

FACILITATORS' FIELD GUIDE FOR FARMER FIELD SCHOOLS ON PARTICIPATORY PLANT BREEDING

Module: Plot design for Participatory Varietal Selection (PVS) research plots



This field guide is developed by the Sowing Diversity=Harvesting Security program (www.sdhsprogram.org) and its consortium partners Community Technology Development Trust (CTDT), Asociación ANDES, Southeast Asia Regional Initiatives for community empowerment (SEARICE) and Oxfam. It is based on Farmer Field School training experience in Zimbabwe, Peru, Myanmar, Lao P.D.R. and Vietnam.

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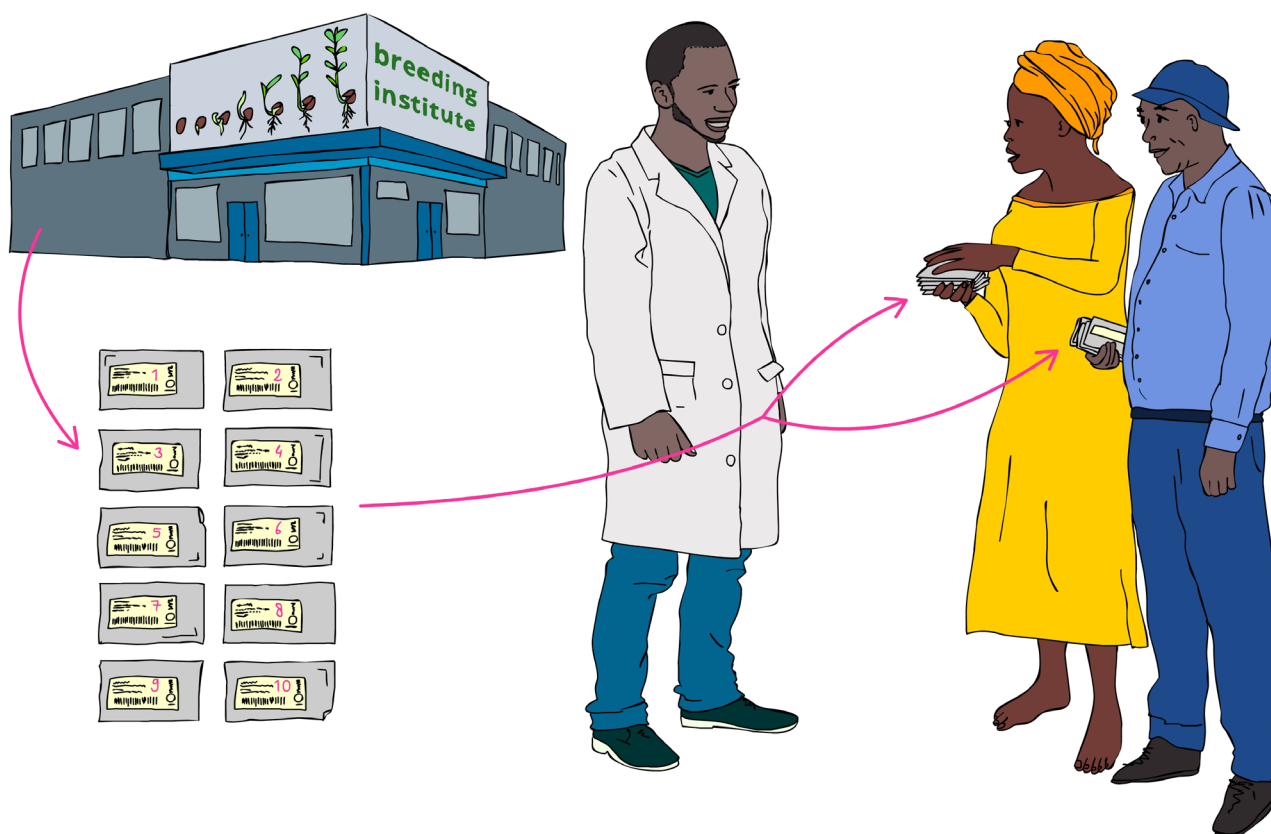


This module is part of the Facilitator's field guide for Farmer Field Schools on Participatory Plant Breeding.

