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Plant Propagation in Organic Agriculture

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SUMMARY

The choice of high quality organic seed and plant propagation material of suitable varieties is an important key to successful organic farming, allowing for improved yield and product quality, for crop resilience, considerate use of non-renewable resources and for increased genetic and species diversity. This practice describes the principles of plant propagation in organic farming, as well as the importance of the use of traditional varieties and their conservation.

INTRODUCTION

Ideally, all plant production should be based on organically-breed and organically-propagated varieties. Where the number of organically bred varieties are very limited or non-existent for certain crops, conventionally bred varieties are allowed, except for varieties derived from genetic engineering (GMO crops, Figure 11-1), which are not allowed in organic farming. However, the seeds of conventionally bred varieties should be propagated under certified organic systems. To improve the quality of organically propagated seed and plant material and to make the propagation less risky, training of farmers' groups that will specialize in this issue is required. Training is needed in all aspects of propagation: maintenance breeding, avoidance of unwanted crosspollination, seed and plant health, phytosanitary issues of vegetative propagation, cleaning and processing of seeds, short and long term storage, as well as marketing strategies. Seed production should be combined with on-farm variety testing to provide as much information for farmers as possible.

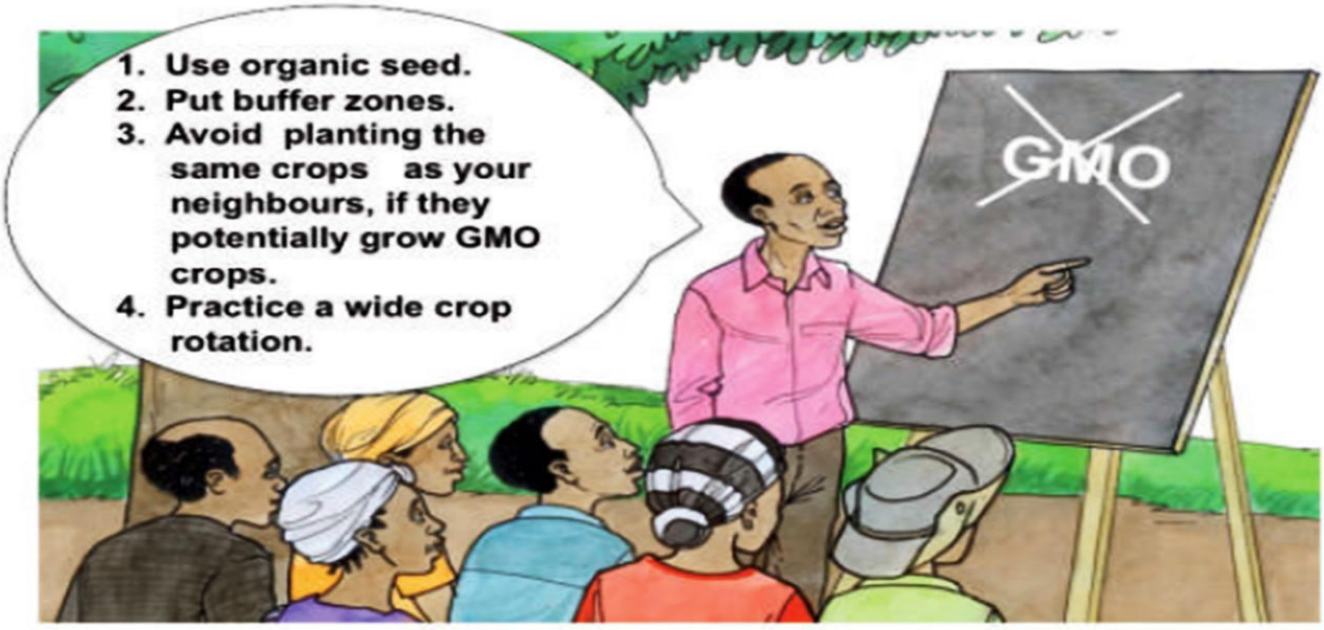

Figure no 1: Reducing the risk of GMO crops.

