LESSON 7

CONCEPT OF PRODUCTION

Introduction -

Consumption is considered as the beginning and end of all economic activities. In the previous chapter, we have studied two approaches of utility analysis, Cardinal and Ordinal related to consumer's behaviour. The power of a commodity to satisfy human wants is known as utility. It is created through production process. Consumption is possible only after production. The demand of goods and services is dependent on their consumption, similarly their supply depends on production. The level of production also decides the level of national income and per- capital income. The prosperity and economic progress of a country lies in the increase in the level of production. It has a positive impact on the standard of living of people.

Meaning of Production -

The act or process of creating, increasing or construction of utility is known as Production. There are many forms of production. For instance the production of food grain by the farmer, manufacturing of cloth, machine, toys, soap, cement furniture etc. are examples of production. Similarly, the provision of various services like education, health, banking, accounting, postal and telephone communications, transport etc. are all acts of production.

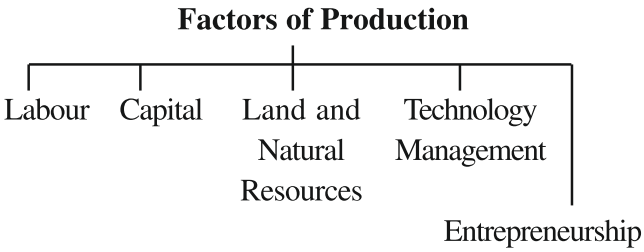
Definition of Production-

Economists have given various definitions of Production. Alfred Marshall has defined it as creation of utility. According to Fisher, production is restoration of utility. Similarly, Meyers has defined production in narrow sense as a process of converting inputs into output.

According to Gerald W. Stone "production is the process of transforming inputs into outputs". In simple words, production is a type of flow of goods and services. It is a special process. Production is a process of creating or increasing the power of goods and services to satisfy human wants.

Various factors of production and their classification:

Production is a process of creating utility. Through production, a flow of goods and services is created over a period of time. Production is done with the help of certain factors such as labour, capital ,land ,management, technology, entrepreneurship (L, K ,N, T, E). Factors of production are also known as "inputs". The production of goods and services is also called output. On analysing different factors of production we find that, they are different in nature. The different types of factors of production are as follows -



1. Land –

Land is a gift of nature. It has the quality of scarcity and is available in limited quantity. There is difference in the fertility of land.

2. Labour –

The meaning of labour is, any physical or mental work undertaken for some monetary reward . According to classical economists labour is the basic factor and it is a active factor of production. It uses all the other factors in production. (Capital, Land, Management, Technology). The supply of labour is both quantitative and qualitative. Today, in the world there is great importance of capital, management, technology and entrepreneurship. But still the value of labour has not decreased in production process. Labour is both, a producer and a consumer.

3. Capital –

Capital is the third important factor of production. In narrow sense it means "capital in cash". Presently, capital includes various types of machines, equipments etc.

4. Management and Technology –

Management and Technology is one of the most important factors of production. Management and Technology help in the organisation of production. Today, organisation of large scale production is done by specialists. The managerial part is looked after by the management team whereas the technical organisation is taken care of by technical experts. The technocrats choose the best available technologies in the production process. Similarly, the management experts adopt the optimum form of business organisation from different available forms like individual ownership, partnership etc.

5. Entrepreneurship -

It is the fifth important factor of production. Lots of risk and uncertainty are borne in production process. The risk factor involved in a Socialist Economy is less, compared to in Capitalist Economy, as it being a free economy, the role of government is negligible.

The organisation of factors of production is done in such a way that the technique adopted is best out of all the available techniques. The cheaper factors of production are used in larger quantity. For instance, if labour is relatively cheaper than capital, then more labour is used. This is known as labour intensive technique. Similarly, if capital is cheaper we adopt capital-intensive technique. Thus the factors of production are organised on the basis of prices of the inputs.

