay loans to the main lending agency.

(c) A number of lending agencies may lend credit to a single agency that pools all loans and then makes these available for farm investment. The lender may not know the ultimate borrowing agency. Usually, commercial banks and insurance companies fall in this category.

(d) The lender may be government that makes loans available to the farm operators on more favourable terms either directly or through some agency.

Repayment of loans may also take different forms depending upon the nature and terms of a loan, its size and modalities of repayment. The loan may be repaid in one lump-sum, while interest is paid at regular intervals of time. Loans may also be repaid in several instalments, wherein the principal amount and interest payable are combined in instalments. Sometimes, loans are repaid in fixed instalments comprising principal and interest at regular intervals till the principal is fully paid back.

A noticeable difference between private lending and public lending agencies should not go unattended. Operationally, lending practices of private and public agencies are not the same. During periods of economic depression, private agencies are nervous of making loans to farm operators and in such situations, public agencies have to come in a big way to boost the economic performance in the farm sector. During periods of recovery, the share of private sector lending goes up considerably and public agencies direct their investible funds toward other sectors of the economy. It is, therefore, necessary that under depressing economic conditions, government should come to the rescue of the farmers. Since in the underdeveloped countries economic conditions in the farm sector are depressing, in general, the role of government is very crucial. So long as farm productivity does not rise considerably, the farm sector cannot grow without the capital made available through government lending. This assumes more importance since seasonality and periodicity in the farm sector is very strong and irregular.

Individual loans to farm operators are an old practice. The level of acquintance and mutual trust determines the size of the loan and the modalities of repayment. The breach of trust leads often to litigation which tends to harm both the parties and in particular, the borrower.

Loans from commercial banks is relatively a recent phenomenon in agriculture. Commercial banks usually favour lending to the nonagricultural sector where returns are adequate and most certain, thus ensuring the repayment of loans. Recently, however, the popular democratic governments are encouraging lending from commercial banks to farmers by providing some incentives to commercial banks on such loans. Some governments in underdeveloped countries have nationalised their major banks and made them open branches in rural areas so as to facilitate bank loans for the farm population. Rising population and hence a greater demand for agricultural products, rising prices of farm products and higher farm productivity have made the bank loans to agriculture a very happy experience. The nervousness on the part of private institutions to lend to farm operators is, therefore, waning. Since commercial banks primarily raise their funds from surplus money with the public and seek to invest it to earn profits for their depositors, the safety of loan weighs heavy on their lending decisions. With relatively stable growing economic conditions and higher returns from agriculture, the safety of a bank loan to a farmer is no longer in danger and hence this form of farm credit should flow uninterruptedly to the farm sector.

Insurance companies these days have started issuing loans to the farm sector in a big way in the developed countries of the world. These loans are usually of bigger size and of longer duration compared to bank loans. Often such loans go to build real estate. Loans are made available under land-mortgage schemes or against the borrowers' insurance policies with adequate safeguards for their repayment. There may not be any significant difference between lending practices of insurance companies and commercial banks. Insurance companies, however, seek to promote goodwill among the farm population in order to expand their business. Loans from insurance companies are, however, less known in the underdeveloped countries. Recently, with the introduction of new farm strategies better agricultural inputs and efficient farm management, insurance companies in the less developed countries have taken up the crop insurance schemes. This should certainly be paving the way for insurance of loans to the farm sector by the insurance companies. In the developed countries, insurance companies recruit trained agricultural personnel to deal with agricultural credit. This practice has started being adopted by the commercial banks and insurance companies in the developing countries as well.

Merchants and dealers in the developed countries and moneylenders (who often are village shopkeepers as well), in the underdeveloped countries issue loans to farmers. Because of acute poverty and poor consumption levels, farmers in the underdeveloped countries have a tendency to spend part or whole of a loan from the money-lender on current consumption. In this decision-making, the money-lender himself takes keen interest because he issues commodities instead of cash and promotes his double interest of retail business and money-lending. Even otherwise, such loans are often sought for current production programmes and if by bad luck the crop fails, the farmer is doomed for a long time.

Government agencies play a vital role in making farm credit available on more favourable terms. Many a time government agencies instead of issuing cash loans, supply farm inputs to the farmers and help stabilise the farm commodity prices. In an underdeveloped country, this also helps in the fair distribution of farm inputs to different regions and categories of farmers in order to promote an overall development of the farm sector. Many governments have started specialised institutions for the supply of farm credit such as land development banks, agricultural credit corporations and rural banks.

Agricultural co-operative credit societies are also issuing loans in cash and kind to the farmers to run the current production programmes. Due to a number of malpractices and inefficiency, the co-operative credit schemes have so far achieved only little success in their efforts.

2.5.4 DECISION MAKING REGARDING BORROWING AND INVESTMENT

An attempt shall now be made to elucidate the basic principles used in making decisions regarding borrowing of additional capital for farm investment. The first principle that guides such a decision is related to the impact of new capital on the efficiency of farm management. Such an impact can be worked out in different forms:

Rule 1. Firstly, it has to be estimated whether new capital will result in the improvement of quality of farm products or result in the increased output. Improvements, both in quality and quantity, will augment farm receipts, on the one hand, and may also result in saving on wage bill, on the other. Because of new capital, some adjustments may be necessary in the farm production plan which may at times lead to a fall in receipts from some crops. Estimates as regards the net annual gain shall, therefore, have to be made to assess the impact of new capital. The size of the gains shall, therefore, guide the decisions regarding the adoption of new capital.

Secondly, it has to be examined if the introduction of new capital brings in new costs. If the cost of production with the introduction of new capital increases relatively to the cost of production with the existing capital, the decision of accepting or not accepting new capital will depend upon the difference between net gains and additional cost. A positive difference would certainly suggest a decision in favour of using additional capital. An important item that would enter into the computation of cost of production in this case is the rate of depreciation of new capital. Expert assessment of such costs is necessary before a final decision is made.

Rule 2. Before making a decision for or against the adoption of new capital, it shall have to be assessed as to what type of technical problems are involved in using the new capital. Such problems manifest themselves into two forms: Firstly, the introduction of new capital may warrant the existence of trained personnel to provide for proper maintenance of new capital. Secondly, the introduction of new capital may require accessories of new specifications, the existence and regular supply of which is essential in order to make the new capital to work on an optimum level. The changes in the existing practices of agricultural operations shall have to be foreseen. These might necessitate some changes in the inputs of labour, seed, fertilizers etc. All these changes which are essentially a technical agricultural exercise have to be estimated and the decision with regard to introduction of new capital taken accordingly.

Rule 3. The process of decision-making with regard to the introduction of new capital shall also depend upon the nature and extent of risks and uncertainties associated with the new capital.

Additional capital is always introduced with an objective of increasing the returns from an agricultural pursuit and as such these forecasts have to be made. The risk involved in these forecasts is great, keeping in view the nature of an agricultural activity. Estimates of agricultural forecasts shall certainly depend upon the price and wage structure prevailing at the time of introduction of new capital and likely to emerge in the near future. 1£ the magnitude of risk is not carefully estimated, the uncertainties of new capital becoming rewarding may increase further and replacement of new capital may not be possible or without great loss.

In taking any capital investment decision, risks and uncertainties are inevitable, more so in agriculture. The likely return from new investment is, therefore, to be adjusted by the factor of uncertainties and the final result weighed in the light of costs involved. Naturally, therefore, risk discounted prospective value of the return, should be taken into account while making a decision regarding new capital investment. A decision taken on the balance of cost and returns may also prove to be a painful exercise, for at present the making of estimates of future risks may turn out to be wrong. But in any case, the decisions have to be made at present regarding what is likely to accrue in future. Personal experience, judgement and foresight may reduce the extent of uncertainties.

Any capital investment decision may have to be considered from the community's point of view as also from an individual's point of view. The risk involved is to be considered accordingly and a general theoretical frame may not possibly be constructed in this regard. An illiterate farmer's decision sometimes is more accurate than that of. an agricultural expert. Estimating a return on capital investment is, therefore, a difficult task and shall have to be executed very carefully.

Rale 4. Introduction of new capital will also depend upon whether it restricts the farmer's freedom to choose the type of crops, variety of seeds and other such inputs. To the extent such freedom is curbed, whether a farmer would be in a position to readjust his plans to his advantage, will also have to be considered. If, for example, new capital imposes the restriction that only crop "A" can be raised and no other crop, the farmer would be constrained to examine the net comparative advantage not in terms of output alone., but his personal satisfaction, the community's reaction, the market prospects and seasonal influences, besides, of course, other problems of a more technical nature. Such a limitation may necessitate the choosing between alternative forms of capital. The farmer would, naturally, opt for that alternative which puts lesser restrictions on his choice and offers him relatively easier possibilities of adjustment.

Taking help from rules discussed above, the farm operator can guard himself against the possibility of taking a wrong decision with regard to new capital. The set of rules discussed here may not be a complete set, for, decision-making is a more complex process than it appears. Often the practical farm decision is far different and more complex than the theoretical one. But the rules discussed here identify the broad contours within which a capital investment decision can be taken.

2.5.5 ALLOCATION OF CAPITAL IN AGRICULTURE

Allocation of capital among different farm activities is an equally important and complex decision. A farmer would naturally be guided by the maximum returns criterion. He will, therefore, so allocate the units of capital at his disposal as to derive the maximum net gain out of it. Let us suppose that capital worth ₹ 10 constitutes a unit of capital and an addition made in the total output by using this unit of capital, therefore, a marginal gain from this. Let us further suppose that the farmer is running five different farm activities at a time. The theory then suggests that if the farmer is maximise his returns from capital investment, the marginal gain on all the farm activities is, therefore, not only the most important problem the farmer shall be faced with but also unfortunately the most difficult problem as well.

2.5.6 CHARACTERISTICS OF AGRICULTURE AFFECTING AGRICULTURAL CREDIT

The difference between agricultural credit and other types of credit is only of degree than of kind but some characteristics of agricultural industry warrant a special study of agricultural credit. A brief introduction of these characteristics is given here.

1. Agriculture, instead of being a single homogeneous industry, is an industrial complex of many different types of production and marketing. The size of holdings, forms of land tenure and methods of production differ a good deal from country to country. These differences give rise to many different kinds of complex relations between farmers, on the one hand, and middlemen, manufacturers and consumers, on the other. This complex nature of agriculture makes the financing of it relatively more difficult than the financing of industry and trade.

2. There is little scope of combination in agriculture because farmers are mostly individualistic and extremely suspicious of combining with each other for a common purpose. The nature of farm economy develops social characteristics and habits of mind that raise a barrier to corporate effort. The absence of combination in agriculture makes it difficult for the farmer to obtain cheap credit.

3. Uncertainty in agriculture which is present throughout the productive process also affects the capacity of the farmer to obtain credit. Natural forces, such as floods or drought, may cause unexpected but considerable losses to the agriculturists. Further, most agricultural products tend to perish in storage and the difficulties of holding back surpluses when supply exceeds demand, are very great. All these peculiar characteristics of agriculture making it highly uncertain make credit agencies unwilling to tend money to agriculturists except at a very high rate of interest.

4. The productive process in agriculture is such that there is a long interval between the effort and reward. During this interval, the demand for agricultural produce may change upsetting the calculations of the farmer. This introduces another uncertainty and another important reason for the credit supplying agencies to refuse, credit to the farm operator.

5. While an industrialist or a businessman is able to borrow against stock of goods, machinery etc. which can be easily converted into cash, the farmer has only his land as security against his loan but land is not an asset which can be easily and quickly converted into cash. If farmers are prepared to borrow against their marketable surplus of foodgrains or raw materials, it should be easy for them to raise funds but this is generally not the case because farmers need funds to finance production and not marketing. The absence of a tangible security except land and the tendency to borrow for production rather than for marketing, are two important reasons which prevent lending institutions, particularly commercial banks, from lending to the farmers.

6. Finally, farmers, particularly the small farmers, need credit not only for production purposes but also for consumption requirements. In the period's of crop failure, most of the credit obtained by farmers of limited means is spent on providing consumption requirements to them and their families. Moreover, traditionally the farmers of underdeveloped countries are accustomed to spend beyond their means on social and religious functions etc. Litigation is another important non productive requirement for funds.'

2.5.7 CLASSIFICATION OF CREDIT

Agricultural credit may be classified purpose-wise; period-wise, security-wise and creditor-wise. A brief introduction to these classifications is given below.

1. Purpose for which Credit is Required: Purpose-wise, every farmer needs four types of credit, viz. development credit, production credit, marketing credit and consumption credit. Development credit (also known as investment credit) is required by the, farmer to make investments on the farm which include: (i) purchase of land, imple-ments, farm machinery etc.; (ii) development of irrigation through sinking of new wells, renovation of old wells, installation of pump sets, installation of lift irrigation system on rivers etc.; (iii) undertaking land reclamation and development works, soil and moisture. conservation' works, landlevelling, land shaping, laying out field channels, drainage etc.;.(iv) construction of farm structures such as cattleshed, silo-pits, farm-godown, fencing, gobar gas plants etc.; (v) development of horticulture, fruit gardens, 'plantation crops and nursery crops; (vi) development of dairy, poultry, piggery, fishery, sericulture, apiculture, etc. through construction of sheds, purchase of animals, birds, equip-ment etc.,

Production credit is required by the farmer for crop production. This type of credit is needed by the farmer to purchase seeds, fertilizers, manure, pesticides, insecticides and other important variable inputs besides paying wages to hired labourers.

In short, while production' credit helps the farmers, it. also lays sound foundations for modernising his agriculture. Production credit helps him to purchase essential inputs of production without which he cannot increase output on the farm.

2. Length of Period for which credit is Required: The financial requirements of the farmers can. also be classified on the basis of period for which they are required. The expenses which must be incurred in advance can be 'divided roughly into three categories, viz., long period medium period and short period credit. There are, however, no hard and fast definitions of these types 6f credit. But by convention, long-term credit is generally spread over a period ranging from 5 years to 20 years. Intermediate term credit is meant for a period from 2 years to 5 years. The credit required for current consumption and production for a period ranging from 3 months to about 18 months, i.e., between one crop and the other, comes under the short-term category;

Farmers need funds for short periods for hiring labour, for buying seeds and fertilizers and for holding stocks of the finished product until they can be sold. They may also require funds to support their families in those years when due to adverse weather conditions, crops either totally fail or are inadequate to meet the consumption requirements of the family. Such short-period loans are given for seasonal agricultural operations and are normally repaid after the harvest. The current expenditure on the farm can be subdivided as under:

(i) Purchase of seed.

(ii) Purchase of manure.

(iii) Purchase of fodder.

(iv) Payment of wages.

(v) Payment of land-revenue, and other charges.

(vi) Payment of rent.

(vii) Maintenance of irrigation resources.

(viii) Repairs and maintenance of implements etc.

(ix) Other current farm expenditures.

Long-term credit is mostly acquired by the farmers to acquire agents of production which help in the productive process over a long period of time. This type of credit is needed normally for the purchase of land, machinery or to effect permanent improvements on land and farmers can repay the loan raised for these purchases only out of the extra income secured by their investments. Lands is, of course, a long period capital good. So is the work which must be done to bring about any permanent improvement to the land, viz., clearing trees, drainage, fencing and so on, which once performed is inextricably tied up with the land itself. So is the case with farm buildings and machinery which is required in production and the breeding and milking stock. Long-term expenditure can be subdivided as under:

(i) Purchase of land.

(ii) Reclamation of land.

(iii) Bunding and other land improvements.

(iv) Digging and repair of wells.

(v) Development of other irrigation resources.

(vi) Laying of new orchards and plantations.

(vii) Purchase of implements, machinery and transport equipment.

(viii) Construction of farm houses, cattle. shed etc.

(ix) Other capital investment in agriculture.

For some purposes, it is desirable to subdivide long-period capital into long and intermediate periods. This type of credit is normally required for a period of two to five years for the purchase of livestock, agricultural implements for laying of orchards, plantations, and other production facilities, minor irrigation and minor land improvements etc.

Thus, in short, production loan (crop loan) which a farmer secures from an agency is a "short-term" loan which he has to repay in full, in one instalment after the crop is harvested and produce marketed. Investment loan, on the other hand, is either a medium-term or long-term loan which he has to repay in suitable instalments over a period of 3 to 20 years, as the case may be.

3. Security against which Loan is Granted: Loans on the basis of security against which they are granted can be divided into three categories: (1) Farm mortgage credit which is secured against land by means of a mortgage of land, (2) Chattel and collateral credit which is given to the farmer on the security of livestock or crops or warehouse receipts, and (3) Personal credit, which is generally based on the character and repaying capacity of the borrower and not on any tangible asset. The kind of security which will be accepted would generally depend upon the length of the period for which the loans are required. As a general rule, long-term loans are usually advanced on the security of land, while short-term and medium-term loans are made on personal and collateral security respectively. .

(4) Creditor-wise Credit: Another way of classifying agricultural credit is from the standpoint of creditor or credit-giving agency. It may be private credit such as given by the moneylender, indigenous bankers, traders, landlords, friends and relatives etc. This kind of credit is generally exploitative and is not governed by any codes of conduct. The farmer for most of Unproductive credit requirements depends on these non-institutional agencies. However, the urge to develop agriculture as fast as possible has led to the evolution of suitable credit institutions which provide credit for agricultural development. This type of credit is known as institutional" credit. It is governed by proper codes of conduct and is intended to be conducive for development.

2.5.8 NEED FOR AGRICULTURAL CREDIT

The major requirement of any agricultural credit is that it should be a "dynamic credit" which is-identified as one where in at the end of the credit period, there is an improvement in output and income or in assets so that repayment of credit is made out of the income generated by the use of the credit. At present, in most developing countries, the credit extended to the farmer is of "static" type. Static credit is defined as one under which at the end of the (credit period, there is no increase in output, income or assets of the farmer. In short, the quantity of credit, organisation and conditions under which it is, granted should be such that it promotes development. The old proverb, credit is a hangman's rope" is to be replaced by a new one' credit serves as an elevator". Agricultural credit is no longer viewed as an instrument of causing the extinction of the farmers. On the contrary, it is visualised as an economic ladder helping in the upliftment of the poor peasantry. This dynamic outlook has, been fostered primarily by the intensity of the society's demand for increased agricultural production and by a feeling that the desired goals cannot be achieved unless an' appropriate production oriented credit 'policy is pursued by the credit institutions. Agricultural credit becomes a problem when it cannot be obtained but it can also be a problem when it can be had but in such form, quantity and terms that. it does more harm than good. It is, therefore, essential that the following criteria must be fulfilled in any scheme of agricultural credit.

1. It must be adequate, timely and convenient to the borrower. The amount, the timing of loan, conditions of repayment and other terms should suit the convenience of the borrower. It must be granted for a sufficiently long period, commensurate with the length of the operation which it is designed to facilitate. The repayment of loan should be such that it suits the farmer with the provision that the repayment be deferred in case of exceptional circumstances.

2. Credit should be granted at a low rate of interest so that even the poorest of the farmers can afford it. This can be achieved in two ways. Partly by lowering the cost of lending to the lending agencies and partly by subsidizing the cost of lending by the government.
3. Credit to the farmers should be granted on the basis of the prospective repayment capacity rather than on the strict' credit-worthiness based on the availability of existing tangible assets of the farmers. The essentiality of considering the types and adequacy of the security offered and the current indebtedness of the loanee cannot be denied but at the same time, it must be recognised that adherence to the security aspect alone would fail to infuse dynamism necessary for the development of the agricultural sector.
4. Credit should be so obtainable that the act arid effort of obtaining it shall educate, discipline and guide the borrower; the method of providing it must teach the lesson of self and mutual help; it should be productive and thrift-creating instead of unproductive and dangerously facile.

2.5.9 ESTIMATION OF CREDIT REQUIREMENTS

The credit requirements of the farmers vary from region to region, season to season and from crop to crop. There is also no agency which provides adequate statistical information regarding individual credit needs. These two factors make it difficult to estimate the aggregate requirements of the agriculture sector. However, economists have attempted to formulate models applicable at the micro level to estimate the credit requirement of a farmer.

According to Singh and Gupta, short-term credit requirements of a fanl1er can be estimated by taking the area, under cultivation and capital inputs in a given farm into consideration.

According to their model,

$$y_i - R_{ij} - I\ P_{ij}\ X_{ij}$$

where P_{ij} = *Capital input per acre in the ith farm;*

R_i = *Proportion of credit to capital inputs on ith farm;*

X_{ij} = *Area under ith crop on jth farm; and*

Y_i = *Credit requirements.*

Singh and Gupta have taken the value of:

R_i = *0.50 Small Farms.*

R_i = *0.45 Medium Farms.*

R_i = *0.40 Large Farms.*

Credit requirements for a block would, therefore, be determined as:

$$C = \frac{A_h}{A_{s=1}}\ niyi$$

Where A_i = *Total cultivated area in a block.*

A_s = *Sample holdings.*

n = *Number of holdings.*

Since credit requirement of a farmer, we know, is functionally related to the cost of exogenous inputs like fertilizers, irrigation, other agricultural inputs, net operated area, etc., its requirement can be calculated by using the regression. equations of the following type:

$$Y = AX_1^{b1} X_2^{b2} X_3^{b3} X_4^{b4}$$

$$C = B_1X_1 B_2X_2B_3X_3B_4X_4$$

Where Y = *Total returns from crop*

X_1 = *Investment on irrigation*

X_2 = *Investment on draft cattle*

X_3 = *Expenditure on fertilizers*

X_4 = *Area cultivated*

C = *Amount of credit required.*

and b_1_____b_n and B_1_____B_n are respective regression co-efficient.

This model, however, is not suitable for estimating total credit requirements for agriculture as a whole since regression co-efficients vary from region to region.

2.5.10 SOURCES OF AGRICULTURAL CREDIT

Agricultural credit is supplied by several agencies. These are very varied in their character. But broadly, these can be grouped under two categories: (i) private sources or non-institutional sources under which fall such agencies of finance as the money-lender, traders, commission agents, landlords relatives etc.; (ii) institutional sources comprising commercial banks, cooperative societies, government, etc. We will now discuss in some detail individual sources supplying agricultural credit.

2.5.11 NON-INSTITUTIONAL SOURCE AND ITS FUTURE ROLE

As mentioned earlier, the main suppliers of non-institutional agricultural credit are moneylenders, traders, commission agents, landlords and relatives. A brief introduction to these follows:

1. Moneylenders: The moneylender from times immemorial has been the main supplier of short and medium-term credit to the farmers in all those countries of the world where agriculture is still traditional and carried out on a subsistence basis and where institutional sources are not yet fully developed. Two types of moneylenders are mostly found in the rural areas: (i) professional moneylenders whose main or only function is to grant loans to the farmers, and (ii) agriculturist moneylenders, who combine money lending with farming.

In most underdeveloped countries of Asia, the money lender, even today, is the biggest contributor of farm credits This preponderance of the moneylender in the arrangements for agricultural credit is, however, no proof that he satisfies the essential requirements of a good agricultural credit system more than the rest of the agencies put together. On the contrary, he satisfies none of the tests of a good credit system. The main reasons for his popularity are:

(i) The Moneylender makes no attempt to integrate credit with services and his loan can be utilized for productive as well as unproductive purposes;

(ii) He may not necessarily insist on tangible security for his loans but that is because he knows the borrower intimately or has some hold over him;

(iii) The loans advanced are seldom related to the purpose and he is not particular about fixing the duration of the loans;

(iv) He adapts himself to the requirements of the borrower and is thus quite flexible;

(v) His credit is also available readily at least to those persons whom he knows closely; and

(vi) The moneylender adopts a somewhat flexible attitude towards execution of documents and the security to be obtained.

But the importance of the moneylender in the field of agricultural credit is not because of his satisfying the tests of a sound agricultural credit agency, but because alternative agencies have still not been able to build up their organization adequately to replace him: The resources at the command of each individual moneylender will prove thoroughly inadequate to meet the, demands for credit of modem agriculture, particularly if a large number of cultivators take to such agriculture.

2. Traders and Commisssion Agents: Another agency which provides short-term credit to farmers is traders and commission agents. They provide loans to the farmers for productive purposes before the harvest is ready on the condition that they will sell their produce to then at pre determined prices which are usually very low compared to prevalent market prices at the time .of harvest. This type of loan acquires more significance in the case of cash crops like cotton, groundnut, sugarcane, tobacco, etc.

Borrowing from traders, merchants dealers, auctioneers, cattle dealers, etc. is a traditional and widespread practice amongst farmers. It is common for farmers to obtain cattle or seeds, and to defer payment until the fat cattle are sold or crop is harvested. This method of borrowing has certain advantages. The merits are: the ease of approach, the absence of a whole range of formalities and the convenience of being able to borrow at the time of need. This method, however, suffers from two serious defects. The first is that the cost of borrowing is rarely known, for is not usual for traders to state the rate of interest charged. Secondly, borrowing from traders and merchants is often accompanied by conditions which seriously limit the farmer's freedom of buying and selling in a market of his own choice and at his own time.

Now-a-days, the method of hire-purchase has been increasingly applied to the purchase of farm requirements. Under the best of these methods, the farmer, purchasing goods on a credit basis from the dealer or merchant, enters into a contract with regard to the price, the interest rate and the further disposal of the goods purchased.

3. Private Borrowing: Farmers also borrow from their relatives, friends, landlords or from village shopkeepers to overcome temporary difficulties. Private borrowing is very prevalent though there is no means of measuring its real extent. Private loans are often convenient and also often undoubtedly adequate but they suffer from at least three disadvantages. In the first place, the conveyancing costs are generally high. Secondly, they are not usually repayable in regular and easy instalments. Thirdly, they are always liable to be foreclosed at short notice and thereby cause considerable inconvenience if not embarrassment to the borrower.

Future Role of Non-institutional Credit

There is reason to believe that the growth of competition from institutional credit, the progress of land reforms to the extent it has taken place in many countries and the general improvement in the state of agriculture in terms of technology and profitability are all having an impact on the average cultivator's position vis-a-vis the landlord-cum-moneylenders. The farmer is less helpless than in the past and is, therefore, able to obtain private credit on slightly improved terms in some areas. In .this respect, we may fore-see a decline in the contribution of non-institutional rural credit. But the fact remains that large sections of cultivators, continue. to seek accommodation from private credit agencies either because the latter are easily accessible and flexible in the matter of period of repayment, procedures

for lending and security requirements and because institutional credit is reluctant in many areas to open its doors to all sections of cultivators and is otherwise associated with delays and rigidities. Further, it appears that because institutional credit" restricts itself to productive purposes, the sections of cultivators whose needs are largely for consumption and maintenance purposes naturally turn to private credit agencies. As long as these two problem persist, the role' of private agencies is likely to remain significant.

2.5.12 INSTITUTIONAL AGENCIES – COMMERCIAL BANKS

The note of commercial banks in financing agriculture is very significant though in most of the developing agricultural economies, these have entered this field recently. In the past, commercial banks have been found lending to the non-agricultural sector where returns have been adequate and mostly certain, thus ensuring the repayment of bank loan. Very recently, however, many popular governments in underdeveloped countries have encouraged the commercial banks to lend money to farmer by providing some incentives to such banks. Some of the governments in such countries have gone to the extent of nationalising their banks and then encouraging them to open branches in rural areas so that they can come forward to help the farmer. Rising prices of farm products and high farm productivity have made bank loans to the agricultural sector a very happy experience. Since commercial banks primarily raise their resources from surplus money with the public, their first obligation is to invest this money in the safest venture with prospects of high return. Further, since most of the deposits are current deposits, which can be withdrawn at any time, the resources of commercial banks can be loaned only for a short period.

Commercial banks can also extend their support to the provision of rural credit by way of indirect financing by (1) financing co-operative societies engaged in marketing and processing of agricultural produce or in activities ancillary to agriculture such as dairy farming, poultry farming, etc.; (2) providing indirect finance for the distribution of fertilizers and other input; (3) extending credit to manufacturing and distribution firms and agencies and co-operative engaged in the supply of agricultural inputs and machinery; and (4) financing the agencies engaged in procurement, storage and distribution of farm products.

Bank credit, the cost of which is known, and which allows the borrower some freedom to use the loan as he thinks best, is theoretically a much more business-like method of borrowing. Loans are made on the bank manager's assessment of the creditworthiness of the borrower. Farmers of good standing, therefore, find little difficulty in obtaining credit from banks. But most often the bank manager may wish to have some kind of collateral security. The farmer who had no other security to offer is, therefore, at a great disadvantage.

In conclusion, the scheduled banks have not looked with favour on financing agricultural industry so far because they do think it is not very profitable for them to do so. They consider profit and security as the sole motive for functioning. They should seek security for loans but it should not be security of a rigid nature which is unhelpful in a developing country. In the context of planned development of agriculture on progressive and profitable lines in many developing countries of the world, the aloofness of the scheduled banks would no longer be justified. It should be possible for the scheduled banks to take a more constructive interest in schemes of progressive farming and agricultural development.

2.5.13 AGRICULTURAL COOPERATIVE CREDIT

In most countries of the world, an attempt has been made to develop institutional credit for agriculture on co-operative lines. The cooperative form of organisation are considered best for providing credit to the farmers, especially small and marginal. On the unique role of cooperatives in the provision of agricultural credit, attention was drawn in 1927 by the World Economic Conference held by the League of Nations in Geneva. A special resolution of the conference defined their role as follows:

"The increase in agricultural production is intimately bound up with the organisation of agricultural credit, which will place at 'the disposal of the agriculturist the necessary capital on favourable terms. The first condition for surmounting these difficulties is the organisation of the credit institution in those countries where they do not exist and their development where they are already in existence. The best form of institution appears to be the co-operative credit society operating by means of resources which the very fact of association enables it to procure and no increase with or without the assistance of the public authorities".

In 1937, the statutory report of the Reserve Bank of India stated, "An agency which satisfies the requisite conditions for agricultural finance is the co-operative society and it has been so recognised in almost all agricultural countries."

In 1954, the Rural Credit Survey Committee stated, Today more than ever before, there is every reason for an institutional system of rural credit to be based on a co-operative association in the village.

Cooperative organisations have been recognised as the best institutions for providing rural credit to the farmer because they satisfy all the important criteria of sound agricultural credit. The cooperative organisation satisfies the basic condition of proximity as the cooperative societies can have intimate knowledge of the character and abilities of their members. The societies can also supervise the use of credit so that it is invested in improving the productivity of land. Further, the credit provided by co-operative societies is bound to be cheap due to their low administrative cost. The credit provided by these societies is neither too rigid nor too elastic. The credit provided by these society is also safe as it assists and does not hamper the borrower's stability and productive capacity.

In spite of its plus points, co-operative credit is not far from defects, Working of co-operative credit societies in many countries have pointed out the following defects in this type of institutional credit:

1. The tendency of co-operative credit has been to flow mainly towards larger cultivators. In many parts of the world the smallest farmers have been handicapped in having access to co-operative credit both for current inputs and viable investment.
2. Working of co-operative credit in many countries shows that despite improvement over the years, the proportion of co-operative credit to total borrowings of cultivators appears to have continued to be small on absolute standards.
3. The orientation of co-operative credit to production needs has, by and large, been inadequate.
4. Co-operative credit system has given rise to increasing overdues from year to year.
5. A large number of primary agricultural credit societies are neither viable nor even potentially viable and must be regarded as inadequate and unsatisfactory agencies for dispensing production oriented credit.
6. Co-operative credit has frequently fallen short of standard of timeliness, adequacy and dependability. This has been due to various reasons, including paucity of resources, lack of eligibility, time consuming and cumbersome procedures, poor quality of management and general efficiency of working methods.
7. Co-ordination between the authorities and agencies in charge of cp-operative credit and those in change of supplies, extension etc. under agricultural programmes has generally been inadequate.

