

Examples of topics for discussions with farmers to reach common understandings of farmers' seed management and to identify options for action

- Are farmers selecting?
 - Is seed harvested in specific types of fields?
 - Is seed harvested from specific types of plants?
 - Are specific grains used for seed?
 - Who does what?
- Are farmers keeping different varieties of the same crop for specific purposes?
 - Do individual farmers keep more than one variety?
 - Do different farmers in the village keep different varieties?
 - Do farmers use seed from outside the village?
 - And why?
- Do farmers keep different varieties separate?
 - Do they grow different varieties in separate fields or in mixtures?
 - Do they harvest seed of different varieties separately?
 - Do they store seed of different varieties separately?
- What do farmers do when they don't have the seed they need?
 - From where/whom can they obtain the required seed?
 - Under what conditions?
 - What are the consequences of using seed from others?
- What do farmers do if someone asks them for seed?
 - To whom do farmers give seed?
 - What seed do they give?
 - What do they get in return for their seed?
- How do farmers control the quality of their seed?
 - Visual or sieving?
 - Seed hardness?
 - Seed health?
 - Germination test?
 - Water floating test?

Further information on tools for assessing farmers' seed management

<https://seedsystem.org/>
<https://tools4seedsystems.org/>

References

Siart, S. (2008): Strengthening Local Seed Systems. Options for Enhancing Diffusion of Varietal Diversity of Sorghum in Southern Mali. Margraf Publishers, Weikersheim.

Deu et al. (2014): How an improved sorghum variety evolves in a traditional seed system in Mali: Effects of farmers' practices on the maintenance of phenotype and genetic composition. *Field Crop Res.* 167: 131-142.

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Understanding farmers' seed management practices

This practice guide is meant to:

- Explain what farmers' seed management involves
- Provide entry points for understanding how farmers manage diversity, breed varieties and produce seed
- Help identify opportunities for strengthening farmers' seed management

What is farmers' seed management?

Farmers' seed management comprises many activities that impact the quality, diversity and availability of seed that farmers use. These activities and management decisions are implemented by farmers throughout the growing cycle.

1 | Sourcing of seed

Farmers decide which variety or varieties of a crop they will sow and from where they obtain the seed of each. The seed sources they may use include:

- Farm-saved seed from previous harvests
- Grain from previous harvests
- Seed from neighbors, friends, family members
- Grain of a known origin from the market
- Certified (packaged) seed from the market

Farmers' decisions about which variety and which seed to sow may be influenced by many factors: which varieties and seeds best fit current needs, whether farm-saved seed is available with good germination, and if money or credit can be mobilized to purchase seed. Farmers' experiences with qualities of different sources of seed, curiosity to try something new, the onset and amount of rainfall and other conditions that influence farmers' expectations about the growing season may also contribute to their decisions.

2 | Preparing the field

The way farmers prepare their fields for crop production contributes to the types of indirect selection exerted for adaptation. The removal of shrubs, the depths and intensity of tillage, the spreading of manure, ash or other soil amendments all influence the environment in which the crop plants establish and must survive to reach maturity. Farmer's integration of seed and crop production means that annual field preparations for food production contribute to shaping the genetic composition of farmers' saved seed.

3 | Preparing the seed

At the time of sowing, farmers make their final decisions of which seed of which variety to sow where, and whether they prepare mixtures of seed for specific situations. Farmers may check the quality of seed with visual checks, e.g. for mechanical damages, insect infestation, fungal diseases, etc. They sometimes also assess the germination rate of their seed using various methods.

Understanding farmers' seed management – why knowing 'who does what' matters

Women and men, elder and younger family members may take responsibilities for different, specific tasks. This division of tasks may differ between crops and depend on the skills and other responsibilities of the various family members, making generalization difficult. The individuals who actually do specific seed management activities typically know best about the problems and practices used. Thus, to better understand farmers' seed management, knowing 'who does what' matters.

Before sowing, farmers sometimes condition their seed by:

- Cleaning and sorting grains by size or weight, e.g. by sieving or winnowing
- Washing or soaking
- Separating light, hollow or otherwise damaged seeds (e.g. by water floating)
- Removing immature seeds
- Coating seed with mineral or biological substances, such as ash, cow dung/urine, etc.
- Coating seed with chemical treatments



▲ Pearl millet seed and grain store in central Mali.

4 | Selecting during the growing period

During the growing period, farmers engage in activities such as hoeing, weeding or sowing an intercrop. Through such activities, farmers influence the growing conditions for individual plants. Weaker and more susceptible plants may die or be removed, while vigorous plants of weedy crop relatives may remain. There is thus indirect selection for adaptation to these conditions since only plants that manage to flower contribute to the next generation.

