



# **AGRICULTURE INPUTS AND THEIR IMPORTANCE FOR PRODUCTIVITY - AN OVERVIEW**

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## **BACKGROUND OF AGRICULTURE INPUTS**

Agriculture in India shifted its scope and focuses more on towards commercialization and export-orientation. Creation of employment opportunities and achieving food security are among the top priorities in the policies related to agriculture. Thus agriculture has been a prominent sector accounting for 14.2 per cent of Gross Domestic Product (GDP) in 2011 agriculture and agro-industries are considered to be highly important for the country's economic development. Although the service and industrial sectors showed higher rates of growth and have been contributing higher percentages to Gross National Product (GNP), Worldwide, expansion in agricultural commodities and food products has been accompanied by significant increase in usage of agricultural inputs such as fertilizers, pesticides, farm machinery and improved seed material. The use of such intensive inputs in agriculture and access to plentiful energy, where they were previously limited or unavailable, has enabled an increase in food production and thus provides better food and livelihood security.

In developing countries increased growth in agricultural production depends on continuous improvement through technological changes. This requires a sustained and rapid growth in the use of agricultural inputs such as seeds, fertilizers, pesticide, farm implements, farm machinery, etc.,

### **Seeds**

Seed is the basic and most critical input for sustainable agriculture. The response of all other inputs depends on quality of seeds to a large extent. It is estimated that the direct contribution of quality seed alone to the total production is about 15 – 20% depending upon the crop and it can be further raised up to 45% with efficient management of other inputs. The developments in the seed industry in India, particularly in the last 30 years, are very significant. A major re-structuring of the seed industry by Government of India through the National Seed

Project Phase-I (1977-78), Phase-II (1978-79) and Phase-III (1990-1991), was carried out, which strengthened the seed infrastructure that was most needed and relevant around those times.

The production and distribution of quality/certified seeds is primarily the responsibility of the State Governments. Certified seed production is organized through State Seed Corporation, Departmental Agricultural Farms, Cooperatives etc.

### **Fertilizers**

Just like humans and animals, plants need adequate water, sufficient food, and protection from diseases and pests to be healthy. Commercially produced fertilizers give growing plants the nutrients they crave in the form they can most readily absorb and use: nitrogen (N), available phosphate (P) and soluble potash (K). Elements needed in smaller amounts, or micronutrients, include iron (Fe), zinc (Zn), copper (Cu) and boron (B). Fertilizer is generally defined as "any material, organic or inorganic, natural or synthetic, which supplies one or more of the chemical elements required for the plant growth". The main aim of the industry is to provide the primary and secondary nutrients which are required in macro quantities. As per the Fertilizer Control Order (FCO) 'fertilizer' means any substance used or intended to be used as fertilizers of the soil and or crop and specified in part A of Schedule I and includes a mixture of fertilizers and special mixture of fertilizers. Primary nutrients are normally supplied through chemical fertilizers.

### **Pesticides**

The practice of agriculture first began about 10,000 years ago in the Fertile Crescent of Mesopotamia (part of present day Iraq, Turkey, Syria and Jordan) where edible seeds were initially gathered by a population of hunter/gatherers<sup>1</sup>. Cultivation of wheat, barley, peas, lentils, chickpeas, bitter vetch and flax then followed as the population became more settled and farming became the way of life. The first recorded use of insecticides is about 4500 years ago



by Sumerians who used sulphur compounds to control insects and mites, whilst about 3200 years ago the Chinese were using mercury and arsenical compounds for controlling body lice<sup>4</sup>. Writings from ancient Greece and Rome show that religion, folk magic and the use of what may be termed chemical methods were tried for the control of plant diseases, weeds, insects and animal pests. As there was no chemical industry, any products used had to be either of plant or animal derivation or, if of mineral nature, easily obtainable or available. Up until the 1940s inorganic substances, such as sodium chlorate and sulphuric acid, or organic chemicals derived from natural sources were still widely used in pest control.

### **Farm Machinery and Equipments.**

Technology and machinery enhanced the ability, quality, accuracy and efficiency of the human being. By using technology in any field the rate of production and quality automatically increases. Farm mechanization helps in effective utilization of inputs to increase the productivity of land and labour. Besides it helps in reducing the drudgery in farm operations. The early agricultural mechanization in India was greatly influenced by the technological development in England. Irrigation pumps, tillage equipment, chaff cutters, tractors and threshers were gradually introduced for farm mechanization. The high yielding varieties with assured irrigation and higher rate of application of fertilizers gave higher returns that enabled farmers to adopt mechanization inputs, especially after Green revolution in 1960s. The pace of farm mechanization in the country accelerated with the manufacture of agricultural equipment by the local industries. With the modest beginning of manufacture of tractors in 1960s with foreign collaboration, to-day the Indian farm machinery industries meet the bulk of the requirement of mechanization inputs and also export. Farm machines have not only increased the mechanical advantage, but also helped to reduce drudgery while performing the different agricultural operations.