Government

Governments, in many countries, have also come forward to meet the credit needs of the farmer. Governments mostly come forward to provide a cash or a kind loan to the farmers in the areas where the establishment or reactivization of the co-operative credit structure or promotion of supplementary credit arrangements by the institutional agencies is likely to take so long that tlle current agricultural progralJ1mes might suffer on account of the lack of credit support. But the experience of government participation in supplying credit to the farmers has not been happy in many countries. Government's credit often tends to be governed more by political than by economic consideration and

is too rigid to take into account the requirements of individuals according to the production programmes they have in view. In most cases, it tends to become security rather than production-oriented, so that officials at the lower level tend to give preference to medium and big farmers to the neglect of others. Further, governmental agencies are generally very poor in closely supervising the end-use of credit and in providing any guidance to the farmer in putting the investment made out of the loan to optimum use. Finally, the repayment of loan is generally left to the good behaviour of the borrower, with the result that the recovery of agricultural loans advanced by the government is generally the poorest.

In recent years, more emphasis is placed on government financing agriculture indirectly through co-operatives mainly in the following directions:

(i) In order to enable co-operative societies to stand on their own feet, government may purchase their shares.

(ii) Government may provide guarantee to the relatively weak apex co-operative banks.

(iii) Government may incur expenses on the training of personnel for co-operative societies.

Land Development Bank

The long-term credit needs of the agricultural sector are met by the Land Development Banks which provide long-term credit against the mortgage of lands. The need to start such banks arose because (i) the primary co-operative societies cannot provide long-term loans to the farmers as they themselves draw their resources from the central cooperative banks for short and medium period loans, and (ii) provision of loan for a long period against the security of land requires expert assistance for valuation, title deed, etc., which the primary co-operative societies do not possess. The loans provided by these banks are at fairly low rates of interest and have to be repaid in easy instalments over a fairly long period, say, 15 to 25 years.

Institutional Agricultural Financing – An Appraisal

The performance of the institutional credit agencies has to be judged not alone by the volume of credit advanced for agricultural development but also by their capacity to meet the challenge of reaching out to the small and marginal farmers, agricultural labourers, rural artisans and other members of the weaker sections of the community. The successive review of the working of the institutional credit system made in many developing countries have revealed several lacunae in the procedure and organisation of this system. It has been found that small farmers have been handicapped for want of access to co-operative credit. An important feature of co-operative credit has been its tendency to flow mainly to larger cultivators. Similarly, an analysis of the agricultural financing by the commercial banks has also revealed that a major chunk of rural credit extended by these banks has gone to big farmers. The major factor which inhibited banks' efforts to cover small and marginal farmers more extensively were their organisational structure and conventional land based norm of security. Consequently, these sections of the farming community had a very niggardly share in the loans advanced by these institutions.

As far as the financing institutions are concerned, it is not enough to finance bankable credit proposals for financially viable production units. Project appraisal techniques should take note of the farmers who have the potential to become viable through added investment or through adoption of new technology. It may be necessary to change the production structure itself involving diversification of crops, changing crop-mix and undertaking new enterprises such as dairying, poultry, piggery and other animal husbandry activities etc. The supporting services structure also needs to be changed in such a manner as to enable the small farmer to get all inputs, marketing facilities and extension services at places within easy reach.

2.5.14 DECISION OF CREDIT USE

Credit, as we have seen, is a valuable asset for famers with limited capital and most farmers have limited capital. But the use of credit may increase farm efficiency and hence the incomes and level of living of the farmer or its irrational use may bring doom to the farmer and in the process he may even lose his land and savings. The decision to borrow can mean success or failure; the farmer's ability as a financial manager determines his success or failure. The decision to borrow capital is one of the most important farm management decisions. Factors which influence this decision-making are: (1) when to borrow, (2) how much to borrow, (3) What to borrow for, (4) length of loan and repayment schedule, and (5) what to offer for security.

The added return-added cost principle helps the farmer to decide how much capital he can profitably use. On anyone farm, the productiveness of the land, the condition of the buildings, the amount of capital owned, the health and age of the operator, and the level of management determine the amount that can be safely borrowed. In addition, all farmers are subject to varying degree of uncertainty which introduces an, element of risk. The safe amount to borrow, therefore, varies from one person to another, from one area to another area, and also from one period to another period. There is no simple answer to the question, how much can a farmer safely borrow? The principle of increasing risk helps us to determine how much money we can safely borrow. Although the security which can be offered by the farmer sets the absolute limit to borrowing, the opportunity cost principle along with risk consideration set the limit to the use of capital in anyone establishment. Many alternative investment opportunities lie before the farmer with limited resources. A vital problem is to determine where in the farm business to invest these scarce funds.

In order to solve this problem, the farmer uses the techniques of budgeting and the opportunity cost principle.

At the micro-level an individual farmer will undertake an investment if the net present value of that investment is greater than zero. The calculation of the net present value of an investment requires the preparation of cost series, on the one hand, and income series, on the other. In terms of notation, the net present value (NPV) can be expressed as:

$$NPV = \sum_{i=1}^{n} \frac{Y_i}{(1+r)^i} - C$$

Where C refers to the initial capital cost of investment and Yi stands for net cash flow at the end of year i where the benefit of the investment is spread over "n" years.

The above formula is alright for calculating the net present value of a self-financed investment. But when investment is made by the farmer out of a loan whose repayment is spread over some later years, the above formula requires a slight modification. The capital cost in this case will be equal to the aggregate present value of all the instalments of principal and interest payments to be made over n years by the farmers. The present value of the capital cost incurred at a number of periods is arrived at by summing over the discounted values of principal and interest components of costs in each period. The corresponding equations become:

$$C = \sum_{i=1}^{n} \frac{C_i}{(1+r)^i}$$

Thus, the modified formula of the net present value can be expressed as:

$$NPV = \sum_{i=1}^{n} \frac{Y_i}{(1+r)^i} = \sum_{i=1}^{n} \frac{C_i}{(1+r)^i}$$

where $C_i = P_i + I_i$, P_i refers to the annual instalment towards repayment of principal and/to annual interest payment.

2.5.15 AGRICULTURAL CREDIT IN INDIA

The present system of agricultural credit in India consists of two sectors; viz. institutional and non-institutional. The non institutional sector consists mainly of the professional and agricultural moneylenders, landlords, traders and commission agents and farmer's relatives and friends. The institutional sector comprises co-operatives, commercial banks and regional rural banks.

To gain an idea about the various sources of agricultural credit, one has to necessarily turn to findings of countrywide surveys undertaken by the Committee of Direction. All India Rural Credit Survey (1951-52) and All India Rural Debt and Investment Survey. Table 5.1 gives an indication of the extent to extent to which the main agencies for rural credit contributed to the total annual borrowing of the cultivator in 1951-52 and 1961-62.

Table 5.1 Borrowing of Cultivators from Different' Sources

(in percentages)

Credit Agency	1951-52	1961-62	1971	1981
Moneylenders	69.7	49.2	36.1	16.1
Traders and Commission Agents	5.5	8.8	8.4	3.2
Relatives	14.2	8.8	13.1	8.7
Cooperatives	3.1	15.5	22.0	29.9
Government	3.3	2.6	7.1	3.9
Other Agencies	4.2	15.1	13.3	38.2
Total	100.00	100.00	100.00	100.00

It is evident from Table 5.1 that in 1951-52, the two most important sources of rural credit were moneylenders and borrower's relatives who between them accounted for about 84 per cent of total credit. The credit supplied by the three institutional agencies, viz., government, co-operatives and commercial banks, was insignificant. But over the decade, things have changed significantly. The share of moneylenders and relatives fell from about 84 per cent to 58 per cent whereas the contribution of co-operatives rose from 3.1 to 15.5 per cent. Other agencies whose share in rural credit increased during the decade were traders and commission agents and "Other Agencies" while the share of government fell down from 3.3 to 2.6 per cent.

Although, in comparison to 1951-52, significant expansion has taken place of institutional credit in 1961-62, yet non-institutional agencies continue to playa dominant role in the supply of rural credit. Although these agencies charge usurious rates of interest and follow unethical practices, they will dominate the rural credit supply scene because farmers find it more expedient to resort to them rather than to the agencies in the organised sector. The main reason for this is that the former's lending procedures are relatively simple and credit assistance timely. However, the share of non-institutional sector in the -total borrowings of fanners has recorded a reduction from more than 95% in 1952 to 85% in 1961-62, 75 per cent in 1971-72 and about 65 per cent in 1978.10

We will now discuss in detail individual sources supplying rural credit.

Institutional Agencies

2.5.16 COOPERATIVE CREDIT

Efforts to build up the institutional financing system for agriculture commenced with the adoption of the Cooperative Societies Act in 1904. However, during the first three decades of the century, the village moneylender was the main source of finance to farmers. Several reports such as Sir Malcom Darlinks Report (1935) and the preliminary and statutory reports of the Reserve Bank of India (1936 and 1937) emphasized the fact that almost the entire farm finance was supplied by moneylenders.

The government made deliberate attempts to nurture the co-operative movement, to institutionalise efforts to relieve farmers from the traditional burden of debt and to promote thrift. Gradually, the cooperatives assumed a more positive role as compared with their earlier characteristic of organisation for defence against exploitation by moneylenders. There was not only a steady quantitative expansion in numbers but also a growing diversity in the functions assumed by co-operative societies. Till 1947, the general thinking was in favour of promoting multipurpose primary societies in rural areas. During the period 1947-56, co-operatives were recognised as an instrument of planned economic action and the co-operative system was considered more suitable than the departmental agencies for dispensation of farm credit. The All India Rural Credit Survey (1951-54) brought out the fact that in spite ef various procedural and administrative reforms as well as credit facilities from the Reserve Bank of India, the co-operative system could account only for 3 per cent of the total borrowing of cultivators. Even in areas where co-operative credit societies were functioning, a large part of the cultivating population was outside its ambit. The report recommended that lending policies should be geared to production programmes and an integrated scheme should be evolved to link credit with marketing and processing in the co-operative sectors.

In considering the need for rural credit being directed towards productivity and for being made available to all creditworthy cultivators, the Survey Committee was of the firm conviction that no other form of credit organisation would be suitable except the co-operative society. The Committee was for creating conditions in which cooperatives could operate efectively for the benefit of the weaker sections of the rural community. Its important recommendations in this context were structural reorganisation of the co-operative credit movement with an apex bank at the state level and central co-operative banks at the district level. As for societies at the primary level, it recommended organisation of large sized societies, administrative reforms as well as credit facilities from the Reserve Bank of India.

In November, 1958, the National Development Council in its resolution on co-operative policy also recommended that the responsibility and initiative for social and economic development at village level should be placed fully on the village co-operative and the village panchayat which were to be considered as the primary agencies for improving all aspects of rural life through the efforts of the people. On the basis of the recommendations of the Committee on Taccavi Loans' and Co-operative Credit (Chairman, Shri B.P. Patel, 1961) the Government of India declared that co-operatives were to be ultimately the sole institutional agency for providing agricultural credit. In order to enable them to take over the entire responsibility of providing agricultural credit, the programme of strengthening primary co-operatives was again emphasized.

The recommendations of the Rural Credit Survey Committee were accepted by the Government of India, the State Governments and the co-operative agencies, and a leading role for co-operatives in more precise terms and in greater detail on the lines recommended by the committee was assigned during the Second Five Year Plan. State c-&operative banks were established or reorganised in all the states and suitably strengthened with share capital contribution from the respective state governments. Rationalisation of the central banking structure was undertaken with a view to having viable institutions at the intermediary level generally at the rate of one bank for each district.

In the years that followed, the working of co-operatives was very much improved due to the financial and administrative support given by the Central and State Governments as well as the Reserve Bank of India under the

Integrated Rural Credit Scheme. The All India Rural Debt and Investment Survey of 1961-62 showed that the share of cooperatives' of ₹ 161 crores in the total estimated borrowings of cultivators at ₹ 1,034 crores recorded an increase to 15.5 per cent from 3.1 per cent in 1950-51. The performance of co-operative credit agencies since 1960-61 is depicted in Table 5.2.

Table 5.2 Performance of Co-operative Credit Agencies

(₹ in crores)

Type of Loans	1960-61	1965-66	1966-67
Short-term	182.82	307.51	326.82
Medium-term	19.93	36.95	38.58
Long-term	11.62	58.24	60.32

Although the Third Five Year Plan envisaged that co-operatives would cover all the village by 1965-66, the actual achievement was only about 90 per cent. The membership of primary agricultural credit societies and primary land mortgage banks at 27 million covered about 42 per cent of the agricultural population. The programme of cooperatives during the Fourth Plan period was to reach. a target of ₹ 752 crores under short-term loans and ₹ 68 crores under medium term loans.

In order to make a comprehensive review of the total credit system for agriculture, including processing, storage and marketing, the R.B.I. appointed the All-India Rural Credit Review Committee in July 1966. As regards the position in 1967-68, the Committee observed that cooperative credit had still not been oriented adequately to production credit needs, It fell frequently short of standard of timeliness, adequacy and dependability. The committee noted that overdues were not only heavy but they were rising from year to year and small cultivators were still unable to get their share of credit from the co-operatives. The Report made several specific recommendations for the promotion of viable units, rehabilitation of weak central co-operative hanks and priority attention to areas of retarded growth.

Direct fina.nce for agricultural development from co-operatives went lip from ₹ 488 crores in 1969-70 to ₹ 610 crores in 1973-74 in the case of short-term loans and from ₹ 52 crores to ₹ 125 crares during the same period in respect of medium and long-term loans.

The Fifth Plan target for agricultural credit aggregated to ₹ 5,400 aores in which. the share' of co-operatives was fixed at ₹ 3,125 crores. At the end of June 1979, there were 1,02,134 primary agricultural cooperative credit societies with a membership of 52 million and a borrowing membership of 19 million.

Ensuring timely and adequate flow of rural credit, especially in regard to meeting the credit requirements of small and marginal farmers and other weaker sections, continued to receive priority during the Sixth Plan period. The quantum of loans purveyed by the co-operative during 1982-83 is estimated at ₹ 2,588 crores, comprising ₹ 1,957 crores as snort-term and ₹ 631 crores as medium-term and long-term credit. The achievement by the co-operatives during 1983-84 is placed at ₹ 2,939 crores consisting of ₹ 2,180 crores of short-term and ₹ 759 crores of medium and long-term loans. More than 40 per cent of the loans issued by co-operatives is estimated to have benefited the weaker sections of the rural society. Credit support by the cooperatives extended to the rural sector in recent years is depicted in the following figures:

Table 5.3

(₹ in crores)

	1980-81	1981-82	1982 -83	1983-84	1986-87	1987-88*
1. Short-term	1,519	1,707	1,957	2,180	2,670	3,289
2. Long-term loan	593	603	631	759	830	1,056
Total	2,112	2,310	2,588	2,939	3,500	4,345
* Target						

Short-term and Medium-term Loans

There are two separate wings of the co-operative credit structure in India, one providing short-term and medium-term loans; while the other provides long-term loans to the agricultural sector. The former wing has a three tier structure with state co-operative banks at the apex, central co-operative banks at the district level and Primary Agriculture Credit Societies (PACS) at the village level. Long-term finance is provided by the state co-operative land development banks and the primary co-operative land development banks.

2.5.17 PRIMARY AGRICULTURAL CREDIT SOCIETIES

These are primary units at the village level functioning as flood gates through which funds are purveyed directly to the borrowers.

These societies may be started with ten or more persons, usually belonging to a village. The value of each share is kept just nominal so that a maximum number of villagers may become members of the society. These societies are managed by an elected body consisting of president, secretary and treasurer. Loans are granted for a short period, normally for one year, for carrying out agricultural operations. Profits, if any, earned by the society are not distributed to the shareholders but are spent on the welfare of the village. The position of primary credit societies in the country is given in Table 5.4.

Table 5.4 Primary Agricultural Credit Societies

	1950-51	1960-61	1970-71	1982-83	1990-91
No. of societies (thousand)	105	212	161	94	88
Membership (lakhs)	44	170	310	N.A.	N.A.
Loans advanced during the year (₹ crores)	23	202	578	2,100	1,349
Loans overdue (₹ crores)	6	44	322	1,500	N.A.

Source: Report of the Ministry of Agriculture, Deptt. of Cooperation.

Table 5.4 stands witness to the fact that usefulness of these societies in providing short-term credit to the farmers has been rising steadily since 1950-51. In 1950-51 these societies advanced loans worth ₹ 23 crares, which rose to ₹ 202 crores in 1960-61 to ₹ 578 crores in 1970-71 and ₹ 2,100 crores in 1982-83. In the wake of the 20 point economic programme, these societies have stepped up their advances to the weaker sections, particularly small and marginal farmers. The societies have been helpful in reducing the influence and also loosening the tight grip with which the moneylenders were holding the peasantry. These have succeeded in educating and motivating the illiterate and ignorant farmers about the alternative sources of cheap credit and have salvaged a large section of village population from the clutches of the moneylender. However, a lot more remains to be done in this regard. Institutional credit has to strike roots deeper into the village society so that the agency of moneylenders is uprooted for ever.

Central Cooperative Banks: In the three-tier credit structure, the PACSs derive their strength from the central cooperative banks which operate at the district level and, for that reason, are also known as district cooperative banks. The main sources of their funds are their own share capital and reserves, deposits from the public and loans from the state cooperative bank. Their main objective is to lend to the village primary credit societies. The working of central co-operative banks has been depicted in Table 5.5.

Table 5.5 Central. Co-operative Banks

	1950-51	1960-61	1970-71	1982-83	1993-94
Number	505	390	341	340	361
Share capital (₹ crores)	4	.39	141	NA	NA
Loans advanced during the year (₹ crores)	83	350	890	850	17,744

Report: Ministry of Agriculture.

There are at present. 361 central cooperative banks with a membership of about 10 lakhs. The total loans advanced by these banks during 1993-94 amounted to ₹ 17,744 crores.

2.5.18 STATE COOPERATIVE BANK

This forms the apex of the cooperative credit structure in each state. Its main function is to finance and control the district or central cooperative banks. It serves as a link between the NABARD from which it borrows and the co-operative central banks and the village cooperative primary societies, which are finance by it. At present, there are 28 state cooperative banks in India. These banks had advanced loans amounting crores during the year 1993-94. Table 5.6 gives the position of state cooperative banks in India.

Table 5.6 State Cooperative Banks

	1950-51	1960-61	1970-71	1982-83	1984-85	1993-94
Number	15	21	25	28	28	28
Deposits (₹ crores)	22	72	279	NA	923	NA
Loans made during the year (₹ crores)	42	258	749	1,550	1;725	14107

Long-term Cooperative Credit Land Development Banks: In order to bring about a permanent release of the agriculturists from their indebtedness, loans for sufficiently long periods are necessary. They are also required to enable the farmers to effect costly but profitable improvements on land. The agencies providing credit to agriculture, such as the moneylender, indigenous bankers, the co-operative societies and the commercial banks are neither willing nor able to help the agriculturists by the provision of long-term finance. Hence arises the need for special type of credit institutions generally known as Land Mortgage Banks. Long-term finance can only be provided on mortgage security and the land mortgage banks with their specialised staff for valuation of land and examination of titles etc. are accepted as the best agency for this purpose in India. These banks generally raise their funds through the sale of debentures and hence are in a position to grant long-term loans.

The real beginning in land development banking (or land mortgage banks as they were previously called) was made by Madras State in 1979. Before independence, the progress of LOBS was very slow and uneven. However,

they have been enjoying a greater degree of prosperity after independence. We have in India, 'central land development banks (generally one for each state) and primary land development banks. Some states do not have primary land development banks, instead, they have branches of central land development banks.

The number of primary land development banks increased from 286 in 1950-51 to 1,830 in June 1983 while that of central land development banks increased from 5 to i9 during the same period. Total loans advanced by the state land development ranks stood at ₹ 470 crores in 1983-84 as against ₹ 480 crores in the previous year.

2.5.19 WEAKNESS AND REMEDY SUGGESTED FOR COOPERATIVE CREDIT

Weaknesses of Cooperative Credit

In spite of its important role in providing agricultural credit, co-operative credit suffers from a number of weaknesses.

Firstly, many agricultural credit societies are of non-viable character. Since the basic philosophy of co-operative societies is to involve the people themselves in the process of economic transformation, a. high degree of efficiency is required to realise this objective. Many co-operative societies did not become viable because dedicated, honest and efficient people did not come forward to undertake this noble task. Because of red-tapism, undue political interference and the strong hold of large farmers, the co-operative movement did not come up to the level of expectation.

Secondly, the co-operative credit structure is criticised on the ground that it is mostly managed by large farmers with the result that small and medium farmers do not get their fair share. Large farmers, with their superior economic and social power, manage to have a greater hold on these societies and pocket a lion's share of benefits. Those of the poorer sections for whom these societies are primarily meant do not get their due share. For several socio-political reasons, they have still not been able to raise their voice against this exploitation.

According to the Programme Evaluation Organisation, it was observed that in 1960-61, only about 15 per cent of the credit went to farmers with 1.21 hectares of land or less as against 46 per cent that went to farmers with holdings of size greater than 4 hectares.

Yet another difficulty in this regard has been the disparity in the expansion of the co-operative credit societies and their coverage. It was observed that in 1961-62, the loans and advances by co-operatives were 23.6 per cent of the total on the all-India figure and against this the figures for West Bengal, Assam, Rajasthan and Bihar were only 9.9, 6.7, 5.2 and 4.1 respectively. On the other hand, co-operative credit societies have failed to cover all the rural families which leaves a big margin for non-institutional credit and hence the perpetuation of exploitation of the rural masses.

Another major problem of co-operative credit is ever-rising overdues. The performance on the recovery side has been dismal. 27 to 50 per cent of the overdues have been reported in respect of the cooperative credit societies. Overdues .exist with respect to primary societies, central-co-operative banks as well as land development banks. Rising overdues weaken the position of these societies and hampers the process of credit distribution.

Suggested Remedies

Immediate remedial measures are called for, failing which this institution will become completely ineffective.

At the first instance, fresh efforts are warranted to create a cadre of trained dedicated and honest workers. Red-tapism, political interference, administrative bottlenecks and undue hold of large farmers has to be done away with. These societies must be run on an objective criterion aimed at quicker transformation of rural society.

Secondly, the credit needs of small farmers have to be given priority the officials should not succumb to local pressure, political or otherwise. Politicians and powerful village lobbies should also not interfere unnecessarily. They should, however, discharge their moral obligations in this regard towards the larger benefits of the village community.

Thirdly, those states that have lagged behind should step up their performance and expand their network to cover as much of credit requirements of the farmers as possible. There also has to be an effort to cover all the rural families so that no margin is left for non-institutional credit and of exploitation of the rural poor.

Lastly, the process of recovery is to be smoothened and stepped up. If the recovery continues to be poor, that will retard the pace of progress of these societies. Unless the process of recovery picks up, refinancing and greater coverage will not be possible.

2.5.20 SUMMARY

Capital means produced means for further production. It is man-made and plays all crucial role in every field of economic activity. More capital accumulation leads to more production and modernisation hence a product of economic development. No need to say capital is meaningful to agriculture mani fold in modern-day agriculture. Capital accumulation is a pre-requisite for agricultural development.

Capital accumulation refers to addition of more capital to the existing stock. Control of capital refers to rational use of capital in farm.

Sources of capital in, agriculture can be listed as savings by landlords, individual farmers savings by farm operators, borrowing form various sources, various transfers and so loke.

Decision making regarding capital investment is a tough decision depending on efficiency, productivity use of capital, risk & uncertainty crop pattern, and farm-freedom.

Agricultural credit is affected by the characteristics of credit. Ag credit can be classified an the basis of purpose, period, security and creditor, Ag. credit must be based on essentialness of credit.

Credit requirement must be based on area under cultivation, capital inputs, development of the land, and other agricultural-related material requisites.

Source of Agricultural credit can be institutional and non-institutional. Institutional agencies include commercial banks, land development banks Rural banks, cooperative credit societies. These are more helpful to peasants non-institutional source. Non-institutional sources are exploitative by nature.

If the defects of cooperative credits can be corrected & it can be more viable, then the system of agriculture can be a huge gainer.

Hence capital formation in agriculture comprising of asset creation for augmenting production, land reclaimation, preventing, soil erosion, irrigation, flood control crop-storage, transportation, communication and other raw material input use, and so on prove the emphatic importance in agriculture.

2.5.21 SELF ASSESSMENT QUESTIONS

1. Define capital. Examine the role of capital in agricultural development.
2. Define capital accumulation. Discuss the various sources of capital used in agriculture.
3. Examine various factors affecting capital formation.
4. Examine the character and role agricultural credit.
5. Discuss various type of agricultural credit. Examine the non-institutional sources of agricultural credit with reference to India.
6. Discuss the role of cooperative credit on Indian agriculture. Fin out the defects and suggest various remedies for better use of credit.
7. Give a critical appraisal of institutional credit.
8. Examine the decision of credit use relating to farm and farmers efficiency.
9. Examine the role of primary agricultural credit societies in Indian Agriculture.
10. Explain the Importance of NABARD in agricultural development of India.
11. Examine the effectiveness of Reserve Bank of Indian's Policy in Indian Agriculture.
12. Explain the role of capital formation the agricultural development. Examine the principles of decisionmaking.

Key Words

1. **Capital Market**: The financial market where long-term debt and equity securities are bought and sold, providing funds for businesses and governments to finance their operations and investments.

2. **Agricultural Finance**: The subset of financial services and products tailored to meet the specific needs of agricultural producers, processors, and related businesses. Agricultural finance includes loans, credit lines, leasing, insurance, and other financial instruments used to fund agricultural activities.

3. **Rural Finance**: Financial services and products targeted at rural areas and agricultural communities, including access to credit, savings, insurance, and other financial resources to support rural development and agricultural activities.

4. **Credit Access**: The ability of agricultural producers and businesses to obtain loans and credit facilities from financial institutions to finance their operations, investments, and working capital needs.

5. **Agricultural Loans**: Loans provided to farmers, agribusinesses, and rural enterprises to finance land purchase, crop production, livestock rearing, equipment purchase, irrigation systems, farm infrastructure, and other agricultural investments.

6. **Collateral**: Assets or property pledged by borrowers as security for a loan to reduce the lender's risk of default. In agriculture, collateral may include land, machinery, livestock, crops, or other valuable assets used to secure agricultural loans.

7. **Interest Rates**: The cost of borrowing money, typically expressed as a percentage of the loan principal. Interest rates charged on agricultural loans influence borrowing costs for farmers and agribusinesses and affect their profitability and investment decisions.

8. **Risk Management**: Strategies and techniques used to identify, assess, and mitigate risks associated with agricultural production, market volatility, weather events, price fluctuations, and other factors that may impact agricultural incomes and financial stability.

9. **Microfinance**: Financial services and products tailored for small-scale farmers, rural entrepreneurs, and agricultural cooperatives who may have limited access to traditional banking services. Microfinance institutions provide small loans, savings accounts, insurance, and other financial services to support rural livelihoods and agricultural activities.

10. **Investment Funds**: Collective investment vehicles that pool capital from investors to invest in agricultural assets, such as farmland, agribusinesses, agricultural technology, and value chain infrastructure. Agricultural investment funds provide investors with exposure to agricultural markets and potential returns from agricultural activities.

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14. Agricultural Price and Income Policy- Schultz

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2.6 Chapter

AGRICULTURAL MARKET

Objectives

After completing this chapter, you will be able:

- To define agricultural marketing and to know its importance on the satisfaction of human wants.
- To know the marketing facility and its support to farmers.
- To understand the role of agricultural marketing in the development of agriculture.
- To understand the special problems in the marketing of agricultural products.
- To know the various marketing functions for achieving the least cost supply to the consumers.
- To understand the benefit of the farmers and consumers.
- To assess the role of middlemen and their exploitation exploring the market margin.
- To know the structure of agricultural market and types of markets prevailing for agricultural produce.
- To understand the role importance, working and success of co-operative marketing.
- To know the advantages of cooperative marketing.
- To find out the defects of agricultural marketing with references to Indian.
- To understand the marketable surplus influencing economic developments and factor affecting marketable surplus.

Structure:

2.6.1 INTRODUCTION AND DEFINITION

The marketing of farm products is a matter of great interest to the farmer, the consumer and the middleman. To the farmer, it provides a channel of communication between him and the society and gives him continuous information about the demand for his product. The consumer views it as a means of supplying his needs since marketing helps in raising the standard of living of people by satisfying a multitude of needs and desires of the consumers. The middleman depends upon it for his livelihood. These diverse interests lead the farmer to seek a high priced market for his products, the consumer a low priced market and the middleman, a margin between the farm price and consumer's price that will amply reward him for his service. The basis of agricultural marketing is that farm products are stored, transported to a place where wanted, at the desired time and transferred to those desiring them. It is for that reason that marketing has become part and parcel of the modern production process.

"Market reform", therefore, "ought to be an integral part of any policy for agricultural development. Normal economic incentives for farmers to increase their productivity can operate only to the extent that the marketing system enlarges the market for their produce and brings them a reasonable price for it. Their desire to earn large cash incomes can be stimulated by a marketing system that brings them cheap consumer goods, and their effort to increase productivity can succeed only if the system delivers the needed inputs. Marketing is as critical to better performance in agriculture as farming itself and should be treated with equal care."

Marketing Defined

The objective of all economic activities is the satisfaction of human wants. In order to achieve this objective, the manufacturers, miners and farmers undertake production of good and services.

But they will fail to achieve their objective if the goods and services as produced do not reach the consumers who demand them at a time when they need them. It is marketing which helps making goods useful to the society by getting them where they are wanted, when they are wanted and by transferring them to those people who want them. Marketing in this sense, has been defined as "all the activities involved in the creation of place, time and possession utilities." To emphasise all these aspects of marketing, Clark and Clark wrote that, "marketing consists of those efforts which effect transfer in ownership of goods and care for their physical distribution."

According to Richard Kohls, "Marketing is the performance of all business activities involved in the flow of goods and services from the point of initial agricultural production until they are in the hands of the ultimate consumer."

A comprehensive definition of marketing has been provided by the Definitions Committee of the American Marketing Association. According to the Committee, "Marketing includes all activities having to do with effecting changes in the ownership and possession of goods and services. It is that part of economics which deals with the creation of time and place and possession-utilities and that phase of business activity through which human wants are satisfied by the exchange of goods and services for some valuable consideration".

In the light of the above definitions of the concept "marketing, we can now define agricultural marketing in a simple language. Agricultural marketing is a process by which the producers and buyers of agricultural goods are brought together. Such a definition emphasises two things (i) the buyers of agricultural goods, and (ii) the chain through which buyers and sellers of agricultural products are connected with each other.

Buyers of agricultural commodities can be divided into three main categories: (i) those who purchase agricultural goods for direct consumption; (ii) those who demand agricultural goods for use as intermediate goods; (iii) those who buy agricultural goods for sending them abroad i.e., exports.

The chain which connects buyers and sellers of agricultural goods has so many links. For example, arrangements have to be made to collect agricultural goods from the sellers in the rural areas and store them before being sent to the market for sale. At mandis too, godowns have to be arranged till the stocks are disposed of. Two other important links of this chain are transport and credit facilities.

2.6.2 IMPORTANCE OF AGRICULTURAL MARKETING

With the advance in intensive cropping, processing, storage and marketing of agricultural produce are becoming more and more important. In the absence of sound marketing facilities, the farmers have to depend on local traders and middlemen for the disposal of their farm produce which is sold at throw-away prices. In the case of small and marginal farmers, marketing of produce is still more critical. Since the amount of produce they are able to sell is small and overhead expenditure on processing, transport and marketing of the produce is heavy, the marketing of their produce is hardly remunerative if they do it on their own. Owens and Shaw very apty pointed out, "Agricultural development is first of all a human problem, not a technical problem. H all farmers have access to production inputs, the financial system, the market and agricultural knowledge, then they can improve the state of agriculture. But most farmers lack access to the market system and thus lack both the resources and the incentives to modernise their production methods." The authors add, "Unequal access to the market is one of the reasons why the Green Revolution in India has benefited mostly large farmers."

