

## **VARIETY DEVELOPMENT, TESTING, REGISTRATION, APPROVAL AND RELEASE SYSTEM IN PAKISTAN**

The main objective of plant breeding programmes is to develop new plant varieties that can enhance the farm productivity. The type of plant varieties so selected for commercial production are greatly influenced by its mode of reproduction, cost of seed relative to its performance, nature of seed production and distribution and the environment where it will be grown. Between creation and marketing of a variety, it is subjected to various forms of testing for registration, release and approval etc. this exercise may vary from country but plant breeders both from public and private sectors often optionally seek to have their varieties tested officially. In fact this led to the development of a system of official variety testing and release.

### **VARIETAL DEVELOPMENT**

The varieties are being developed at Provincial and Federal Agricultural Research Institutes mainly through conventional Plant Breeding i.e. Introduction, Hybridization and selection etc. A significant use of Atomic radiation is being made for the development of varieties specifically of food legumes, rice and cotton. Privatization promotion policy of the government of Pakistan has encouraged the emergence of multinational seed companies like Pioneer Pakistan Seeds Ltd, Monsanto Pakistan Seed (Pvt.) Ltd, Syngenta (Pakistan) Ltd and ICI Pak seed Ltd.

These companies have started breeding programmes and submitting varieties for evaluation and registration. These varieties include hybrids of sunflower, Maize and Sorghum. Pakistan also keeps close liaison with International Agricultural Research Centers like IRRI, ICARDA, ICRISAT, CIMMYT, CIAT, IITA and AVRDC for obtaining germplasm to strengthen the national plant breeding programmes. We are also working on Plant Breeder's Rights, that may change the role of research organizations through more research toward development of germplasm resources, new breeding procedures and identification of superior breeding lines.

### **VARIETY TESTING**

The crop breeders test and evaluate at research centers, a large number of strains in micro-varietal trials, for sufficient number of years and then the promising material emerging from these micro varietal trials is further tested in the out-station zonal varietal trials. The breeders are aware of the variation that can occur on account of the genotypic-environmental interaction. In order to overcome this phenomena Zonal trials are conducted widely in the area of adaptability usually in cooperation with enlightened growers and on government farms. When a breeder selects a variety on the basis of a wide range of tests and considers it having sufficient merit, he submits seed sample to the National Seed Registration Department to determine the distinctness, Uniformity and Stability characteristics for establishing description and registration. Simultaneously, the seed samples are also provided to the Variety Evaluation Committees of Pakistan Agriculture Research Council (PARC) for crops other than cotton. For cotton seed samples are submitted to Pakistan Central Cotton Committee. Both these organizations evaluate the candidate varieties for value and cultivation use (VCU). A variety that meets the requirements of VCU and DUS is then accepted for registration and release as defined in the Seed Act that a released variety means a registered variety having agricultural value for growing and approved by the National/Provincial Seed Council.

### **VALUE FOR CULTIVATION AND USE (VCU)**

Value for cultivation and use is the only criteria for which a commercial variety is developed. Initially the variety is tested locally by adopting a well planned testing procedure covering

suitable field plot techniques and adequate number of replications and experimental design. The agronomic trials are carried out by provincial Agricultural Departments at their adaptive Research Farms, progressive growers and seed corporation farms. Performance of value for cultivation and use of the candidate variety is expressed relative to control variety/varieties used as check.

The most important aspect of testing for VCU perhaps is the yield performance but there are other characteristics which must be assessed. Field characteristics may differ from crop to crop i.e. for wheat resistance to rusts and other pathogens, lodging and bread quality etc. It is also important that the product of the crop must be of the right quality for the purpose for which it is intended.

### **DISTINCTNESS, UNIFORMITY AND STABILITY (DUS) REQUIRMENTS**

In addition to the value of a cultivar for cultivation and use, the cultivar must be suitable for pure seed production which requires the cultivar to be distinct, uniform and stable in its characteristics.

#### **DISTINCTNESS**

The new variety must be defined and clearly distinguishable from all other existing varieties by one or more morphological (shape, color etc.), physiological (resistance, maturity etc.) and metric characteristics (height, leaf length etc.). In the absence of distinctness, it will not be possible to distinguish and identify the new variety for seed production and certification.

#### **UNIFORMITY (HOMOGENEITY)**

The new variety must be reasonably uniform within its stand so that individual plants could be identified. Uniformity or homogeneity relates to the degree of variability within the variety. The degree of uniformity that is attainable depends on the breeding system.

#### **STABILITY**

The new variety must be stable in its essential characteristics, that is to say it must remain true to its description after repeated reproduction or propagation. A stable cultivar is always credited because it can be increased and distributed without many problems. It is not generally possible during a period 2 to 3 years to perform stability tests with same certainty as the testing of distinctness and homogeneity. Generally, when a submitted sample has shown to be homogenous in two growing years, it is taken to be as stable because the breeders/institutions has the responsibility to maintain the variety and its stability in later generations. If failure in stability is detected in later generation then variety could be declared unfit for certified seed production. Stability is further ascertained through pre and post control trials.

### **REGISTRATION OF NEW CROP VARIETIES**

As Soon as a variety completes its evaluation regarding VCU and DUS characteristics, the data are discussed by the Federal Seed Registration Committee (FSRC). The varieties found acceptable are recommended to the National Seed Council (NSC) for confirmation of registration. The registered varieties become eligible for quality control through the Federal Seed Certification Department.

### **SIGNIFICANCE OF REGISTRATION**

- The registration provides the basis for quality control through Federal Seed Certification Department.
- The registration will also provide the basis for administering the Plant Breeder's Rights.
- The registration of varieties and their authentic descriptions provide the basis for true to type maintenance of Breeder's Nucleus Stocks of the variety for the production of Pre-basic seed.

## **APPROVAL AND RELEASE OF CROP VARIETIES**

At provincial level, the registered varieties are released and recommended for general cultivation by the respective Provincial Seed Council (PSC). The Provincial Governments are responsible for arranging production, processing and distribution of quality seed of released varieties in sufficient quantities for the farming community.

- a) **Expert Sub-committee:** At Provincial Level, Expert Sub-committee which is represented by the breeders and agricultural experts receives proposal of new candidate varieties submitted by the breeders. This committee evaluates the data of breeders along with reports of FSC&RD regarding Distinctness, Uniformity and stability characteristics and PARC relating to agronomic value, region suitability/ adaptability and disease reaction. After thorough examination, Expert Sub – committees submits cases of those varieties which are considered suitable for cultivation to Provincial Seed Council for approval.
- b) **Provincial Seed Council:** The Provincial Seed Council (in each province) which is represented by the breeders, seed producers, quality control agencies and enlightened growers discuss the proposals of the candidate varieties in the light of the recommendation /comments of the Expert Sub-committee and approves / release the varieties accordingly.
- c) **National Seed Council:** The decisions of the Provincial Seed Councils regarding approval and release of varieties are usually unanimous. In case of difference of opinion among the members, the cases are referred to the National seed council. In such cases the FSCRD furnishes the views of the crop specialists and submit the cases to the National Seed Council for final decision.