01. Plot design for Participatory Varietal Selection (PVS) research plots

In this module we will prepare the **Farmer Field School (FFS) site and the plots of land** on which we will do the fieldwork and testing of lines for the next season. The way we design the plots and allocate each of the lines that we sow should **minimize the risk of distortion** of the experimental results, by factors such as slope, fertility gradients or other irregularities.

In this module, we design plots for **Participatory Varietal Selection (PVS)**. In PVS we **test stable and advanced lines** provided by Breeding Institutes. Often, Breeding Institutes collect farmers' varieties from other provinces or countries. While these are farmers' varieties, the source when received by an FFS remains the Breeding Institute. In PVS, the one or two most popular and best performing varieties currently cultivated in the village shall be used as **'control' or 'check' varieties**. This is to compare the new lines (received from the Breeding Institutes) and evaluate these to the standards of the popular varieties.



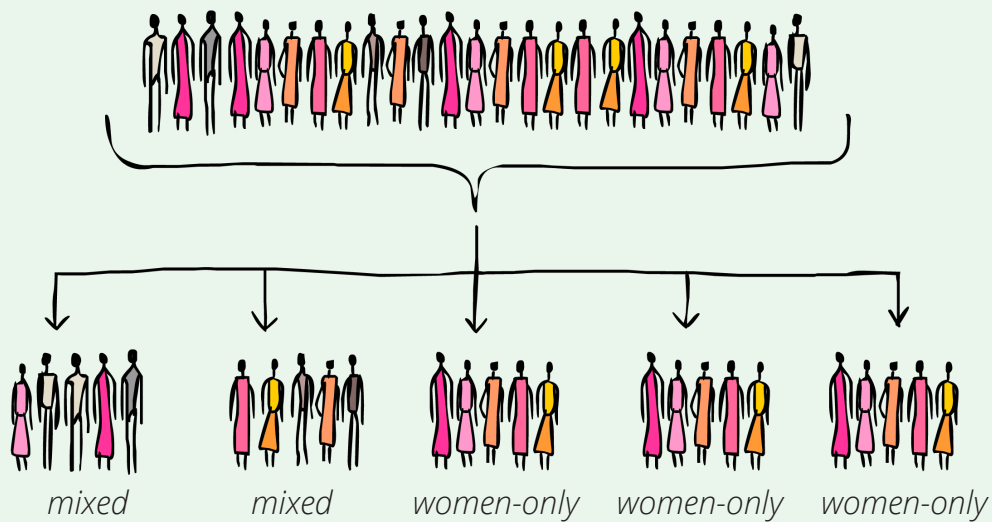
Farmers receive advanced and stable lines from Breeding Institute, while breeding institute often collect farmers' varieties.

