

# **Farmers' Variety in the context of Plant Variety Protection and Farmers' Rights Act, 2001.**

S. Nagarajan, S.P. Yadav and A.K. Singh

The convention on Biological Diversity was signed at the Earth Summit in Rio de Janeiro in 1992. The convention asserts that natural resources belong to the sovereign state in which they exist. Inevitably this stand is in conflict with commercial patent for live forms as the plant variety which is prior art refers to publicly available existing knowledge that is relevant to an invention for which a patent applicant is seeking protection. If the prior art is too closely related to the claimed invention, the application may be rejected on the grounds of lack of an inventive step. The registration officers are required to check for the absence of prior art before awarding a patent now well accepted by Organization Economic Cooperation and Development (OECD) and other group of countries.

Australia, the world's leading advocate of neo-liberal agriculture is facing a crisis of family farming in sectors where corporate entities are entering as horticulture and dairying, altering the nature of farmer/processor relations. The Australian processing tomato industry got drastically altered in the last twenty years. During this period 90% of the growers got eliminated changing the social and economic characteristics of the remaining 10%. In 1984 the average tomato output per grower was 520 tons and by 2004 it is around 12,500 tons. During the period 1975 to 2002 the price of tomato fell almost by 70%. The shift has been towards tomato hybrids production technology, large specialized farm and technology wise well informed growers (Pitchard et al., 2007). Clearly, liberal globalization of agriculture is likely to induce several shifts in the present system of doing farming. A diverse and biological resources rich country like India has to learn from the experiences of others. India must document and legally protect the Farmers' Variety and use them globally as a trade strategy.

The Farmers' Varieties (FV) can be considered as an equivalence of the prior art provision of the Patent Act and is necessary to provide a legal frame work to ensure that already known FV are not encroached as New Variety. Plant breeders have been developing varieties and centrally notifying under the Seed Act, 1966. And even prior to this many of the agriculture colleges and experimental stations have been making available to farmers improved varieties for cultivation, which has now become a matter of common knowledge (CK).

Number of agencies have initiated programme to conserve, document, characterize and publicize germplasm adapted to local environments. Their focus has been on conservation of crop diversity, conserving indigenous agriculture and traditional knowledge. Such attempts have primarily focused on the cereals and millets crops such as Rice (*Oryza indica*), Ragi (*Elusine coracana*), Jowar (*Sorghum biclour*), Grain Legumes etc. Provision has been made under the Protection of Plant Varieties and Farmers' Rights Act, 2001 (PPV&FR Act), for the registration of FV and Varieties of Common Knowledge under the generic class 'Extant Variety'.

FV has been defined under the Act as:

- A. Has been traditionally cultivated and evolved by the farmers in their fields
- B. Is a wild relative or land race or a variety about which the farmers posses the common knowledge.

### **What can be a FV?**

The FV is one that was evolved by farmers / farming communities over several years and has proven special features compared to other materials. These materials must have been traditionally cultivated for considerable number of years. Because of repeated propagation, progeny assessment and advancement, the FV tend to be in a more homogenous, stable with distinct character(s). Such varieties have been provided with unique identity with a vernacular name or a name (predominantly) describing their unique features. The distribution or horizontal spread of such FV in their neighborhood as unregistered variety surmises that there was and is a consumer acceptance for the

produce. This only goes to prove that market driven selection was done by farmers in the selection of FV. It can, therefore, be confidently said that FV are those plant varieties that are homogenous traditionally cultivated by farmers, selected by farmers in their own field and is an improvement over the wild relatives and/or land races. The FV can be elaborated as a variety that is almost uniform, homogenous, distinct trait and enjoys consumer acceptance (Nagarajan, 2007).

### **FV can meet registration standards:**

FV is grouped under the class 'Extant Variety' which has been defined in the PPV & FR Act 2001. The act further adds that the Registrar shall register the FV within three years from the date of Gazette notification of the species and genera eligible for registration under the Act. To facilitate the class of EV getting registered under the provisions of the Act, further a Gazette Notification was issued informing the constitution of the Extant Variety Recommendation Committee (EVRC). This committee is mandated to develop appropriate procedures and examine the EV applications that fall under the Seeds Act, 1966 and recommend to the Authority the suitability of the material for registration.