When the quantity of inputs is changed (increased or decreased), then there is a change (increase or decrease) in production too. On the basis of changes in inputs various concepts have been developed, which can be studied with the help of following table -

Table 7.1

Total, Average and Marginal Production

Land (in Hect.)	Unit of Labour	Total Production TP	Average Production AP	Marginal Production MP
5	0	0	0	0
5	1	5	5	5
5	2	12	6	7
5	3	21	7	9
5	4	28	7	7
5	5	30	6	2
5	6	30	5	0
5	7	28	4	-2

From analysing the above table 7.1, we can calculate total production, average production and marginal production when the value of either one is given. For instance, when the quantity of labour is increased respectively 1, 2, 3,..... then marginal production is 5, 7, 9,7, 2, 0..... etc. with the help marginal production we can calculate total production at 3 units of labour as follows -

Total production = Marginal production of 1^{st} unit of labour + marginal product of 2^{nd} unit of labour + marginal product of 3^{rd} unit of labour. Hence, TP = 5 + 7 + 9 = 21 units

Similarly, when the quantity of labour is increased 1, 2, 3.... then total production is 5, 12, 21, 28, 30..... respectively. By dividing total production by the units of labour we get average production 5, 6, 7, 7, 6, and 5 respectively.

Before explaining the theory of production, it is necessary to understand the following three concepts of production.

1) Total product

2) Average product

3) Marginal product

1. Total product (TP)-

Total product is the overall production in a specified time period, while using all the factors. It can be calculated in two ways.

A) By adding the marginal product obtained from various units of factors

B) By multiplying average product with units of factors.

TP = ΣMP or

= AP × Number of labour (units of factors)

2. Average product(AP)-

Average product is obtained by dividing total product with the quantity of various inputs (here labour).

AP = TP / L

3. Marginal product(MP)-

It is the change in total product resulting from change in variable inputs (labour).

$$MP = \frac{\Delta TP}{\Delta L}$$

Where ΔTP = Change in Total Product

ΔL = Change in Quantity of Labour

Marginal product can also be calculated by following formula:-

$MP = TP_n - TP_{n-1}$

On observing the above table 7.1 and the TP and MP curve in fig. 7.2 and 7.3, it is evident that when marginal product increases, total product also increases at a increasing rate. This is the first stage of production. In the above table the 1st stage starts upto the use of 1 to 3 units of labours. The second stage is when marginal product remains or constant or increases at a diminishing rate. In above table it is from 4 to 6 units of labour, here the total product is constant or increases at a diminishing rate. The third or last stage is when marginal product is negative and total product also starts decreasing, here with the use of 7 units of labour marginal product is negative. A rational producer carries on production only upto the second stage. Figure 7.1 to 7.3 help in understanding this situation.