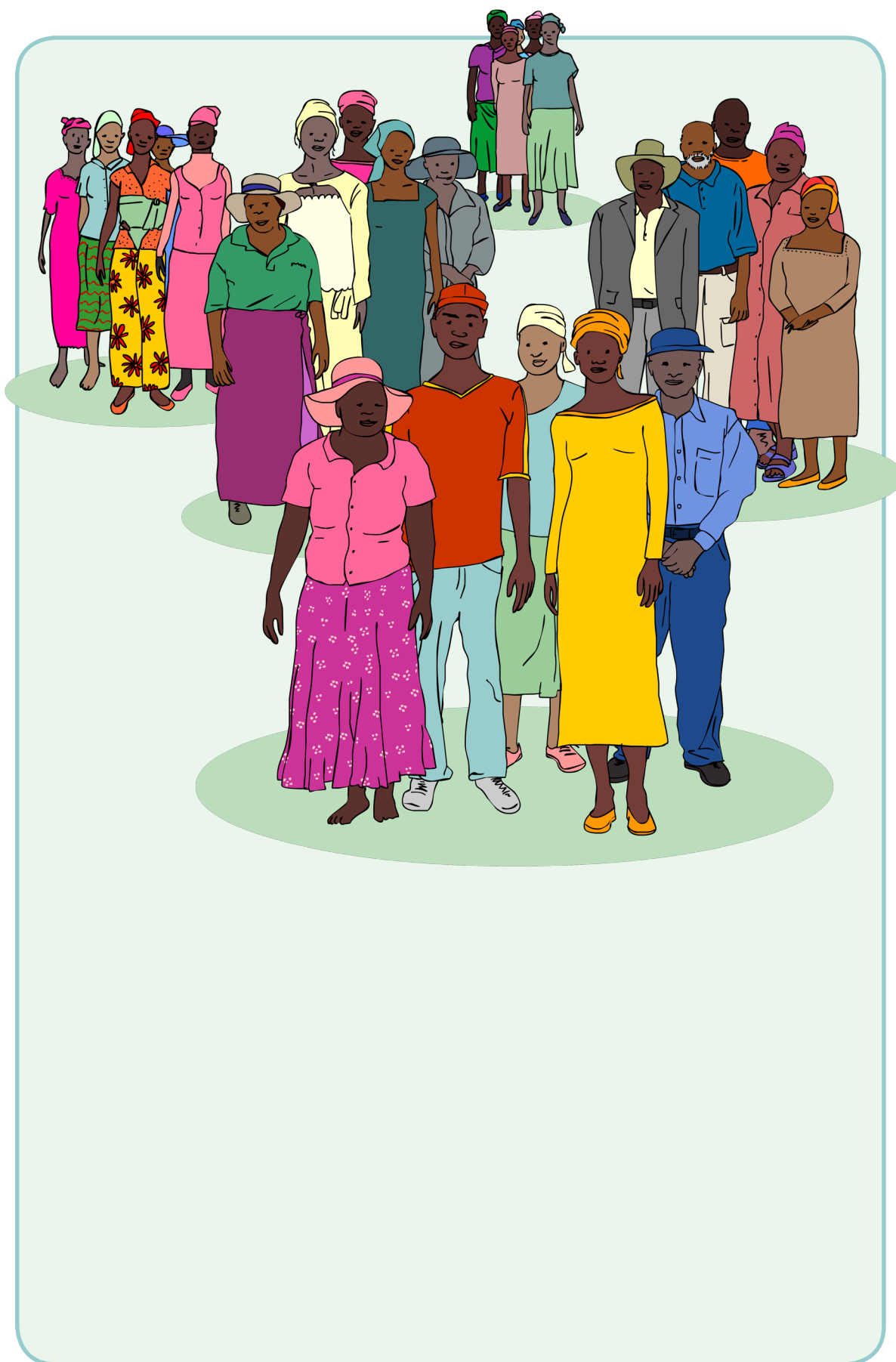
Structure of the module

- How to organize the group?
- How to design and prepare the plots? (step-by-step)
 - Selecting the FFS site
 - Dividing the FFS site into plots
 - Mapping the FFS site
- Questions for group discussion

How to organise the group?

The 25-30 participants should preferably be organized in **subgroups of five**, each subgroup with a **leader and a reporter**. At this stage, it should be decided whether or not to form **women-only groups**. This may be particularly relevant in cases where women's trait preferences clearly deviate from those of men.





The role of reporter and recorder may rotate among the group members, so that each member can gain experience in the process of documentation and reporting.



All groups are allocated its own plot(s) in the larger FFS site. A group of five participants is ideal to be able to go around the field together to observe selected crops. In a small group, **all members are engaged** and it minimizes the risk of stepping on plants. Also, by dividing the group in subgroups, there will be more datasets gathered and this will **improve the group discussion**.



Forming small groups stimulates the engagement of all participants



The observations of the subgroups are presented to the whole group.

Throughout the FFS season, all the members of the FFS should be involved in land preparation. All members of the FFS should be involved in sowing their respected plots.



How to design and prepare the plots?