Thus, for the development of the agricultural sector, it is essential to develop agricultural marketing so as to match with the production surplus resulting from technological innovations and exploitation of the existing land and water resources. Apart from increasing production, marketing and distribution can significantly help in improving the availability of goods and services and also provide a stimulus to greater production. Had it not been for modem marketing, probably the Englishman would not have had his breakfast eggs from Denmark, cornflakes from Canada, and a cup of tea from the East. Marketing also increases demand which will provide its own incentive to increase supply. This point can be illustrated by taking an example. Production of peas, for example, is seasonal and is limits to certain areas in the country because of the climate factors. But if the national market for green peas is developed, a guaranteed price and a stable income will provide an incentive to the farmers to grow peas on a larger area. Farmers will also take to planting of improved varieties of peas which will not only be better yielding but also will be frost resistant.

We, thus find that a scientifically developed market on a large scale for just one vegetable like peas could go a long way towards improving agricultural practices over a period of time. We may here quote Ashok Mehta who, while delivering his speech to the Indian Society of Agricultural Economics, said, "A revolution in agriculture is unthinkable in terms of something happening in agriculture alone. It is to be thought of as a series of interchanges between agriculture and industry with rising intensity, industry supplying the basic needs of material inputs of agriculture, agriculture feeding back its surpluses for the development of industry, and industry supplying back the various consumer goods on which the agricultural surpluses can be spent. While emphasising this thought, I would like to go one step ahead and venture to say that the adoption of modem techniques of production has got to be integrated with the modem techniques of marketing and distribution, because in the ultimate analysis, the key to prosperity depends upon the availability of goods and services".

2.6.3 PROBLEMS RELATED TO MARKETING OF AGRICULTURAL PRODUCE

Marketing of agricultural goods is more complicated than the marketing of other non-agricultural goods for the following reasons:

(1) The output of agriculture is largely a raw material which is used for further processing. This processing may be simple as in converting livestock into meat or it may be highly complex as in converting- wheat into flour. Regardless of the complexities, it is true that in most cases, the product sold by the farmer soon loses its identity as a farm product and simply becomes "food".

(2) Compared to most other products, agricultural products are both bulkier and more easily perishable. When things are bulky, marketing functions concerned with their physical handling are very much affected. In the case of those products which occupy a lot of space in relation to their value, the unit cost of transportation and storage is automatically raised.

Similarly, many agricultural products are exceedingly perishable. The degree of perishability, no doubt, varies from product to product but permissibility remains a distinct characteristic of agricultural goods.

These characteristics have their effect on the facilities necessary to market farm products. Bulkiness plus varying production, necessitates large storage capacities and higher cost of transportation. Perishable products require speedy handling as well as special refrigeration. Due to these characteristics, agricultural marketing sometimes is costlier than the marketing of industrial goods.

(3) Much of agricultural production is highly seasonal. Most of the agricultural goods are ready for the market in certain fixed periods of the year only. For example, the harvest season of rice in India extends to two to three months but demand for it is evenly spread throughout the year. To the extent the commodity can be stored, the facilities must be provided to hold the product, but at peak season, the stores will be used at near capacity and at other times, they may be almost empty. If the product cannot be stored, it must either be processed or consumed immediately. Due to seasonal production, the processing plants will be running at full capacity during some periods and well below capacity in other periods. In case the product must move directly into consumption, transportation and refrigeration facilities must be immediately made available. All of these special situations mean increased costs in the agricultural marketing process.

(4) The quantity as well as the quality of agricultural products are beyond the control of the producer. During some years, the growing conditions are such that the crop in general may be of high quality and more in quantity. In other years, unfavourable conditions may result in lower quality and lower production. Variations in quality and quantity of agricultural goods give rise to the following problems:

(a) Due to imbalance in supply and demand of agricultural goods prices fluctuate from time to time.

(b) Variations in the quality of products make it very hard to apply uniform standards for grades from year to year.

(c) Variations in quantity of agricultural goods throw transport and storage arrangements out of gear.

(5) Agricultural output comes from many small units operating indendently. Since the product is made available in relatively small amounts in the hands of many individual owners, the concentration process becomes very important in the case of agricultural marketing.

(6) In the case of most agricultural goods, the demand is relatively inelastic, consequently, their prices rise steeply during the periods of short supply and fall sharply in the period of excess supply. It is for this reason that marketing of agricultural goods has to face the problem of price stability.

The main characteristics of agricultural goods which make agricultural marketing much more elaborate and complex has been depicted in Fig. 6.1.

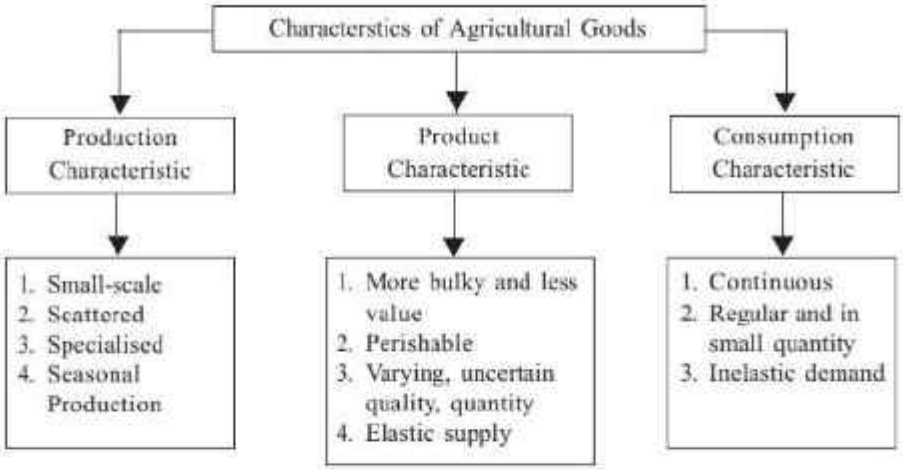

Fig. 6.1: Characteristics of Agricultural Goods Creating Problems in Agricultural Marketing

2.6.4 MARKETING FUNCTION: I. PRIMARY SERVICE AND II. SECONDARY SERVICE

"Marketing function" may be defined as a major specialised activity performed in accomplishing the market process. Modern marketing system has several functions. Its important function is to move the desired varieties of farm products to consumers in the desired forms and conditions at the lowest possible cost. Different writers have used 'different methods of classification of marketing functions and services and somewhat different definitions of similar terms. There are three principal marketing functions: (1) assembling (procurement, concentration), (2) processing (preparation for consumption), and (3) dispersion (distribution). In carrying out each of the three major functions of marketing certain other functions are performed which are termed as "secondary services". They include: (1) grading; (2) packing; (3) transporting; (4) storing; (5) financing; (6) assuming risk; and (7) selling.

We will now discuss briefly the principal as well as secondary market functions:

(1) Assembling

In agriculture, goods are mostly produced by small farmers scattered over a wide area. Collection of small supplies from them, before further processes of marketing, is undertaken, is necessary. Assembling, therefore, means bringing together, collecting and concentrating goods of the same type from the various sources of supply at centrally located places.9 Agricultural goods are assembled chiefly for two purposes; first, for meeting the demand of consumers, and secondly, to provide a sufficient volume of business to middlemen like wholesalers and retailers. The importance of assembling as a means of facilitating the orderly feeding of markets is fairly obvious where these markets are far away from the multitude of small producers responsible for supplying them. In a country like India, where about 70 per cent of farmers are small and marginal, this function has an important role to play.

(2) Processing

We find very few agricultural products which are ready for final consumption when they leave the farm. In most cases, the marketing system must convert them into a suitable form before they can be sold to consumers. Further, excess farm production sometimes poses a serious problem of surplus over the existing demand in the coming years. Processing helps to create a new demand and maintain the quality of the product for a longer period. Processing, therefore, may be defined as the act or series of acts by which a product is converted into a more usable form. The

processing function would include all of those essentially manufacturing activities that change the basic form of the product, such as converting live animals into meat, fresh peas into canned or frozen peas or wheat into flour and finally into bread. To what extent processing can be regarded as a part of marketing is a debatable question. It is often not included in the list of marketing functions since it is essentially form changing activity. But in order to provide consumers with the kind of food and clothing, when and where wanted during the year and to stabilise the market for farmers, processing is necessary. The function of processing which should have been carried out by the farmers themselves has been now-a-days increasing delegated to non-farming specialists.

(3) Dispersion

Dispersion is a process exactly the opposite to that of assembling. After collecting the products of many farmers in scattered localities and processing the same, the process of dispersion begins. This is dispersion of these products to many thousand of consuming market and into the hands of million of consumers. Dispersion function involves finding where potential buyers are located, how much and what products they prefer, and what price they are ready to offer. It also includes selling of the goods, their physical movement and handling and the transfer of funds back to central and assembly markets. Iilt means keeping a steady flow-into consumption of the vast volume of goods which is flowing into the central markets through the assembly end of the marketing system.

Secondary Services

These services are essential to the main functions of assembly, processing and dispersion. They facilitate operations all along the route of products through the market system. The main secondary functions are as follows:

(1) Standardisation and Grading

Standardisation and grading imply the setting up of the basic standards to which the produced goods must conform. A standard specifies what basic qualities a product must have to be designated consistent with established characteristics. Standards are set with regard to the shape, size, colour, quality and performance, etc. The standardisation of products would, therefore, mean that the goods produced would ensure the same specifications as prescribed.

Standardisation, therefore, carries the idea of uniformity of quality. In its general sense standardisation "includes the establishment of standards, the sorting and grading of products to conform to these standards."

The function of standardisation relates mainly to manufacturing products or can be applicable to agricultural processed goods. It is not possible for the farmer to conform to the same size, quality, colour, etc. In agricultural marketing, grading is very important. Grading is the act of separating or inspecting agricultural goods according to established specifications. It refers to the application of basic descriptive standards such as size, colour or appearance to agricultural products where the farmer has limited control over their products' physical specifications. For example, a fruit grower will command a lower price for a mixed lot of ungraded apples than the same lot after it has been graded into lots of equal size and appearance and priced accordingly. The purpose of grading is to establish a common language understood by buyers and sellers as a basis for judging the quality of a product in relation to its sale price.

Grading is also necessary to cater to the special tastes and preferences of different sections of buyers. Quality of a product and its utility are subjective. What standardisation can do is to offer uniform lots for sale in the market and to afford an opportunity to the buyers to purchase from the lot they like the best.

(2) Packaging

Packaging is a process of putting the commodities into convenient containers or wrappers. Most of the products must be put into containers or packages to prevent spoilage and waste and to facilitate their movement from the farms into possession of final consumers. Packaging contributes to more efficient marketing by (1) reducing bulk; (2) facilitating handling; (3) reducing shrinkage and spoilage; (4) facilitating quality identification and product selection by consumers;

(5) assisting in advertising and better merchandising; (6) helping to reduce other marketing costs by facilitating self-service retailing and modern handling methods through the marketing system.

In the face of widening agricultural markets, the packaging of agricultural products has assumed greater importance. Apples of Kashmir have a wide market and if not packed properly, run the risk of spoilage before reaching the final consumer. Some varieties of Indian rice enjoy a world-wide market and it should not be hard to understand the importance of packaging in this regard. Equally important are the changing perceptions of consumers and to satisfy them, packaging and constant improvements in it assume greater significance.

(3) Transportation

Transportation is one of the most important functions of the modem marketing system. This function is primarily concerned with making goods available at the proper place resulting in the creation of place utility of agricultural commodities. In order to maximise the returns from an agricultural pursuit, it is not only the place utility but time utility as well that shall have to be kept in view. While it is always desirable to transport an agricultural commodity as far away as possible to a more remunerative market, it is equally important to reach these products to the consumers at the proper time. In both the (Jses, transport plays a crucial role. An. efficient transport system enables to reach the markets far and wide and also without losing any precious time. Himachal Pradesh in India is an excellent example in this regard.

More than anything else, it gives transport top priority, realising fully well that an efficient transport system would facilitate the quick movement of agricultural and horticultural products from the farms to the consuming centres. In order, therefore, to ensure adequate returns to the producer, the transport system must be developed rapidly.

(4) Storage

In respect of agricultural products, production is seasonal while consumption is throughout the year. Hence, storage of goods is imperative so that they can be protected from deterioration and their supply is ensured continuously. Storage, in fact, creates time utility. It implies storing of farm products in a warehouse or in a cold storage plant, depending upon the nature of the product.

Farm products are stored to make them available the year round, to build stocks during periods of plenty and release during periods of scarcity, as agriculture is characterised by relatively large and irregular seasonal and year-to-year fluctuations in production. Hence there can be two important reasons for holding agricultural products in storage. One is to even out the seasonal factor in production or in sales; the second, some agricultural products get improved in their quality as well as value when stored for a long time. For example, products such as whisky must be conditioned to improve their flavour and thereby to increase their value. Bananas are plucked when raw and stored near the market site till these enter the final market.

This facilitates their transportation to distant places. Several other fruits and agricultural products are handled in the same way in order to minimise the risk of loss.

(5) Financing

The financing function of marketing involves the use of capital to meet the financial requirements of the agencies engaged in various marketing activities. Is Farm products are not sold immediately after they are grown. It takes time for goods to reach the hands of the ultimate consumers. Thus, there is a long interval between the time when the farm products are ready for sale and the time when these goods reach the hands of the user. To the extent that there is a delay between the time of the first sale of raw products and the sale of finished goods to the ultimate consumer, capital remains tied up in operation. The service of providing the credit and money needed to meet the cost of selling merchandise into the hands of the final user is commonly referred to as the finance function in market."

(6) Risk-Bearing Function

The risk-bearing function is the accepting of the possibility of loss in the marketing of a product. These risks can be classified into two broad categories: (1) physical risks, and (2) market risks. Physical risks are those which occur from destruction of the product itself by fire, accident, earthquakes, cold and heat, etc. Risk attached to such natural hazards can often be transferred to institutions that specialize in assuming such risks. Insurance companies cover such risks in return for premium payments.

Market risks, on the other hand, are those which occur due to the changes taking place in product prices. Risks of changes in market demand are reduced through accurate sales forecasting and market research. Such risks can also be reduced through aggressive programme of advertisement, personal selling and the like.

Market research, in particular, is assuming considerable importance these days. Sales forecasts are made by specialised agencies and instructions are issued to the concerned parties accordingly. Market intelligence is also helpful in minimising the agricultural market risks. As the risk component is controlled, the marketing of agricultural products will become more efficient.

(7) Selling

Selling or making persons to demand and agree to make payment for what a given seller has for sale is the central step around which all other marketing services revolve. On that score, it may be considered as the nucleus of marketing. Selling includes transfer of title and collecting or receiving of payment. Selling in its broadest sense not only effects ownership transfer but also helps in identifying prospective customers, stimulating demand and providing information and services to buyers. In order to achieve these goals, the market must combine such activities as personal selling, advertisement, sales promotion, packaging and custom services.

2.6.5 MARKETING MARGIN OF THE AGRICULTURAL PRODUCE

In dealing with the price problems of marketing, it is important to distinguish between the consumer price, the price or margin which marketing agencies receive for the services they perform and the price received by the producer of farm products. Each of the marketing services just described above, as well as the job of buying and selling, adds to the cost of the farm product by the time it reaches the consumer. The difference between the amount consumers pay for the final product and the amount producers receive is generally referred to as "marketing bill" or the "marketing margin". This margin between farm prices and retail prices reflects the cost of marketing and it varies widely for different groups of products.

The study of marketing margin of agricultural products is very important to ascertain the producer's share in the consumer's rupee and also to know the margins of various functionaries involved in the marketing process. It also helps us to know the different components of marketing margins and their influence on the final price which the consumer pays. Such a study for different commodities at different times helps us to know the variations in marketing margins. This is essential for the formulation of an appropriate price policy for agricultural commodities. Marketing margin studies also assume importance because they help ensure reasonable returns to the producers and also make available the commodities to consumers at reasonable prices. Both from the point of view of the producer and consumer, such studies should help identity the areas where market charges can be minimised.

While it is very difficult to measure exactly the cost of marketing, many official and non-official studies made in many countries have confirmed the contention that distribution costs are relatively higher in agriculture. It is often said that the farmer's share in the consumer's rupee is relatively small as compared to that of several intermediaries in the market channel. The merchants absorb an alarmingly large share of this price. Even in England, where agriculture has

been fully commercialised and the farmer does not lack business capacity, "the spread between producers' and consumers' prices", according to the Linlithgrow Committee, "is unjustifiably wide. Taken as a whole, distributive costs are a far heavier burden than society will permanently consent to bear." In the United States, the farmer gets only half the price paid by the consumer for foodstuffs and in Germany about twofifths. In the USA, according to a study conducted by USDA, over the period of about fifty years (1915-1964), farmers have received an average of 42 per cent of the consumer's food dollar, while the marketing agencies have received 57 per cent of the food dollar.

Evidently, this is on account of inefficient marketing system which may arise out of two circumstances. Firstly, the high cost of marketing services and functions, system of transportation, wasteful methods of storage, careless handling of produce, large number of middlemen, etc. will certainly increase the cost of the products and deprive the producer of his due share in the consumer's rupee. Secondly, even if the marketing services are rendered most economically, the producer may be deprived of his due share on account of a defective market structure. Important reasons responsible for the high distribution cost of agricultural products may be listed as follows:

(a) Difficulty of assembling the small outputs of thousands of producers scattered all over the country;
(b) Greater incidence of transport costs, especially for bulky and low-priced products;
(c) Difficulties of grading due to the wide variations in type and quality of output both of livestock and of crop products;
(d) Impossibility of maintaining regular production and supply.
(e) Greater need for storing and processing to cope with seasonality of production;
(j) Grater risk resulting from the need for storage and from the handling of highly perishable products; and
(g) Strict limits within which sale by contract or by sample is possible.20

2.6.6 MARKET STRUCTURE AND TYPE OF MARKETS

In the case of agricultural industry, the farm products are produced by numerous small farmers and it may not be possible for each farmer to sell his produce to the potential consumer himself. The farmer producing on a small-scale has usually neither the time nor the ability to undertake directly the marketing of his produce. His produce is too small for him to undertake economically the direct marketing of his products to the final consumers. In most cases, the farmer's entire output is turned over to one or a small number of agent middlemen for marketing his produce. It is common for the bulk of commodities to change hands three or four times between the producer and the consumer. Usually, farmers sell their produce to small merchants and travelling traders at the village level. This then is taken to the wholesale markets where it is again sold to retailers through which it reaches the final consumer. Farmers with bigger holdings may bypass the village merchant and sell directly in the major wholesale market. Certain commonly encountered and easily recognizable types of markets which generally exist between the farmer and the final consumer are:

(1) Local assembly and processing markets;
(2) District concentration and processing markets;
(3) Primary, terminal or central markets;
(4) Seaboard markets;
(5) Secondary processing markets;
(6) Wholesale distribution markets; and
(7) Retail markets.

These all have been shown in the Fig. 6.2.

Local Assembling and Processing Markets

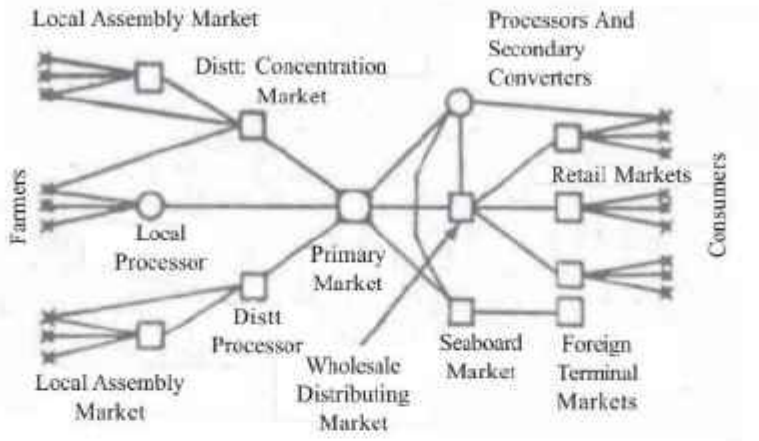

Fig. 6.2 Types of Markets for Farm Products

Before the supply of any agricultural product can be equated to the demand and distributed to the competing buyers, the available supplies of the product will naturally have to be collected from the innumerable farmers who produce it. Most farm products pass through some small markets located close to the point of their production where produce is sold by the farmer to the local buyer who assembles the products of a number of fanners, and sends them to either the district or central market. These local markets, also known as growers' markets or primary markets, are located in small towns and at other convenient places where agricultural producers can bring their goods and sell to the prospective buyers.

District Concentration and Processing Markets

Some commodities are processed either wholly or in part at local markets where consumers purchase them directly from the fanners. But most of the commodities are processed at the large central markets. Between these two types of processing markets, in case of some products, we find district processors or markets where the produce from a considerable number of local assembly markets are assembled and processed for transporting to central markets or direct to consuming markets.

Central Markets

In the Fig.6.2 we find that in between the fan shaped producing and consuming ends of the market system, there are large central markets where goods from many local assembly markets or district processing points are concentrated for processing ,or for additional processing, storage, grading, conditioning and distribution to other processing and secondary wholesale markets or to markets abroad. Central markets, thus, are the last step in the assembling or concentration and the first step in the dispersion process. The big wholesale markets can be compared to reservoirs into which flow the fluctuating and seasonal supplies from different producing areas, and from which is met a constantly fluctuating demand. It is in this market where price making activities take place. It is in these markets where buyers and sellers representing regional, national or even international demand for the agricultural products are seen more clearly in the wholesale market than in producing areas. The adjustment of demand and supply may le said to take place in the central markets. As a matter of fact, a central or terminal market is the meeting point of the three marketing processes - concentration, equalisation and dispersion.

Seaboard Markets

Seaboard market specifically serves the place for ocean shipment to foreign centres. These markets both receive the agricultural goods from the central market or directly from the local and district assembling markets. These markets

have facilities for unloading storing, loading ships and rendering incidental services such as grading and price reporting. Corresponding facilities for handling imports of agricultural goods are also available in such markets.

Wholesale Distributing Markets

The agricultural goods which are now assembled in the central market have to be despatched to consumers through the retailers. Wholesalers operating in the central markets mostly prefer to deal in bulk which cannot be afforded by retailers. Therefore, separate wholesale markets specially for the dispersion of goods to retailers have been developed in between the large central markets and the retailers. These markets are often called "secondary wholesale markets" to distinguish them from primary or central wholesale markets. Another term sometimes applied to them is "jobbing markets".

These markets operate on a smaller scale than the central markets. They do not play any major role in the determination of prices. They are concerned only with those operations which are essential to meet the needs of their retail clients.

Retail Markets

In retail markets, the goods are ultimately placed before the individual consumer for acceptance or rejection. Every retail store in the city, town and village which sells to the final consumers is a retail market. "Retailing is, perhaps, the most difficult part of the marketing process to perform, and certainly is the most expensive. For producers of consumers' goods, the retail store is the ultimate point of contact with the users of their products. Here in the retail store, the battle of the market is fought out to a final conclusion."

2.6.7 COOPERATIVE MARKETING SOCIETIES

Various marketing functions, such as collection, storage, financing, insurance, grading, transporting and selling of agricultural produce are performed by a large number of persons who play the part of middlemen. Very often, there are more middlemen than are necessary and generally the charges are out of proportion to the services they render. The result is that the primary producer does not receive his due share of the price paid by the ultimate consumer. A bulk of price paid by the consumer is digested by these middlemen with the result that the consumer has to pay a higher price while the producer gets a lower return for the' same. Co-operative marketing of agricultural produce assumes significance from the need to reduce the price spread between the producer and the consumer so as to ensure a better return to the primary producer without affecting the interests of the consumers. Co-operative marketing is the organised sale of farm products on a nonprofit basis in the interests of the individual producer. Such co-operatives might start either from the producers' end where they may attempt to distribute their own products in the hope of obtaining higher returns, or from the consumers' end where they may take over distribution in order to buy cheaper.

It is well to stress that the real purpose of co-operative marketing is not to eliminate the middleman but to perform his services at a lower cost.

The primary objective of co-operative marketing is to reduce the marketing margin and thereby assure the farmer a better price for his produce and supply the goods to the consumer at a fair price. A co-operative marketing society may have the following objectives".

(i) To make arrangements for the sale of agricultural produce of members. (It may deal with non-members also but they will not get those benefits which are available to members.)

(ii) To provide loan facilities to members on the security of agricultural produce.

(iii) To give encouragement to members to grow the latest improved and standardised varieties of produce.

(iv) To make arrangements of godown for the preservation of produce of members.

(v) To make arrangements for processing and cold storage activities for members.

(vi) To encourage thrift, self-help and co-operation amongst members.

(vii) To undertake those other activities which can further the objects of the marketing societies.

2.6.8 ADVANTAGES OF COOPERATIVE MARKETING

When the farmers combine and set up a co-operative sale society to collectively market their produce, they are able to enjoy a number of advantages. These are:

(i) Reduced Cost and Improved Service: In the absence of co-operative marketing, assembling is done by a number of local dealers each of whom does not have a sufficient volume of business to reduce his expenses of marketing to the minimum. A co-operative society which includes a large number of farmers in a given area might be able to control a large volume of business and thus effect real economies in services such as transport and storage. In this way, a co-operative marketing society can provide the farm producers improved services at reduced cost.

(ii) Improved Marketability of Products. A co-operative society is in a better position to study the needs of the consumer than the individual farmer. Its main achievement would be to make products conform to the needs of the market. Further by providing better grading facilities, a co-operative marketing society can induce its members to produce those varieties of the product for which there is a greater demand in the market. Thus by paying its members according to grade, it induces the farmers to "send the right things to the market at the right time and in right quantities."

(iii) Improved Bargaining Power: Even if a co-operative marketing organisation only takes over the functions of country dealers, it improves the bargaining position of farmers and makes it possible for them to negotiate, on an equal or perhaps even a superior footing, with large-scale wholesalers. In the case of co-operative marketing, the buyers of agricultural produce have to deal with a farmers' association which controls a large part of the limited supply. Further, the society as a representative of the farmers, can present the farmers' case much better to outside agencies and secure for the farmers the necessary concessions.

(iv) Steadier Supply to the Wholesale Market: The co-operative society may be able to offer to sell the wholesalers a more regular and assured supply of the produce than they can obtain if they have to compete with other wholesalers for the produce of many farmers.

(v) Controlling the Flow to the Market: The formation of a cooperative society makes it easier to adjust producers' supply to demand. It can take over the produce from the growers when the harvest is over, but release it gradually in the market according to demand. In addition, the society can inform the farmers as to the probable future trend of prices, and advise them whether to increase or decrease their scale of production. It is much easier for the co-operative societies than for private firms to educate their members as to what consumers want and when they want it.

(vi) Development of Markets: Co-operative marketing societies are in a better position to develop the market for their produce by effective advertisement and other means. For an individual farmer, advertisement will obviously be beyond his reach.

(vii) Cheaper Finance: These societies can provide loan facilities at a cheap interest rate to members on the security of this agricultural produce. Co-operative society itself can secure a loan on the security of produce stored at much lower rates of interest than the individual farmer.

(viii) Training in Business Methods: Finally, co-operative marketing has the merit of giving the farmer an insight into the marketing mechanism. He starts understanding the problems and difficulties of the middlemen and sees that they may not be exploiting him. "Experience in a marketing association gives farmers a more rational outlook on marketing methods and finally, it gives them, business experience and a higher sense of business responsibility."

All the above advantages of co-operative marketing can be secured only if the following conditions are fulfilled:

(i) In order that the society can reduce its cost of marketing, bargain effectively in the wholesale markets, raise necessary marketing finance at cheap rates and effectively control the flow of the commodity to the markets, it is necessary that it secures a large volume of business.

(ii) Secondly, the co-operative marketing society should be able to secure efficient management. "The business of sale is not a matter for amateurs skilled technical advice and guidance are necessary but even more important is the proper business management. Unless this is available, the society must inevitably come to grief".

(iii) Thirdly, in order to carry on its business effectively, the cooperative must have sufficient capital at its disposal. "In a country with a well-developed banking system, where marketing finance is available at low rates, where there is a well-developed system of advancing loans on the security of warehouse receipts, a co-operative marketing society has greater chances of success."

2.6.9 COOPERATIVE MARKETING SOCIETIES

The main job in agricultural marketing is how to take over the responsibility of the produce of the farmer and give him the best of benefits and amenities without subjecting him to the intricacies of market transactions. In this respect, the co-operative marketing societies were being established prior to 1954 but since then multipurpose societies have been started which, on the one hand, provide credit facilities to the farmers and, on the other, undertake the responsibility of marketing their surplus produce. As soon as the members of these societies supply surplus agricultural produce to these societies, they get an advance to carry on their agricultural operations. The agricultural produce thus collected from members and non-members is processed and then brought to the Mandi for disposal. If current prices are not favourable, society may decide to stock the produce. As soon as the produce is sold, farmers are paid their remaining share after deducting the advance already made.

A significant experiment is being conducted by organising Farmers' Service Societies (FSS) in pursuance of the recommendations made by the National Commission on Agriculture. These societies would disburse all types of credit required, supply inputs including fertilizers, arrange for processing and marketing wherever possible, and undertake all connected activities directly or in conjunction with other organisations. Necessary steps are being taken by the state governments to organise at least one such society in each of the districts covered by special programmes like SFDA and MFAL Development Agencies, Drought Prone Area Programme and the Command Area Development Programme.

2.6.10 PROGRESS OF COOPERATIVE MARKETING IN INDIA

The process of developing cooperative agricultural marketing in India was initiated during Second Five Year Plan on the recommendations of All India Rural Credit Survey Report. The Committee's main recommendations were State participation in the share capital of marketing societies at all levels, linking credit with marketing, establishment of chain of warehouses and management of cooperatives by well trained personnel. A three-tier system of cooperative marketing is prevalent in India.

(i) Primary co-operative marketing at mandi level.

(ii) District co-operative marketing society at district level, and

(iii) Apex cooperative marketing society at the state level. In some states viz. Assam, Bihar, Kerala, Madhya Pradesh, Orissa, Rajasthan and West Bengal, only two tier system is working since in" these states district level co-operative societies are non-existent. At present, the cooperative marketing structure comprises 2,633 general purpose primary cooperative marketing societies at the mandi level, covering all the important mandies in the country, 3,290 specialised primary marketing societies for oilseeds etc. 172 district/Central Federations and the National Agricultural Co-operative Marketing Federation of India at the national level. The total value of agricultural produce handled by marketing cooperatives amounted to about ₹ 9,504 crore in 1994-95, as against ₹ 1,950 crores in 1980-81.

To conclude, cooperative marketing in agricultural products is of immense advantage to the farmers. It releases them from the strains of a parasitic middle agency that chops off a substantial share of profits. However, the success of cooperative marketing societies is greatly dependent upon the efficiency with which these operate. Usually, it has been found that such societies do not do well because of shared responsibility. On the organisational front, therefore, the management of cooperative markets must be sound, honest and efficient. By ensuring fair rewards to farmers through these markets, agricultural pursuits as a whole can be made more remunerative which will go a long way in boosting agricultural production.

2.6.11 AGRICULTURAL MARKETING IN INDIA

Agricultural marketing system prevalent in India is characterised by a considerable degree of diversity and flexibility in the arrangements as between different commodities and regions. The marketing arrangements comprise, on the one hand, systems operated freely by private enterprise without any state intervention and, on the other hand, are systems which are completely under state control. In between these two extremes, other arrangements with varying degrees of government intervention and support in the areas of price fixation, procurement quota, buffer stocks, credit controls, etc. are also prevalent. The need for trying out so many varying marketing systems arises from the greatly dissimilar conditions of production and marketing as between commodities and states. These have been evolved over a period of years on the basis of experience. These systems are also subject to changes and modifications as may be warranted from time to time by the changing production and marketing situations as well as economic policies.

Although state governments enjoy full autonomy in the matter of agricultural policies, including those relating to marketing, yet a broad framework of agricultural policies including marketing are laid down by the Central Government. At the Centre, agricultural marketing is the concern of the Ministry of Agriculture and Rural Development.

At the state level, the administrative set-up for agricultural marketing differs from state to state. In some states, agricultural marketing is in the hands of completely independent departments. In many others, the work is entrusted to a small section forming a part of the Department of Agriculture without a separate identity of its own. At the level of the state secretariat, the subject "Agricultural Marketing" wherever not handled by an independent department, is dealt within the Department of Agriculture or Cooperation.