Plant Propagation

First, the kind of propagation needs to be determined: either those based on generative propagation or sexual reproduction (seeds) such as lettuce, curly endive, pepper, eggplants, tomato, beans, etc.; or those vegetative propagated (asexual reproduction) through another part of the plant: potato tubers, sweet potato roots, bulbs in onion and garlic, cuttings in artichoke, stolons in strawberry, "spiders" or roots in asparagus, etc. Despite the method of propagation to be used, all the seeds and plant material used should be free of pathogens and weeds and obtained from safe sources. Certified seeds are normally clean, but if such seeds are not available to the farmers, the seeds should be treated before use to eliminate seed-borne diseases. Health of the seeds (while storage

period), seedlings, cuttings or other plant material used is crucial for preventing pests and diseases, and to keep crop productivity.

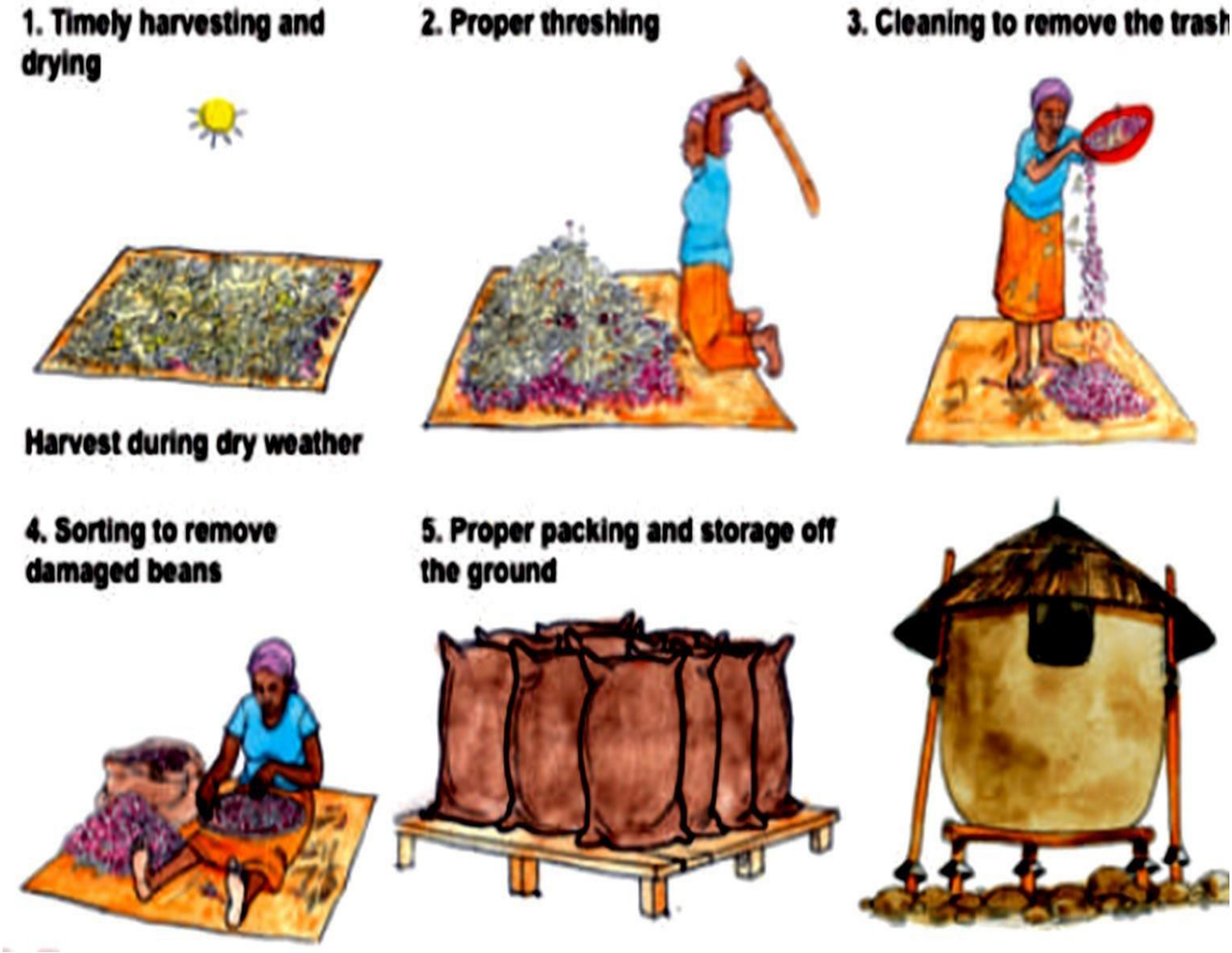

Figure no 2: preservative measures against pest and diseases

Criteria for seed evaluation, characterization and multiplication

Farmers select seeds with specific characteristics to meet their particular needs: yield; quality like colour, texture, flavour; adaptation to climate oscillations; resistance to pests and diseases; fodder value; soil enrichment by nitrogen fixation or extensive root system; among others. Good quality seed is the sum of its genetic, physiological, physical and health traits. Concerning genetic quality, the material should be of known origin, already tested in the region, and produced in an isolated environment (separated from other varieties to prevent inter crossing). The seeds can be bred by a plant breeder of by a farmer.