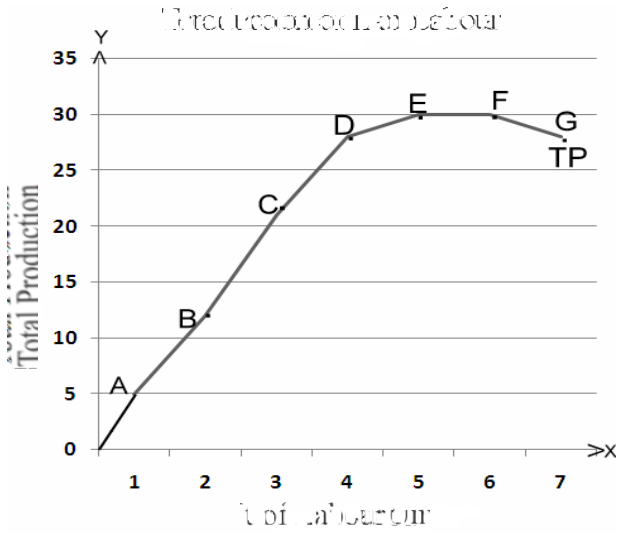


Figure 7.1

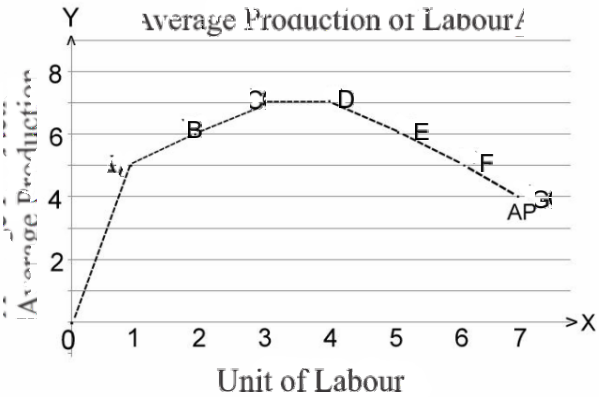


Figure 7.2

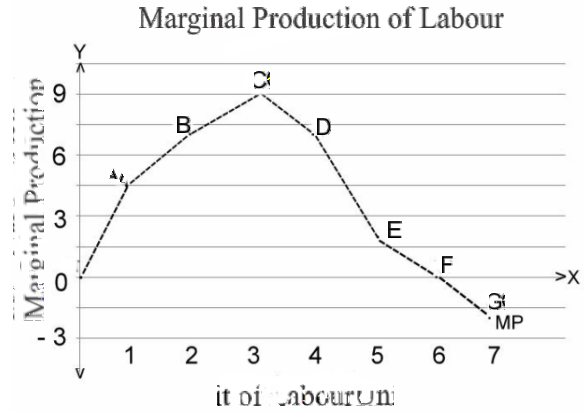


Figure 7.3

1) The changes in average production and marginal product are related to each other. Marginal production depicts the immediate change in production. The changes in marginal product are rapid in comparison to the changes in average production. When marginal product increases, it is situated above the average product and when

marginal product falls, it is below the average product.

2) Average product curve rises and falls gradually in comparison to marginal product. When average product increases, then marginal product increases rapidly. When average product falls, the marginal product falls rapidly.

Law of Variable Proportion-

The Modern economists claimed that the Law of Diminishing Marginal Product is applicable in all sectors of economy. They emphasised that marginal product will eventually diminish not only in agriculture but in all sectors of production. When some factors are constant and others are variable, then with increase in successive units of variable factor, after certain point, its marginal product will start declining. This in known as Law of Variable Proportion. According to Prof. Stigler- "As equal increments of an 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 decrease."

In words of Mrs. Joan Robinson- "If an increasing amount of a variable factor is applied to a fixed quantity of other factors, the increments in total output will first increase but beyond certain point it increases at a diminishing rate."

It is evident from the above definitions that due to decrease in the marginal product of a variable factor, after a certain point, total production starts diminishing, whether on keeping one factor constant and others variable or one factor variable and other factors constant.

1) When the quantity of one factor is varied, keeping the quantity of other factors constant. The ratio or proportion between the factors changes due to which the production also changes, hence it is called the Law of Variable Proportion. According to this law, due to change in proportion between factors, there is change in total, average and marginal product in different ways-

Assumptions of the law-

1. One factor of production is variable, whereas all other factors are constant.
2. The change in proportion between inputs is possible.
3. All units of variable input are homogeneous.
4. The state of technology is constant.
5. This law operate only in short-run.

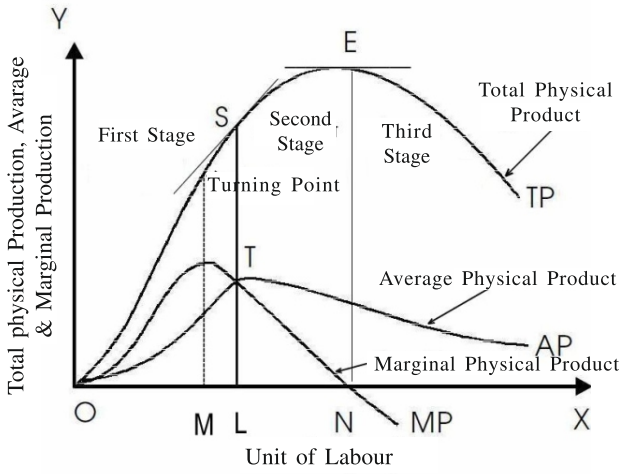


Figure 7.4

Three stages of Law of Variable Proportion-

The behaviour of output when varying the quantity of one factor combined with other can be divided into three stages-

1) Increasing

2) Constant

3) Decreasing

This is explained graphically in the above figure 7.4

A. First stage :-

In this stage, when some factors are kept constant, and labour is increased, the total product increases at an increasing rate. The quantity of fixed factor land or capital is relatively more in relation to the variable factor. With increase in labour the total fixed factors are more intensively and effectively utilised. This causes the production to increase at a rapid rate. In the above

fig. 7.4 from the origin point O to the point S, the total product increases at an increasing rate, the quantity of labour used is from point O to M. At point S where TP stops increasing at an increasing rate, is know as 'point of inflexion'. In this stage marginal product is increasing, hence it lies above the averge product curve. From point 'S' onwards till point 'E' TP increases at a diminishing rate. Here, the first stage of production ends. Stage first is known as the Stage of Increasing Returns because averge product increases throughout this stage.

B) Second Stage-

In stage second the total product continues to increase at a diminishing rate until it reaches the maxmium point 'E' Here, the quantity of labour used is from L to N. The size of fixed factors like land and capital and of variable factor labour is in optimum proportion. At the start of second stage marginal product curve cuts average product curve from above. Here, AP = MP and average product is maximum. At the end of stage at point N, marginal product touches the X axis and is zero. When MP is zero at point 'N' TP is maximim at point 'E'.

