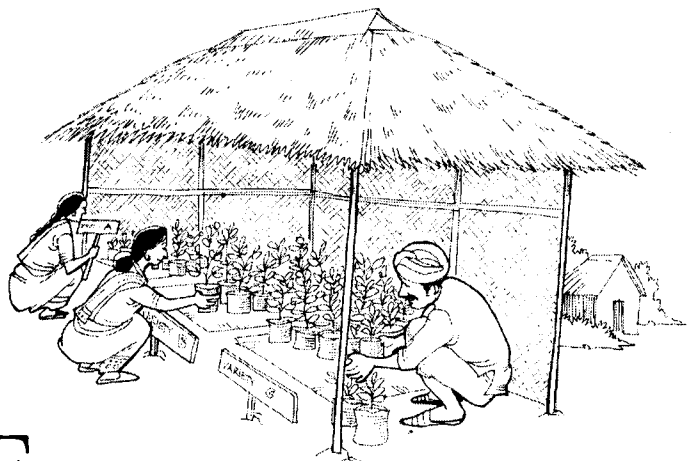


Farmers as Plant Breeders

Three Cases from India



Farmers not only conserve landraces but they also develop new varieties through their own selection and crossing procedures. Farmers have always been known to make selections in the available diversity through natural mutations, mixtures or outcrossing. Sometimes, diversity also comes about due to natural stresses, which create selection pressure. This provides opportunity for less common characters to become noticeable. For instance, if a few rice plants survive in a flooded field, farmers may select these plants and accordingly develop a flood-tolerant variety.

The Honey Bee network has documented a large number of these examples over the last 12 years and three cases are described here, all from India. In each case, farmers' unique ability to observe and select a distinctive variety has brought out the potential of farmers to breed varieties.

The Honey Bee network emphasizes the need for accountability of the formal research system to people whose knowledge is often used to improve formal research work without acknowledgement, reciprocity or sharing of benefits.

The Honey Bee Network has documented more than 10,000 innovations either of contemporary origin or based on outstanding traditional knowledge primarily from India but also from other parts of the world. Many of these innovations are extremely simple and can improve efficiency of farm workers, women, small farmers and artisans.

The network was launched seven years ago and operates in 75 countries.

Case One - Farmer's Selections

An Eye for Detail, Diversity and Deviance

Thakershibhai Savalia, a 70 year-old farmer from Pankhan village in Saurashtra, a dry part of Gujarat, has a very keen eye for variation in the field. In 1987, when there was a severe drought, most of his groundnut crops had withered. However, he found two healthy plants, which seemed different from the rest. He marked these and observed their growth every day. After maturity, he used the seed to multiply and within five years, through recurrent selection, he developed a variety, which he initially named as *Morla* (i.e., like a peacock) because its pod resembled a peacock's beak. It had a very good oil content aside from two unique traits: (a) the lack of ridges on the pod; and (b) a strong peg.



Morla also had better than average disease and pest resistance as well as better drought tolerance than other varieties. It also had an extremely good taste. The stronger peg and lesser ridges helped in digging out the groundnuts after maturity. Pods are less likely to be left in the soil, requiring a second or third digging. Through word of mouth, the variety spread to more than 40 villages in the last few years.

While the variety was rejected in the All India Coordinated Research trials conducted by the Indian Council of Agricultural Research (ICAR), farmers in the region continue to grow it. Thakershibhai is very keen to get varietal protection for his selection.

Case Two - A Pigeon Pea Variety with Pink Flowers

Dhudabhai Punjabhai Patel of Gadha village, Sabarkantha district, Gujarat, selected a few odd plants in a field sown with BDN-2 variety. These plants were neither affected by pest or disease, and also had a different flowering and pod-bearing pattern from the other plants. The plants had pink flowers when most pigeon pea varieties have yellow flowers which attract the pests. The new type had more pods with 5 - 6 seeds per pod. Most of the pod-bearing branches were on the upper part of the plant, thus, making it easier for women to harvest them.



The yield was satisfactory (25 to 30 quintals per hectare) even at low fertilization level. It was also resistant to wilt and was early maturing. The farmer named the variety *Gadha Dudhabhai Punjabhai - 1* (GDP-1). The cooking time for the dried pulse was short. The grain was bolder and more suitable for certain recipes. In 1994, this farmer-bred variety has been registered with the National Bureau of Plant Genetic Resources. Mansukhbhai Ramjibhai Murani has also selected a pigeon pea mutant from the BDN-2 variety. This has bigger leaves, 4 - 5 seeds per pod, equal pod bearing on each branch, requires less water, and seems resistant to the sucking pests. Its flowers are red outside and yellow from inside and provided a good yield.

Case 3 - Sundaram A Penchant for Innovative Plant Selections

Sundaram is one of the most enterprising young breeders and experimenter discovered by the Honey Bee Network. He has developed a very innovative agroforestry system in arid parts of Rajasthan with rainfall less than 20 inches per year. He has also developed numerous vegetable varieties as well as pulses and spices through selection in farmers' fields. He has made unique selections, which even the formal research system has not done. One of his first outstanding selections was a variety of chili with three times more color value than the best variety in India. It also has 50% higher yield than the popular improved variety and twice the market value than the other available varieties.



Among his notable selections are:

- two garlic varieties with earlier maturity than the rest, one of these varieties has a better yield than all the improved varieties released by the formal research system;
- six onion varieties with higher productivity than the improved released varieties;
- six cluster bean varieties, four of which are free from powdery mildew and two from leaf curl disease;
- a sesamum variety which is resistant to drought and free from red rot disease plus other single varieties of green gram, fenu greek, chickpea and cumin which are all disease- and pest-resistant;
- 13 coriander varieties which are resistant to both blight and wilt, some of which also showed synchronous maturity; and
- 22 pearl millet varieties, which are free from black smut, 19 of which are free from downey mildew.

There are numerous programs on so-called participatory breeding around the world. But somehow, when asked to share examples of varieties developed by farmers, the international community seldom provides the necessary responses. This indicates that there are not enough farmer-breeders in the world or maybe, these innovative farmer-breeders are not the main focus of researchers engaged in so-called participatory breeding.



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Contributed by:
Anil K. Gupta
(Email: anilg@imahd@emet.in)