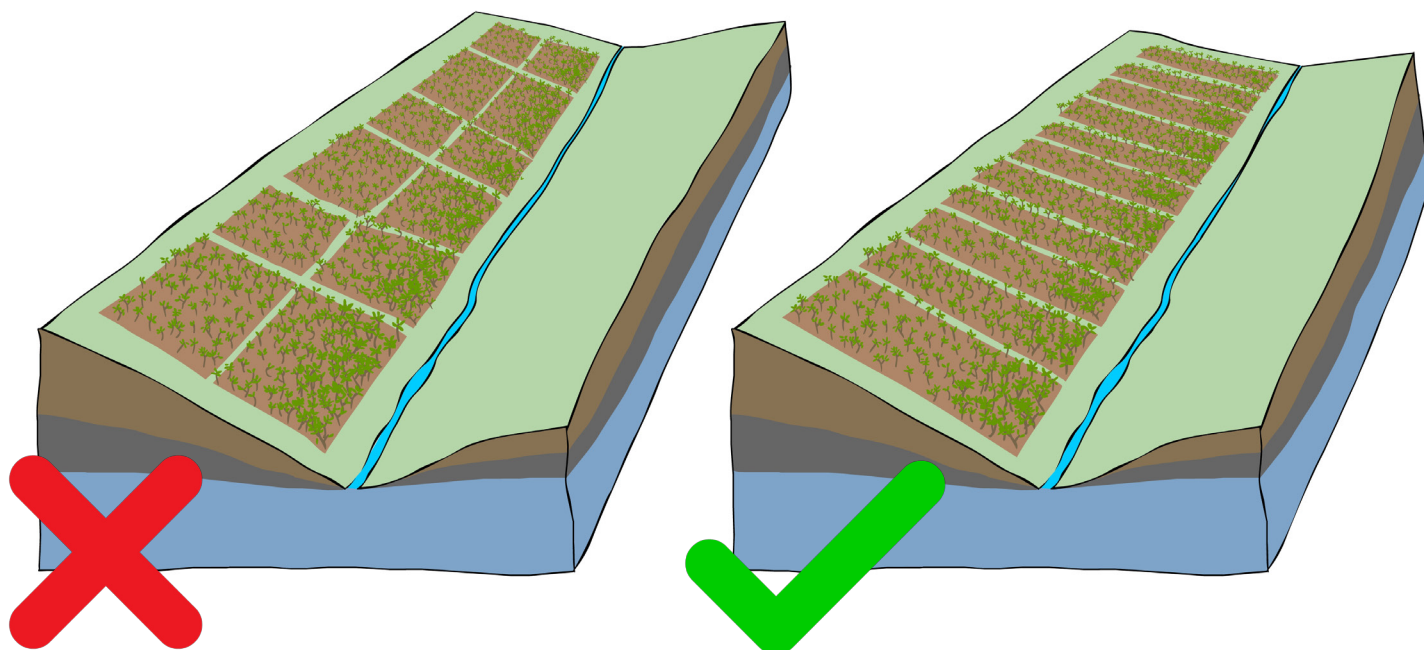
Selecting the FFS site



These steps should be discussed with the group. Why is it important to take into regard these steps?