E) Third Stage-

After a certain point the combination of fixed and variable factor is not in optimum proportion. In third stage, variable factor is more, relative to fixed factor, hence when a producer increases labour after point N, total product declines. Therefore, TP curve slopes downward after the point 'E'. As a result marginal product is negative and MP curve is below the X axis. The average product also declines.

Stage of rational production -

The rational or optimum stage of production for a producer is a situation, where the production is maximum at given cost, or the cost of production of a given production is minimum. The optimum stage of production is known as Equilibrium of a Producer. In the above fig 7.4 a producer maximizes his output at point 'N' of second stage or corresponding point E of TP curve.

If the producer produces, in first stage with quantity of labour less then point N, then his output will be less than maximum output NE. Similarly, by using quantity of labour more than ON, then the marginal product will be negative, and his total output will be less than maximum output NE. Thus, a rational producer will use ON amount of labour and produce optimum production or optimum quantity NE.

Thus, second stage is known as the Stage of Rational Production. In the first stage, all three - total physical product, average physical product and marginal physical product increase. Hence, a producer is encouraged to increase his production and he enters the second stage. On the contrary, in the third stage, total physical product decreases and marginal physical output is negative. Hence, a producer will not produce in third stage. He will use ON amount of labour and produce optimum output at point E.

Importance

Production function and the concept of production are of greatest importance to a producer, society and government. A producer decides to produce a good or a service on the basis of comparison of production function and 'costs'. Generally a producer chooses the technology of that production function where the cost of production is minimum, quantity is maximum and quality is best.

To decrease the cost of production, governments and society spend large amount on new researches and establish 'Research and Development institutions'.

Thus, it is evident that inputs have important place in an economy. The coordination of all factor inputs is essential for production-process. Economic progress and development depend upon the quantity and quality of factors of production.

Important points-

- Production is the act of creation, increment or construction of utility.
- The factors of production such as labour, capital, land, management, technology, and entrepreneurship help in the process of production. They are called inputs.
- The more use of labour in comparison to capital is called labour intensive method / technique and more use of capital is known as capital intensive technique / method.
- The various concepts on basis of change in inputs, resulting in change in output are Total product= Σ (TPP_1 +TPP_2 + TPP_3.....TPP_n) . Average product AP = TPP_n/L_n, and marginal product (MP) = TPP_n - TPP_{n-1} = $\Delta TPP/\Delta L$
- The change in output, as a result of change in the proportion of inputs in known as Law of Variable Proportion.
- According to Law of Variable Proportion change in total, average and marginal product occurs in different ways when one factor is changed and others are kept constant.
- Initially, the output increases at an increasing rate due to optimum proportion of factors but optimum situation ends at a later stage and lack of coordination among factors is responsible for the diminishing rate in increase of production.
- A rational producer will achieve equilibrium in the second stage of production.

Exercise Questions-

Objective Type Questions:-

1) Which stage of production is chosen by a rational producer ?
   (A) First
   (B) Second
   (C) Third
   (D) Fourth

2) Labour is .....factor of production.
   (A) Active
   (B) inactive
   (C) Neutral
   (D) None of the above.

3) Factors of production are-
   (A) Labour and land
   (B) Capital and technology
   (C) Entrepreneur
   (D) All of the above

4) Generally, the variable factor in short run is-
   (A) Labour
   (B) Technology
   (C) Capital
   (D) Land

5) The point where total product is maximum, marginal product is-
   (A) Zero
   (B) One
   (C) Infinite
   (D) Two

Very Short Answer Type Questions:-

1) What is production?
2) Which are the factors of production?
3) What is total production?
4) Define average production.
5) Define marginal production.

Short Answer Type Questions:-

1) Write the importance of organisation in factors of production.
2) Write a short note on factors of production- land and labour.
3) Explain the relationship between average product and marginal product.
4) Define the law of variable proportion.
5) Describe briefly the rational stage of production.

Essay Type Questions:-

1) Explain in detail the various factors of production.

2) Explain in detail the different concepts of Total Product, Average Product and Marginal Product.

3) Explains in detail the Law of Variable Proportion.

4) Why a rational producer chooses to produce upto the second stage of production? Explain.

Answer Key

1	2	3	4	5
B	A	D	A	A