

## **Chapter 5: Theory of Production**

### **Production**

In General, Production means, “Any Activity of Making Something Material.”

In Economics, Production means, “Any Economic Activity which is directed to the Satisfaction of the Wants of the People.

Production means “Creation or Addition of Utility”.

### ***Production Function***

Production function refers to the functional relationship between the quantity of good produced (output) and the factors of production (inputs) necessary to produce it.

According to Watson, “The relation between a firm’s physical production (output) and the material factors of production (inputs) referred to as production function.”

### ***Fixed and Variable factors of Production***

A fixed factor of production is one whose quantity cannot readily be changed. Examples include major pieces of equipment, suitable factory space, and key managerial personnel.

A variable factor of production is one whose usage rate can be changed easily. Examples include electrical power consumption, transportation services, and most raw material inputs.

### ***Law of Variable Proportion***

The law of variable proportions states that as the quantity of one factor is increased, keeping the other factors fixed, the marginal product of that factor will eventually decline. This means that up to the use of a certain amount of variable factor, marginal product of the factor may increase and after a certain stage it starts diminishing. When the variable factor becomes relatively abundant, the marginal product may become negative.

It refers to Input-Output relationship, when the Output is Increased by varying the Quantity of one Input. This Law Operates in Short-Run when all the Factors of Production cannot be Increased or Decreased. Law states that “As we Increase the Quantity of One Input which is combined with other Fixed Inputs, the Marginal Physical Productivity of the Variable Input must eventually Decline.

The Law states that an Increase in some Input relative to other Fixed Input will, in a given State of Technology, cause Total Output to Increase; but after a point the extra Output resulting from the same addition of extra Inputs is likely to become Less & Less.

### **Assumptions:**

The law of variable proportions holds good under the following conditions:

- One of the Factor is Variable while all other Factors are Fixed.
- All Units of the Variable Factor are Homogenous.
- State of Technology is Constant.
- Factors of Production can be used in Different Proportions.

### Total Product (TP)

- Total Product is the Total Output resulting from the efforts of all the Factors of Production combined together at any Time.
- One Factor kept Constant, Total Product will vary with the Quantity used of the Variable Factor.
- Total Product rises as more & more units of variable unit is employed.

### Average Product (AP)

Average Product is the Total Product per unit of the Variable Factor. i.e.

$$AP = TP/\text{Unit of variable factor}$$

### Marginal Product (MP)

Marginal Product is the Change in Total Product per unit Change in the Quantity of Variable Factor. i.e., Marginal Product if the Addition made to the Total Production by an Additional Unit of Output.

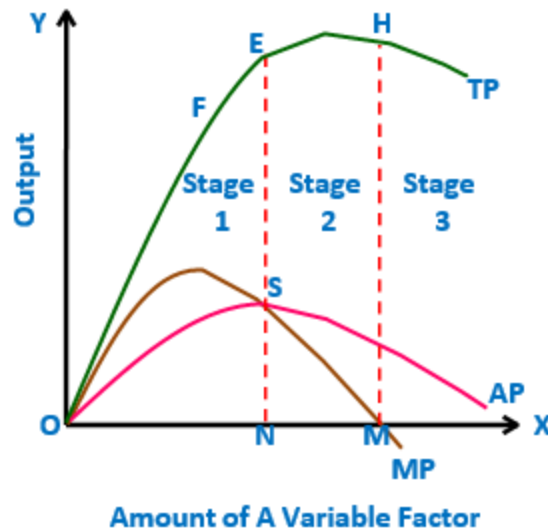
$$MP = TUn - TUn-1$$

# Product Schedule



Quantity of Labour	Total Product (TP)	Average Product (AP)	Marginal Product (MP)
(1)	(2)	(3)	(4)
1	100	100.0	100
2	210	105.0	110
3	330	110.0	120
4	430	107.5	100
5	520	104.0	90
6	600	100.0	80
7	670	95.7	70
8	720	90.0	50
9	750	83.3	30
10	760	76.0	10
11	740	67.2	-20

# Law of Variable Proportions



Stages	Total Product	Marginal Product	Average Product
1 <sup>st</sup> Stage (O to E) (MP > AP) Law of Increasing Returns	Initially it increases at an increasing rate. Later at diminishing rate	Initially increases & reaches the maximum point. Then starts declining	Increases & reaches its maximum point. Here AP=MP
2 <sup>nd</sup> Stage (E to H) (MP < AP) Law of Diminishing Returns	Increases at diminishing rate & reaches its maximum point	Decreases & becomes zero at point M.	After reaching its maximum point, begins to decrease.
3 <sup>rd</sup> Stage (Beyond H) Law of Negative Returns	Begins to fall	Becomes negative	Continues to diminish but remains positive.

## Law of Returns to Scale

- It refers to Input-Output relationship, when the Output is Increased by varying the Quantity of All Inputs.
- Law Operates in Long-Run when all the Factors of Production can be Increased or Decreased.

- It is the study of Behaviour of Output in response to Change in Scale i.e. All Factors are Increased or Decreased in Same proportion.

***Types of Returns to Scale***