A recent development is the formation of Marketing Boards in a number of states. The functions of these Boards vary considerably from state to state. While in some states, these Boards have merely advisory functions, in others, the Marketing Boards are gradually taking over the responsibility for all agricultural marketing activities in the state.

The system of agricultural Marketing as it stands now is complex and not neutral to returns to individual farmers. Though the state has come in a big way in this area, a lot more remains to be done to streamline agricultural marketing in the country.

2.6.12 EXISTING SYSTEM OF AGRICULTURAL MARKETING

The existing system of agricultural marketing in India is as under:

Sale of Agricultural Product to Moneylenders or Village Traders: With the advances made in intensive cropping, proceessing, storage and marketing of agricultural produce are becoming more and more important. In the absence of sound marketing facilities, the farmers have to depend upon local traders and middlemen for the disposal of their farm produce which is sold at throw-away prices.

In the case of small farmers, marketing of produce is still more critical. Since the quantity of their produce is small and overhead expenditure on processing, transport and marketing of the produce is heavy, the marketing of their produce is hardly remunerative if they do it on their own. In most cases these farmers are forced, under socioeconomic

conditions to carry on distress sale of their products. In most small villages, the farmers sell their produce to the moneylender from whom they have usually taken loans, who in turn/ passes it over to a bigger merchant or firm in the neighbouring market-town. According to an estimate, 85 per cent of wheat and 75 per cent of oilseeds in Uttar Pradesh, 90 per cent of jute in West Bengal, 70 per cent of oilseeds and 35 per cent of cotton in Punjab are sold by the farmers themselves in the village.

Haats and Shandies: Another prevailing method of disposing the produce is selling it in weekly or bi-weekly bazars called haats held in the village or a nearby town. Sometimes, produce is disposed of in the fairs which are held at some places on important religious occasions. The area covered by a haat usually varies from 6 to 12 kilometres. The sellers in these haats are usually marginal and small farmers. The big farmers with large surplus go to larger wholesale markets.

Primary Markets: The third way of disposing of the farm produce is to take it to primary markets. There are more than 22,000 rural primary markets in the country where petty dealers and agents of merchants operate. A great majority of these primary markets is owned and controlled by local bodies, a smaller number is controlled by regulated markets and a few owned by private individuals.

Wholesale Markets: From the rural primary markets, the activity shifts to the wholesale assembling markets of which there are more than 5,000 in the country. A majority of wholesale assembling markets is controlled by Regulated Market Committees at the local level and by the State Marketing Boards or State Marketing Departments at the state level. At these markets, a host of functionaries such as wholesale merchants, commission agents, brokers, etc. operate and aid the marketing process.

2.6.13 DEFECTS OF AGRICULTURAL MARKETING

It is quite obvious that the present system of agricultural marketing in India is far from satisfactory. The following are the main defects:

(1) Forced Sales: One of the major defects in agricultural marketing in India is the inability of the majority of the farmers to wait for long after harvesting their produce. The average Indian farmer is so poor and indebted that he cannot afford to wait till such time when he will be able to sell the produce at reasonable higher prices. In order to meet his commitments and pay his debt, he is forced to sell the produce just after the harvest at whatever price is offered to him. The Rural Credit Survey Report rightly remarked that producers in general, sell their produce at an unfavourable place and at an unfavourable time and usually they get very unfavourable terms.

(2) Inadequate and Expensive Facilities of Transport and Communication: One of the important components of the infrastructure necessary for the growth of agricultural marketing is communication and transport. Forced and distress sales by the farmers are further facilitated by the fact that the means of transport available to the farmers are inadequate and very expensive. Even at present, there are many rural areas which have not yet been well connected with main roads or with marketing centres. Most roads in the rural areas are Kutcha (bullockcart roads) and in the rainy season, no means of transport can ply over these. Besides inadequate transport facilities, they are so costly that they are beyond the reach of many small and marginal farmers. Difficulties also arise at the terminals, where exploitation of innocent and illiterate farmers often takes place.

(3) Inadequate Storage Facilities: Storage facilities in the rural areas and in the primary markets are either totally absent or grossly inadequate. Farmers mostly store their surplus grains in earthen vessels or in the Kutcha rooms or in the underground Kutcha pits. This type of storing exposes the grains to white ants, rats, dampness, etc. and results in considerable loss. Lack of storage facilities also forces the farmer to sell immediately after the harvest.

With the increase in agricultural output, there is an obvious need for increased storage to minimise wastage. While production has maintained an upward trend, facilities for storage have not kept pace. The task now is to create additional facilities for storage of all agricultural products, more particularly foodgrains in the rural areas. In the absence of adequate storage facilities in the rural areas, the farmers are compelled to sell their produce immediately after harvest at prevailing prices which are bound to be low. Such distress sale of farm products deprives the farming community of its legitimate incomes. Further, farmers are compelled to store foodgrains and other products in improvised sub-standard godowns. Such storage of food grains and other products leads to deterioration of these commodities owing to dampness etc. As a result of this, the quality of agricultural produce goes down and the farmers are again compelled to sell their produce at a lower price view of deterioration in quality. Storage in Kutcha godowns also leads to a loss due to the attack of rodents, insects, pests, etc. The Parse Committee estimated the post-harvest losses at 9.3 per cent of which nearly 6.6 per cent occurs due to poor storage conditions alone.

There is, therefore, great need for providing the farming community with storage facilities near their farms. These godowns should provide facilities for scientific storage so that wastage and product deterioration are avoided. The farmer should also be able to get his credit requirements without being compelled to sell his produce at a time when prices are low.

(4) Superfluous Middlemen and Malpractices: In the absence of an organised marketing structure, private traders and middlemen predominate the marketing and trading of agricultural produce. In between the farmer and the ultimate consumer, there is a large army of middlemen who function at various stages in the process of assembling and distribution of farm produce. In the village, there is the bania; in the town, there are commission agents, brokers and others who get fat at the expense of the poor farmer. Mukherjee, in this connection, says "the system of agricultural marketing in India is saddled with a long chain of middlemen and the remuneration for their services, increase the load on the consumer, although the producer does not derive similar benefit". Many market surveys have revealed that middlemen take away about 48 per cent of the price of rice, 52 per cent of the price of groundnuts and 60 per cent of the price of potatoes offered by consumers.

(5) Unauthorised Deductions and Multiplicity of Charges: The sale proceeds of the farmer are subjected to many unauthorised deductions like Zakat, Dharmada, Goshala, Shagirdi, etc. In addition to these charges, a number of other charges, legitimate or illegitimate, are.' also claimed by the middlemen. Such allowances are claimed on account of moisture, dust; husk, etc. The Report on the Marketing of Wheat in India observes that, "not only the arhatia and dalal, but the minimum, the chowkidar, the sweeper etc. regard themselves as entitled to share of his produce." Anyone connected with the marketing of agricultural produce directly or indirectly, nearly or remotely, legally or illegally, claims his share in the rupee that becomes due to farmers with a result that the poor fellow is back home with only a fraction of the rupee that his produce fetched him in the market. .'

(6) Absence of Grading and Standardisation: Heterogeneity in quality of agricultural produce is a universal phenomenon. Majority of farmers in India sell their farm produce without proper grading. In such a "dara" sales wherein heaps of all qualities of grains (good and bad) are sold in one common lot, farmers are deprived of a better price for a better produce. In fact, the whole lot gets rated at the inferior level and yields the farmer a return much lower than the one he deserved.

(7) Lack of Marketing Information: Most Indian farmers do not get the necessary information regarding prices of different farm goods prevailing in different markets. Farmers' most important source of information is the village bania or the middlemen whose information is more biased in favour of the market trader and hence our farmer fails to realise reasonable returns for his produce. The situation in this regard should have improved recently due to the expansion of the television network in different parts of the country. But due to lack of associated amenities, the farmer fails to get a full advantage of this facility.

2.6.14 GOVT. MEASURE TO IMPROVE THE AG. MARKETING

A number of measures have been initiated by the Government of India to improve agricultural marketing since independence. The suggested lines of improvement along which the action has been initiated by the Government can be listed as follows:

(1) Establishment of Regulated Markets: As mentioned above, a major defect in agricultural marketing in India has been the prevalence of unfair means and malpractices in most of the markets. These practices rob the farmer of his due share and place him at a disadvantage vis-à-vis the more organised section of the trading class. Regulation of agricultural markets aims at eliminating the unfair market practices not only of existing markets but the regulation of new markets set up under law. The regulation of markets generally introduces a system of competitive buying, helps in eradicating trading malpractices, ensures the use of standardised weights and measures and evolves a suitable machinery for the settlement of disputes, thereby ensuring that the producers are not .only not subjected to exploitation but also receive remunerative prices while disposing of their produce in the markets. The enactment of Agricultural Produce Markets Acts has enabled the states to establish regulated markets administered by Market Committees on which are represented producers as well as traders. As on 31-3-1984, there were 2,045 principal markets and 3,534 sub-markets which had been brought under regulation. These markets have to grow in size and number to universalise the regulated markets in the country. With this, the farmer will get commensurate returns and a stimulus to grow more on his fields.

(2) Provision of Storage and Warehousing Facilities: Scientific storage is crucial from the point of view of farmers and the consumers. At present, there are a number of agencies engaged in warehousing and storage activities. The Food Corporation of India, the Central Warehousing Corporation and State Warehousing Corporations are among the principal agencies engaged in this task. Besides, the ARDC is also financing suitable agencies engaged in building up storage capacity. Table 10.1 shows the growth of warehousing facilities in India in recent years.

Table 10.1
Storage Availability with the Public Agencies

(In lakh tonnes)

AgenC1J	1973-74	1979-80
F.C.L	51	76
C.W.C	12	20
S.W.Cs	6	24
State Governments	18	19
Co-operatives	32	47
Total	**119**	**186**

In addition to the above capacity, the FCI has taken over a hired capacity of 3.8 million tonnes from private parties.

Taking note of the inadequacy of storage facilities in rural areas, and the consequent hardships and losses to the rural community, the Central Government is implementing the scheme for the establishment of a National Grid of Rural Godowns since 1979-80. This scheme is different from the other schemes in as much as it is primarily meant for providing warehousing facilities to the farmers. The aim is to create an additional storage capacity of 2 million tonnes at the village level by the end of 1985. The capacities of the godowns vary from 200 to 1,000 million tonnes.

Only limited studies about the actual shortage of storage at the village level have been conducted so far. In a study conducted by the Administrative Staff College, Hyderabad in 1975, it had been worked out that the gross additional rural storage required as a percentage of production in Punjab will be 25 per cent and in Andhra Pradesh as heig as 42 per cent. This is an indicator of the kind of additional storage requirement in the rural sector. In spite of the absence of

precise figures of storage requirement in rural areas, a programme to meet the requirements of safety of food grains for orderly transportation and marketing and for ensuring farmers the return they deserve under the proclaimed policy of the government is called for.

The Working Group on additional storage facilities in rural areas has recommended a scheme of establishing a network of Rural Storage Centres to serve the economic interests of the farming community by providing them warehouses to store their agricultural products. The proposed scheme is intended to:

(a) Prevent distress sale of foodgrains and other agricultural produce immediately after harvest at low prices and to strengthen the farmer's staying power;

(b) Ensure remunerative prices to farmers by storing agricultural produce in well-managed god owns till favourable prices could be obtained;

(c) Avoid loss and deterioration in quality while in storage;

(d) Provide easy credit facilities against the pledge of stocks;

(e) Reduce pressure on storage space with existing public agencies.

(f) Reduce pressure on transport facilities in post-harvest periods of peak demand for transport; and

(g) Create additional Opportunities of employment.

(3) Grading and Standardisation: With a view to making available unadulterated and standard quality agricultural produce including horticulture and livestock produce, to the consumer and ensuring better prices to the producers, grading and standardisation of agricultural produce is carried out under the provisions of Agricultural Produce (Grading and Marketing) Act, 1937. Under this Act, grade specifications in respect of 142 commodities have so far been notified.

Grading falls into the following three categories:

(i) Compulsory grading for export;

(ii) Grading at producers' level; and

(iii) Voluntary grading for internal consumption.

In order to promote export trade of agricultural produce by ensuring quality products to the exporters, compulsory grading of agricultural produce has been introduced in respect of 41 commodities under "Agmark". The important commodities covered under this scheme are spices, unmanufactured tobacco, walnuts, vegetable oils, essential oils, onion, ginger, potatoes, pulses, etc. Under this scheme, the value of commodities graded for export during the year 1983-84 was ₹ 593.92 crores which is estimated to be ₹ 653.48 crores during the year 1984-85.

Voluntary grading of agricultural commodities under the Agmark for internal trade and consumption is aimed at ensuring products of purity and quality to consumers. There are, at present, 15,467 holders of certificate of authorisation under "Agmark" for grading of agricultural commodities in the country.

For securing an adequate return to the producers the programme of establishment of grading units in the regulated markets and marketing co-operatives has been introduced since 1962-63. For this purpose, a number of grading centres have been established in various states by the State Marketing Departments or Marketing Boards. The total number of grading centres set up at producer's level in March 1984 was 808. Paddy, wheat, maize, jowar, potato, gram, tur, groundnut, mustard, mustard-seeds, dry chillies, fruits, onion, cotton and jaggery are among the important agricultural commodities graded at the producers' level. The value of commodities graded at the producers' level during 1984-85 was about ₹ 600 crores.

(4) Use of Standard Weights: Using of non-standard and arbitrary weights by "arhatiyas" and brokers to cheat the farmer is one of the major defects of the unregulated markets. A number of steps have been taken by the government in this direction. The Standard Weights Act was passed as back as in 1939. After the introduction of metric system of

measures in 1958, all old system of weights and measures have been replaced. Weights and Measures Departments in the states take all precautions to see that only standard weights are used in the regulated markets.

(5) Dissemination of Market Information: In order to apprise the farmers of prices prevailing in the different markets and the condition of demand for different agricultural commodities, market information relating to agricultural products is made available to the farmers through different media like television, newspapers, radio, etc. Market intelligence reports are made available to the farmers and are displayed in a number of markets in the country. Information about the prevailing prices of important commodities in different markets is provided daily by All India Radio and in a regular manner on the television network.

(6) Better Transport Arrangements: Another important infrastructure badly needed for agricultural marketing is rural transportation. Vegetables, foodgrains and products of animal husbandry which are being harvested in plenty now-a-days cannot find their way to the nearby towns unless villages are connected by proper roads. Our planners have assigned higher priority to the construction of rural roads. According to the information available with the Planning Commission, 26,724 out of 69,400 (67.3%) villages having a population of over 1,500,26,814 out of 56,608 (47.4%) villages having a population of between 1,000-1,500 and 1,02,738 out of 4,67,075 (22.1%) villages having less than 1,000 population are expected to have been connected by all-weather roads as on 31st March, 1984. Efforts to develop more rural roads and to link many villages with the markets will be pushed up during the Seventh plan period.

(7) Provision of Central Assistance: A scheme for providing Central assistance for the development of selected regulated markets is in force since 1972-73. Since the inception of the scheme and till 31-3-1984, 449 selected regulated markets have been granted Central assistance of ₹ 1,557.18 lakhs.

To help the farmers, particularly the small and marginal ones, who depend on the nearest rural markets like "hats", "shandies" etc. for the sale of their small marketable surplus, a scheme for the development of primary rural and wholesale markets in backward areas is in force since 1977-78. Under this scheme, grant-in-aid to the extent of ₹ 1.50 lakhs per primary rural market and ₹ 5 lakhs per rural wholesale market situated in backward areas has been made. During the years 1977-78 to 1983-84, Central assistance of ₹ 2,224.30 lakhs has been granted for development of 1,948 rural primary markets.

2.6.15 SUMMARY

Agricultural Marketing plays a very vital role in the economy specially for the farmers, middlemen and consumers. It looks satisfaction of consumer, income of farmer and profit middleman. A good market provides incentives to farmers.

Marketing on agriculture can be defined as the performance of all kinds of business activities in the flow of goods and services from the point of in total agricultural production until they are in the hands of the ultimate consumers.

Marketing is very significant for the development of agriculture and benefit of the farmers. Agricultural Marketing faces the problem of processing, grading, storage, quality, control, transportation, perish ability pricing, and supply - demand imbalance and exploitation in the way to market.

Market function relates to activity performed in the market. These include, (i) Assembling (ii) Processing (iii) Disperson and secondary services like, (i) Standardisation, (ii) Grading (iii) Packaging, (iv) Storage, (v) Transportation, (vi) Financing, (vii) Risk Bearing, (viii) Selling

Marketing Margin can be defined as the difference between the amount consumers pay for the final product and the amount the producers receive. The margin between farm price and retail prices reflect the cost of marketing which differs from region to region.

Market structure refers to the operation of market at different levels. It includes.

(i) Local assembly and processing Market

(ii) District concentration and processing Market

(iii) Primarily Terminal or central market

(iv) Sea-board Markets

(v) Secondary Processing markets

(vi) Wholesale distribution market

(vii) Retail market

Cooperative marketing is the organized sale of firm products on a non-profit basis in the interest of the individual marketing is to reduce the market margin so as to assure the farmers a better revenue for his produce and satisfy the consumer by supplying the commodity at a cheaper & fair price. Cooperative marketing plays a significant role in the development of agriculture.

Cooperative Marketing societies assume the responsibility of the produce of the farmer as a protectionist in India Govt. started such organisation since 1954, but till now it has not been fully successful. Govt. is adopting several measures to develop the system. Success is yet to reach.

2.6.16 SELF ASSESSMENT QUESTIONS

1. Define Agriculture Marketing. Discuss the problems faced by the farmer in the marketing of ag. produce.
2. Define Ag. Marketing. Explain the different marketing function related to ag. marketing.
3. Give a note on market structure on agriculture.
4. Define Cooperative Marketing. Critically examine its function and advantages.
5. What is Cooperative Marketing? Discuss the role of cooperative marketing societies? Assess the progress of cooperative marketing in India,
6. What is Agricultural Marketing? Outline the different of agricultural marketing with reference to India.
7. What is Ag. Marketing? How far it has been successful in India? Point out the measures undertaken by Govt to improve the system.
8. Critically examine Govt measures to establish free and fair and successful agricultural marketing in India.
9. Write a note on Marketing Margin, and its importance on agricultural marketing.

Key Words

1. **Commodity**: Agricultural products traded in the market, such as grains (e.g., wheat, corn, rice), livestock (e.g., cattle, poultry), fruits, vegetables, and other crops.
2. **Supply and Demand**: The fundamental forces that determine agricultural prices. Supply refers to the quantity of agricultural products available for sale, while demand refers to the quantity of agricultural products consumers are willing and able to purchase at various prices.
3. **Price Volatility**: Fluctuations in agricultural prices over time due to changes in supply and demand factors, weather conditions, geopolitical events, government policies, and other factors.
4. **Market Access**: The ability of farmers and agricultural producers to sell their products in domestic and international markets. Improving market access involves reducing trade barriers, improving transportation infrastructure, and enhancing market information systems.
5. **Market Structure**: The characteristics and organization of the agriculture market, including the number of buyers and sellers, degree of competition, market concentration, and market transparency.
6. **Marketing Channels**: The pathways through which agricultural products move from producers to consumers, including direct sales, wholesale markets, supermarkets, food processors, exporters, and other intermediaries.
7. **Price Discovery**: The process by which agricultural prices are determined in the market through the interaction of buyers and sellers. Price discovery mechanisms include auctions, spot markets, futures markets, and electronic trading platforms.
8. **Market Information Systems**: Systems that provide timely and accurate information on agricultural prices, production levels, market trends, weather forecasts, and other relevant factors to farmers, traders, policymakers, and other stakeholders.
9. **Contract Farming**: Agreements between farmers and buyers (such as food processors or exporters) in which farmers agree to produce a certain quantity and quality of agricultural products according to specified terms and conditions.
10. **Value Chain**: The sequence of activities involved in bringing agricultural products from the farm to the consumer, including production, processing, packaging, transportation, distribution, marketing, and retailing.

2.6.17 Reference:

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2. Progress of Land Reforms-U.N.O

3. Economics of Agricultural Production and Resource Use-Heady

4. Economic Organisation of Agriculture-Schultz

5. Introduction to Economics of Agriculture-Black

6. Economics of Agriculture-Cohen

7. Introduction to Agricultural Economic Analysis-Bishop and Toussiant

8. Agricultural Credit-Belshaw

9. Agricultural Price-Thompson and Foots

10. Readings in Agricultural Development (Ed.)-Khurgo

11. Agriculture in Economic Development (Ed.)-Eicher and Witt

12. Readings in Agriculture-Pramit Choudhury

13. Agricultures in an Unstable Economy-Schultz

14. Agricultural Price and Income Policy- Schultz

15. Marketing of Farm Products-Shepherd

3.1 Chapter

AGRICULTURAL PRICES

Objectives

After completing this chapter, you will be able:

- To know the price determination for agricultural produce.
- To understand price determination under different market condition.
- To know the factors influencing market demand and supply.
- To study the role of elasticity of supply and demand for farm product.
- To study the fluctuation of prices for agricultural produce.
- To know the price support by the Govt to stabilise price.
- To know the cyclocal and seasonal variation on agriculture.
- To find the behaviour of agricultural prices on India.
- To evaluate the agricultural price policy to sustain price stability and supply and support the farmers.

Structure:

3.1.1 INTRODUCTION

Price determination is a process of balancing demand with supply. In a capitalistic economic order, price system is an important means of allocating society's scarce resources among alternative used. The phenomenon of pricing is a reflection of scarcity of goods and services in relation to their demand. In a competitive economic system, pricing performs three most important functions: (1) It directs the consumption of products and services. It helps a consumer in deciding what to buy and how much to spend on each product, taking into account the relative prices of the products and services and the amount of satisfaction expected to be derived from them; (2) It also directs the use of resources in production. It helps the farmer-producer in deciding what to produce, how to produce and how much to produce. These decisions are based upon relative prices of products and inputs, along with the information on physical input-output relationships; (3) It helps to distribute income among the owners of productive resources. Price variations result in the redistribution of incomes and property values among owners of productive agents. Thus, we find that the knowledge of pricing is of vital importance to the farmer-producer.

The term "price" may be defined as the value received in exchange of goods and services and distinguished from money which is only a medium of exchange. However, the value of an article is itself an abstract concept and depends upon its marginal utility.

3.1.2 CONCEPT OF DEMAND AND FACTOR INFLUENCING DEMAND

The demand for a commodity is a schedule of the quantities that buyers would be willing to purchase at different prices at any given time or during a given period of time. The demand for a commodity is the total of the demands of the individual buyers in a market. Two important things must be noticed about the quantity demanded. Firstly, it is a "desired" quantity. It is how much the households actually wish to purchase and not necessarily how much they actually succeed in purchasing. If sufficient quantity of a commodity is not available in the market, the amount the households

wish to purchase may exceed the amount they actually purchase. Secondly, it must be borne in mind that quantity demanded is always a flow. We are concerned not with a single isolated purchase, but with a continuous flow of purchases, and, therefore, demand of a commodity must be expressed as so much per period of time.

Factors Influencing Demand

Demand for agricultural commodities is influenced by many factors. Four important factors which influence the household demand for agricultural commodities are listed here. These are:

(1) Price of a Commodity: Household's demand for an agricultural commodity is influenced by the price of that commodity. Usually, the higher the price, the lower will be the quantity demanded.

(2) Prices of Related Goods: It is also influenced by the changes in prices of related commodities. In some cases the demand for one commodity will increase as the price of another commodity increases (when the commodities are close substitute), while in other cases, the demand for one commodity may decrease as the price of another commodity increases (when the commodities are complementary).

(3) Tastes, Habits and Fashions: A household demand for agricultural goods is also influenced by the tastes, habits and fashions prevailing in the society at a particular period of time.

(4) Income: Demand for agricultural goods is also influenced by the household income. In most cases, the larger the income, the greater the quantity demanded. But this rule may not always be true in the case of agricultural goods. Since most agricultural goods are necessities of life and their demand is limited by the extent of human stomach, a rise in income of the household may not result in an increase in the demand for such goods. On the other hand, a rise in the income above a particular level may cause a decline in the demand for agricultural goods.

Thus, we find that the amount of an agricultural commodity a household is prepared to purchase is a function of the price of the good in question, the prices of other goods, the household's income and its tastes and habits. This statement may be expressed in symbols by writing down what is called a "Demand Function".

$$Q^d_n = F(P_n\ P_1, \ldots\ldots . P_{n-1}, Y, T)$$

Where q_n^d is the quantity that the household demands of some commodity, labelled commodity n, P_n is the price of this commodity;

$P_1 \ldots\ldots p_n - 1$ is short-hand notation for the prices of all other commodities;

Y is the household's income and T the tastes and habits of the members of the household.

3.1.3 LAW OF DEMAND

We observe in our daily life that the higher the price charged for an article, the less of it will be demanded. And the lower its price, the more units people will wish to buy. Thus, there exists at any one time a definite relation between the price of a good such as wheat, rice, etc. and the quantity demanded of that good. We have seen above that the amount demanded is influenced by many factors. While explaining the law of demand, we assume all other factors except price to be constant. Thus, other things remaining the same, the law of demand, states that more will be demanded at a lower price and less when the price is higher. In other words, there is an inverse relationship between the quantity demanded and price. Based on the law of demand, we can construct a demand schedule for an agricultural commodity. An individual household demand schedule is a list of various quantities of a commodity which an individual household purchases at different alternative prices. Table 3.1 shows the quantities of potatoes that would be demanded each week at a number of alternative prices.

Table 3.1

	Price per Quintal	*Quantity Demanded in Hundred Quintals per Week.*
1	80	1.0
2	60	2.0
3	50	3.0
4	40	5.0
5	20	6.0
6	10	8.0

Table 3.1 gives the quantities of potatoes demanded for six selected prices but there is a separate quantity that would be demanded at each possible price. It is evident from Table 3.1 that when the price of potatoes is as high as ₹ 80 per quintal, demand for potatoes is as low as 100 quintals. With a fall in price, the demand has shown a corresponding rise. A market demand schedule can well be obtained from this individual household schedule. The market demand schedule can be obtained by adding up all the demand schedules of the individual households in the market.

3.1.4 DEMAND SCHEDULE AND DEMAND CURVE

Data contained in Table 3.1 when plotted on a graph give the demand curve as shown in Fig. 3.1

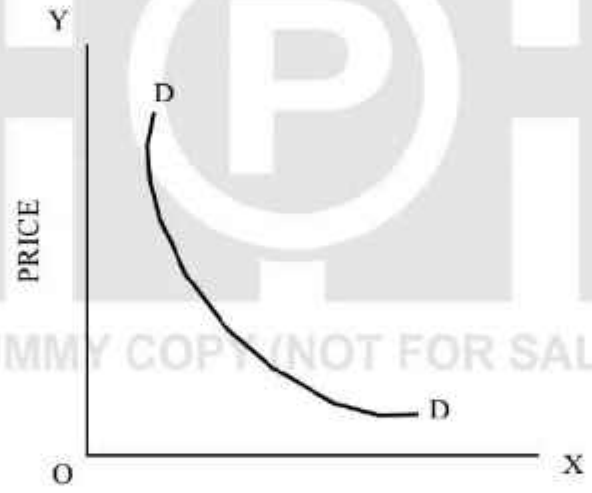

Fig. 3.1 Demand Curve

DD is the demand curve. This curve shows the quantity of potatoes that the household would like to buy at each price of potatoes.

The downward slope of the demand curve indicates that the quantity demanded increases as the price falls. The curve has been drawn on the assumption that income, tastes and all other prices remain constant.

In the case of inferior goods, the demand curve may be perverse. Inferior goods are those goods which purchasers buy in smaller quantities as they become richer. The demand curve of such goods will only be perverse if they account for a significant proportion of the purchaser's total expenditure. Perverse effects found mostly in the case of staple goods of relatively poor populations since these take a high proportion of their total income, leaving little scope for readjustment of their expenditure elsewhere.

The demand curve that an individual farmer faces for his produce is perfectly elastic. Since he is among the large numbers of producers, he with his own produce cannot influence the market price. In the market, he is a price-taker. At the prevailing market price, he can sell whatever quantity of produce he has produced.

3.1.5 ELASTICITY OF DEMAND

Consumer's decisions to how much to spend on as commodity at different prices is of great importance to the producers of the commodity. It is so because the responsiveness of the consumers to price changes determines the changes in total revenue resulting from changes in price, and producer's profit is the difference between total revenue and total cost. The law of demand simply shows the direction in which demand will move when the price changes. But it does not show by how much or to what extent a change in price will affect the quantities demanded. With some products, a change in price will bring about a proportionately large increase or decrease in the quantity that can be sold, while with others, the quantity is only slightly responsive to changes in price. This responsiveness of consumers to change in price is known as "elasticity of demand". It is the relative change in the quantity bought resulting from a given relative change in price.

Alfred Marshall was the first economist to give a clear formulation of price elasticity. According to him, it is the ratio of a relative change in quantity to a relative change is price. Let E stand for elasticity. Then:

$$E_p = \frac{\textit{relative change in quantity}}{\textit{relative change in price}} = \frac{\frac{Q}{Q}}{\frac{P}{P}}$$

where Q is quantity, P is price and Δ (delta) is the symbol meaning "a change in". Thus, $\Delta Q/Q$ is a relative change in quantity and $\Delta P/P$ is a relative change in price.

There can be five types of elasticities. The numerical value of E may vary from zero to infinity (0 to ∞). If demand is completely unresponsive to the change in price, E will be equal to zero. In this case, demand is said to be completely inelastic. When the increase in quantity sold is proportionately smaller than the decrease in price, it is a case of a relatively inelastic demand. In such a case, value of E is greater than zero but less than one ($O < E < 1$). When the proportionate change in the quantity demanded is just equal to the proportionate change in its price, it is case of unit elasticity. The value of E in this case is equal to one. The demand is called elastic and the value of E is greater than 1($E > 1$) when the proportionate change in the quantity demanded is more than the proportionate change in price. Each of these five cases is illustrated graphically in Fig. 3.2 (a, b, c, d, e).

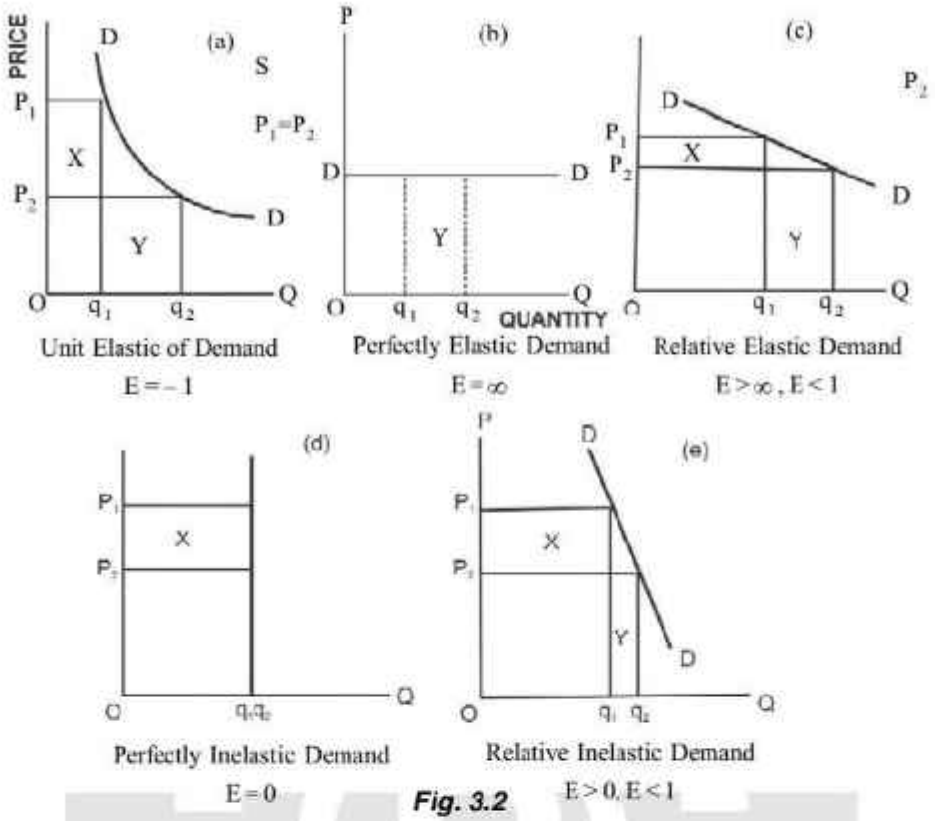

Fig. 3.2

The elasticity of demand for individual commodities and for farm products as a whole is very significant in connection with their price determination. The demand for all food products taken as a single commodity is inelastic. The highly inelastic demand for farm products has very important implications for understanding agricultural price policy.