### **Norms for FV Registration:**

The criteria of DUS to be adopted for the EV may marginally vary from that of what is specified for new varieties. It may also vary between species and depending upon if the candidate is a variety or hybrid. There is paucity of experimental data to indicate the level of distinctiveness that is available between FV to separate them from one another. The selection criteria followed by farmers has been the yield stability, risk avoidance, low dependence on external inputs and attributes related to storage, cooking and taste (Green Foundation, 2003). The FV are generally niche-specific and dispersed through informal system of seed exchange (Saxena and Singh, 2006). Implying that the special characters would be the main basis of difference since most of the FV may not have plant types with spectacular morphological variation. Yet, careful observation reveal perceivable differences for awn length, grain size, ear head shape, straw strength etc. Evaluating of FV as per descriptors notified in the Plant Variety Journal (PVJ) has not yet been done. At best qualitative and limited passport data are available

for the FV, falling short of the registration requirements. The essential characters and grouping characters is based on UPOV and Indian plant breeder's perception. It needs a fresh examination to assess whether the notified descriptors meet the requirements of the FV as well.

#### **Testing procedure for FV:**

The FV are said to be high performers under low input conditions. This implies that a FV undergoing DUS test to resolve a tussle is to be conducted under restrictive input conditions. Such changed growing condition should give results comparable to the new variety tested under the recommended agronomic procedure. The type of irrigation and nutrient schedule needed for the pest vulnerable FV has not been examined scientifically to arrive at any meaningful recommendation.

#### **Distinctiveness between FVs:**

The traditionally cultivated, farmer field evolved varieties are invariably tall ideotypes. More than that, the FV is likely to possess certain qualitative characters such as aroma, grain elongation on cooking, nutraceutical uses, tolerance to flooding, soil salinity, etc. These characters are of utmost importance and shall call for defined laboratory procedures for assessment. The 'Traditional Knowledge' associated with the FV should be recorded and the claims must be experimentally validated. Establishing the distinctiveness of the FV material based on the claims made by the applicant can be for the EVRC a demanding decision. The public funded agricultural research establishments, said to be dedicated for the cause of farmers should conduct critical experiments and provide the needed data to farmer/ farming communities on an acceptable term so that they are able to file FV with all supportive information. When done, logically provincial institutions have reasons to be proud that they have protected the crop genetic resources of their area in a manner benefiting the farmers.

This bulk head progeny is their seed chain sustainer. In mass selection, plants are chosen on the basis of the phenotype and the harvested seed composite is advanced without progeny testing. The performance of the mass selected material is compared with the original seed variant to assess the benefits gained through mass selection. The FV is a product of a type of mass selection (because the farmer willfully retains certain degree of heterogeneity without impairing the main frame work of features of FV) done by farmers to keep purity and homozygosity in an acceptable range to cushion against environmental aberrations and sustain the consumer preferences. Farmers' selection criteria are stability of performance between varying years. Whereas plant breeders conduct mass selection (mass pedigree) to breed varieties to excel in performance. While the approach may sound similar, the objectives are not. Farmer does head bulking year and again to retain the good combination(s) with certain degree of elasticity (Figure-1). Farmer assesses each year performance recollecting back the yield record/ trait details retained in his memory. Once he achieves repeatable yield 'fete' with those important traits, then the material is considered fit and the community horizontally spreads the FV over a niche, through seed exchange. These materials being niche specific (distinct cohesion of morphology, geographical distribution, agro-ecological adaptation and breeding behavior having their own local names, but hasn't been selected or maintained for genetic integrity/uniformity) fail to yield the same attributes when grown away from their belt and fail to receive the same level of consumer patronage. The FV, occupy a reasonable area in a given belt and yet may not be the dominant variety there.

### **How uniform should FV be:**

The selection criteria of the farmer being what it is, one needs to quantify the level of uniformity that is to be prescribed for FV. Since DUS test is not always advised for FV, evaluating uniformity can be a tricky exercise. It can be done by physically examining an acceptable amount of seed sample for the uniformity of seed features and grain hardness etc. Under such a situation the level of seed off types permissible to infer the extent of uniformity of the FV should be indicated. There is paucity of experimental data to declare the number of off types that can be tolerated for FV taking

into account that it will assess the stability. Since FV has inbuilt antiquity (as per the definition) it is necessary to scientifically validate the level of non uniformity tolerated by the farmers and the consumers.

#### **Duration of registration of FV:**

This then leads to the question of for how many years the plant breeder's rights should be granted after the FV is found fit for registration. By definition FV is one that is traditionally grown and implies that the material has already covered the period of protection prescribed for the new varieties or certain class of Extant Variety (EV). Therefore, providing fresh plant breeders rights for FV can only be notional. Hence, a provision would provide access to benefit sharing if FV is used further for variety development. If the FV is used in developing a new variety or an essentially derived variety by any breeder, then while granting prior permission owners of the registered FV can negotiate a deal.

