

# VIDYA BHAWAN BALIKA VIDYA PITH

शक्तिउत्थानआश्रमलखीसरायबिहार

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## Production Function

### 5.1 MEANING OF PRODUCTION

**Production is defined as the transformation of inputs into output.** For example, inputs of sugar cane, capital and labour are used to produce sugar. Production includes not only production of physical goods like cloth, rice, etc., but also production of services like those of a doctor, teacher, lawyer, etc.

### 5.2 PRODUCTION FUNCTION

#### 5.2.1 Definition of Production Function

The term production function means **physical** relationship between inputs used and the resulting output. Production function is a purely **technical** relation which connects the quantity of inputs required to produce a good and the quantity of output produced. **Production function is the process of getting the maximum output from a given quantity of inputs in a particular time period. It includes only technically efficient combinations of inputs (i.e., those which minimise the cost of production).**

A **production function** is an expression of quantitative relation between change in inputs and the resulting change in output. It is expressed as:

$$Q = f(i_1, i_2, \dots, i_n)$$

Where  $Q$  is output of a specified good and  $i_1, i_2, \dots, i_n$  are the inputs usable in producing this good. To simplify let us assume that there are only two inputs, labour ( $L$ ) and capital ( $K$ ), required to produce a good. The production function then takes the form:

$$Q = f(K, L)$$

#### 5.2.2 Short-run and Long-run Production Function

There are two *types* of production function:

- Short-run Production Function.** It refers to production in the short-run where there is at least one factor in fixed supply and other factors are in variable supply. In short-run, production will increase when more units of variable factors are used with the fixed factor. **Fixed factors** refer to those factors whose supply cannot be changed during short-run. For example, land, plant, factory building, minimum electricity bill, etc.
- Long-run Production Function.** It refers to production in the long-run where all factors are in variable supply. In the long-run, production will increase when all factors are increased in the same proportion. Variable factors refer to those factors whose supply can be varied or changed. For example, raw materials, daily wages, etc.

## 5.3 CONCEPTS OF PRODUCT

### 5.3.1 Total Physical Product (TPP) or Total Product (TP)

**Total Physical Product (TPP) or TP.** It is defined as the total quantity of goods produced by a firm with the given inputs during a specified period of time. In the short-run, *TP* can be increased by employing more units of the variable factor. In the long-run, *TP* can be increased by employing more units of all factors.

**Shape of TP Curve.** *TP* curve starts from the origin, increases at an increasing rate, then increases at a decreasing rate, reaches a maximum and after that it starts falling. Thus, as more units of variable factor is employed, it will **not always increase** the *TP*. It is illustrated with a *TP* schedule in Table 5.1 and a *TP* curve in Fig. 5.1.

*TP* schedule confirms that in the beginning total production increases at an increasing rate. *TP* starts increasing at a decreasing rate with the employment of the fourth unit of labour. When seventh unit of labour is employed, *TP* becomes stable at 30 units and with the employment of the eighth unit, it starts declining.

In Figure 5.1, units of labour are shown on the *x*-axis and total product on the *y*-axis. As the units of labour increase, *TP* curve increases at an increasing rate till point *A*. Then *TP* curve increases at a decreasing rate till point *B*. *TP* is maximum at point *C*. It falls after point *C*.

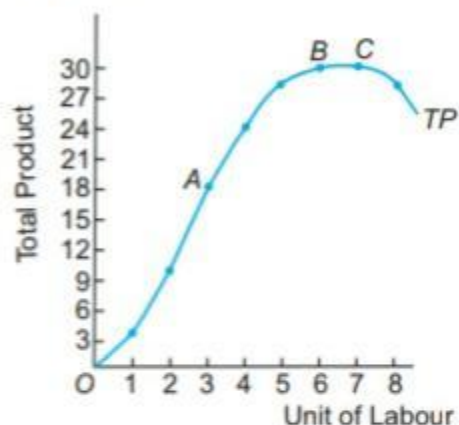


Fig. 5.1 *TP* Curve

Table 5.1 *TP* Schedule

Unit of Labour ( <i>L</i> )	Total Physical Product ( <i>TP</i> ) (units)	Shape of <i>TP</i> Curve
0	0	<i>TP</i> rises at an increasing rate (from origin till point <i>A</i> )
1	4	
2	10	
3	18	<i>TP</i> rises at a decreasing rate (from point <i>A</i> to point <i>B</i> )
4	24	
5	28	
6	30	<i>TP</i> is maximum (point <i>C</i> )
7	30	
8	28	<i>TP</i> falls (beyond point <i>C</i> )