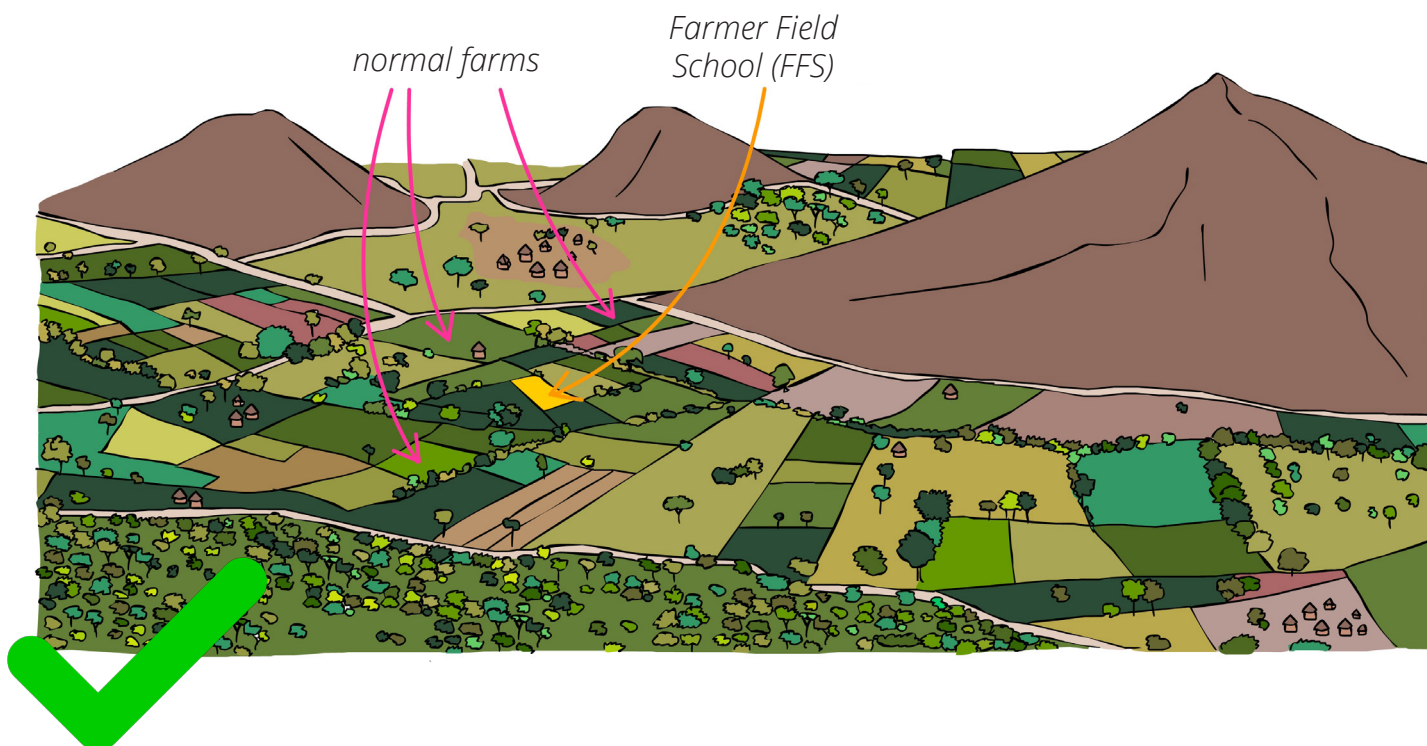
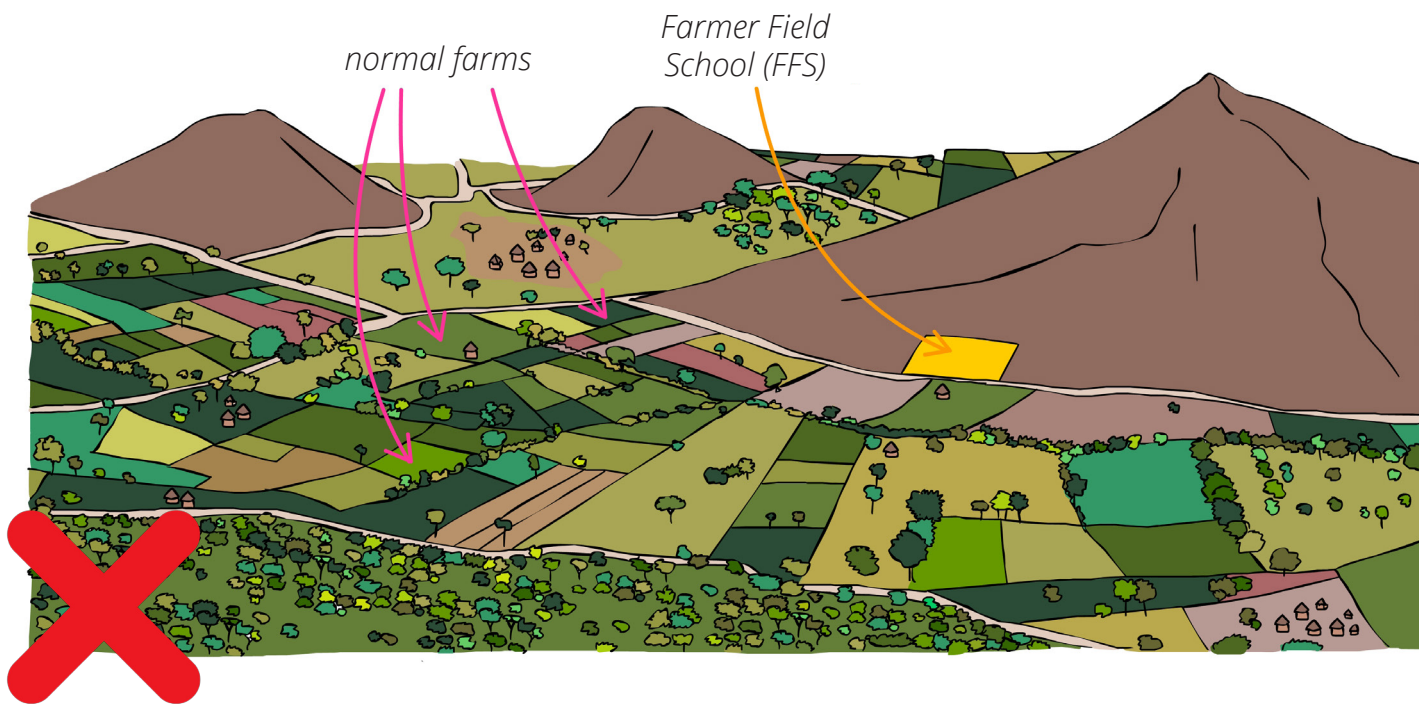
Step 1.