3.1.6 CROSS ELASTICITY OF DEMAND

The relationship between the two goods *X* and *Y* can either be substitutive or complementary, or it can even be neutral. In the context of these relationships, the cross elasticity of demand measures the economic relationship between commodities on the demand side. The term cross elasticity of demand may be defined as the ratio of proportionate change in the quantity demanded of commodity *X* to a given proportionate change in the price of the related commodity *Y*. The cross elasticity between two goods, *X* and *Y* is measured by:

$$E_O = \frac{\text{The percentage change in the quantity purchased of X}}{\text{The percentage change in the quantity purchased of Y}}$$

The sign of this fraction tells us whether the two goods are related as substitutes or as complements, and its size tells us how close the relationship is. If *X* and Yare perfect substitutes for each other, a slight rise in the price of *Y* will reduce the demand for *Y* to almost zero. In this case, the cross-elasticity of demand will be infinity. On the contrary, if two goods are not substitutes at all, the value of cross-elasticity will be zero. Thus, depending upon the degree of substitutability existing between two substitutable goods, the cross-elasticity of demand varies between two extremes - infinity and zero.

In the case of two goods which are complements, instead of being substitutes, the cross-elasticity will be negative. A rise in the price of Y will not only lower the quantity demanded of Y but also a decrease in the quantity demand of X, because both are complementary. A rise in the price of bread might, for instance, cause decreased demand for butter.

3.1.7 INCOME ELASTICITY OF DEMAND

Income elasticity of demand for a commodity shows the extent to which a consumer's demand for that commodity changes as a result of a change in his income. It is expressed as:

$$E_i = \frac{\text{The percentage change in the quantity demanded}}{\text{The percentage change in income}}$$

other factors, in particular the price of, commodity, remaining unchanged, so that the change in income is the exclusive cause of the change in purchases. The fraction is normally positive, a rise in income inducing some increase in demand, and a fall,' some decrease. The income elasticity will be negative only in the case of an inferior good, and since most of the agricultural goods fall under this category, negativeness of income elasticity for farm products plays a significant role in the pricing behaviour of agricultural products.

There is, of course, considerable variation in the income elasticity of demand for different food products. It tends to be highest for the "protective foods" such as fruit, vegetables, eggs and meat, goods which are relatively expensive per calorie and contain a larger amount of minerals, vitamins or proteins. It is lowest for cereals and potatoes which may indeed be inferior goods. Agricultural products which are industrial raw materials, such as wool or rubber, may have a rather high income elasticity.

If the changes in price are very small, the point elasticity of demand method is used for measuring the responsiveness of demand. In case changes in the price are not small, the arc elasticity of demand method is applied.

The point elasticity of demand is defined as the proportionate change in the quantity demanded resulting from a very small proportionate change in price. Symbolically, we may write:

$$ep = \frac{dQ}{Q} \Big/ \frac{dp}{p}$$

or

$$ep = \frac{dQ}{dp} \cdot \frac{p}{Q}$$

If demand curve happens to be linear

$$Q = -b_o - b_1 p$$

Its slope $\frac{dQ}{dp} = -b_1$

Substituting the above formula, we obtain

$$ep = -b.\frac{P}{Q}$$

The simplest way of explaining the point method is to consider a linear demand curve. Let the straight line demand curve be extended to meet the two axes as shown in Fig. 3.3.

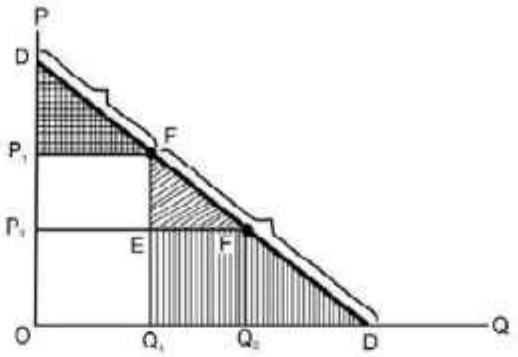

Fig. 3.3

We take any point F on this demand curve which divides the demand curve into two segments. The point elasticity is, thus, measured by the ratio of the lower segment of the curve below the given point to the upper segment.

The elasticity of the linear demand curve at point $F = \frac{FD'}{FD}$

The above formula is used to measure the elasticity of demand only for infinitely small changes in price. If price changes are appreciable, we use the following formula, which measures the arc elasticity of demand.

$$ep = \frac{\Delta Q}{\Delta P} \cdot \frac{\frac{P_1 + P_2}{2}}{\frac{Q_1 + Q_2}{2}} = \frac{\Delta Q(P_1 + P_2)}{\Delta P(Q_1 + Q_2)}$$

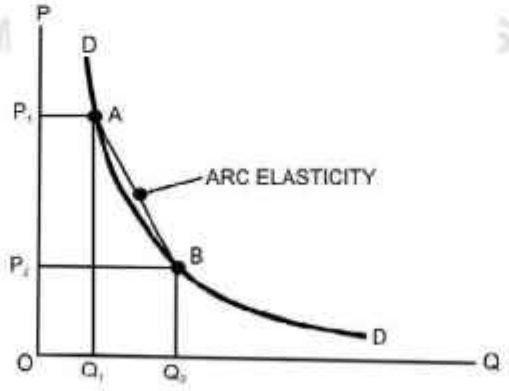

Fig. 3.4

In the measurement of arc elasticity, we use the average of the two price figures *A* and *B* as shown in Fig. 3.4 (Original and subsequent)

However, this method gives an approximation of the true elasticity of the section *AB* of the demand curve. Clearly, the more convex to the origin the demand curve is, the poorer the linear approximation attained by the arc elasticity formula.

3.1.8 SUPPLY AND FACTORS INFLUENCING SUPPLY

By the supply of a commodity we mean the amount of that commodity that producers are able and willing to offer for sale at a given price. Supply may be carefully distinguished from stock and production. Stock constitutes the potential supply but supply at a time is that part of the total produce which the farmer is willing to sell is the stock and is known as marketable surplus and the portion which is actually brought to the market at a particular time for sale is the supply of the produce and is labelled as marketed surplus. Similarly, supply of the farm produce, sometimes, may be more than the current production if past stocks are also brought to the market along with it.

Factors Influencing Supply

Factors which influence the supply of agricultural commodities are numerous. Given below is a brief introduction to these factors:

(1) The supply of an agricultural commodity would depend upon its cost of production, that is, the prices of factors of production which are involved, in the production of said commodity. For example, a rise in the price of land will have a large effect on the cost of producing wheat. Thus, a rise in the price of factors of production will cause the supply of the product to decline and a fall in the prices of factors production may lead to an increase in supply.

(2) Supply of an agricultural commodity is also affected by the price that commodity commands in the market. Other things remaining the same, the higher the price of the commodity the more profitable will be to increase its supply.

(3) The supply of an individual agricultural commodity will be affected also by the prices of other agricultural goods. An increase in the price of other commodities will make the production of the commodity whose price has not risen relatively less attractive than it was previously. This mainly leads to changes in cropping pattern in agriculture.

(4) Supply of agricultural goods also depends upon the state of technology. Agricultural technology helps in bringing down the cost of production and hence increases the supply.

(5) There are a number of other factors which affect the supply of agricultural goods, viz. adequate and well spread-out rainfall, improvement in irrigation facilities, increased supply of chemical fertilizers and manure and better and improved methods of production.

We may summarise the above discussion as follows: the supply of an agricultural commodity is a function of the price of that commodity, the prices of all other agricultural goods, the prices of the factors of production, technology and the natural factors. This statement may be expressed in symbols by writing down what is called a supply function:

$q_n^s = S(P_n, P_i \ldots\ldots P_{n-1}, F1 \ldots\ldots F_m, G, T)$

Where q_n^s is the supply of agricultural good, n, P_n is the price of that commodity $P_i \ldots\ldots P_{n-1}$ stand for the prices of all other agricultural goods, $F_i \ldots\ldots F_m$ denote the prices of all factors of production, T is the state of technology and G stands for natural factors.

3.1.9 LAW OF SUPPLY

As already mentioned, supply has a functional relationship with price. In order to know how the supply of an agricultural commodity varies with its own price, we will assume other things (which also affect supply, to be constant) i.e., $q_n^s = S(P_n)$. With this assumption of other things remaining the same, we can define the law of supply as the quantity of a commodity produced and offered for sale will increase as the price of the commodity rises and decrease as the price falls. Based on the law of supply, we can construct an imaginary supply schedule for an agricultural commodity. A supply schedule represents the relation between prices and the quantities that sellers are willing to sell in the market.

Table 3.2 shows the quantities of potatoes that would be produced and offered for sale each month at a number of alternative prices.

Table 3.2
A Supply Schedule for Potatoes

Price of Potatoes	Quantity Supplied (₹ per quintal)	(Hundred quintals per month)
1	20	5.0
2	40	46.0
3	60	77.0
4	80	100.0
5	100	115.0
6	120	122.0

As is evident from Table 3.2, when the price of potatoes is as high as ₹ 120 per quintal, farmers are ready to offer as much as 122 hundred quintals of potatoes for sale. But the amount of potatoes offered for sale decreases as the price falls. Thus, as the price falls, supply is reduced and as the price rises, the supply is extended.

3.1.10 SUPPLY CURVE

Data contained in Table 3.2 could be plotted on a graph to get the supply curve as shown in Fig. 3.5.

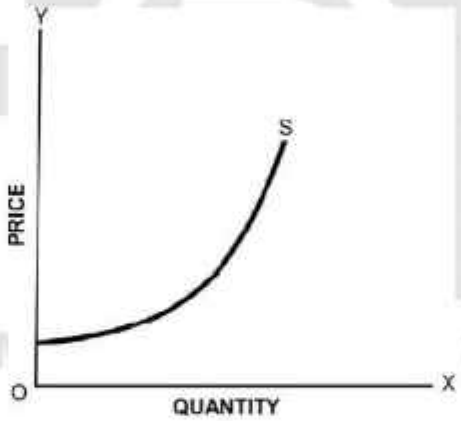

Fig. 3.5 Supply Curve

Quantity is measured along OX and price along OY. SS is the supply curve. The curve SS shows the relation between the price of the commodity and the quantity producers wish to sell. It slopes upward indicating that higher the price, the greater the quantity producers will supply. Further, it has been drawn on the assumption of the constancy of all other factors that influence supply other than price of the commodity.

3.1.11 PERVERSE OF SUPPLY CURVE

It has often been categorically stated that the supply curve of the produce of the small family will be perverse. The existence of such a supply curve, at least for the peasant farmer in Asia and Africa, was accepted as a dogma between the period of two great wars. It was based on the assumptions that such farmer had a certain, rather low It has often been categorically stated that the supply curve of the produce of the small family will be perverse. The existence of such a supply curve, at least for the peasant farmer in Asia and Africa, was accepted as a dogma between

the period of two great wars. It was based on the assumptions that such farmer had a certain, rather low "target" or cash income and that, once this was attained, the farmer would only work as hard as was necessary to maintain it. If the price of his produce rose, he would produce less and enjoy more leisure, if it fell, he would produce more m an attempt to enjoy the same income as before. Studies that have been made to test this hypothesis for commercial crops have not, however, borne it out.

There are two types of perverse response of supply to price. First, supply of farm products may rise in response to price rise to a certain point, but thereafter, it tends to decline though the price continues to rise. This has been shown in Fig. 3.6.

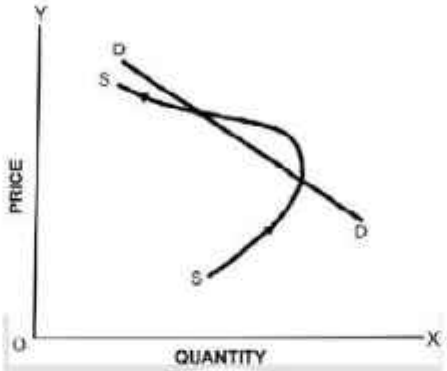

Fig 3.6 Poverse Supply Curve

The situation seems to be rather irrational, if we take into account only the price the commodity as the sole determinant of its supply. But mostly, the price of inputs used in the process of production, the prices or the cost of production of other agricultural commodities which can be produced as alternatives undergo a change and given that demand is relatively price inelastic, it is just rational for the producers to reduce production of the first commodity and produce more of other commodities.

Secondly, supply may not fall in response to a falling price. This reaction is typical of agricultural production.

3.1.12 ELASTICITY OF SUPPLY

When the elasticity of supply is referred to with no qualifications, it is taken to mean price elasticity. It measures the direction arid extent of the sellers response to change in the' price of his product and is expressed as:

$$E_s = \frac{\text{The percentage change in the quantity supplied}}{\text{The percentage change in the price}}$$

where the change in price is the exclusive cause of the change in supply. As in the case of demand, we call the supply inelastic when this fraction is less than one, and elastic when it is greater than one.

In continuous terms, assuming that $x = f(p)$, the co-efficient of the elasticity of supply is:

$$\frac{dx}{dp} \times \frac{P_x}{x} = \frac{\frac{dx}{dp}}{\frac{x}{P_x}}$$

= marginal of the function divided by average of the function.

It is well known that the supply of all agricultural produce taken together is much less elastic than that of industrial products. According to a study made by Miss Cohen, during the world-wide depression of 1929-32, total world manufacturing production fell by 37 per cent but agricultural production by only 1 per cent. In the United States, the price index of non-agricultural commodities fell by 38 per cent from 1929 to 1932 while for agricultural produce, it fell by 54 per cent. During the same period, industrial production fell by 47 per cent, while agricultural production was actually higher in 1932 than in 1929, although by the following year, it was three per cent lower.

3.1.13 PRICE DETERMINATION UNDER PERFECT COMPETITION

We have different market situations prevailing in a society, viz., perfect competition, monopoly, monopolistic competition, oligopoly etc. But in the agricultural sector, conditions of perfect competition are more prevalent than that of any other market situation. We shall, therefore, confine our discussion of price determination in a simplified market, operating under conditions of "perfect competition". The conditions that exist in a perfectly competitive market are as follows:

(1) There are a large number of buyers and sellers so that no individual can affect prices by his own actions.

(2) The product produced by all sellers is homogeneous so that there is no basis for preferring one seller's product to another.

(3) Both sellers and buyers have perfect knowledge about the prevailing price in the market.

(4) There are no legal or institutional restrictions on buyers and sellers.

There should be no difficulty in presuming the existence of the conditions listed above for most of the farm products. For example, farm products are generally produced by numerous farmers spread over the entire country and the produce of any individual farmer is so little that it cannot affect the price prevailing in the market. Further, in most cases, product differentiation is not possible since farmers in the market, for a specified product handle the same identical product and there is no basis for preferring one seller's product to that of another. On the side of consumers also, this type of market situation could be reasonably assumed. They, too, are price-takers. They, too, as individuals, buy so little of anyone commodity that each act of purchase has no appreciable influence on price.

A competition that is not pure is called imperfect competition. It exists in two forms, monopolistic competition and oligopoly. In monopolistic competition, though there are many producers but each produces and sells differentiated products. Oligopoly refers to a few sellers, either producing physically homogeneous products or differentiated products. There is an extreme case also when we have practically one seller. It happens in the case of monopoly. All these three market situations practically do not prevail in the agricultural sector.

Within a competitive environment, market prices are determined by the intersection of supply and demand. Demand is a decreasing function of prices while supply is an increasing function. The price is fixed by the point at which the

two curves intersect, indicating that demand equals supply. It would be appropriate here to discuss, a priori, the demand and supply separately.

3.1.14 CHANGE IN DEMAND AND SUPPLY

Price changes brought about by shifts either demand or supply curves or both. If supply remains unchanged' while demand increases, a higher equilibrium price is called for. Fig. 3.7 illustrates a hypothetical situation.

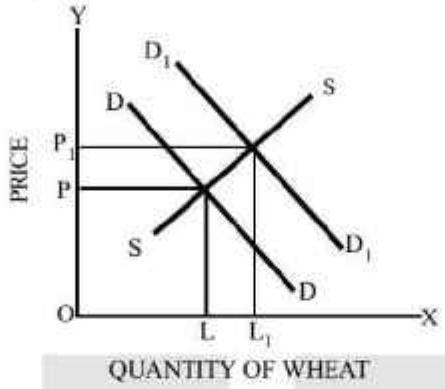

Fig. 3.7 Change in Demand.

In Fig. 3.7, whereas the supply curve based on annual production of wheat in a country X remains unchanged, the demand curve shifts to the right (from DD to D_1D_1) indicating an increase in the quantity of wheat that could sold at any given price. Under original market conditions, the price would have OP per quintal and the quantity supplied would have been OL quintal. Due to a shift in demand from DD to D_1D_1 the new equilibrium is at the price OP_1 per quintal of wheat which corresponds to the supply which corresponds to the supply of OL_1.

In some cases, price changes may be initiated by changes in supply while the demand curve remains in the same position. Fig. 3.8 illustrates the effect of shifts in the supply curve for wheat.

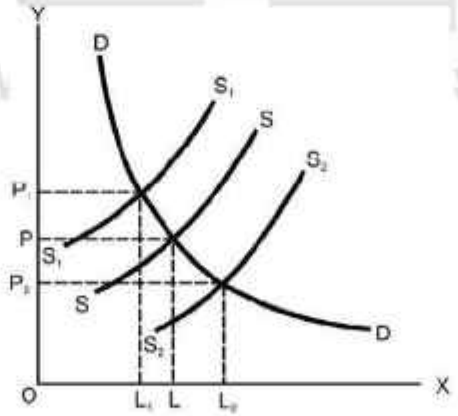

Fig. 3.8 Changes, in Supply

In Fig. 3.8 when the supply curve shifts to the left (decreases); the price/rises from OP to OP_1 and when it shifts to the right (increases), the price falls to OP_2.

In case both the supply and demand curve change their positions, the direction and theoretical amount of price changes are less certain than in the cases just described.

3.1.15 EXCEPTIONS IN AGRICULTURE

The response of supply as well as of demand to price changes in agriculture may not exactly be the same as visualised by the law of demand and supply. There is one very important difference between the demand for agriculture and for industrial products. Agriculture as we know, produce mainly foodstuffs, which are one of the main necessities of life. As a result demand for agriculture products, taken together, tends to be inelastic. The main reason for this is .that capacity' of the human stomach is limited. When people improve their standard of living, they substitute better food for plan fare. But beyond a certain point, when their incomes increase, people Start spending more on non-agricultural goods. Similarly, when prices of agricultural goods fall, consumption will not greatly expand, nor will greatly contract if food prices rise. Accordingly, a low price elasticity indicates that consumers are not sensitive to changes in prices of food on the farm level. This insensitivity stems from two reasons: (1) food is necessary for life, thus changes in its price do not affect its quantity demanded drastically, and (2) with a rise in the standard of living, people spend relatively a small fraction of their income on food which reduces the sensitivity of consumers to changes in the price of food. Econometric studies have shown that price elasticity with respect to food on the farms level is in the order of magitude of 0.20 to 0.25 which means that if the demand curve for food does not shift, then a 10 per cent increase in the quantity of food will be cleared by the market only after the price of food is cut down 40 per cent.

Because of the inelastic demand for farm products, it may be said that at any particular time any factor which has the effect of increasing the quantity of agricultural products will also have the effect of reducing gross receipts. Any factor limiting the quantity marketed will have the effect of increasing gross receipts of farmers above what they would otherwise have been.

Similarly, aggregate agricultural production is not very responsive to price changes. It is mostly assumed that the farmer is less responsive to price changes. In most cases, agriculture tends to use much the same amount of the factors of production especially land and labour, even when the general level of prices is falling. In consequence, the level of total output in agriculture remains remarkably stable from

year to year, notwithstanding the fluctuation in the general price level. The following are the main factors which help to explain the farmer's relative insensitivity to price changes.

1. The Cost Structure of Agriculture: Costs incurred, whether by the farmer or by the manufacturer, may be divided into two broad categories as escapable and inescapable. Escapable costs are those which, in a given time period, may be avoided by reducing production; inescapable costs are those which, in the same time period, have to be met if the entrepreneur is to stay in business at all. In agriculture, the proportion of inescapable to escapable costs is much higher than in industry where the greater part of manufacturing costs is made up of variable costs. This means that, in bad times, there is less scope for the farmer to reduce his expenses by reducing his production, while every unit of production he can sell will help towards covering his high inescapable costs.

2. The Small Scale of Farming Business: The great majority of farmers the world over are family concerns, employing little hired labour. In bad times, he may consider a very large fall in family income preferable to leaving agriculture altogether. This is an important factor in the inelasticity of total agricultural supply in the face of a price fall.

3. Time Element: Another factor which has an influence on the response of farmers to changes in the relative prices of farm commodities is the time element involved in switching from one time of production to another. There are two considerations. The first is that a long period required to make the change may be a deterrent to making any change at all. The second is that after a change has actually been made, it may still take a long time for it to become effective in adding or subtracting supplies.

4. Subsistence Farming: The most important reason responsible for the insensitivity of the farmer to price changes is that most farmers the world over produce for their own consumption and not for market and are, therefore, not affected at all by price changes. Further, since the scope for large incomes is smaller in farming than in industry, the average level of intelligence is probably also lower; as a result, traditional methods of production are ever more important in agriculture than in industry and only a few of the most enterprising farmers really adapt their output as rapidly as it would be most profitable for them to do.

5. Role of Nature: Agriculture is a biological process and even if the farmer increases certain acreage of a particular crop in response to price changes, he will not be sure to increase its supply. The total output of many crops varies more with the yield per acre which the farmer cannot control than with the number of acres from which he can.

It does not follow from this, however, that the supply of individual agricultural commodities is not sensitive to changes in individual commodity prices. On the contrary, there is evidence that changes in relative prices within agriculture induce changes in supply reasonable efficiently.

3.1.16 THE COBWEB

We now introduce an elementary dynamic theory of price determination of agricultural products. In this theory, we assume that farmers' output plans are fulfilled but with a time lag and we try to show how planned changes in supply can give rise; to oscillations in market behaviour. Agricultural markets subject to simple one-year time lag are illustrated in Fig. 3.9 and 3.10.

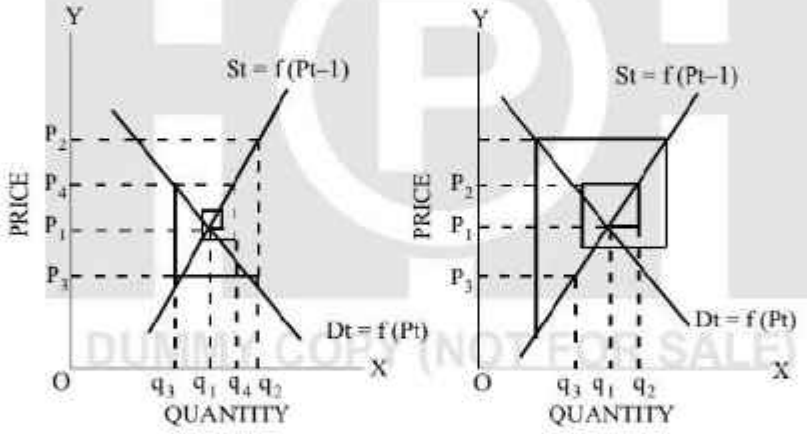

Fig. 3.9 Fig 3.10

Taking Fig. 3.9 first, if in one year t, the price is P_2, farmers will plan to produce q_2 in the following year. In the year t_{+1}, q_2 will come in the market and in order to sell this quantity, price must fall to P_3. This level of price (P_3) will induce the farmers to produce only q_3. In the following year t_{+2}, q_3 quantity will be sold at price P_4. This price in turn will call forth a supply of q_4 the next year, t_{+3} and this will depress the price below P_4. It is thus clear from the figure that if nothing further disturbs the market the price and quantity will oscillate around their equilibrium values.

In other figure, exactly the same argument as in the previous paragraph'appl1es but in this case, the oscillations become larger and larger so that the equilibrium is never restored.

Thus, while market in Fig. 3.10 has an adjustment mechanism which unstable; market in Fig. 3.10 has one which is unstable. The difference between the two figures is that while the demand curve in Fig. 3.9 is flatter due to which an excess demand and supply can be eliminated with only a small price change, in Fig. 3.10 the supply curve is flatter

than the demand curve, which causes the quantity supplied respond more to price changes than does the quantity demanded. In this case, when there is excess supply, a large price fall is necessary to call forth the required demand.

3.1.17 PRICE DETERMINATION UNDER IMPERFECT COMPETITION AND MONOPOLY

So far we have discussed one market situation, which is known as pure competition. As already stated, there are, however, other market situations which are briefly described as under:

1. Monopoly: A monopoly situation in the market exists when (1) there is practically one producer or seller, (b) difficulty of entry to the industry, and (c) when no close substitutes exist for the product. Both (a) and (c) imply a demand curve with finite elasticity.

2. Oligopoly: It is a market situation in which the number of sellers dealing in a homogeneous or differentiated product is small. In oligopoly, there is complete interdependence among the sellers with regard to their price output policies. Each seller has direct and ascertainable influences upon every other seller in the industry.

3. Monopolistic Competition: It is a market situation in which there is a large number of producers with free entry into, and exit from, the industry, but in which each producer sells a product which is somewhat different from that sold by his competitors or we can say that products are differentiated. When there is a large number of a firm producing differentiated products, each one has a monopoly of its own product, but is subject to the competition of close substitutes. It is thus clear that monopolistic competition involves both the monopoly and competitive elements.

Monopoly, oligopoly and monopolistic competition all come under the general heading of imperfect competition, characterised by individual sellers whose individual demand curves are not perfectly elastic. The degree of control over prices exercised by any firm operating under imperfect competition is limited by the slope of the demand curve for the product of this individual seller.

On the whole, imperfect competition in agricultural marketing probably has considerably less effect than in industrial production and marketing. Product differentiation, for example, can be much more effective in enhancing the prices of well-advertised face cream, the properties of which are generally a mystery to consumers, than in obtaining higher prices for breakfast butter, the quality of which almost any housewife considers herself a good judge. Consumers more familiar with the real qualities and relative values of foods will not fall so easily for sales propaganda in regard to them.

3.1.18 DETERMINATION OF MOST PROFITABLE PRICE

The principles of determining the most profitable price for the seller, selling under conditions of imperfect competition as found in most of economics textbooks are stated in terms of per unit prices and quantities. They involve the use of concepts, such as marginal revenue and marginal costs, which are unfamiliar to most farmers. This principle, however, can be simply stated in terms of total revenue and costs, which art more easily understood. In Fig. 3.11, DD shows the demand curve of an individual producer in and imperfect competitive Situation. The horizontal axis represents sales in thousands units while the vertical axis represents the price per unit of product in rupees.

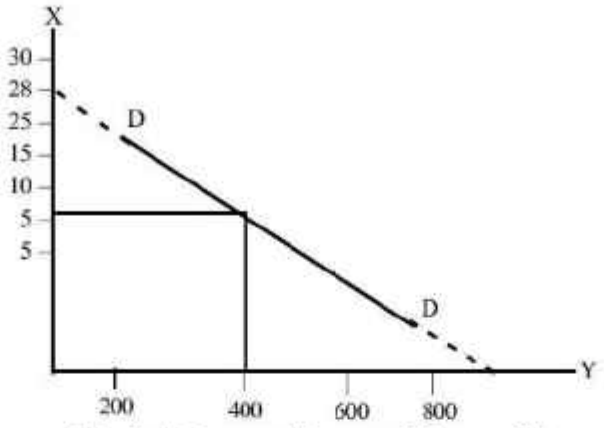

Fig: 3.11 Demand Curve of Monopolist

It is evident from Fig 3.11 that the producer can establish his price in this case any where between zero and ₹ 28 per unit. Any price higher than ₹ 28 per unit would bring his sales to zero.

In Fig 3.12, the horizontal scale is the same as in fig 3.11 representing sales in thousands units. The vertical scale, however, is different. It represents total rupees of revenue derived from the sale of different quantities. The TR curve represents the total revenue that would be realised from the sale of each of the quantities specified in the horizontal axis. The TR curve has been derived from the demand curve DD in fig 3.11 TC is the total cost curve, which represents the sum of fixed and variable cost for any given output.

The net profit or loss received by the seller by selling any given quantity of the produce is represented by the vertical distance between lines TR. and TC. In case the line, TR is above the line TC, a net profit is indicated, since gross revenue is greater than total cos. In this figure the greatest profit which is reflected by the greatest distance between lines TC and TR is found at a quantity of 440,000 units. Against this sale, the net profit would be 13,000 (TR – TC). In order to maximise his revenue, this is the, quantity of produce a seller under imperfect competitive conditions would wish to sell. What price should be charged by producer could be found by referring again to Fig. 3.11. It is evident from the figure .that a quantity of 440,000 units will sell for a price of approximately ₹ 16 per unit.

The monopolist's total revenue and total cost can both be expressed as function of output:

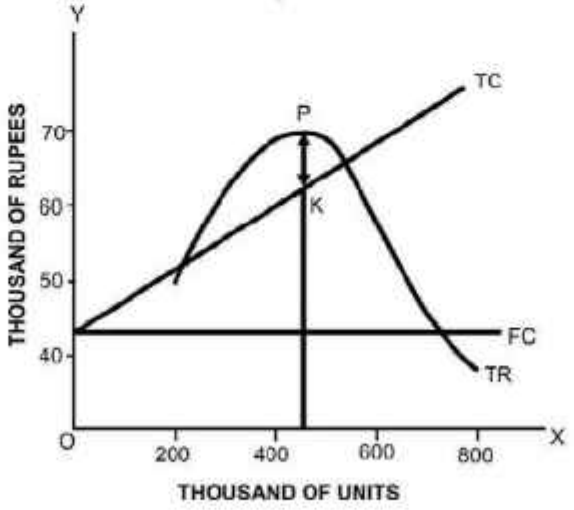

Fig 3.12 Profit Maximaisation

$R = R(q)$, $C = C(q)$

His profit is the difference, between his total revenue and total cost:

$\pi = R(q) - C(q)$

To maximise profit, we set the derivative of the above equation with respect to q equal to zero

$$\frac{d\pi}{dq} = R(q) - C'(q) = 0$$

or $R'(q) = C(q)$

The second-order condition for profit maximisation requires that

$$\frac{d^2\pi}{d\pi^2} = R''(q) - C''(q) < 0$$

or adding C" (q) to both sides of the inequality,

$R''(q) < C''(q)$

The rate of increase of *MR* must be less than the rate of increase of *MC*.