5 | Selecting at harvest

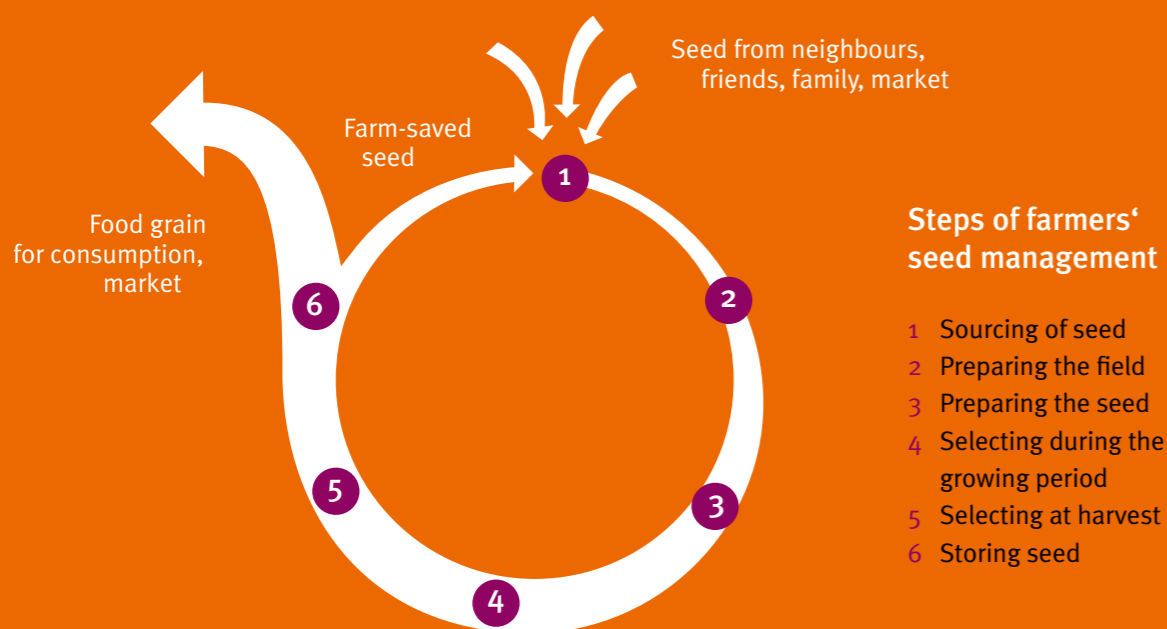
At the time of harvest, farmers select seed in diverse ways. Experienced, trusted people may be responsible for selecting plants for seed before the general harvest. The intense selection, keeping only a few plants out of thousands as practiced for millet and sorghum, can greatly influence the genetic composition of the seed lot. Farmer's selection practices may involve harvesting panicles/pods from specific fields, parts of fields or from plants showing preferred traits in the field or on the threshing floor.

6 | Storing seed

Farmers may store the seed separately from the general harvest to keep it under better conditions. This may include:

- Storing entire panicles/pods in the smoke of the kitchen fire
- Keeping seed of different varieties separately
- Keeping panicles or threshed seed in seed stores, containers, or bags
- Using additives, such as ashes, medicinal/aromatic plants or chemicals to protect the seed
- Checking the seed quality several times during the storage period and removing all panicles/pods or grains that appear to be infested, e.g. by insects and/or fungal diseases

Strong social rules exist in many cultures that prohibit the use of seed as grain for consumption, even when food shortages occur. These rules contribute to securing seed availability and maintaining the diversity of locally adapted varieties.



What functions does farmers' seed management fulfill?

1 | Seed production: Produce seed of good and known quality for the next sowing season

Keeping farm-saved seed requires knowledge, skills and experience but no or only limited cash expenditures. Farmers, by saving their own seed, contribute to availability and access to seed of known origin and quality that favors seed security. Sharing seed among farmers is often practiced according to well-established social rules that depend on and build relationships among farmers.



▲ Bundles of sorghum seed selected at harvest.

2 | Breeding: Create new varieties and adapt existing ones to prevailing conditions

Farmers' seed management imposes many selection pressures that continuously adapt existing varieties to diverse and evolving growing conditions and objectives. Farmers may create new varieties when seeds from different sources are sown in proximity such that some cross pollination occurs, even without managed crossing. Farmers, by applying their seed-management practices in these fields, can create new diverse populations. By selecting for new combinations or levels of preferred traits over successive generations, farmers may create new varieties and adapt their seed to changing production conditions over relatively short periods of time.

How varietal diversity is maintained by farmers at farm, village and landscape level

As families frequently keep varieties different from those of their neighbors, the range of varieties within a village is nearly always higher than that maintained by a family. In Mali, for example, studies revealed that most families cultivated one to three distinct varieties of sorghum, and in some cases up to five. At the village level, nine to ten distinct sorghum varieties were typically grown, and sometimes up to 14 in different regions. The varieties farmers grew differed greatly between years, especially in a year following drought when farmers faced severe food insecurity (Siart, 2008).

The numerous, contrasting varieties maintained by families and villages contribute to the diversity of varieties cultivated at the landscape level, which is further maintained by farmers exchanging seed between villages and occasionally using seed from markets.

3 | Conserve and manage diversity: Maintain several varieties and/or diversity within seed lots

The decision which seeds to plant lies in farmers' hands in most circumstances in West Africa. Farmers' seed-management practices and strategies shape the diversity of the crops in their fields, on their farms and in larger landscapes or regions.

However, farmers' seed management can only produce genetic changes if genetic diversity is present and observable. Practices such as mixing seed lots of the same variety obtained from contrasting fields, 'renewing' a portion of the seed with seed obtained from someone outside the family or circle of friends, mixing seed of different varieties or keeping plants of wild or weedy crop relatives in the fields can all contribute to enhancing diversity within a variety or field. Cultural practices, such as donating seed at marriage or bringing seed from travels, help to maintain or increase diversity. Grain traders at local markets may offer farmers opportunities to see and access seed of new varieties from beyond their own village or area and frequently provide information about their origin.