Farm mechanization is an important element of modernization of agriculture. Farm Productivity is positively correlated with the availability of farm power coupled with efficient farm implements and their judicious utilization. Agricultural mechanization not only enables efficient utilization of various inputs such as seeds, fertilizers, plant protection chemicals and water for irrigation but also it helps in poverty alleviation by making farming an attractive enterprise.

### **NEED FOR NEW TECHNOLOGY IN AGRICULTURE**

Farm power - consisting of manual labor, agricultural tools, draught animals, tractors, implements, equipment and machinery – is an essential farm input. In almost any agricultural production system the annual expenditure on farm

power, whether on labor, draught animals, or fuel and depreciation of machines, largely exceeds the costs of other inputs such as agro-chemicals and seeds. In many developing countries, agricultural production and food security are adversely affected because of insufficient use of farm power, low labor productivity or labor scarcity. The need to improve agricultural labor productivity is increasingly recognized. In the case such as pump sets for irrigation, the need for machinery is undisputed. Rather than agricultural mechanization, it would be preferable to use the term Farm power or labor productivity enhancing technology to recognize not only the importance of manual labor and hand tools, draught animals and mechanical power, but also 12 other issues related to the labour scarcity, such as cropping and farming systems.<sup>8</sup> Finding solutions to environmental problems in agriculture requires agricultural tools and machinery,

### **IMPORTANCE OF MECHANISATION**

Mechanization involves judicious application of inputs by using agricultural machinery/equipment e.g. hand tools, bullock drawn equipment, power driven machines including the prime movers for performing various operations required for crop production activities. Mechanization ensures reduction of drudgery associated with various farm operations as also economizes the utilization of inputs and thereby harnessing the potential of available resources. Traditionally, Indian farmers have been using animal and human power. These sources have limitations and have been proved ineffective to achieve multiple crops. Even with limited land resources, multiple cropping is considered to be the best way of increasing productivity. b) Draught animals are easily available as progenies of local milk animals and this perpetuates the use of draught animal power as a major power source for operations. In the sloping hill regions and on small farms, these draught animals will continue to be the main power source, besides human power. However, the number of these animals is on the decline. Mechanisation enables timely field operations and effective application of various inputs. Tilling, sowing, irrigation, plant protection and threshing have been successfully mechanized and widely used by Indian farmers. d) The farmers practicing dry land agriculture, work under unpredictable weather conditions and for them timeliness is very important. This calls for quick time-bound operations of tilling and ploughing, which cannot be done depending entirely on human or animal power. The use of machine is a must for modernization of agricultural operations. Human labour is the largest cost item in the cost structure. An implication is that even a relatively small increase in the wage would have a large impact on the economies of crop. As a result, farmers are likely to be very sensitive to wage



increases and this may be an important reason for the move towards mechanization and other labor

### **NEED FOR FERTILIZERS IN INDIA**

Fertilizer is a substance to soil to improve plants' growth and yield. First used by ancient farmer's fertilizer technology developed significantly as the chemical needs of growing plants were discovered. Modern synthetic fertilizers are composed mainly of nitrogen, phosphorous and potassium compounds us the secondary nutrients added. The use of synthetic fertilizers has significantly improved the quality and quantity at the food available today but their long term use is debated by environmentalists. Following points shows need for fertilizers in India:

(1) Its universally accepted that the use of chemical fertilizer in an integral of the package of practice for raising the agricultural production to a higher place. Studies continued by the Food and Agricultural Organization (FAO) of the United Nations have established beyond about that there is a close relationship between the Gerry crop yields and fertilizer consumption level. Moreover the nutritional requirement of different crops could not be fully met with the use of organic manures like FYM and other bulky organic manures like cack, neem, groundnuts castor, etc. for want of their availability in adequate quantities.

(2) Increasing agriculture production in Indian by area increasing process is no longer possible as cultivable and left over is only marginal. Further a considerable cultivable land is being diverted year after year for housing and industrial etc. Hence self sufficiency in food lies in increasing the field per unit area per unit time through adoption of modern agricultural technology.

(3) Fertilizer have the advantages of smaller bulk easy transport relatively quick in an availability at plan-food constituents and the facility of their application in proportion suited to the actual requirements of crops and soils.

(4) There is need for an efficient use of fertilizers as major plant nutrient resource in enhancing the farm productivity.

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