

## 1.1 PRODUCTIVITY

Today, the term 'productivity' has acquired a wider meaning. Originally, it was used only to rate the workers according to their skills. The worker who produced more was said to have higher productivity. Productivity is often mixed up with higher production. Production can be increased by increasing the inputs. Productivity results in higher profitability, but profitability is not a measure of productivity. Profit depends upon supply and demand, cost and price differential. Even a product manufactured in the most inefficient way involving all types of wastages can be sold at a profit if there is a demand for it. Productivity is a function of cost and hence improvement in cost leads to increase in productivity.

*Thus productivity may be defined as the ratio of output and input.* It can be expressed as

$$\text{Productivity} = \frac{\text{Output}}{\text{Input}}$$

Output means the amount produced or number of items produced and input means various resources used e.g. land, labour, material, building, equipment, machinery etc.)

Productivity may be improved by elimination of wastage. Lower the wastage, higher the productivity and vice-versa. To measure productivity, a relationship between the output and input factors must be developed. For a given output, lower the input and greater is the productivity.

## 1.2 FACTORS AFFECTING PRODUCTIVITY

There are various factors which affect productivity. Sometimes, it becomes difficult to decide whether increased productivity is the result of better machinery, better skill, better management or elimination of wastage. The factors affecting productivity can be classified into two categories :

1. Internal factors (Controllable),
2. External factors (Uncontrollable).

1. **Internal Factors (Controllable)** : The following controllable factors affect the productivity :

- (i) Product,
- (ii) Plant and equipment,
- (iii) Technology,
- (iv) Materials and energy,
- (v) Human factors,



- (vi) Work methods,
- (vii) Management style.

2. **External Factors (Uncontrollable) :** The following uncontrollable factors affect the productivity :

- (i) Structural adjustment (economic and social),
- (ii) Natural resources,
- (iii) Government policies and infrastructure.

These above said internal and external factors are explained below :

1. **Internal Factors (Controllable) :**

(i) **Product :** In this context, productivity means the extent to which the product meets the requirements. A product is judged by its usefulness. The cost benefit factor of a product can be enhanced by increasing the benefit at the same cost or by reducing cost for the same benefit.

(ii) **Plant and Equipment :** Plant and equipment play a major role in increasing the productivity. The increased availability of the plant through proper maintenance and reduction of idle time increases the productivity. It can also be increased by paying proper attention to utilization, modernisation, cost, investment etc.

(iii) **Technology :** The use of latest technology improves productivity to a large extent. Automation and information technology help to achieve improvement in material handling, storage, communication system and quality control. The various aspects of technology to be considered are as follow :

- (a) Layout of plant, shops and machine tools.
- (b) Timely supply and quality of inputs.
- (c) Production planning and control.
- (d) Repair and maintenance.
- (e) Reduction of wastage.
- (f) Efficient material handling systems.
- (g) Inspection.

(iv) **Material and Energy :** Efforts to reduce materials and energy consumption bring considerable improvement in productivity. The following factors can be considered :

- (a) Selection of right quality material.
- (b) Control of wastage and scrap.
- (c) Effective stock control.
- (d) Development of sources of supply.
- (e) Optimum energy utilisation and energy saving.

(v) **Human Factors :** Productivity basically depends upon human competence and skill. Ability to work effectively is governed by various factors such as education, training, experience, attitude etc. of the employees. Employees participation in management, mutual trust, co-operative relationship and motivation play an important role in influencing productivity.



(vi) **Work Methods** : Improvement in present work methods improves productivity. Work study and industrial engineering techniques and training are the areas which improve the work methods and hence productivity improves certainly.

(vii) **Management Style** : Management style influences the organisational design, communication in organisation, policies and procedures. A flexible and dynamic management style is a better approach to achieve higher productivity.

## 2. External Factors (Uncontrollable)

(i) **Structural Adjustment** : It includes both economic and social changes. Economic changes which influence significantly are as follow :

- (a) Shift in employment from agriculture to manufacturing industry.
- (b) Import of technology.
- (c) Industrial competitiveness.

Social changes such as women's participation in the labour force, education, cultural values and attitudes are some of the factors which play a significant role in the improvement of productivity.

(ii) **Natural Resources** : Manpower, land and raw materials play an important role in the improvement of productivity.

(iii) **Government Policies and Infrastructure** : The Government policies and programmes are significant to productivity. Practices of government agencies, transport and communication, power, fiscal policies (interest rates, taxes etc.) influence productivity to a greater extent.