3.1.19 PRICE SUPPORT AND STABILISATION OF PRICE

Unplanned fluctuations in supply do occur frequently in agriculture. In those economies where the prices of such goods are left to be determined by the free market forces, we experience large price fluctuations. In the case of many agricultural goods, as already stated, the demand is quite inelastic. In these cases, we find very large price fluctuations together with the peculiar situation that when nature is unexpectedly kind and farmers are rewarded with a bumper crop, they see their incomes dwindling, while when nature is moderately unkind and farm supplies fall unexpectedly, farmers' income rises. "Thus, during a year, the market price of food grains is determined predominantly by the size of the harvest and the price elasticities of consumer demand for food grains. Because of generally low price elasticities of demand for food grains, it needs a disproportionately large rise in order to restrict the demand to a somewhat smaller harvest; and it needs a disproportionately large fall in price, to expand the demand to a somewhat large harvest. The market price of food grains is thus liable to large fluctuations from year to year, firstly because of fluctuations in the size of the harvest and secondly because of the generally low price elasticities of demand for food grains." On account of the generally low price elasticities of consumer demand for food grains, the fluctuations in prices are likely to be more pronounced than warranted by fluctuations in the harvest. Thus, in a year of bad harvest, the rise in price might more than compensate the fall in yield and the producers might actually reap a higher total revenue. On the other hand, in a year of good harvest, the prices might fall so low that in spite of the high yields, the producers might end up with a smaller total revenue. There is, therefore, a strong case for minimum support prices of food grains, particularly in a year of good harvest.

From the consumer's point of view also, stability in food grains prices is highly desirable. "It does not help the consumer to have a low price and high consumption in a year of good harvest and a high price and low consumption in a year of bad harvest. Therefore, he would prefer the price to be supported in a year of good harvest and thus not be allowed to fall below a certain minimum, provided a revenue obligation is accepted and in year of bad harvest, the price is not allowed to rise above a certain maximum. Thus, in the view of the consumer, a maximum ceiling price is a necessary corollary to a minimum support price."

It is not easy to give a precise definition of "support price". It can be differently defined with reference to the objectives of the price policy in view. Among the three objectives of price policy, viz. stability, equity and growth, growth objective is in such more relevant in the present context of many developing countries. Considering this objective, the minimum support price can be defined as a "reserve price" announced 'in advance of the production period and more or less corresponding to a forward price,' which, in conjunction with other measures, will ensure the desired quantities of production and desired relationship between each other."

In simple words, support price may be defined as the price at which the government would be under obligation to buy the entire stocks that may be offered to it for sale. The support price would have no direct incentive role to play, but would insure farmers against the risk of prices falling below a particular level. The support price would also have to be such as would not inhibit adoption of improved technology by progressive farmers.

Under the support price policy, government attempts to stabilise the incomes of farmers by entering the market itself, buying and selling in the open market when there is a shortage.

An important question that must be answered is: "What should be the minimum support price?" Guidelines for determining support prices of agricultural products would depend on the objectives that are sought to be achieved. Objectives of agricultural price support policies can be and are in fact diverse in different countries. By definition a support price policy assures the farmers against a fall in prices beyond the stipulated level. In some countries (mainly advanced), such price insurance has the primary objective of maintaining the general level of farm incomes. In several other countries (especially developing countries), the main objective of support price policy is to help augment overall agricultural production. Thus, on the basis of the primary objectives that they seek to achieve, the support price policies can be categorised as either "Income-oriented" or "Production-oriented".

In most developing countries, including India, the main objective in the present context is to step up the rate of growth of agricultural production so as to match the growth of consumer demand. The support price policy, which is production-oriented, therefore, would seen to have greater relevance. The objective of improving agricultural incomes will be achieved as a sequel to increased production and productivity.

For the fixation of minimum support price, some economists believed that it should be based on the cost of production. But this is not so simple. The main questions that need to be answered are: (a) What costs to be considered? Cost of production of a commodity depends on a number of factors which vary from farm to farm, e.g., size of the farm, soil type, cropping pattern, farm investment as well as technique of production employed. It is also observed that farms in a homogeneous tract do not incur uniform or similar costs. Also standardisation of agricultural produce is not easy as the quality of produce depends mainly on natural factors, among other things. As such it is not easy to work out the average cost of production. To avoid these difficulties, support price has to be related to the costs of farms for which the inputs are mostly purchased and not home produced. The reserve price has to be related to the cost of production of a "model" commercial farm, for which alone the cost is a measurable concept. The reserve price may thus be defined as "the price that ensures the cost of production of a commercial farm under normal weather conditions."11 Thus defined, it will vary from year to year, depending upon changes in the conditions of supply, and hence it will have to be flexible.

The cost of production approach, though useful for some purposes, is essentially a backward-looking approach. It cannot ensure the necessary stimulus for increasing production. For this purpose, support prices must have an element of incentive.

The price mechanism is a highly sensitive and delicate instrument and the repercussions of a change in price in one area would be so widespread that it seems almost an impossible task to take into account all of them and arrive at an integrated price structure that may be truly described as in equilibrium, both over space and time. Nevertheless,

attempts to collect and analyse as much empirical evidence as possible will have to continue and to be intensified so as to derive supply response co-efficient, which can serve as guidelines for determining support prices. However, we may be sure that the primary objective of the support price policy in our country has to be that of augmenting agricultural production and not of achieving income redistribution between agricultural and non-agricultural sectors. The guidelines for determining support prices will have to be evolved keeping this objective firmly in view.

According to this programme, the government should fix the price of farm produce at a level which is higher than the market price and to buy from the farmers whatever surplus are not cleared in the market. In Fig. 3.13, P_0 is the market price of, say, wheat.

The support price by the Government pegs the prices at P_1. At that price, according to the demand curve D_0, only OA units of wheat are taken by consumers. But on the other hand, *OB* units of wheat are offered for sales. Thus, the government is under the obligation to purchase this surplus supply (*AB*) and keep it in the buffer stock.

In case this policy is successful, we will, firstly, have smaller fluctuations in the price of farm produce than there would be if price were determined on the basis of a completely free market. Secondly, total revenue of the farm producers will get stabilised in the face of fluctuations in production.

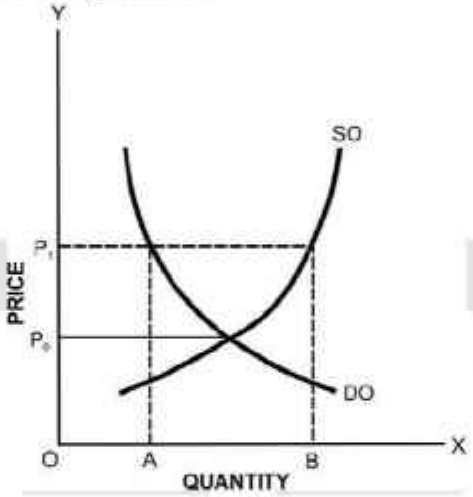

Fig. 3.13 Government Policies Designed to Stabilise Price

3.1.20 LONG-TERM CONSIDERATIONS

In the short period, since the supply of agricultural produce cannot be increased, the price which the farm operator receives may be determined by the intersection of existing demand and existing supply. Such price determination is more or less independent of the inputs or costs incurred by the farm producers. In the long-run, the size of production is, however, positively related to the inputs or costs incurred. The producer knows that he can expand production by increased inputs or costs. But he would naturally not do it, unless it paid him to do so. Thus, the inputs or the costs that the producer incurs get relate to the price that he expects. Under these conditions, the demand for minimum support price arises on the ground that the producer must be assured of minimum price which he may count upon and which may provide a basis for production decisions regarding inputs and costs to be incurred. Higher support prices fixed by the government may stimulate agricultural production by causing farmers to use more labour and other variable resources inputs to reach higher output levels with existing methods of production, or by inducing investment and the discovery and adoption of new agricultural technologies that result, in new, lower-cost production possibilities by farmers. Thus, a

surplus of AB units of output is created in the market. This surplus is purchased by the government at the support price announced by it and kept in the buffer stock.

The purpose of fixing support price, therefore, is to assure the farmer that in case market prices tend to go below then, government will step in and purchase all quantities offered to it for sale at the guaranteed prices. It is obvious that the fixation of support prices does not rule out the possibility of market prices being higher than the support prices. In fact, in a situation where demand is increasing at a faster rate than supply, market price can generally be expected to remains higher than the support price.

3.1.21 BEHAVIOUR OF AGRICULTURAL PRICES IN INDIA

Agricultural prices, unlike manufactured goods prices, fluctuate more violently as the agricultural sector is highly influenced by the vagaries of nature. The prices of agricultural goods in India have been rising continuously since independence except during the First Five Year Plan, When the prices actually fell. The trends in wholesale prices of agricultural goods have been presented in three different Tables 3.2, 3.3, 3.4, depending upon three series of index numbers of wholesale prices:

Table 3.3

Trends in Wholesale Prices of Agricultural Goods

Year	Index Number 1952-53=100	Per cent Increase Decrease
1950-51	110.0	—
1955-56	88.0	—
1956-57	104.5	+ 18.8
1957-58	107.4	+ 2.8
1958-59	114.0	+ 6.1
1959-60	116.5	+ 2.2
1560-61	123.8	+ 6.3
1561-62	115.5	- 6.7

Table 3.4

Index Number with Base Year 1961-62=100 Weight 33.2

1962-63	102.3	+2.3
1963-64	108.4	+6.0
1964-65	130.9	+20.8
1965-66	141.7	+8.3
1966-67	166.6	+17.3
1967-68	188.2	+ 13.0
1968-69	179.4	-4.7
1969-70	194.8	+8.6
1970-71	201.4	+3.2

Table 3.5

Index Number with Base Year 1970-71 = 100 Weight 40.4

1971-72	100.4	+0.4
1972-73	110.3	+9.9
1973-74	139.2	+26.1
1974-75	169.2	+22.1
1975-76	157.3	-7.4
1976-77	158.4	+0.7
1977-78	174.8	+10.3
1978-79	171.9	-11.7
1979-80	188.7	+9.8
1980-81	210.5	+11.6
1981-82	236.5	+ 12.3
1982-83	248.3	+5.10
1983-84	283.1	+14.0
1984-85	303.2	+7.2
1985-86	309.6	+2.1
1986-87	330.1	+6.6
	Series with Base 1981-82=100 Base Year Weight 27.5	
1982-83	107.3	+7.3
1983-84	121.7	+13.1
1984-85	129.2	+6.4
1985-86	129.1	-0.1
1986-87	142.8	+ 10.6
1987-88	161.8	+13.3
1988-89	170.9	+5.6
1989-90	174.4	+2.0
1990-91	198.3	+13.7
1991-92	236.7	+19.4
1992-93	255.6	+8.0
1993-94	271.2	+6.1
1994-95	307.7	+13.5
1995-96	330.5	+7.4
1996-97	358.4	+8.4

Index numbers presented in the above tables make it distinctly clear that there occur sharp variations in the agricultural prices. Since the early sixties, these prices have not only been rising over the years but have also fluctuated at times. The decade of fifties may be treated as the period of stable agricultural prices except for the year 1956-57 which was a very bad agricultural year. In the sixties, prices maintained an upward swing and almost doubled over the decade with some years showing marked variations. During the seventies and late eighties, agricultural prices rose at an alarming rate and more than trebled between the years 1971-72 and 1986-87. In some years, prices went up by as much as 26 per cent.

3.1.22 AGRICULTURAL PRICE POLICY

Need for Agricultural Price Policy

As stated earlier, agricultural prices fluctuate violently and frequently under the free market mechanism to the disadvantage of both the producers as well as the consumers. These fluctuations in the prices of agricultural products are the greatest hurdle in the way of agricultural development, for they bring ruin to many. For instance, in the bumper crop years, prices fall too low to leave farmers any appreciable margin and in the light crop years, prices rise so steeply that the farmers have a very little marketable surplus. Similarly, persistent imbalance between supply and demand causes violent fluctuations in consumer prices and thus affects the poor consumers. The two major aspects of the price policy, therefore, are: (i) to protect the farmers interests by removing or at least mitigating the major uncertainties by assuring them remunerative prices for their produce, and (ii) to safeguard the interests of the low income consumers by assuring minimum supplies of food articles at reasonable prices.

Objectives of Price Policy

The major objective of the agricultural price policy is to achieve price stability without destabilising total revenue of the farmer and provide a price support which would be economic to the grower as well as agro-based industry and at the same time, subserve the interests of the consumer. In other words, the intention is to integrate support prices with policies to stabilise prices and supplies to consumers. In the developed countries like the U.S.A., Canada, and Western Europe, where the farm incomes have badly lagged behind non-farm incomes in the process of economic growth, the main objective of price policy is to raise farm incomes so as to bring them in lin) with the income levels in the rest of the country. In the under-developed countries, however, the income-oriented price policy of the developed countries has not much direct relevance. In poor countries, the problem is not aver production. In these countries, the objective of farm price policy, therefore, should be to increase agricultural production by creating economic incentives far farmers. The policy should be able to perform the fallowing functians.

(i) To accelerate the growth of agricultural output as a whole.

(ii) To stabilise prices in order to prevent fluctuations.

(iii) To bring about desired changes in the product mix.

(iv) To increase the marketable surplus.

(v) To ensure adequate supplies of foodgrains to the law income consumers at reasonable prices.

Thus, the "price policy must ensure that agricultural production is economic bath in the widest and in the strictest sense of the term. In its narrow sense, economic production would mean that casts are reduced to the minimum, that the agriculturists have a fair margin of profits and that the casts of agricultural products, foodgrains and raw materials as they enter into the casts of living and the prices of manufactured articles either in the internal or external markets are healthy levels. In the wider sense, economic production would signify the widest distribution af scarce land resources among the various competing ends, fares try, pastures and cultivation in first instance, and secondly, between food crops and cash crops.

3.1.23 EVALUATION OF AGRICULTURAL PRICE POLICY

The Price Policy, whether of agricultural products or of manufactures, is formulated keeping in view some objectives. The objective of stability is, perhaps, the most important one, more so, in agricultural where due to strong natural factors, serious fluctuations can occur. Drastic and frequent fluctuations are deterrent to increased production and result in considerable uncertainty. Government's agricultural price policy is designed by the Agricultural Price Commission (APC) which after taking note of the cost of production fixes procurement prices and minimum support prices of different agricultural commodities. Procurement prices are those at which the government procures surplus grain from the farmers and support prices are those at which government is bound to purchase the surplus grain if the prices fall below the minimum level. However, the effectiveness of these policies is determined by the level of implementation. Many a times, what has been happening is that the level of implementation would remain below expectations and there would arise differences between the actual procurement prices and the effective market prices. These differences, sometimes, have been found to be so substantial that it has affected adversely market arrivals. Such ineffective implementation and regulation of prices even now leads to fluctuations in agricultural prices which are not desirable.

While formulating a price policy, it has to be kept in mind that the benefits percolate to all sections of the farm population. Usually, it has been noticed that the benefits accrue more to the large farmers than to the small ones. Large farmers have better access to inputs and they generate a higher marketable surplus compared to the small farmers who do not enjoy such access to inputs. Even the system of procurement is such that the small farmer's is not reached in his own village. Government operates through private commission agents and does not directly enter the open market. In some cases, it has also been noticed that large farmers hold back their surplus and sell it at a higher price sometimes later in the open market. This benefit does not accrue to small farmers who are in greater need of cash and sell their surplus only through the procurement channel. Strong regulatory measures are, therefore, required in this regard so that incentives are provided to both large and small farmers in an adequate measure.

The agricultural price policy should also provide safeguards to the consumers, and one of the best ways to do this is through a proper public distribution system. As such, a public distribution system should provide for adequate food through fair price shops to meet the requirements of the vulnerable sections of society, should include all the major crops and should reach the depressed sections in the rural areas. It may be noted that our public distribution system flops on all these counts. Stocks are often inadequate, mainly rice and wheat are covered ignoring other inferior grains which form food for the poor and which do not reach all the rural poor population.

Procurement prices have been raised year after year and agriculture forming the dominant sector in the economy, the general price level has been moving up in full sympathy, with, the trend in procurement prices. As such, these prices tend to be inflationary. It has been observed that higher procurement prices in the previous years have enhanced the holding power of large farmers which in turn becomes a contributing factor to further rise in procurement prices. While fixing procurement prices, the APC takes cognisance of the cost of production but not of the return to each rupee invested which may often be more than 100 per cent. As such, under the garb of higher cost of production, the procurement prices are forced to be fixed at a higher level than before and made to contribute to inflationary tendencies. The agricultural price policy of post-independence era seems to have failed to protect the interests of the rural poor such as marginal farmers and landless labourers. Higher procurement prices give a spurt to foodgrain prices and make things hard for the poor whose bulk of earnings go to the purchase of foodgrains. Since they do not have any marketable surplus so that they could benefit from er1hanced procurement prices, they pay through their nose for their very livelihood.

The agricultural price policy has to be reoriented in a meaningful fashion, blending production incentives with consumer safeguards in a more balanced manner.

3.1.24 FARMERS TERMS OF TRADE

Terms of trade simply denote the terms on which two sectors exchange their goods. Farmers' terms of trade refer to the terms at which agricultural products are exchanged for non-agricultural products. The agricultural sector offers foodgrains and other raw materials to the non-agricultural sector and the former in turn, purchases a large number of manufactured goods and agricultural inputs from the non-agricultural sector. The terms of trade may be favorable or unfavorable to a particular sector depending upon the relative movement of prices in both the sectors. For instance, if, over a period of time, the prices of agricultural products rise at a faster rate than the prices of the manufactured goods, we will describe this situation as the agricultural sector having favorable terms of trade and vice-versa. Farmers' terms of trade in a nutshell may be defined as "the ratio of prices received and prices paid by the farmers land may be explained as:

$$\text{Farmers' terms of trade} = \frac{\text{Farm prices}}{\text{Manufactured goods prices}}$$

If the above ratio happens to be greater than 1, the terms of trade would be deemed favorable to the agricultural sector and in case, the ratio is less than 1, farmers would be losing their income considerably.

3.1.25 SUMMARY

Price refers to the exchange value of a commodity. It is the value received on exchange of goods and services that depends upon the its marginal utility. In agriculture price is the source of revenue for the farmer and farm owner. Nature; Demand and supply differs to some extent in case of agriculture.

Price Determination is a process of balance between demand and supply. It varies depending upon the market condition. Demand for a commodity is a schedule of the quantities that buyers on the market would be willing to purchase at different price at any given time or during a given period of time. Demand is influenced by (i) price, (ii) Price of Related goods, (iii) Taste, habit fashion, custom, tradition, iv. Income, v. Population and so take many factor, Elasticity

$$\text{of Demand} = \frac{\Delta Q}{\Delta P} \times \frac{P}{Q} = Q_p$$

Supply refers to the quantities of goods and services a producer would be willing to supply at different prices during a given period of time. Supply is influenced by (i) cost of production, (ii) Price of the commodity, (iii) Price of Related good, iv. State of technology v. volume of production and so take. Supply curve is perverse for a small firmly farmer.

$$E_s = \frac{\text{Proportionate changing Quantity Supplied}}{\text{Proportionate changing in price}}$$

Equilibrium price is determined where supply of the agricultural produce is equal to the demand for the agricultural produce. Change in the demand and supply leads to change in the price level. In agriculture price varies for several reasons. Monopoly market & Imperfect market determine the prices at a more profitable way.

Price support is extended by the govt to stabilise the price which is prone to fluctuate on agricultural sector. It happens due to seasonal and ecological variation.

In Indian economy price shows fluctuating behaviour. Price policy determines the stability and promotes economic development.

$$\text{Farmers' } Terms\ of\ Trade = \frac{Farm\ Price}{Manufactured\ Goods\ Price}$$

3.1.26 SELF ASSESSMENT QUESTIONS

1. Examine the nature of demand and supply for agricultural product.
2. How price is determined under perfect competition.
3. Show the price determination under imperfect competition. How the most profitable price is determined.
4. Examine the effect of price change on agricultural output.
5. Examine the law of supply. Explain the perverse supply curve.
6. Analyse the demand curve for farm products.
7. Should the demand curve for farm products.
8. Write notes on
   (i) Price Support
   (ii) Income elasticity at demand
   (iii) Agricultural price policy.

Key Words

1. **Price Support**: Government policies or programs that aim to stabilize agricultural prices by setting a minimum price floor for certain commodities. Price support mechanisms may include minimum price guarantees, direct payments to farmers, or government purchases of surplus produce.

2. **Market Intervention**: Government actions to intervene in agricultural markets in response to price fluctuations or market disruptions. This may involve buying or selling agricultural commodities, releasing emergency stocks, or implementing trade restrictions to stabilize prices and ensure market stability.

3. **Buffer Stocks**: Reserves of agricultural commodities maintained by governments or international organizations to stabilize prices and supply in the event of market disturbances or emergencies. Buffer stocks are used to absorb excess supply or release additional supply to regulate prices and prevent extreme price fluctuations.

4. **Subsidies**: Financial assistance provided by governments to agricultural producers to support their incomes, lower production costs, or promote specific agricultural activities. Subsidies may include input subsidies (e.g., fertilizer, seeds), price subsidies, or income support payments to farmers.

5. **Price Bands**: Government-imposed price bands or ranges within which agricultural prices are allowed to fluctuate. Prices falling outside these bands may trigger government intervention measures such as market purchases or sales to stabilize prices.

6. **Tariffs and Import Controls**: Government-imposed tariffs, quotas, or import restrictions on agricultural imports to protect domestic farmers from competition, stabilize prices, and ensure food security. Tariffs and import controls may be used to regulate imports during periods of domestic oversupply or low prices.

7. **Export Subsidies**: Financial incentives provided by governments to promote the export of agricultural commodities by domestic producers. Export subsidies aim to make domestic products more competitive in international markets and support farmers' incomes by expanding export opportunities.

8. **Market Information Systems**: Government-sponsored systems that provide timely and accurate information on agricultural prices, production levels, market trends, weather forecasts, and other relevant factors to farmers, traders, policymakers, and other stakeholders. Market information systems help improve market transparency, facilitate informed decision-making, and prevent market distortions.

9. **Contract Farming Regulation**: Government regulations or policies governing contract farming arrangements between farmers and agribusiness firms. Contract farming regulation aims to protect farmers' interests, ensure fair contract terms, and promote equitable sharing of risks and benefits between contracting parties.

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4.1 Chapter

STATE INTERVENTION IN AGRICULTURE AND STABILISATION OF PRICE

Objectives

After completing this chapter, you will be able:

- To know the reasons for state intervention in agriculture.
- To Understand the problems of agricultural policy.
- To understand the problem of agricultural marketing.
- To know the problem in price and income determination.
- To find solution for maintaining price stability.
- To protect the farmer and farm wage.
- To know the various problems associates with agricultural marketing, agricultural labour and to find a solution.

Structure:

State Investment is a must in agriculture. Today state has emerged as the participant in the process of development and a great system analyser and manager of agriculture. The day of Laissez-faire is gone. In recent year state plays the vital role in smoothening and stabilising agriculture. In every sphere of economic activity state has to interfere for the sake of economy. In the process of agricultural up gradation, development, mechanisation and other activities state plays a very vital role in accelerating such activities. State is a great promoter, supporter accelerator, and booster and stabiliser of agricultural activity. It is the fundamental institution of economic development and hence a great stabilizing and controlling agent of economic development and agricultural development. In developed, developing and underdeveloped countries the state is one of the most diminishing institution whereas determining in the developing and underdeveloped

countries the role of the state cannot be ignored or over emphasised of agriculture remains backward, other sectors of the economy can not develop because agriculture in one of the key sector of the economy. But when agriculture lacks stability, infrastructural facilities, basic needs for promotional activity; urgent factors for agricultural development, elementary needs for the higher productivity, basic elements of investment, hinderance in the marketing, and so take key factor, state in the primer institution to intervene in the activities of agriculture to support and promote this sector.

In fact state has always intervened to a certain extent in agriculture. In present day context, state intervention has become essential to boost and build the agricultural system by controlling and guiding the different agrarian activity on or off the field. Almost all over the globe state intervention on agriculture has been purely urgent either to save from difficult or to promote to better stage. In the present day all economies are prone to critical fluctuation and victim of strings of trade cycle, Market fluctuation price on stability trade – problems make the countries farmers helpless, where they seek the support of the state. Agriculture in recent years are confronted with several problematic issues like land problem, productive problem, Infrastructural problem, energy crisis, Labour problem, tenancy problem, ownership menace, marketing hindrance, trade related hurdles, capital scarcity, under utilisation problem and so like myriads of difficulties. As the nation grows, population grows and the nature of issues grows. All these are happening or mishaps necessitate the role of the state to be utmost urgent, Day by day the burden of the state and responsibility of the govt. Increasing faster. Without the state intervention on agricultural sector, its development cannot be imagined.

4.1.1 NEED FOR STATE INTERVENTION

Around the globe many govts may have devoted special attention towards the farming development that proves the urgency of state intervention. Some of the important reasons are discussed below:

(a) Agriculture is peculiarly dependent upon the land. The system of land tenure, the laws of in heritance, and the farming are related to land. All these can be determined and controlled by the state for the benefit of agriculture and peasant society otherwise agriculture cannot be carried forward.

(b) Agriculture is a derivative function of land-tenant relationship. For the development of agriculture this relationship should be just and rational. If the farmers/tenants do not get genuine rent, security of tenure, right to ownerships & guarantee by farming when agriculture shall be spoiled. For this intervention of the state is urgent.

(c) Farming is predominantly a small industry in comparison to other industrial units. This hampers the farmers in organizing services on production available to large scale undertakings. Farmers are confronted with the problems of capital and other basic equipments. Further they are put into troubles by the middlemen who are dominating by nature and influence. From bargain they suffer from huge loss and mental agony that may lead to hamper the productivity in agriculture. In such a circumstance state must come forward to provide support to the farmers.

(d) Agriculture the provider of food grain and cloth to the population and other basic necessities indirect by throughout the would has been a relatively depressed and dilapidated industry deprived of better attention and care. Particularly it is the greatest contributor to income and employment is not well-treated. The declined efficiency and quality need to be rejuvenated by the state intervention caring of agricultural will save the nation.

(e) State is the premier institution and dominating organisation that can save the agriculture from the eventuality of price fluctuation. In an economy we find violent fluctuation of prices particularly in agricultural sector. Supply does not adjust itself to demand in the shortrun.

(f) The lacuna in the agricultural sector arising out of various social and political factors can be better treated through state action. State leads the agricultural sector towards development.

4.1.2 METHOD OF STATE INTERVENTION

State is the supreme institution of a country. So it can enter into different sectors for smooth operation. In case of agriculture it can intervene in various ways.

State Intervention in Production

The very first and foremost duty of the state is to raise the productivity and efficiency of agriculture. Hence it should first intervene in the field of agriculture to ensure better farm productivity. In this sphere state must be active regarding the suitable policy framework in support in the agricultural society state should prepare framework in support of the agricultural society state should prepare plan to reduce the dominating role in the land lords and must try to eliminate the land lord's control in farming and control the diffusion of landed property. State should orient in such plan measures so as to provide wide spread land ownership by redistributing the land ownership and security of tenure and must concentrated on the regulation of better rent. At the same it should think over the equitable distribution land property and prevailing system. It must take note of the uneconomical holding of land and the problem of labour and capital in agriculture who deeply influences the productivity & efficiency of agricultural return. Suitable policies may be formed to encourage the farmer's productive skill by supporting financially and technically and by discouraging the sale/mortgage of land by small and marginal farmers, state should carry on initiatives for the provision of basic needs to the small and marginal farmers to raise their efficiency and production ability state should be a participant in the field of agricultural to ensure the tenants their security and right to ownership by regulating a justified rent policy in favour of the peasants society by certaining their freedom or enterprise. At the same time if should adopt adequate measures to dispel the bad tenants.

In a state, state should watch over the large estates. Where the land-lords rule dominance. The poor tenants do their business on rent. To add woe they borrow capital on interest and suffer. State may frame suitable policy to make them stable. Further the land should be of economical size so that it can be better cultivated. On the other hand long term capital of the estate may be depleted by a number of censes extraneous to the efficiency of the farm, such as taxation level on the death of the owner, or his spend thrift or charitable nature. Moreover, the land-lord may be either absentee or ignorant, so that he cannot supervise the running of the estate.

In addition, both the owner - occupiership and that of Land-lord and tenant suffer from two defects.

(i) Productive power of the soil by no means is always indestructible and it is possible greatly to influence the growing of crops in adverse way. Empirical evidence has shown that the productive power of the soil has been roughly affected. Private owners are not so apt to venture into the further. Proper care of the land can save it from various extraneous harms. To take the drought and flood & other natural calamities Govt. should be more careful.

(ii) Owners of land, both agricultural and otherwise obtain an unearned increment on value of the development of a near by city or improvement of transfer increase in demand for their land. It is very improbable that this increment of income will be distributed according to need.

State as the authority may implement legislations to minimise the effect of the defects on agricultural so as to support it to prosper and develop their economic efficiency and productivity.

Many agronomists prefer to state ownership of land in order to come over the difficulty. Because under state ownership the farmer will be benefited adequately to the farmers will feel secured of their ownership and rent. State can protect and preserve the agriculture and can be more vigilant to enhance the unsuitable crops. State can be more vigilant to enhance the productivity and efficiency of agriculture by providing adequate infrastructural facilities.

But many have upbeat of their eyebrows on this context they put forward various arguments against land nationalisation these arguments are like:

(i) It would prevent people obtaining the satisfaction of land ownership that will both eliminate the source of cheap capital to the tenants and a real element of happiness.

(ii) Another most defect lies with management of land. Delegated land management is very harmful for the land improvement and agricultural productivity. It is an inefficient way of management that hampers the psycho-willness of the peasantry class.

(iii) A further people argue that state is very unlikely to be swayed away economic motives in deciding the size of farmers, but is far from likely to move them smaller rather than larger than they are as present, by adopting an uncertain economic policy of small holdings.

It is further stated that has many other ways to influence the agricultural products and efficiency and there by raising the agricultural outputs. To improve the farm efficiency state can take suitable other measures than the system of land ownership as such:

(i) State may strike such policies which cover the whole area of farming state should implement such a policy that covers whole of the productive area by providing adequate crop protection and saving the farmers' Labour in land. National or local units the state should be active in standing behind the farming community. For example the crop of an individual farmer is affected by a disease and he is not on a position to save his crop from that will spread over the neighbour is land. What we call negative-spill-over effect. But a suitable measure in time can protect those crops and thereby the crops of neighbour hood land.

(ii) Adequate Research & education may be imparted by the state to the farmers & would-be farmers that will be reap the benefits in the long-run. Which not visible nut highly generated and productive. This is the best way to step the agricultural activity what can be framed as prevention is better than care. Creation of skilled, educated, trained agricultural lists lead to the development of agriculture on manifold. This is one of the best ways to fight with agricultural problems with the support of the state.

(iii) We can better look into the organisation set ups and like co-operative societies, co-operative farming, co-operative marketing which the state can take initiatives to build up. An individual farmer fails to do so. He fails to undertake better organisational farming because of paucity of funds, day to day business, narrow outlook and so on. An individual farmers faces the problem of funds to invest in agricultural outputs like better HYV seeds, fertiliser, feeding stuffs, the pesticides, & other farm requisites. This problem can be managed & solved by state initiatives.

(iv) The very peculiar problem of underdeveloped and developing countries is the ignorance of farming class especially among the small and marginal farmers they do not have adequate knowledge regarding the full utilisation of their resource justifies action of the method of cultivation. Some methods of production are not desirably used out of ignorance or paucity of skill and fund. State can intervene in this field to make necessary correction what will lead to raise the output of a state significantly.

(v) State or its local representatives may step in when there is a reason to believe that some specific farmers or land owners are filling to pursue what of considers to be efficient methods. Such intervention is specifically required either when maximum production is vitally necessary or when prices are so favourable that even inefficient farmers can remain in business.

4.1.3 STATE INTERVENTION IN MARKETING

In the interest of the public welfare, state intervention directly or indirectly is necessary. The extent of intervention depends upon objectives to the govt and to the extent of defects and malpractices prevailing on the existing system of marketing. It is no doubt desirable when the agricultural marketing suffers from the under supremacy if the big

brotherhoodness of middlemen, the extra beneficiary of the system who suffocate by exploiting both consumer and the initial producer.

State intervention is desirable to protect the farmer, the initial producers and the consumer state should try to save both from the unnecessary exploitation by the middlemen who warms his pocket being a bridge to transfer the agricultural produce from the initial producer to final consumer thereby creating a huge market margin, the difference between the price of the initial producer and the final consumer state should intervene make the transparent distribution of agricultural produce through public distribution system. Further state should play the mature role to reduce market margin for the high gain of farmers.