Avoid distortions by factors such as slope and fertility gradient.



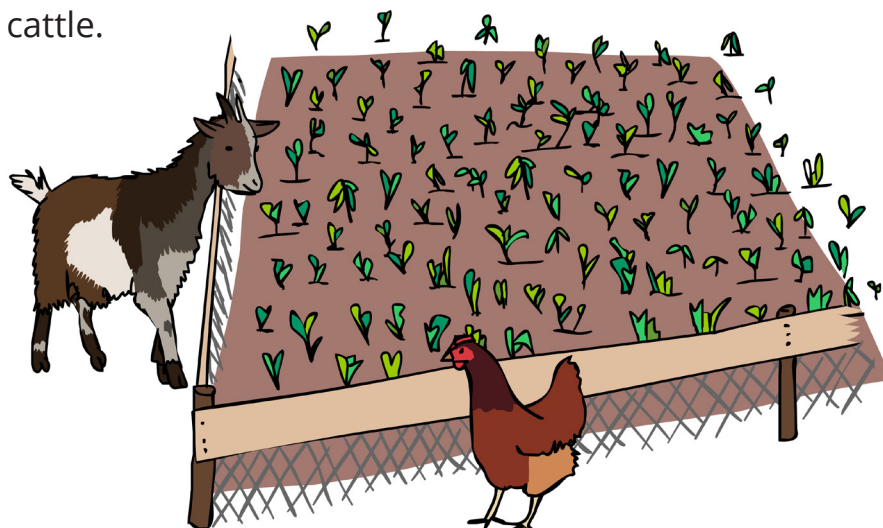
Step 2.

The plots should be **representative** of the farms in the ward.



Step 3.

The plots should be **save from livestock**. Preferably, a fence should surround the study field in order to guard it against grazing cattle.



Step 4.