## 1.3 IMPORTANCE OF PRODUCTIVITY

To improve standard of living, it is necessary to build more houses and produce more food and clothes. It also requires more opportunities of employment, increase in earnings of people and reduction in prices of goods by opening new industries and installing latest equipments and machinery to increase production.

To increase productivity, the National Productivity Council (NPC) spread all over India, supplies publications, utilises audio-visual media of films, radio and exhibitions. It conducts training programmes for various levels of management. The main reason of our poverty is the low level of productivity. Despite very high wages to workers in U.S.A., their unit cost works out to be very low and inspite of our low wages, our unit cost is high. The main reason behind this is that their productivity is very high and our productivity is very low. To improve standard of living of people and national economy, it is necessary to increase productivity. If our energy is dedicated to the cause of improving productivity, there will be an era of all round prosperity for our country in the shortest possible time.)

## 1.4 MEASUREMENT OF PRODUCTIVITY

The following four formulae are used for the measurement of productivity.



1. Physical output per man hour.
2. Physical output per tone of raw materials consumed.
3. Physical output as a percentage of the rated capacity of the plant or the ratio of the productive machine hours used to total productive machine hours available.
4. Physical output per rupee of working capital employed.

It may be said that scaling down cost and increasing productivity are possible through simplification, standardization and operational research.

## 1.5 CAUSES OF LOW PRODUCTIVITY

The following factors are considered for low productivity :

1. **Frequent Machine Breakdown** : The frequent machine breakdown automatically stops production. The efficiency of the system is affected badly, resulting in low productivity.
2. **Lack of Managerial Control** : The effective managerial control plays an important role in increasing productivity. Lack of managerial control results in poor material handling, poor scheduling, poor despatching, poor handling of grievances, increased industrial disputes and poor quality, which cause decrease in productivity.
3. **Idle Man** : Idle man and idle machine due to faulty planning of production and control result in low productivity.
4. **Poor Quality** : Due to poor quality, the acceptability of product in market will come down. Wastage of material and large rejection due to lack of inspection and process control will result in poor quality of the product. No sale and no profit will lower the productivity.
5. **Confusion in Machine Scheduling** : If machine scheduling is not done properly, then it will halt the process resulting in idle machine hours and idle man hours, which ultimately decrease productivity.
6. **Shortage of Raw Materials** : If the raw materials are not supplied at right time in right quantity, then the resulting shortage of raw materials supply will affect the production system. When no input is available, then no output will be obtained. Shortage of raw materials will result in less production, which will increase the cost of production and hence causes low productivity.
7. **Excess Inventory** : The proper inventory control is required at each level for smooth functioning of the system. Excess inventory will invite problems of storage, excessive material handling and large space area resulting in increase in cost of production. Anything that does not add value to the product is called waste and excess of inventory not in use is also termed as waste which will decrease productivity.
8. **Large Quantities of Reworked Material** : Large quantities of reworked material increase the cost of production, resulting in low productivity.

## 1.6 METHODS TO IMPROVE PRODUCTIVITY

The management needs following two bases to increase productivity and to reduce cost of the product :

1. Human base,
2. Technological base.

Constant efforts are required to intensify co-operation between these two bases. Some of the important points of co-operation are as follow :

### 1. Human Base :

- (i) Worker's participation in management.
- (ii) Mutual trust and co-operative relationship.
- (iii) Type of union.
- (iv) Rationalization and automation.
- (v) Provision of raw materials, components and supplies.
- (vi) Plant, equipments and their maintenance.
- (vii) Training.
- (viii) Working conditions.
- (ix) Work simplification and suggestion box scheme.
- (x) Working hours.
- (xi) Welfare schemes and other amenities.
- (xii) Man power budgets, fair wage system.
- (xiii) Production schemes.

### 2. Technological Base : New methods and techniques should be implemented in :

- (i) Planning and progress.
- (ii) Layout of plant, shops and machine tools.
- (iii) Material handling and internal transport.
- (iv) Inspection.
- (v) Defective work.
- (vi) Substitutes.
- (vii) Design.
- (viii) Standardisation.

## 1.7 DIFFERENCE BETWEEN PRODUCTION AND PRODUCTIVITY

Production may be defined as *a process or procedure to transform a set of input into output having the desired utility and quality*. It is a value addition process. *It is an organised process of conversion of raw materials into finished products* as shown in fig. 1.1.