State intervention is necessary when it tries to reduce the cost of the produce. It is desirable that should take necessary steps to reduce the cost so that farmers can gain netter leading to rise in productive efficiency. Reduction cost of producer will lead to rise on demand for the farm good because of lower price on retail shops. Further that also creates extra saving far the farmers along with gain to the consumers.

Retail Distribution is unduly expensive, because each shop is small retail counter, for a particular agricultural product, that makes services unnecessarily costly. This is not confined to the retailing of farms products but is general through out the field of retail distribution, in this context suggestions are made for the opening up of. Co-operative markets and regulated markets by providing adequate information on price and products for the benefit of the consumers. That will gain the farmers, mostly the small farmers state should take control over prices by creating marketing zones, checking the quality thereby. Local administration must be given responsibility for the smooth management and operation.

State should be active on the connection for establishing co-operative marketing system will full control and good operation. Only opening up the system may not prove justified if that doesnot function properly.

Co-operative Marketing is a wise step for the better management of agricultural produce on the market particularly by easing the storage, processing, transportation, marketing, purchase and sale and rational distribution. Regulated markets may be helpful on this direction.

Regulated markets establish by govt to regulate the conduct of business may and to ensure fair price facilitates with how market charge to eliminate the exploitation of farmers justifies the state intervention. It prevents the loss or farmers, protects consumers, and establishes transparent marketing system with necessary infrastructural facilities to eliminate malpractice from the system.

COSAMB (council of state Agricultural Marketing) Board is a step forward to have necessary control over market by controlling price, quality and educating business man, consumer farmer regarding efficient marketing system and supplementing aids and assistance financially and technically.

Directs efforts may be initiated by the state to control over monopoly big farms. Countries all over the globe in recent years have been much alert. To protect the farmers and consumer potentially. Different countries have developed different laws but all have fell the urgency of state intervention in marketing of agricultural produce.

Further state should intervene to protect quality standardisation, weight measures, fixing of price, trade facility protect the volume of trade and so on. Role of the state is urgent to protect small farmers, Marginal farmers who have no scope for preservation.

During the period of crisis like natural calamity war like situation, other disturbances the role of the state becomes more crucial & unimminent. As of proves to be from the history of economies state intervention in marketing inalogical necessity.

4.1.4 THE DIVERSION OF RESOURCES

Diversion of Resources refers to the transfer of the resources employed in one to other uses as per the desire of the economy derives from the display of demand and supply interaction in the market during a given period. In this context we refer to the normal mechanism in which economic resources driven from agri culture to other sectors of occupation when consumer's demand desires this, or driven towards agro-culture due to expansion many need on the consumers' performance. All these mechanisms are operated and controlled by price-mechanism. The diversion of resources is expected to play a very important role in the development of agriculture and the development of the economy consequently. Normally such a process of diversion takes place on the economy to accelerate the process of development. For such act state plays a major role and particularly state intervention comes into act.

State intervention is desirable even in normal times to put gear for the transfer of factors of production between agriculture and industry and within agriculture. In the process of diversion state must look into a gainful transfer in favour of the industry and agriculture. Agriculture and industry, Agriculture and allied industries all are closely related on the production system of an economy, both sectors are complementary to each other. From the movement of the market activity and the preferences of the consumers and producers market displays the diversion of resources. When demand exceeds supply, price fluctuation affects the production process, there happens a situation of economic embarrassment, state intervention becomes imminent and urgent state, controlling authority of the economic system intervenes to stabilise the price and provide a justified expected revenue to the farmers for their productivity with a view to encourage the production of foodstuff most required by the economy. During the period of crisis state needs to control the agricultural prices for the benefit of the consumer and farmer what necessitates diversion of resources from one use to the other. Rationing of demand and supply can be better done by the state this apex authority. When prices rise abruptly, particularly when the prices of necessary food stuffs rise, of becomes profitable for the producers but harmful for the consumers. In such a case state intervention becomes urgent for the sake of the market correction, particularly it is very much necessary for controlling the black market. Sometimes the state comes for ward to subsidies the necessities. For better allocation of resources and better distribution of consumer necessities state intervention and Diversion of resources become the necessity in the economy during the period in economic crisis like inflation and deflation. Consequently more direct state action it needs to secure the required production of the most important foods.

A state plays an important role in correcting the economic disorders. Particularly of may urge producers to expand or contact the output of particular foods and take steps to provide information on possible alternative occupation, or it may offer more direct assistance to movement or hamper production where a contraction is required. In extreme cases state may impose restrictions or prohibit the production of something or instruct farmers to produce another.

To maintain the economic discipline and to eradicate the deficiency or any surplus state intervenes to transfer resources from one agricultural sector to another state may initiate some policy measure to prosper the agricultural sector particularly by rationalising the resources use. State may try to modify the agricultural system and the cropping pattern in favour of the economic needs. Introduction of new product, support to farmers and organisation of research work may lead to the redistribution of resources. So to say state intervention has been a common issue in modern day economy and the expanding role of the state has been realized on the field of agriculture for the diversion of economic resources to achieve the better economic devt. The concentration of state action in agricultural cannot be over emphasised.

4.1.5 THE STABILISATION OF PRICES OR INCOMES

Every economy is subject to fluctuation of price and employment. Depression and inflation are two major problems of the economy. State action is designed to iron out the fluctuation in general employment and income. In this state

plays a great role in maintaining stability on agricultural employment. Action designed to modify farmers income, either through affecting the amount they after, or through subsidies, and levies may after the general level of employment.

State invention is necessary to modify farmers' receipt with objectives; it may aim at reducing the fluctuations on prices or incomes whole preserving the same average; it may aim at raising the averages. Necessarily the two policies may work together since those ostensibly designed to stabilize the process for frequently attempt to raise them when they are low without reducing them when they are high and thus increase the average level. It simply means that states has to intervene in agricultural sector to maintain stability in the price and income to lead the economy towards development.

To stabilise the price and income on the agricultural sector state by taking on to consideration the farmers' receipt from the agricultural sector, let us assume that farmers' receive that the consumer pays for any food, less marketing charges, we shall then ----- to consider what differences are made of the stage is prepared to inject subsidies or make levies so as to diverse producers & consumers prices. It there is no provision far subsidy or levy, producers price can be stabilized by putting supplies on the market at a more regular rate.

Unnecessary fluctuations on prices of individual products are undesirable both for producers and for consumers, particularly of they lead, as they usually so to, variations in farmers' intended output. State may also prefer to adjust the cost variations of the producer to bring stability. State can be authoritative to stabilize the price by providing adequate measures particularly by rationing the prices.

State can adopt measures for the diversion of resources from those units where demand is inadequate to those units of production where demands for the goods are in high demand. Economically this is highly desirable be cause this leads to economic development and agricultural development variations in the prices can be better managed & controlled by the state to intervene for balancing the price by controlling producers action in the market.

Intervention of the state takes place in two ways.

(i) State may collect and publicise information of the true situation.

(ii) State may assist schemes for carrying over surpluses from large crops.

State may adopt other measures to control the economic fluctuation by raising the prices.

Agriculture is a very much subject to cyclical and seasonal variations, because on this sector producers have no better idea about the prevalent conditions of demand and supply. Agriculture suffers from the fluctuations when affects its productivity and efficiency, the state tries to correct the fluctuation by gathering adequate statistical informations to illuminate the true position of the agricultural market. The agricultural producers do not have adequate knowledge for agriculture and control the situation or price trouble, on such case state comes forward to take over the whop and adjust the price up and down. So that of controls the level of income and employment in the agricultural sector that leads to stability. State organizes body to apprise the producers about the precarious situation, particularly they educate the producers regarding the price situation production level, the market demand and market supply and they cater enough knowledge regarding the necessity of the market so that producers become more conscious and rational about the market situation.

State intervention is quite necessary to control the cyclical fluctuation by controlling the live stock to control the production and crop pattern. Errors and ignorance of the farmers can be corrected by the sufficient state activity and particularly by providing informations to the farmers. State prepares plans for the future to prosper the status of the peasants by supplementing the farming activity and market knowledge.

State has to intervene in agriculture to develop the system. Here state has to be more vigilant regarding the nature of the commodity. Depending upon the perishability or non-perishability of the commodity state has to prepare plan, policy to safeguard the farmers. Farmers may not have sufficient scope for the storage of commodities which may be supplemented by the state. State must take measures to facilitate storage facility for the producers agricultural goods which are perishable than products of manufacture sector. Because of the perishable nature of the goods market is subject to cyclical fluctuation and because seasonal production of goods it is subject to seasonal variation, all these can be corrected by the state through warehousing state must also provide financing assistance to the farmers from the exploitation by the money lenders and other non-institutional financial agencies which is responsible for the price and income fluctuation on agricultural sector state participation in agricultural sector to support and supplement farmers help to stabilise price and income particularly by strong the bumper crops and financial aid.

State intervention to stabilise price and income with out disturbing the agricultural productivity and efficiency or accelerating the same may be well for appreciation. Adjustment of supply and demand by supporting the farmers, minimising the pressure from middleman, by controlling the unnecessary hoarding and market on stability can be a great effort of the state on this direction.

Experience shows that the organised bodves are very unrolling to recognise that the underlying conditions require lower price, and are apt to interpret very decline as a temporary one, even though in fact of may be due to permanent changes, such as a reduction in costs of production. Such mistakes lead either to an unjustified increase in production and a greated price fall than would otherwise have been necessary, or if the amount produced is controlled to the exploitation of consumers.

This is a reason for entrusting price stabilisation measures to ondependent bodies, not producers organisation representing sectional interests only. Such bodies of may be hoped, will have more require for the general interest. This is a point is taken into account in the new proposals for international rules governing the regulation of trade and employment.

State may be further vigilant to provide subsidy to the farmer during depression and money recovered on additional resources will, over the average of good and bad times be attracted into agriculture. Moreover, since agricultural supply as a whole is inelastic on the short-run, it is unlikely that agricultural output will be stimulated much on depressions by such a policy or checked on booms. Thus such a policy should be helpful.

But at the sometimes state should realise that tax imposition on agricultural product may not be good for the economy always. It may hamper the benefit is the farmer it may reduce the productive capacity. It may be unfavorable for the small and marginal producers crop production may be affected what may further add woe to instability. Hence state may be more calculative to make the policy more effective and efficient. The same may be adopted seeking the price situation and productivity pattern while providing subsidy to the farmers.

Thus state plays a major role in maintaining price stability and income stability.

4.1.6 PROTECTION OF AGRICULTURE

State is the supreme authority and its primary role is to maintain stability in agriculture and at the sometime state should be the authority to protect the interest of the farmers and agriculture. There are ways on which the state can hope to lower the cost of production, and marketing there are measures which it can take to facilitate the transfer of labour, and there are occasions when well-on-farmed and restrained and restrained state action can stabilise prices, seasonally or cyclically. But it is the state to protect the farmers by providing subsidy during the depression and also help to stable the agricultural market during inflation, whatever major steps state adopts of should be in the interest of farmers and ultimately on the development in agriculture.

Protection of Agriculture and agriculturalists and the agricultural products may be the urgent for the state. It they are not protected, the economic development of a country may be hardly affected.

State intervention is necessary to save agriculture from unnecessary fluctuation. Cyclically or seasonally. Farmers new support to carry n their efficiency in production and boost the developmental activity in agriculture many have justified such a protection is an urgent issue for agriculture.

Role of the state during depression has been prescribed by J.M. Keynes since the 1929 great depression that can be better applied depression to raise the productions income of the agricultural sector. So that fluctuation can be controlled and agricultural sector can be protected. Similarly stage should intervene during the period of boom. Recovery from the boom can be possible through state action.

State may provide other supports to the agricultural sectors to boost productive efficiency during depression particularly through financial assistance and other necessary needs for the development of the sector. It must helpfully support the farmers and consumers during such a crisis. Similarly protection is urgent during inflation may trend also fair income to agriculture is the key to success. Agriculture is not fairly supported then the development of the nation may be endangered. At the same time state should take initiative to protect the agricultural producer from the drown trend of production and income.

State should be watchful to protect agricultural sector the foreign competition. Agricultural market should be saved from the external fluctuation and trade relationship must be set favourable. Agricultural labourers should be given fair chance to deliver their better service.

In underdeveloped and developing nations agriculture is the chief source employment and contributor to national income. In such economy agriculture should be under the best supervision of the state. During unprecedented situation agriculture needs full support and care of the state.

State intervention agriculture is found to be fully justified and necessary. To grow agriculture for the benefit of the people agricultural dependents, state needs to be vigilant and careful.

4.1.7 SUMMARY

State intervention is must on agricultural. It is justified on many grounds. It is justified for the benefit of farmers consumers and economic development. State support is necessary for the development of agriculture, to uplift agriculture from the ground level. It is to save agriculture from the malpractice within the system.

State needs to intervene in production pattern, to raise the efficiency and productivity. It is necessary to support agricultural producer class by rationalising the land tenure system, regulation of rent, ownership right and security of tenure. It must intervene in agricultural marketing to control quantity, quality and rational distribution.

It must play a good role on the diversion of resources from one use to the other, form unproductive to productive sector.

Satisfaction of price and income is urgent for the economic and agricultural development. State can take initiatives control fluctuation and maintain price and income stability so as control the agricultural system.

State intervention is urgent to protect the agricultural producer, agricultural productivity, consumer satisfaction and overall economy of agriculture.

4.1.8 SELF ASSESSMENT QUESTIONS

1. Critically assess the reasons for and fields of state intervention in agriculture.
2. Do you think state intervention can reallocate the resources?
3. Justify the role of the state in protecting agriculture.
4. How far state has been successful in maintaining stability of price and income in agriculture.
5. Give a note on planning in agriculture.
6. Find out the problems on agricultural policy.

Key Words

1. **Price Support**: Government policies or programs that aim to stabilize agricultural prices by setting a minimum price floor for certain commodities. Price support mechanisms may include minimum price guarantees, direct payments to farmers, or government purchases of surplus produce.

2. **Market Intervention**: Government actions to intervene in agricultural markets in response to price fluctuations or market disruptions. This may involve buying or selling agricultural commodities, releasing emergency stocks, or implementing trade restrictions to stabilize prices and ensure market stability.

3. **Buffer Stocks**: Reserves of agricultural commodities maintained by governments or international organizations to stabilize prices and supply in the event of market disturbances or emergencies. Buffer stocks are used to absorb excess supply or release additional supply to regulate prices and prevent extreme price fluctuations.

4. **Subsidies**: Financial assistance provided by governments to agricultural producers to support their incomes, lower production costs, or promote specific agricultural activities. Subsidies may include input subsidies (e.g., fertilizer, seeds), price subsidies, or income support payments to farmers.

5. **Price Bands**: Government-imposed price bands or ranges within which agricultural prices are allowed to fluctuate. Prices falling outside these bands may trigger government intervention measures such as market purchases or sales to stabilize prices.

6. **Tariffs and Import Controls**: Government-imposed tariffs, quotas, or import restrictions on agricultural imports to protect domestic farmers from competition, stabilize prices, and ensure food security. Tariffs and import controls may be used to regulate imports during periods of domestic oversupply or low prices.

7. **Export Subsidies**: Financial incentives provided by governments to promote the export of agricultural commodities by domestic producers. Export subsidies aim to make domestic products more competitive in international markets and support farmers' incomes by expanding export opportunities.

8. **Market Information Systems**: Government-sponsored systems that provide timely and accurate information on agricultural prices, production levels, market trends, weather forecasts, and other relevant factors to farmers, traders, policymakers, and other stakeholders. Market information systems help improve market transparency, facilitate informed decision-making, and prevent market distortions.

9. **Contract Farming Regulation**: Government regulations or policies governing contract farming arrangements between farmers and agribusiness firms. Contract farming regulation aims to protect farmers' interests, ensure fair contract terms, and promote equitable sharing of risks and benefits between contracting parties.

4.1.9 Reference:

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12. Readings in Agriculture-Pramit Choudhury

13. Agricultures in an Unstable Economy-Schultz

14. Agricultural Price and Income Policy- Schultz

15. Marketing of Farm Products-Shepherd

5.1 Chapter

INTERNATIONAL TRADE IN AGRICULTURAL COMMODITIES

Objectives

After completing this chapter, you will be able:

- To know the relationship between foreign trade and agriculture.
- To understand the export competitive measures.
- To know the relative of agriculture on international trade.
- To know various agreements relating to agricultural products on foreign trade.
- To know the impact of globalisaion on agriculture.
- To understand various international programmes for agricultural development.
- To know various measures or policies to safeguard agriculture.

Structure:

5.1.1 FOREIGN TRADE AND AGRICULTURAL DEVELOPMENT

Agriculture and foreign Trade are many ways related from age of the primitive to the modernity Agricultural true has its share on foreign trade and it contributes immensely to foreign exchange earning. In underdeveloped and developing nations agriculture plays the most significant role. Each developing and underdeveloped country depends on its agriculture for the international trade relationship which is supposed to be the resources of foreign exchange. Agriculture is the most fundamental sector influence trade is the primary producing countries. In Indian economy Agriculture faces this stiff competition from the other Asian Countries that has been furthered during the age of globalistion. In this new liberalisation of word trade, agriculture has found new vistas of growth and govt has been to take initiatives on agricultural development to meet successfully the newly emerged challenges the performances agriculture has been more export oriented after the integration with the world market extending its scope for development on quality and quantity to achieve wind up competition.

The relationship between foreign trade and Agricultural development has been more crucial and attached. Agriculture has contributed to foreign trade immensely.

(i) Agriculture is primary source of export on the primary producing countries. It contributes the large hare in developing and under developed countries.

(ii) It is the major source of foreign exchange, hence it bridges up the gap between exports and import (Tradegap)

(iii) It is the source of foreign capital, hence it helps in capital formation of a country.

(iv) It helps in the technological transfer and thus it accelerate the process of economic development.

(v) Normally Indian economy in recent year has a very low import that has helped the country to grow by creating export surplus, in commodities like, wheat, rice, sugar, coffee, tea, milk products, fruits etc.

(vi) In recent years about 18% of the export is still contributed by agriculture. Despite competition from wind market it has successfully challenged in raising the export.

(vii) It has been responsible creating opportunity is labourers and farmers in the world market particularly promoting research facilities. Ag. Labour market has opened up.

To be more specific, foreign Trade in Agriculture has helped this country to lower the cost of production and raise the output return from the agricultural field. Now the Agricultural goods enjoy comparative cost advantage and better competitive position on the world market. Adequate research works has been initiated by the countries agro economists to determine the competitiveness of Agriculture and further its role in foreign trade in favour of the countrys' economy and peasant society. Govt. may prosecute good policy measure to come around the export competitiveness of Agricultural by creating a market expansion.

5.1.2 EXPORT COMPETITIVENESS MEASURES

In determining the export competitiveness, they have taken Indian prices of agricultural commodities and compared them with international prices. They have discussed competitiveness in two alternative situations, namely, "importable hypothesis" and "exportable hypothesis." Under the importable hypothesis, the commodity in question is regarded as an import substiture, i.e., the commodity under consideration is assumed to be imported and expected to compete with the domestically produced commodity in domestic market. Thus, this approach includes the international price of the commodity under consideration, international transportation cost between exporting country and India and post clearance charges. Further, if the commodity is required to be transported for sale in the regional markets, then the transportation cost within India is also included in the price of the commodity. Under the exportable hypothesis, the Indian Commodity under consideration is expected to compete in foreign country at a foreign port. The relevant reference price is determined after deducting the domestic and international transport costs, marketing cost and traders margin as also processing

cost necessary to make commodity marketable. The commodity' is judged as exportable if the price of domestically produced commodity is less than the international price of the commodity, Mr. Gulati have evolved a concept, namely Nominal Protection Co-efficient (NPC) and this concept is the measuring rod of competitiveness. The NPC of a commodity has been defined symbolically as:

$$NRC = Pd/Pb$$

Where NPC = National Protection Co-efficient

Pd = Domestic Price of Commodity

Pb = Border or reference price of a commodity after taking care of transportation and marketing expenses.

Under both hypothesis, a commodity is adjudged competitive if the NRC is less than unity. In other words, if domestic price of a commodity is less than the border price or reference price inclusive of importable and marketing costs, the commodity is judged as export competitive. The dominant factors are the domestic price and transportation costs.

The authors have also evolved a concept namely, Degree of Export Competitiveness, which is an extension of the concept of NPC. Symbolically, the Degree of competitiveness has been expressed as under:

$$\text{Degree of Export Competitiveness} = \frac{1 - NPC}{NPC}$$

The higher the ratio, the greater will be the degree of competitiveness of the commodity under consideration.

With the help of above concepts, the authors have discussed export competitiveness in respect of major cereals fruits and vegetables produced in India. Among cereals rice has been found as highly export competitive. Wheat has also become export competitive while maize and sorghum are less export competitive. The degree of export competitiveness of rice worked out by the authors is 1.2 whereas that of wheat is 0.2. The degree of competitiveness of maize and sorghum is worked out to be -0.1 and -0.25 respectively.

Among fruits and vegetables, banana, lychee, tomato, grapes, sapota, onion, mango and potato have turned out to be positive export competitiveness products.

The above findings of the authors are of great value to policy planners and entrepreneurs in India. They provide a basic for judging the competitiveness to an individual entrepreneur if he decides to go in for an export venture in agricultural goods.

There is a host of non-price factors which contribute to competitiveness of agricultural commodities. These factors relate to consumers tastes and preferences, brand equity of products, changes in consumers' taste and preference, packaging etc.

5.1.3 INDIA ON AGRICULTURAL FOREIGN TRADE

The Indian agricultural sector with the significant share in GDP plays a significant role in the employment generation specially in the rural sector. In the aftermath of agreement on agriculture under the aegis of W.T.O. it has significant potential as a net foreign exchange earner.

The main approach of the Government policy has been to control trade in a mariner to ensure adequate availability of essential food items to consumers at reasonable prices and to protect farmers from foreign competition. The objective of export and import policy with respect to agricultural foreign trade is given as under:

(1) *Exports:* To maximise agricultural exports in order to ensure remunerative prices to the farmers and boost foreign exchange earnings, keeping in view the prime consideration of sufficient availability of essential commodities to the domestic consumers at reasonable prices.

(2) *Imports:* To regulate imports, keeping in view the domestic demand and supply situation, indigenous production, export potential and consideration of foreign exchange.

Specific policy in respect of principal agricultural commodities as contained in EXIM policy 1997-2002 is given below:

(i) Rice: Export is allowed freely without any restrictions now.

(ii) Coarsegrains: Exports are allowed upto a quantitative ceiling of 50,000 Mts. during 1997-98.

(iii) Wheat and Wheat Products: Export of wheat banned now, but export of wheat products, whether in bulk or in consumer packs, be allowed within an over all quantitative ceiling of 0.5 million tonnes.

(iv) Pulses: Export is permitted against a license subject to a quantitative ceiling but export in consumer packs be freely allowed.

(v) Hybrid Jowar: The export of hybrid jowar is freely allowed.

(vi) Oilseeds: (a) The exports of HPs groundnut and seasame seeds are freely allowed for the year 1997-98 (b) The export of castor seeds is allowed freely.

(vii) Tobacco: Export is free without any restrictions for both (a) unmanfactured and (b) manufactured.

(viii) Spices: Export is free without any restrictions.

(ix) Cashew: Export is free without any restrictions.

(x) Horticultural Floricultural and Fresh, vegetable products Exports are free without any restrictions.

5.1.4 PERFORMANCE ON EXPORT SECTOR

Increased export of agricultural commodities has been witnessed over the years. In the last five years, the value of agricultural exports has increased from ₹ 78,84,29,00 thousands in the year 1992-93 to ₹ 2,10,20,99,00 thousand in the year 1996-97. The commodities like wheat, rice, groundnut, oil meals and raw cotton have registered significant increase in exports during the last five years. Table 5.1 provides information about agricultural exports of principal commodities during 1992-93 to 1996-97.

The Table 5.2 containing the statistics pertaining to agricultural exports of India clearly shows that increased exports of agricultural commodities has been witnessed over the years. In the last five years, the value of agricultural exports has increased from ₹ 78,84,29,00 thousand in the year 1992-93 to ₹ 2,10,20,99,00 thousand in the 199697. The commodities like wheat, rice, groundnut, oil meals and raw cotton where significant increase in exports (in quantity) has taken place during the last five years.

Yearwise data on volume and value of imports of agricultural commodities are given in Table 5.2

The figures do not reveal any disernible trend. However, imports of agricultural products, in general, have been going down except for wheat which has considerably increased in 1996-97 compared to previous years. The increased import of wheat is an indication of wheat production reaching the plateaus which situation will have to be changed. New technology breakthrough, in wheat production is required to meet the growing needs of the Indian economy. On the other hand gains through exports of rice (Basmati), spices, oil meals, sugar and mollasses and marine products will have to optimised in fact in the liberalised regime emphasis will have to be placed on exports because imports of agricultural products should normally not pose any alarming situation. Complete eliminate of agricultural imports cannot be thought of in the globalisation of the world economies. Agricultural exports will have to be diversified as also made more competitive in the coming years.

Table 5.1
Statement Showing Export of Agricultural Products

Qty: 000 tonnes
Value: ₹ in thousand

Sl. No.	Item	1992-93		1993-94		1994-95		1995-96		1996-97 (p)	
		Qty.	Value	Qty.	Value	Qty.	Value	Qty.	Value	Qty.	Value
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
1.	Pulses	34.31	53.44.00	43.60	73, 59.00	50.51	90.41.00	61.36	131.81.00	53.56	128.13.00
2.	Rice Basmati	324.79	800.64.00	527.23	1061.26.00	442.23	865.32.00	373.31	850.67.00	488.74	1197.75.00
3.	Rice (Other than Basmati)	255.62	174.96.00	567.19	225.46.00	448.50	340.47.00	4540.70	3717.41.00	1984.92	1952.83.00
4.	Wheat	36.75	10.21.00	0.39	0.21.00	86.63	42.34.00	632.47	366,76,00	1094.19	679.97.00
5.	Other Cereals	17.06	10.16.00	148.32	34.02.00	84.24	28.03.00	28.10	16.97.00	64.77	48.84.00
6.	Tobacco Unmanfg.	70.61	355.57.00	90.49	368.26.00	42.91	184.13.00	77.66	378.69.00	77.09	445.98.00
7.	Tobacco Mfg	17.65	118.47.00	14.18	92.95.00	10.82	70.62.00	9.43	68.13.00	9.85	91.83.00
8.	Poultry & Dairy Products	—	—	—	—	—	48.88.00	—	58.76.00	—	118.80.00
9.	Floriculture Products	—	14.91.00	—	18.84.00	—	30.84.00	—	60.14.00	—	61.80.00
10.	Spices	128.71	393.42.00	182.33	568.91.00	154.95	612.24.00	203.73	793.52.00	366.19	1196.22.00
11.	Cashew (include. CNSL)	62.66	748.66.00	78.47	1048.20.00	80.25	1247.09.00	70.83	1237.16.00	70.11	1283.03.00
12.	Sesame & Niger Seed	67.70	116.22.00	39.05	73.51.00	59.57	141.73.00	84.14	257.26.00	100.91	276.69.00
13.	Ground Nut	4.34	7.72.00	254.21	170.63.00	51.12	101.32.00	118.91	230.69.00	143.45	313.35.00
14.	Oil Meals	3678.84	1545.29.00	4837.28	2323.92.00	4150.85	1797.84.00	4300.82	2348.61.00	4459.69	3486.29.00
15.	Castor Oil	68.23	117.39.00	138.91	289.30.00	184.64	441.28.00	291.82	742.52.00	219.08	624.02.00
16.	Shellac	5.01	41.07.00	5.97	65.47.00	4.58	46.86.00	5.70	62.73.00	4.71	47.51.00

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
17.	Sugar & Mollasses	485.10	358.51.00	204.53	178.08.00	51.08	62.16.00	863.72	506.40.00 1	1539.67	1049.91.00
18.	Fruits/Vegetable										
	Seeds	—		—	—	3.54	22.98.00	6.72	41.14.00	3.25	41.29.00
19.	Fresh Fruits	—	312.42*	—	414.34.00*	—	181.75.00	—	230.19.00	—	249.34.00
20.	Fresh Vegetables	—	—	—	—	—	247.98.00	—	297.41.00	—	342.36.00
21.	Processed Vegetables	—		—	—	—	79.14.00	—	142.75.00	—	106.35.00
22.	Process Fruits Juices	—	119.76.00	—	155.60.00	—	169.44.00	—	204.56.00	—	224.58.00
23.	Misc. processed Items	—	108.44.00	—	128.42.00	—	112.60.00	—	540.45.00	—	771.08.00
24.	Meat & Preparations	—	257.11.00	—	344.52.00	—	402.73.00	—	627.00.00	—	694.34.00
25.	Marine Products	210.49	1743.15.00	257.98	2551.89.00	320.91	3536.64.00	—	3381.13.00	3980.56	—
26.	Cotton Raw include. Waste	63.74	181.78.00	312.56	653.59.00	70.75	139.76.00	33.28	203.54.00	277.53	1606.64,00
	Total		7884.29.00		10810.97.00		11051.53.00		17496.40.00		21020.99.00
	Country's Total Exports		53688.26.00		69748.85.00		82673.40.00		106353.35.00		117524.98.00
	% Share of Agriculture Export In Country a export		14.69		15.81		13.37		16.95		17.89

* Fruits and vegetable containers
(P) Provisional.

Table 5.2
Statement Showing Import of Agricultural Products

Qty: 000 tonnes
Value: ₹ in thousand

Item	1992-93		1993-94		1994-95		1995-96		1996-97 (p)	
	Qty.	Value	Qty.	Value	Qty.	Value	Qty.	Value	Qty.	Value
1. Wheat	363.00	710.06.00	241.70	125.65.0	0 0.54	0.38.00	8.24	10.39.00	625.1	403.76.00
2. Rice.	102.00	73.32.00	75.52	55.26.00	6.90	8.55.00	0.08	0.05.00		
3. Other Cereals	—	0.19.00	0.53	0.11.00	0.99	0.34.00	1.04	0.24.00	11.40	0.51.00
4. Cereal Preparation	145.00	182.19.00	85.03	109.87.00	71.85	83.06.00	55.65	69.48.00	41.10	77.15.00
5. Pulses	382.00	334.37.00	628.16	567.01.00	554.27	592.73.00	490.75	685.57.00	531.54	731.76.00
6. Milk & Cream	—	44.79.00	2.55	16.53.00	0.95	5.72.00	5.09	37.01.00	0.49	3.09.00
7. Cashew Nuts	134.00	376.33.00	191.32	482.70.00	28.18	691.29.00	222.32	760.08.00	192.29	640.58.00
8. Fruits & Nuts (excluding cashew nuts)		186.92.00		217.82.00		313.60.00		330.86.00		459.15.00
9. Spices			25.68	75.72.00	20.27 5	4.97.00	24.28	74.12.00	31.21	91.45.00
10. Sugar		0.43.00	0.35	0.45.00	13933.95	2283.12.00	150.53	215.89.00	2.09	3.18.00
11. Oil Seeds		10.64.00		6.98.00		5.35.00		36.17.00		4.91.00
12. Vegetable Oils Fixed (Edible)	102.00	166.88.00	114.36	166.63.00	346.75	624.24.00	1061.99	2261.93.00	1287.28	2926.22.00
13. Cotton Raw & Waste	138.00	216.49.00	3.82	18.39.00	80.80	506.90.00	69.62	521.23.00	2.38	31.42.00
14. Vegetables & Animal Fats					0.75	1.96.00	0.94	3.24.00	8.08	11.65.00
Total		2304.61.00		1843.12.00		5172.21.00		5006.26.00		5384.83.00
Country's total Reports		63374.52.00		73101.01.00		89970.70.00		122678.14.00		136844.35.00
% Share in Total Imports		3.64		2.52		5.75		4.08		3.94

(P) Provisional

Future Strategy

On the agricultural exports front, consistent and persistent efforts to enhance agricultural productivity, processing and preservation facilities for agri-products are needed.

