# 6. SEED TECHNOLOGY

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## LEARNING OBJECTIVES

This chapter is designed to enable the student to do the following things:

- Define seed and understand its role in crop production.
- Understand seed structure and modes of germination.
- Discuss the characteristics which determine seed quality and factors affecting these characteristics.
- Be exposed to the concept of seed technology.
- Evaluate seed health and learn methods of seed health testing.
- Define prebasic, basic, registered, and certified seed.
- Describe the methods of producing certified seed for self and cross-pollinated crops.
- Discuss seed legislation in Pakistan.
- Explain how seed is processed and stored.
- Tell how to protect seed from pests and diseases.

## 6.1 Role of seed in crop production

Seed plays a key role in increasing food and fibre production to meet the increasing demands of the people, and is a focus around which strategies to boost crop yields can be built. Silvey (1981) estimated that wheat yields in England and Wales increased by 105% within 30 years, of which 63% was due to the use of seed of new and improved varieties.

The role of seed in providing sustainable crop production is mainly through new varieties. Investment in research and plant breeding will be of little use unless varieties showing significant genetic superiority, high purity, and sound health are actually used by the farmers. Good crop stands are

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ensured through the use of seeds which germinate vigorously. The spread of weeds and diseases can be minimized by using clean and healthy seeds. Another important aspect of the role of quality seed is that among the inputs used by the farmer, seed is the cheapest.

Seed is a carrier of new technologies. High-quality seed when wisely combined with other inputs significantly increases yield levels. In China, India, and Pakistan, the trend towards self-sufficiency in food over the past few years is mainly due to the cultivation of high-yielding varieties. The introduction of improved seed raises the utility of traditional inputs and increases their consumption as well.

Quality seed is a basic tool for a secure food supply. With quality seed in hand, a nation can successfully survive both in peace and in war. Dependence on other countries for food is minimized and a considerable amount of foreign exchange is saved. Improved seed is a medium for rapid rehabilitation of agriculture in cases of natural disasters like floods and droughts with their subsequent threats of famine and starvation.

## 6.2 Concept of seed technology

Seed technology is that branch of science which deals with methods of improving the genetic and physical characteristics of seeds. The definition and concept of seed technology varies widely among institutions, authors, and countries. In its broadest sense, seed technology encompasses all the technical and support activities involved in the development and release of varieties: production, harvesting, conditioning, processing, storage testing, quality control, distribution, and marketing of seeds. Since it deals with a wide range of subjects such as seed production, processing, storage, testing and certification, and marketing, and the relevant research in these areas, seed technology is an interdisciplinary science.

Although seeds of crops such as maize, cotton, rice, sorghum, wheat, soybean, pulses, and oilseed receive the maximum attention at Pakistan's Federal Seed Certification Department, due importance is also being given to forage, pasture, vegetable, and forest seeds.

With the advent of hybrids and high-yielding varieties of crop plants, great care has been given to the maintenance and preservation of the quality which the plant breeder has synthesized in these hybrids and varieties. Moreover, the production of high-quality seeds has become a specialized enterprise. Seeds are treated as a high-technology end product, which is to be multiplied rather than merely consumed in the production process.

Seeds are alive and must be kept under conditions appropriate to living things. The job of the seed technologist is to protect the seed by providing suitable conditions and looking after its welfare.