When a farmer wants to select his own genetic material, he has to bear many details in mind: • Choose the best plants on the farm: vigorous growth, high yielding plants, good quality fruits (shape, colour and flavour (when applicable)), best fruit covering, good health, etc.

- The selected plants should be looked after with the utmost care.
- Every plant not corresponding to the chosen type should be eliminated, and isolation distance strictly respected.
- Neighbouring plants having pest or diseases must be eliminated.
- Fruits must be picked at optimum maturity.
- Once picked, the seeds should be taken out at once.

- Only pure seed of the selected species should be kept, free from foreign seeds. Great care must be taken while picking lettuce, onion, carrots, broccoli, cabbage, cauliflower, to keep out weeds with seeds, because separation later is very difficult.
- It should include the smallest possible amount of inert material (remains of flowers, fruits, etc.)
- It should have good weight and size, without mechanical damage (e.g. wild radish seeds are very sensitive, their seed cuticle being very brittle during the seed cleaning process).

Importance of Traditional Varities

Traditional seeds are locally available because farmers collect good seeds from their own plots and keep them for the next season. Farmers either buy or exchange their seed with other farmers or grow their own seeds. Therefore, the cost of seeds is minimal. Native seeds are geared to a subsistence economy as the farmers first grow food for his subsistence and/or stock seed for the next season and market only the surplus. Native seeds embody indigenous knowledge. A farmer who uses native seeds use his/her traditional knowledge, skills and wisdom to grow them, promoting self-reliance. An outstanding feature of native seeds is diversity. Native seeds are hardy, as they have, over the years, developed resistance to the pests and diseases. Traditional seeds have high level of tolerance to conditions of stress and are adapted to local agro-climatic conditions.

Seed Conservation

Farming communities have always implemented conservation methods known to the formal sector as ex-situ (off-field) and in-situ (in-field) conservation strategies. In-situ conservation provides farmers a valuable option for conserving crop biodiversity and helps to sustain evolutionary systems that are responsible for the generation of genetic variability. This is especially significant in many parts of the world subject to drought and other stresses because it is under such environmental extremes that variations useful for stress-resistance breeding are generated. In the case of diseases or pests, this allows for continuing host-parasite co-evolution. Also under these conditions, access to a wide diversity of local seeds probably provides the only reliable source of planting material. The ability of such material to survive under to survive under these stresses is conditioned by their inherent broad genetic base. The seed system used in most traditional farming systems is based on the local production of seeds by the farmers themselves. Farmers consistently retain seed as security measure to provide back-up in case of crop failure. Farmers practice seed selection, production and saving for informal distribution of planting material within and among the farming communities. Community seed bank represents one strategy for a collective maintenance of genetic diversity in crops/plant species. Low-cost community level seed bank or seed storage facilities can help to preserve climate mitigating characteristics of traditional varieties, while, at the same time, serving as a base material for farmers to select special lines to meet their changing needs. They also play a role in improving market outlets through enabling communities to produce crop of known quality and in stabilizing prices over changing situations. Thus, community seed bank development contributes toward promoting economic empowerment of farmers. Likewise, the establishment of species adapted to extreme environments in field gene banks at strategic sites can provide a reserve for places where traditional crops may have completely failed. Germ-plasm materials maintained in such fields could be distributed to rural farming communities or for further investigation of their potential use in breeding programs to improve food security.

CONCLUSION

Seed is the basic input for cultivation of any crop. This material should be selected very wisely. During organic cultivation by considering all the points discussed above, a good seed material can be selected by farmers.

REFRENCE

Shiva V., Pande P., Singh J. 2004. Principles of organic farming: Renewing the Earth's Harves. Published by Navdanya, New Delhi, India.