

Strategies to Produce Farmers Own Seed of Open Pollinated Varieties (OPVs) of Maize

A. G. Rather, Shafiq A. Wani, S. Najeeb, F. A. Sheikh and M. A. Ahangar*

**High Altitude Maize Research Sub-Station, Sagam
Sher-e-Kashmir University of Agricultural Sciences & Technology of Kashmir, India.**

***E-mail: agsamina@yahoo.com**

Maize varieties may be either hybrids or open pollinated. While hybrids are inherently high yielding, OPVs have the advantage of stable performance than hybrid in low yielding and stress environments. Moreover, the seed of the OPVs can be saved for next planting. Maize being a highly cross pollinated crop, standards for minimum isolation have been developed for seed production depending on class of seed and size of the field.

In Kashmir maize is second most important crop after rice occupying about 01 lakh hectares. The crop is largely cultivated under rainfed conditions using OPVs. Among many factors responsible for low productivity of the crop, seed has been recognized one of the crucial elements. It is well documented that good quality seed alone can enhance productivity up to 20%. Due to unorganized seed sector and underdeveloped infrastructure more than 85% farmers use their own saved seed. Since the maize grown in contiguous plots, the production of quality seed under prescribed minimum isolation distance becomes difficult rather impossible. However, owing to straightforward nature of seed production in OPVs farmers can use their own saved seed for several seasons without substantial loss of yield potential or good agronomic characters provided some precautionary measures as described below are undertaken;

Choice of cultivar: Broadly speaking two types of cultivars are available suited to two different agro-ecological situations (valley/high altitude) of Kashmir. Farmers should choose the cultivars according to their ecological requirements.

Seed: Initially certified seed of particular cultivar should be used to produce farmers own saved seed.

Cultural practices: Agronomic practices are, in general similar to used in producing a grain crop. However careful consideration must be given to land preparation and fertilizer/manure application to produce the uniform growing conditions in seed production plot. This would facilitate the identification of off-types during rouging operation. **Seed**

rate: Plant 10-15% more seed than desired at the harvesting time to compensate for reduced germination and seedling mortality caused by pest attacks (cutworms etc).

Irrigation: If there is a provision of irrigation two irrigations may be given at tasseling and grain filling stage.

Field layout to produce farmers own saved seed for 8 kanals (1 acre*): In one acre of land plant 9-10 kg seed of the desired OPVs uniformly in lines** drawn 60 cm apart. At four leaf stage thin out excess plants maintaining a plant to plant distance of 20 cm. Emphasis should be given to the removal of plants that do not resemble the variety based on colour of leaves/stem, height, vigour etc. In the middle of the field select 150 sq m (15 x 10 m) area where slightly wider spacing (25 cm) is maintained between plants. Thus there will be 25 rows of 10 m length, each row having 40 plants to accommodate about 100 plants. The wider spacing will ensure good seed set and development. This will also allow full expression of plant type to aid in the identification of off-types. When a hill is missing allow two plants to grow in the next hill. In the selected area detassel plants, before pollen shed, not confirming to the varietal description because 90% of the pollen comes from plants in the vicinity. In the central 17 rows excluding 5 plants from each side of row (500 plants), henceforth called seed plot, detassel 40% (200) plants before pollen shed which are considered atypical. Selection criteria used will include plant and ear height, leaf/ stem colour, pubescence, disease/insect damage etc. Very tall and very dwarf plants as well as plants falling outside the range of maturity are rejected. Allow the crop to mature.

Harvesting: Harvesting the crop when seed moisture is between 16-20% (dry husk stage). Harvesting should be done carefully by hand. Harvest seed plot first to avoid any chances of mixture. Only those plants (300) are harvested for seed which had been lift with their tassels on in the seed plot whereas the rejected plants are detassled. Spread these 300 ears on a tarpaulin or on a dry and clean concrete surface and check for ear and grain characteristics (ear size and kernel colour/ texture) after dehusking. Select 250-275 true type ears free from disease and insect damage.

Drying of ears: Sundry selected ears on a clean and dry surface. Do not heap ears while sun drying. Turn ears frequently for uniform drying. Shelling is done when grain moisture comes down to 14% level. A simple test can be applied to check whether seed has reached 14% moisture content. Shell an ear and mix 100 kernels with one gram of common salt. If the salt feels moist after five minutes, ears need to be dried further but if salt remains dry shelling can begin.

Shelling: shelling by hand minimizes the seed damage. The best seed is obtained from the middle of the ear so the seed of 2 cm from tip and bottom may not be included.

* It is highly desirable if 2-3 farmers, having their fields adjacent to each other, join to produce the seed of the same variety in a bigger plot of at least one hectare. The selected area shall be increased accordingly.

**If line sowing is not possible in the entire area, seed may be broadcast in the non selected area.

Drying of seed: Sundry the seed to 12% moisture level (when seed under teeth is broken with a sharp sound) for safe storage. Low seed moisture increases the viability and storability of the seed. While sun drying ensure that seed is turned frequently to prevent “sun burn” damage to the embryo.

Cleaning: The shelled seed may be cleaned (winnowed) and any chipped and diseased seed be removed by hand. A quantity of 18-20 kg seed will be obtained from selected ears.

Treating: Treat the seed with Thiram @ 2g/kg of seed. Ensure that seed is uniformly treated. When treating with chemical observe safety recommendations given on the container. Treated seed must never be used for human or animal consumption.

Storage: Store in gunny bags in a cool and dry place away from rodents.

During the next season half of the seed is sown and next half is retained to meet any eventuality. The process is repeated for three seasons before procuring fresh certified seed.

The package of seed production described above briefly mentions the maintenance and seed multiplication of maize OPVs but provide plenty of information to the resource poor farmers who are ignorant about the importance of quality seed. The necessary infrastructure for the production and marketing of superior hybrids are still not available under our temperate conditions. Hence maize is generally grown on marginal lands as rain fed crop with least inputs and whose economic production is highly dependent on input based technologies. Thus rules out the possible role of single cross hybrids in improving the economy of the farmers. The OPVs resolves the problem in the form of genetic and population buffering, besides are easier to develop than hybrids. The seed production is relatively simple and inexpensive and resource poor farmers who grow them can save their own seed for planting 2-3 subsequent seasons. Also the management technologies presented in the article can be undertaken without involving any special operation and cost except some minor manipulations and adjustments together will create plenty of employment opportunities.

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