#### **The issue of maintenance of FV:**

Once registration is granted under the Act the concerned plant breeder is to do the maintenance breeding of the material and produce true to type seed. In case of FV, the community intends to do maintenance breeding, adequate care must be ensured so that the variety sustains the main attributes for which the FV got registered. How the seed production chain of FV will be sustained without causing any drift from the initial population is an issue. In the event of granting post registration field life for FV, there is to be a mid-term review and renewal similar to any registered new variety. The New Variety on the contrary, is a product of pure line selection system and therefore, is bound to be more uniform than a variety like FV which is a product of bulk head advancement. It is, therefore, obvious that the final product accomplished by informal plant breeders like farmers is to be viewed and evaluated in a different manner.

#### **Land races and Folk varieties:**

The definition of FV under the PPV & FRA covers the wild relative or land race of a variety about which farmer posses common knowledge. The Biological Diversity Act (2002) (BDA) explains the land race as a primitive cultivar that was grown by ancient

farmers and their successors. The NBA further defines that the cultivar as a plant variety, which has originated and persisted under cultivation or was specifically bred for the purpose of cultivation.

Folk variety which finds a place only in the BDA is explained as a cultivated variety of plant that was developed, grown and exchanged between the farmers. Here the definition excludes the traditional nature of the cultivated variety nor is it to be evolved by farmers in their own field. Tradition, like custom, covers a long span of time or generations and the folk variety apparently need not have such a time lineage. Also FV are those that are evolved in their own fields. Between the FV and folk variety the differences are substantial and needs further analysis to separate the two group with and clarity.

### **Selection from Land Race:**

Land race and the locally popular varieties are rather heterogeneous and the cultivator keeps it that way, as part of subsistence farming so as to face the various production uncertainties. Often, plant breeders collect such adapted material; make mass selection within that population in their experimental farm, assess the benefit gained and release them for cultivation. Such materials are not FV as per the definition given in the PPV&FR Act, 2001. The UPOV (2002) has grouped such material as new varieties.