Intensive research on post-harvesting grading, packaging and quality improvement of exporting material is required. This includes extending necessary assistance on matters such as communication, packaging, warehousing, transportation and speedy customs clearance. It is also equally important to ensure co-ordination with various organisation both within the country-and abroad?

Government of India has already taken various measures to boost farm exports. These include cash assistance import replenishmnet, duty drawback, abolition of execise duty and imposition of export duties where necessary. Attention has also been given to strict quality control and pre-shipment inspection systems.

Though the debate on whether Indian farmers are responsive to prices and other incentives is an unsettled one, we should pursue with the conviction that the agricultural sector is responsive to incentives and that incentives are needed for export promotion. The basic question however is that the incentives should reach the producers. In view of the unorganised nature of the agricultural sector, it is to ensure that the incentives such as price support, export subsidies, concessional finance, etc.

5.1.5 NEW ECONOMIC POLICY AND INDIAN AGRICULTURE

Indian Economy after passing through several phases of development has come to pass a very difficult phase towards the beginning of nineties. These unpleasant developments on the economic front had emerged out of both domestic and external disturbances primarily from political instability which was being witnessed both on home as well as an international front. Foreign exchange position had primarily come under heavy strain.

The liquidity crisis of 1991 turned out to be a watershed in India's post independence history. The balance of payments situation had deteriorated so sharply and the foreign exchange reserves had fallen so low that the possibility of default in payment was imminent. Orthodox and unorthodox measures had to be taken urgently to restore credibility. On the domestic side while the Indian economy had done extremely well in terms of real growth between 1985 and 1990, the fiscal situation had deteriorated sharply. The budget deficit as well as the overall fiscal deficit had sharply increased contributing, on the one hand to large increases in money supply and, on the other, to sharp increases in interest payments. Fiscal deficit of the centre and the states taken together which was about 7.5 per cent of the GDP in the late 70s had increased to about 11 per cent by 1991. The fiscal deficit of the central Government alone which was between 6.00 per cent in the late 70's had increased to 8.5 per cent during the same period. Consequently interest payments in the central government's budget had become the single largest expenditure item rising from 2 per cent of GDP in 1980-81 to near 4 per cent of GDP in 1990-91. The country thus entered the 90s with a fiscal deficit that was not sustainable. These disturbing developments led to a review of economic policy and forced unavoidable changes in it.

The New economic Policy comprises the various policy measures and changes introduced since July 1991. There is a common thread running through all these measures. The objective is simple and that is to improve the efficiency of the system. The regulatory mechanism involving multitudes of controls had reduced competition even in the private sectors. The thrust of New Economic Policy was towards creating a more competition environment in the economy as a means of improving the productivity and efficiency of the system. This was to be achieved by removing the barriers to entry and the restrictions on the growth of firms. What was sought to be achieved was an improvement in the functioning of the various entities, whether they be in the private or in the public sector, by injecting an element of competition.

The policy changes brought into force since 1991 fall broadly into two categories. The first set of measures is part of what is normally known as stabilisation policy. The second act of measures come under the category of structural reform policies of while the stabilisation policies are intended to correct the lapses and put the house in order in the short-term, the structural reform policies were intended to accelerate economic growth over the medium term. Structural reform policies cannot succeed unless a degree of stabilisation has been brought about. But stabilization by itself will not be adequate unless structural reforms are undertaken to avoid the recurrence of the problems faced in the recent period.

Structural reforms were broadly in the area of industrial licensing and regulation, foreign trade and investment and financial sector. There is considerable unanimity among the economists about the need to reduce and as far as possible eliminate barriers to entry and expansion of firms. The policy of licensing as has been practiced in the past had no particular merit. In relation to foreign trade policy, the aim was to liberalise the regime with respect to imports and try to bring about a closer link between exports and imports. Yet another objective is to reduce the tariff rates. As regard foreign investment, the new policy measures certainly make a break with the past. In an era in which capital is mobile and moving across boarders in a big way and where technology transfer is through investment, we cannot afford to close our country to the flow of foreign investment. Finally in relation to the financial sector, it has to be noted that while there has been a considerable widening and deepening of the Indian financial system many inefficiencies have crept into the system during the past 20 years. A reform of the financial system to provide greater autonomy to the institutions both in terms of interest rate structure and operational matters had become necessary.

5.1.6 REFORM PROGRAMMES

The programme recommends in its extreme form full economic liberalization which implies: (a) elimination of industrial licensing, capacity controls and capital issue restraints; (b) relaxation of MRTP regulations on the growth of big business houses; (c) removal of administrative control in prices and distribution of commodities, public utilities and labour markets; (d) reforms of credit and financial system in a manner as would allow the banking sysem to play its true role as a financial intermediary; (e) fiscal reforms aiming at elimination of deficit financing and inflation and at introducing tax reforms so as to reduce the size of tax evasion; (f) price-reforms for products of public and enterprises; (g) closure of sick units in the public and private sectors and at least partial privatisation of public units to make them financially viable; (h) import liberalization by elimination of quantitative restrictons and replacing them by tariffs; (i) reforming tariff structure by reducing the average rates of tariffs; (j) liberalizing imported inputs for exports and adopting flexible exchange rate policy; (k) improving the availability of foreign exchange by opening up domestic capital markets to nonresidents and foreign institutional investors; (l) improving the availability of foreign exchange through direct investment flows by lowering entry barriers on them; (m) improving country's access to international capital markets through external debt reforms and finally; (n) introduction of current and capital account convertibility.

With the adoption of new economic policy, there has been an increasing trend of withdrawing of controls and regulations in the economic field. A new economic environment has, thus, come into being which calls for a new approach and strategy to deal with the situation. An impression is usually carried that the reforms of the type as mentioned in new economic policy have a bearing only on industry and infrastructure. This is, however, not so. Agriculture cannot escape the important policy changes; whatever these may be and whenever these may occur. Unlike industries, agriculture in India has functioned more or less in a competitive environment all along. Nevertheless, "inefficient in resource use in agriculture arose due to trade restrictions, inappropriate pricing of inputs and outputs and the prevailing microenvironment. Trade restrictions take various forms like, total ban on export, export licensing, Canalisation through Government agencies, as well as restrictions on export prices. Distortions in input prices arise mainly due to subsidies on farm inputs. A combination of the trade restrictions and Government intervention in commodity markets result in distortions in farm

output prices. It is quite important to note that the agricultural and rural sector which form the mainstry of two-thirds of the population in India are also the focus of attrention now for significant policy changes and private initiatives as part of the new economic regime. Already steps like reduction in subsidies and removal of some restrictions on domestic and international trade in agricultural commodities have been and are being taken. All this is being attempted with a view that agricultural sector can really act as the most effective safety net in the process of adjustment programmes both in terms of giving positive results as well as preventing some of the negative effects of a market economy. Impact of new economic policy on agriculture and agricultural development has been discussed here under five heads: (i) fiscal adjustment; (ii) the structural adjustment policy; (iii) financial reforms, (iv) policy of globalisation and (v) other measures and approaches relevant to the agricultural sector.

5.1.7 FISCAL ADJUSTMENT

Since July, 1991, a prime component of the Government's drive to contain the fiscal deficit within limits has been the reduction in food and fertilizer subsidies. However, there has been no reduction in budget allocation for food subsidies so far, the budget for 1998-99 provided ₹ 9,000 crores as against the 1992-93 revised estimates of ₹ 2,800 crores. Although the level of subsidy in the Indian agriculture sector estimated at about 5 per cent of the agricultural product is much below the permissible limit of 10 per cent under GAIT provisions, yet the budgetary burden of agricultural inputs and output subsidies is becoming progressively. Unbearable for the national exchequer. An immediate impact of new economic policy on agriculture could, therefore, be reduced budgetary allocations for this sector. This would call for phasic, if not drastic reduction in agricultural subsidies to begin with. Subsidies for agricultural inputs may warrant reduction and so may be the case as far as support to the output prices is concerned. This would directly affect cost of production, returns and profit margins in agriculture sector, specially for foodgrains crops, because these are the crops that are major users of subsidised inputs and derive the main benefit on account of support and procurement prices. Again, reduction in tariffs on imports of competing products, allowing the imports more freely may pose stiff competition for the farmers in the domestic market in the years to come.

Thus in a situation of resource crunch, which India is facing today, the agricultural sector will have to perforce more away from the regime of subsidies. "Easy situation on foodgrain stocks is likely to impel the government to go easy on administered prices and procurement through support price system may also not remain in demand to that extent. Unless these surpluses find reasonable export market, in a competitive market environment, there would develop pressures for diversification of production patterns away from foodgrains and traditional crop systems to high value products that would be suitable for processing and would be more in demand in the national and international markets. Indian agriculture, thus operating in a free competitive market, will have to face international competition in both the domestic and international market". Many aspects of macroeconomic stabilisation programme may result in fiscal compression resulting in withdrawing subsidies to fertilizer, deceleration of public investment in irrigation, power and rural and infrastructure including agricultural-research roads and communication etc.

5.1.8 STRUCTURAL ADJUSTMENT POLICY (SAP)

The basic logic of the SAP is that industrialisation will set in motion forces which generate commensurate growth impulses in other sectors of the economy as well. The condition which the SAP introduces for this kind of industrialisation and growth are: (i) substitution of the market and of private enterprise for planning and public sector in industry; (ii) reorientation towards export production in phase of import substitution, and (iii) removing the capital goods industries bias in resource allocation and letting the market do the allocation. As a consequence of the above conditions for industrialization and growth there would be downgrading of the priority to food self-sufficiency and emphasis would be placed on more commercialised and export oriented rural and agricultural economy. In order to achieve high agricultural

productivity as a part of NEP philosophy, a substantial increase in the average size of the farming this has to be combined with considerably more capital intensive technologies. As agriculture becomes more market oriented. "Government Policy regarding procurement and maintenance of food stocks would also change - Except for such restricted public distribution outlets as may be maintained for purely political reasons, buffer stocks may be held only for occasional market intervention by government. But even this may become redundant when the Indian market is globalised, since imports may take over the job of filling in the shortfalls in domestic production when necessary."6 However, in persuing above economic programme, we may not loose sight of the costs of transition in terms of agricultural unemployment and other sacrifices to be made by marginal and small farmers. Above improvements in agriculture doubtless, require less labour and more capital investment.

The new economic policy shall have to be weighed against Indian agricultural situation keeping in view the national priority of food self sufficiency and accelerated agricultural transformation so as to generate more surpluses not only for export but also for industry. Keeping also in view that trickle down mechanism is not effective, more so when greater emphasis is on privatisation, any distortion in agricultural development shall seriously handicap the working of the welfare state towards removal of poverty and unemployment. Notwithstanding the desirability of reforms, influences on agricultural and rural sector will have to be studied carefully and non-conflicting safeguards provided for to ensure harmonious growth of the economy.

5.1.9 REFORM ON FINANCIAL SECTOR

The rural credit system is threatened by rising overdues and deficiencies in management. Improving the economic viability of credit institutions, is, therefore, high on the agenda for reforms. The high priority accorded to it is clear from the fact that within months of its assuming office. Narasimha Rao government appointed the Narasimha Rao Committee on the financial system. Though committee has confined its attention to the industry and export sectors, yet it takes the view that the rural branches of commercial banks are unremunerative and that the Government's policy of requiring banks to provide 40 per cent of their advances to priority sectors has been a drag on their resources. Such a recommendation of the committee has resulted in something worse than a being neglect of the agricultural sector. R.B.I. has permitted banks to close down loss-making rural branches, and there is no longer any urge or incentive to extend the rural network. However, recently, Government has augmented the share capital of the National Bank for Agriculture and Rural Development (NABARD) and undertaken a major programme for rehabilitating the financially weakned Regional Rural Banks. It has also deregulated the leading and deposit rates of all credit rate of 12 per cent per annum in order to give cooperatives greater flexibility to mobilise resources and lend them to their members at appropriate interest rates which cover costs.

5.1.10 PLACE OF AGRICULTURE UNDER GLOBALISATION POLICY

The working of new economic policy will force the Indian agriculture to drop the crutches of support procurement-administered prices and farm subsidies mechanism and "also out of its own necessity and in response to GAIT challenges and opportunities that will emerge in international markets in the near future, agricultural market is bound to get progressively integrated with the global market." The Government of India's drive towards globalisation has been motivated by three principal expectations: (i) the entry of foreign competitors into India's domestic market will stimulate local producers to minimise their costs of production; (ii) with reduced cost and access to imports India's exports can be rapidly expanded; (iii) with freedom of access to foreign investment the economy will benefit from an inflow of both financial resources and advanced technology. These factors are, also expected to transform Indian agriculture and elevate its growth rate.

However, it has been demonstrated by many studies that agricultural production is more responsive to non-price factors like irrigation, technology, credit, infrastructure and so on. Though trade liberalisation in terms of reduction in imports restrictions and tariffs and export taxes can help reduce the anti-export bias of the previous policy but this does not necessarily mean an increase in the Real Exchange Rate (RER) as the other macro-economic policy changes in the fiscal financial and monetary sectors tend to offset the imcrease in RER resulting from trade liberalisation measures after the expansion in production for export?

Enlarging agricultural exports depends on a continuing increase in agricultural output, together with the diversion of a larger proportion of it to the export sector. Under free market system, this implies the following: (a) a high price-elasticity of agricultural production; (b) existence of higher prices abroad than the domestically prevalent; (c) availability of adequate shipping and other facilities to shift supplier from one market to another; and (d) easy access to necessary finance and market information.

Unfortunately, all these conditions do not exist presently. And if they do not, can they be created quickly enough to push up exports and export earnings? In brief the export potential for each agricultural commodity should be reviewed separately. Much depends on the efficiency and productivity. It requires vigorous implementation of the measures to improve the productivity by upgrading technology and to evolve a strategy for global competitiveness. This has to be a coordinated effort involving government-cooperatives, research organisations and farmers. Even though India has many agricultural Universities and Research institutions, technological upgradation will be an uphill task and effective extension on a big scale. Can Indian agricultue be an equal partner in the global system, is an important question. However, bigger and broader exposure through liberalised regime should open out new opportunities and stimulate innovations in production as also in marketing of agricultural products in the international market.

5.1.11 AGRICULTURE AND MNCS

As a consequence of liberalisation and globalisation of the Indian economy, it is but expected that Multinationals will enter the domestic market. The activities of these corporations have a significant impact, positive or negative on the economic structure and political and social systems of the countries where they operate. The MNCs are interested in capturing markets in host countries because the domestic demand may be inadequate. MNCs have played an innovating and catalytic role in funding new industries, transmitting technological and managerial skills as well as capital and, in many cases, creating entire social infrastructures, including transportation, in order to conduct their business. Moreover, MNCs have world wide marketing organisations that facilitate exports from developing countries and thus help the process of transformation of a traditional less productive sector into high productive export sector. "Opportunities that emerge, through the entry of MNCs are tremendous by way of forcing the domestic companies to become quality conscious and cost effective both in the supply market and product market. Also the induction of new technology and quality parameters in collaborative enterprises can go a long way in improving production and value added processing of agricultural produce. As the process catch up, more avenues of gainful employment would be created for both the educated and uneducated employed persons. Farm incomes will improve and gainful employment opportunities would expand."

On the other hand, the operations of MNCs have, of course, been beset with short-comings and disadvantages. Their technical, financial and market network strength as well as risk bearing capacity can compete out the indigenous goods and services from the national market. For instance, under GATT provisions, improved and hybrid seeds can capture the Indian market at the cost of National and State level seed. Corporations and Private Domestic Seed Companies. Similarly, these can capture (they have already captured) the business of processing of agro-products and considerably corner the domestic market on the strength of their quality products based on state of cost technology

used (Pepsi taking over manufacturing of potato chips). To the extent the national companies are crowded out by the multinations, they develop the strength for treating the agricultural produce market as a captive market for the supply of raw materials.

These imminent dangers steering into our eyes should not diminish our efforts and also our courage to continue with the process of reforms. On the other hand, thoughtful strategy needs to be evolved to dilute the adverse effects and create workable channels of sharing the emerging global gains in a more sounder fashion.

The effect of MNCs entering into agro-based industries would be commercialisation of agriculture. A likely shift in the crop pattern from food crops to cash crops may be expected mainly in the areas served by irrigation. Another possible shift will he in favour of crops used for processing industries like maize and barley which are used for making breakfast cereals (Kallog's Corn Flakes).

As the food processing industry will aim at getting assured supply of inputs which will be agricultural products, the shift in crop pattern will be more in the areas served by better infrastructural support and assured irrigation facility. This may effect the food production adversely.

It may generally be expected that the large and medium farmers will be the first to adopt the changes, as they will be able to accept the risk involved. This may further increase the class differences in the rural society.

Commecialisation of agriculture as a result of new investment made by MNCs may lead further regional and crop imbalances which are highly visible in the post green revolution scene of Indian agriculture. Crops which will go directly for processing and the areas where they will be grown will prosper much faster than other areas.

As a result of free entry of MNCs Indian agriculture may change to a commercial venture - Production as well as productivity of crops will have a chance of improvement. However, there is possibility that most of the investment may take place in areas serveq by better infrastructure and relatively well off part of the rural community will participate in the changed atmosphere, which may lead to further regional and income imbalance in the economy. Employment in agriculture proper may decline over a period of time due to increase in mechanised farming, however, with the growth of the economy, employment situation is likely to improve. Many well known foreign companies have already entered and are showing interest in investing in India and many more may follow. On the whole the policy changes will be beneficial for the development of agricultural sector and inturn the entire economy. Care will have to be taken that the new initiatives in agriculture bring about a rational balance between the growth of crops, on the one hand and among the regions as also among different systems of farming on the other. The exicitement of new regime should not blur the view of our own priorities, even when it would mean a relatively slow transformation without, of course, the processes of change which are immediately warranted to usher in a better state of economy on the threshold of next millennium.

5.1.12 VARIOUS AGREEMENTS FOR AGRICULTURE

GAIT (General Agreement on Trade and Tariffs) was founded in 1947 with the objective of prescribing the rules for international trade. This international body had initially 23 members including India. Over the years the membership of GAIT swelled and in 1994 it had reached 118 member countries. The overwhelming majority of this body, roughly two-thirds, comprises of developing countries. The members of the GAIT account for 93 per cent of world trade at present. Several left over countries which are not members of this body are keen to seek admission in it. Prominent among these cOUntries is China which is making all out efforts to become the member of this body. The headquarters of the GAIT is situated in Geneva. Besides other activities, GAIT is akil to an internationals Court. With the result it is empowered to resolve trade disputes creeping up among its members.

The detailed rules of the GATT weave around the following three basic principles:

(i) World trade should be carried on non-discriminatory basis.

(ii) Domestic industry should only be protected by means of custom tariffs and not through other commercial measures.

(iii) The GATT serves as a framework within which negotiations can be held to reduce tariff and other trade barriers.

GATT provided for reduction in tariffs and trade restrictions in a phased manner over a period of time. The guiding principle of GATT has been, what is known as the MFN (most favoured nation) clause. This clause says that, "any advantage, favour, privilege or immunity granted by a contracting party to any product originating in or destined for any country shall be accorded immediately and unconditionally to the like product originating in or destined for the territories of all contracting parties". The purpose of this clause was to encourage multilateralism so that the world trade could expand in an orderly manner. GATT also provides for action by the contracting parties for settling disputes that might arise due to the application of the agreement.

The GATT has proposed multi-lateral trade regime with the suggestions that its benefits will be exprienced in due course of time by all member countries. The member countries meet periodically to take stock of progress and problems of international trade and these talks are usually referred to as GATT Rounds of Talks. Since 1947, eight rounds of talks have taken place and the latest round was held in Uruguay and it came to be known as Uruguay round of talks. This round assumed considerable importance and was spread over seven long years (1986-93). It was after this round that WTO (World Trade Organisation) was born and the expression GAIT was given up.

In the normal course, the Eighth round talks should have been concluded in December 1990, but in the absence of a concensus, the same did not happen. The then Director General of GATT, Mr. Arthur Dunkel (now retired) was assigned the role of preparing a draft proposals as a compromise formula. The package of proposals presented by Mr. Dunkel came to be known as Dunkel Draft and was later signed by all members on December 5,1993. The Dunkel Draft is now part of the new GATT accord, approved at Marrakesh or April 15, 1994. This has paved for setting up of World Trade Organisation (WTO) with effect from January 1, 1995. The significance and comprehensiveness of the 8th round lies in the sense that it covers a wide range of areas like agriculture, TRIPS, TRIMS, etc., A noteworthy condition in the Dunkel Draft is that each and every clause must be adopted without leaving any requiring that the draft be accepted in its totality or not at all.

5.1.13 GATT RECOMMENDATIONS

For the first time, agriculture was included in GATT. Following are the recommendations of GATT with respect to the agricultural sector.

(a) Non-tariff barriers like quotas imposed by nations on foreign agricultural products will be converted into tariffs, which will be reduced by 36 per cent in case of developed countries and 24 per cent in case of developing nations. This tariff cut will be implemented over 6 years for the developed countries and 10 years for the developing nations.

(b) By 1999, the term subsidies should not exceed 10 per cent of the value of the output of a product. Trade distorting support for farmers will be cut by 20 per cent over 6 years for developed nations and 13.3 per cent for the developing nations.

(c) The value of export direct subsidies will have to be cut by 36 per cent and the volume by 21 per cent over the next 6 years by the developed nations.

(d) Countries having a closed market for agricultural products have to import at least 3 per cent of their domestic consumption.

On the basis of these recommendations the following four areas have been identified which are causing concern to India regarding its agriculture sector.

(1) The accord will force the Government to reduce subsidies given to Indian agriculture.

(2) The Government will have to import three per cent of the domestic demand for agricultural products.

(3) The accord will interfere with the Government's policies on public procurement operations and the public distribution system.

(4) It will require the patenting of seeds, forcing farmers to buy them from multinational firms.

The supporters of GATT proposals, on the other hand, believe that these will bring some advantage to Indian agriculture in the manner as described below:

(1) India's exports will increase as the international prices of agricultural products will go up. This will help our country to add more foreign exchange to its reserves and guarantee our peasantry a good price for their products. India should exploit this opportunity to increase its exports of rice, fruits, milk products, cotton, floriculture, processed food, etc. and optimise to gains from the emerging international market.

(2) Patenting of seeds will benefit India as it will bring latest developed and high productive hybrid seeds and enable the, farmers to increase their productivity.

5.1.14 OBJECTIVE EVALUATION OF GATT

The apprehensions that in response to GATT proposals, the Government will have to reduce the subsidies given to the farmers are not well placed. As per GATT recommendations, the farm subsidies granted by any Government to its farmers should not be more than 10 per cent of the value of output of a product. It is providing minimum support price to 20 agricultural products in each of which the subsidy is well below 10 per cent. Taking into account the current levels of subsidy offered, the fear that there will be a cut in subsidy is unfounded. But on the other hand the agricultural exporting countries like France, Australia, etc., have been paying subsidy ranging from 35 per cent to 90 per cent. If such a high level of subsidy comes down, the prices of agricultural products in those countries will shoot up giving ample opportunity for Indian farmers' to enlarge export and enjoy a competitive edge in the international market.

The second apprehension expressed by the detractors of GATT is that India has to import atleast 3 per cent of the domestic demand for agricultural products. This will have to be examined in broader context than merely as an imposition to force the country to spend its precious little foreign exchange on food imports which might otherwise have not been required. Considering the vagaries of weather and other crop uncertainties, it might prove to be a desirable thing to import a small amount of agricultural products from abroad. The country could as well escape the operation of this clause under the pretext that it is a developing country reeling under weak and unfavourable balance of payments position.

The third area of concern is that India has to abandon its policies on public procurement operations $d public distribution and system (PDS). The question of undue influence on the Public Distribution System does not arise because the PDS is meant to help the poor consumer and not the farmer. Logically, the dominant agricultural exporting countries would like to see India distribute its food under PDS. By so doing, the demand for food will increase and India has to import food from outside.

Serious apprehensions are also expressed about the effects of patenting seeds and genetic materials. It is admitted that as a result of patenting seeds, the food price will surely rise, but the farmers will not be affected as much as they proclaim it to be. The real fact regarding the patenting of seeds is that our farmers have the choice to buy high productive seeds if they want an increase in their agricultural production. Thus, if they want a higher yield, they can go for a good

variety of seeds, and additional cost will be compensated as a result of increase in the production. Farmers will have the previlege to use seeds saved during particular year for the subsequent years as long as they remain grain producers. Similarly, researchers are free to develop a new variety of seed by using one protected variety. This might also induce more original research in the development of new crop gene/seeds suiting not only the Indian agro-climatic conditions but that of other developing countries as well and thus offer an opportunity to the country to export these and earn royalties therum.

The above analysis shows that India will stand to gain in some fields while simultaneously it will have to exercise caution so as to capitalise more on the advantages and at the same time evolve some new ways to combat effectively the areas which are detrimental to India's interests.

Agriculture obviously is an important sector of India's economy and any distortions in its development are likely to produce far reaching implications for the people, in general, and farmers, in particular. At no stage can the country afford to ignore the economic and social effects of agriculture. But in the changed world economic scenario, it may not be possible or even desirable to keep agriculture as a highly protected sector of the economy. There is need to accept the liberalised agricultural trade and orient the country's policy towards that end. This will call for allround improvement in agricultural efficiency to bring it closer to the international norms. While as in absolute terms, the country might be one of the largest producing countries of agricultural products, in relative terms, the productivity levels are still very low and need to be enhanced substantially. A few hard facts may make it more clear. In rice, India's rank in the world production is 2 but its rank in yield per hectare is 28, in wheat, the relevant figures are 3 and 31, in milk, 1 and 34 in groundnuts, 1 and 34 and in Jute and fiberes, 1 and 11.

Agriculture related provisions in GATT also offer ample opportunity to India to expand its agriculture export market. However, it cannot do so until it is able to produce more than its domestic consumption. This can be achieved only by quick increase in the agricultural production. Thus/ we should address more to modernising the agricultural sector and providing farmers the latest developed agricultural equipments. At the same time we should concentrate more on research and development in this sector, so as to develop more productive hybrid seeds, so that our farmers may not fall prey to the multinational corporations.

5.1.15 WTO AGREEMENT ON AGRICULTURE (AOA)

World Trade organisation (WTO) is areas international organisation set up as a permanent body and is designed to play the role of a watch dog in the spheres of trade in goods & services foreign investment and intellectual properly rights etc.

In a agriculture of is a very much careful is the development and trade relationship Agreement in Agriculture provides a long run reform of agricultural trade and domestic policies over the years to come with the objective of introducing increased market orientation agricultural trade. It provides for commitment in the area of market access, domestic support export competition and transform offer in tariff barriers. It also includes patent right to restrict the quality controls market access particularly favouring this production by winning the competition.

This has created the improved prospers for agricultural exports. Agriculture is likely to gain from this agreement because of increasing in would prices of agricultural products due to reduction on domestic subsidy and barriers to foreign trade. While in the one has agriculture will reap the high earnings from agricultural trade (exports) in this other hand India has assured that all major programmes for the development of agriculture will be exempted from this disciplines on the agricultural agreement. This will not affect the PDS and subsidy shall not be withdrawn. Further protection to under developed & developing economy will be on tact. Further to say

(a) AOA has legitimised the various trade developed countries on their favour.

(b) AOA provides that countries not using any subsidies during the period (1986-88) are prohibited from entering any new subsidy during WTO regime.

(c) About 40-50% of the support to farmers on USA and EU is in the form of Green box and Blue Box subsidies and are that exempted from reduction commitments.

(d) The peak tariff on agricultural commodities on developed countries is very high.

But AOA has not pointed out any answer to the food security a major of every developing and underdeveloped countries.

5.1.16 DOHA DECLARATION

Doha Development Agenda signed by the member countries are

(i) It announced a new round of Negotiations termed as DOHA Round

(ii) It expressed concern over public Health and announced patent right on pharmaceutical products on public Health ground.

(iii) Importantly of emphasised on the agricultural subsidies to be continued as per commitment of developed nations who have failed in their commitment.

It emphasized on the market access, reducing it with the aim phasing out all forms of export subsidies and substantial reduction on trade-distorting domestic support.

5.1.17 CONCLUSION

An interesting international debate is going on over the GAIT recommendations. In some sectors, it is held that these recommendations are a consolidations of the economic dominance of the developed countries like USA, EC, Japan, etc. and are anti-third world; while others are hopeful that it would cause higher employment generation, more investment and more trade and would ultimately bring discipline in trade practices. The Scenario that would unfold can not be predicted now as there is a time span of 10 years on an average for the implementation of GAIT recommendations. The developing countries could use the phase-out time to readjust their development priorities and evolve strategies to farmer sufficient benefits from the liberalised world regime. The global equations and balances of power are hinging on pendullum and third world countries will be required to work hard to swing it in their direction.

5.1.18 SUMMARY

Agriculture has a vital role in foreign trade and it promotes economic development of a country particularly the developing countries like India faces from the problem or competitiveness. So a lot of competitive resources have been adopted. Reform programmes have shown the change in the era of glabalisation. Structural Adjustment & financial reforms have been adopted to make agriculture effective.

GATT and WTO agreements have emphasized in the expanding role of agriculture. Developed nations must be supporting towards the agricultural development of the poor and developing. But it has still moles to go.

5.1.19 SELF ASSESSMENT QUESTIONS

1. Critically examine the role of agriculture in foreign trade.
2. Critically examine the GATT argument in the development of agricultural trade.
3. Outline the role WTO to expand the agricultural trade and development.
4. Examine the role of globalisation on the development of agricultural trade.
5. Assess the trend of agricultural export import policy in the era of liberalisation.
6. Given a trend of export and import of agriculture in Indian economy.
7. Give a note on Indian's Foreign Trade Policy on agriculture.
8. Critically examine export competitiveness measures of Govt. of India to promote agricultural trade.
9. Assess the achievements and failure of agricultural commodities during new economic policy.

Key Words

1. **Export**: The sale and shipment of agricultural products from one country to another. Exporting countries produce surplus agricultural commodities that are in demand in international markets.

2. **Import**: The purchase and receipt of agricultural products from foreign countries. Importing countries rely on imported agricultural commodities to supplement domestic production and meet domestic demand.

3. **Trade Balance**: The difference between the value of a country's agricultural exports and imports over a specific period. A positive trade balance occurs when a country exports more agricultural products than it imports, while a negative trade balance occurs when imports exceed exports.

4. **Trade Liberalization**: Policies aimed at reducing trade barriers and restrictions on agricultural imports and exports, such as tariffs, quotas, and subsidies. Trade liberalization promotes increased market access, competition, and efficiency in agricultural trade.

5. **Tariff**: A tax imposed by governments on imported agricultural commodities. Tariffs increase the cost of imported products, making them less competitive compared to domestically produced goods.

6. **Quota**: A limit set by governments on the quantity of agricultural commodities that can be imported or exported during a specific period. Quotas restrict the volume of trade and may be used to protect domestic producers or manage supply and demand.

7. **Subsidy**: Financial assistance provided by governments to domestic agricultural producers to support their incomes, lower production costs, or promote specific agricultural activities. Subsidies can distort international trade by making domestic products more competitive in foreign markets.

8. **Trade Agreement**: A formal agreement between two or more countries to facilitate trade by reducing tariffs, quotas, and other trade barriers. Trade agreements promote economic integration, market access, and cooperation in agricultural trade.

9. **Sanitary and Phytosanitary (SPS) Measures**: Regulations and standards imposed by governments to protect human, animal, and plant health in international trade. SPS measures include food safety standards, quarantine requirements, and inspection procedures for agricultural imports and exports.

10. **Technical Barriers to Trade (TBT)**: Regulations and standards imposed by governments on product specifications, labeling, packaging, and testing that may affect international trade. TBT measures aim to ensure product quality, safety, and compliance with technical regulations.

5.1.20 **Reference:**

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12. Readings in Agriculture-Pramit Choudhury

13. Agricultures in an Unstable Economy-Schultz

14. Agricultural Price and Income Policy- Schultz

15. Marketing of Farm Products-Shepherd