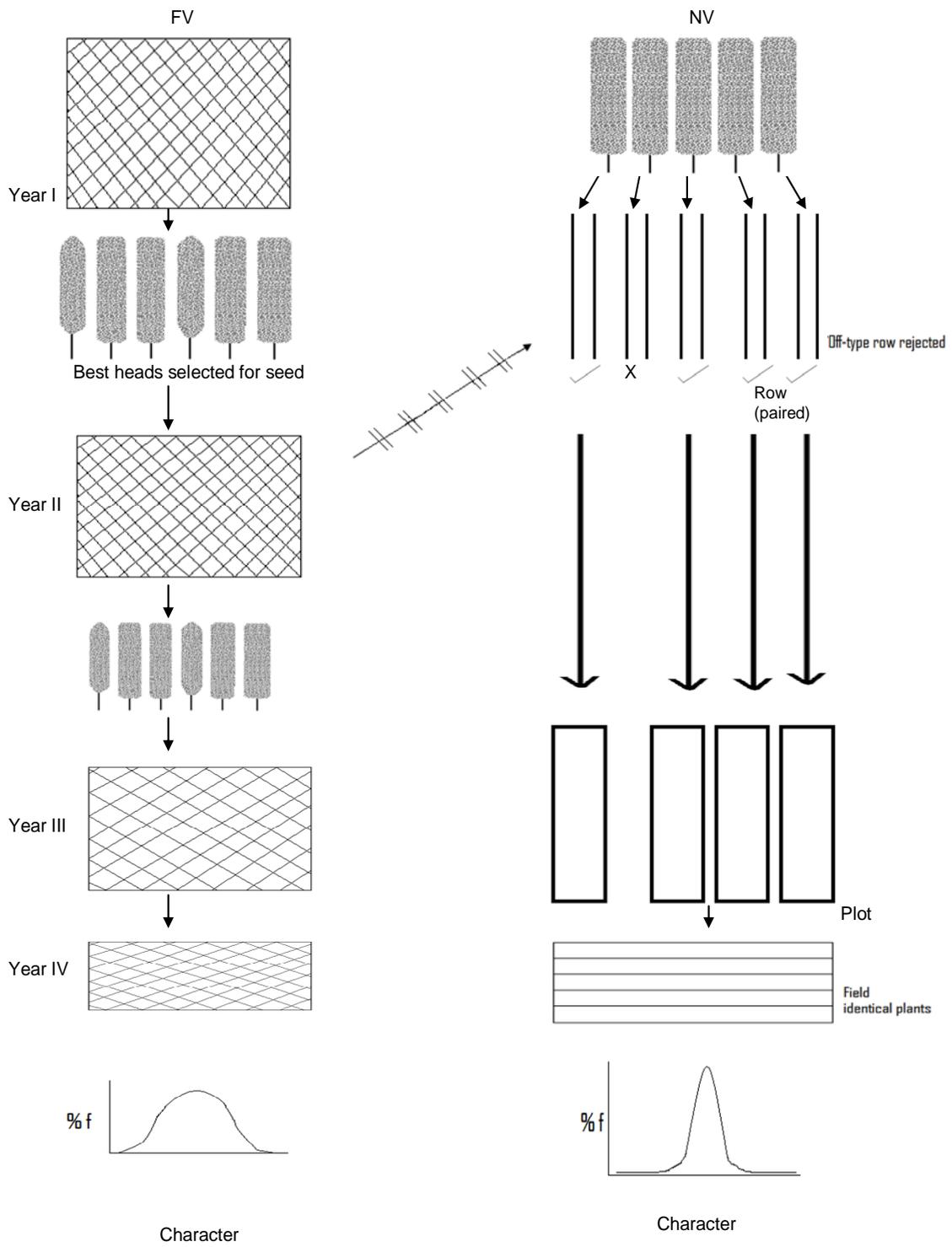


Figure 1. Time scale and differences

## **FV in the context of cross pollinated crops and others:**

The fore gone discussion is primarily in the context of self pollinated crops such as rice, wheat, french bean, peas, soybean, tomato, etc. where out crossing is up to 0-5%. But the issue becomes much more complicated when we examine the often cross pollinated crops as pigeonpea, okra, brinjal, chilli, etc. with about 5-12% of out crossing and cross pollinated crops such as sorghum, maize, pearl millets, gourds, cabbage, carrot, cauliflower, onion, melons, radish, etc. having greater than 12% out crossing. The extent of variation in the FV of these crops in farmers' field differs considerably between location and season. A guesstimate of the extent of off-types that that can be permitted for FV based on reasoning has been given in table – 1. On a priority basis the level of farm level heterogeneity in these FV should be quantified before DUS test norms are framed. Such an argument can be extended to the vegetatively or clonally propagated material, bud sports and for chemaric material. The level of variation in these crops being large a proper understanding of the concept of FV as perceived by farmers and consumers is necessary before binding the FV for a high level of uniformity.

## **Summary**

It is clear that FV is a reputed product of elite farmers having a long tradition and was evolved in their own field from out of a non descriptive heterogeneous land race. The yard stick of DUS for FV needs a fresh look so that a pragmatic procedure to register the FV under the PPV&FR Act, 2001 can be designed. For crops where within field variation is very high and behaves as a population or as land race, fresh research efforts are necessary to purify them. Considerable research is necessary to understand the farmers' perception of a variety, and the reasoning behind why they permit certain degree of floating variation in the FV. It is also quite intriguing as to why consumers have all along been patronizing a product with certain degree of variability.

**Table. 1: Acceptable level off types in New Variety and Farmer's Variety**

S.No.	Crop	No. of Plants/ replication	Natural Out- crossing Percentage	Permitted off-type/ population	
				New Variety/ Hybrid	FV*
1	Bread wheat <i>Triticum aestivum L.</i>	360	0.5 to 1%	2/100	4
2	Rice <i>Oryza sativa L.</i>	900	6.8%	4/1500 (lowland)	15
				4/1500 (upland)	15
3	Maize <i>Zea mays L.</i> Inbreds and single cross hybrids	120	95%	3/100	5
				Variety/other Hybrids	240
4	Sorghum <i>Sorghum bicolor (L.) Moench</i>	240	90 to 95 %	6/100	15
5	Pearl millet <i>Pennisetum glaucum (L.) R. Br.</i> Inbreds and single cross hybrids	240	95%	3/100	5
				Variety/other Hybrids	240
6	Pigeon pea <i>Cajanus cajan (L.) Millsp.</i>	150	5-40%	4/300	15
7	Green gram <i>Vigna radiata (L.) Wilczek</i>	~ 140	0-1%	4/250	7
8	Blackgram <i>Vigna mungo (L.) Hepper</i>	140	0-1%	4/250	7
9	Lentil <i>Lens culinaris Medik</i>	200	0-1%	3/250	5
10	Kidney bean <i>Phaseolus vulgaris L.</i>	140	0-1%	3/300	5
11	Chickpea <i>Cicer arietinum L.</i>	200	0-0.5%	3/100	5
12	Field pea <i>Pisum sativum L.</i>	125	0-0.6%	4/300	7

\* Suggested level for FV.

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*The authors are with the Protection of Plant Varieties and Farmers' Rights Authority, Ministry of Agriculture, Government of India, NASC Complex, Opp. Todapur Village, DPS Marg, New Delhi 110 012, India*

*e-mail: snagarajan@flashmail.com, plantauthority@gmail.com*