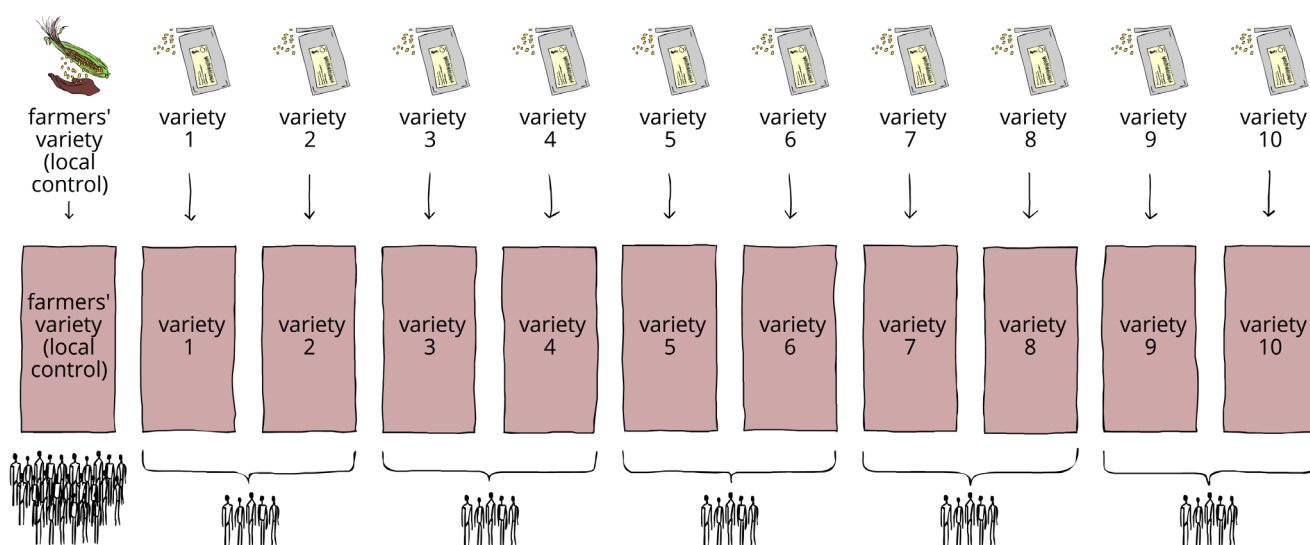
The plots should be **accessible for villagers** who are not participants of the FFS.



Dividing the FFS site into plots

Step 5.

For PVS, **the number of plots is determined by the number of lines** received from the Breeding Institutes by the FFS **plus one or two control varieties**. For example, 9 received lines need 10 plots (because of the added control variety). It is recommended to sow a **maximum of 10-12 lines**. This number is both manageable and sufficient for farmers to gain the required knowledge and skills to complete the FFS. These plots should be allocated to the small groups. In the case of 10 total lines (including control variety), 5 small groups within one FFS will manage 2 plots each containing 2 lines). The small groups shall be responsible for managing their plots. The plot is where the data shall be gathered by each small group.



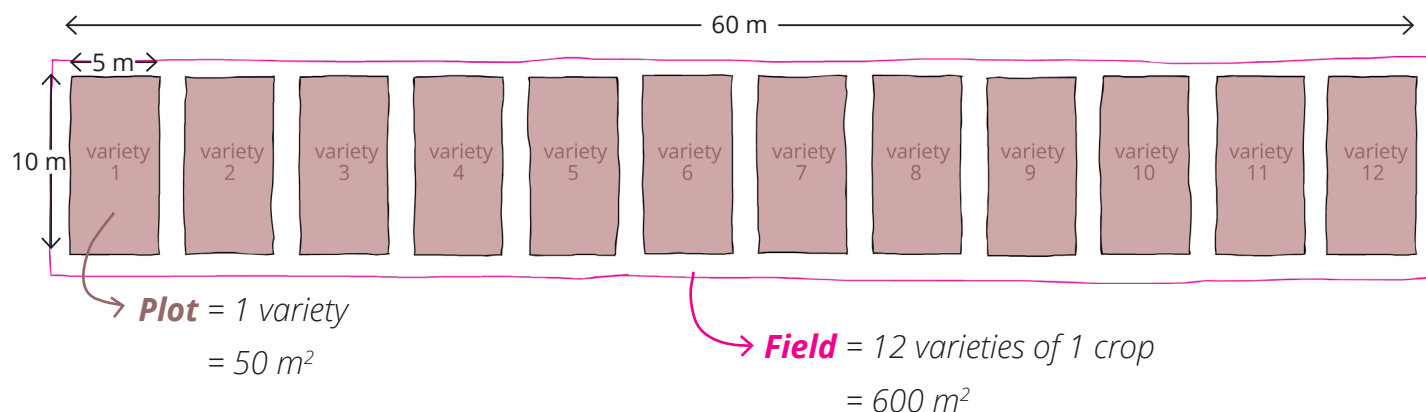
Step 6.

Divide the **field size** of the crop varieties that you plant in **plots per variety**.

Plot size per variety or line should be **around 50 to 60m²**, depending on the number of seeds received and the planting density (the space you leave between the single seedlings in one row and between the rows of seedlings; see diagrams in Step 8).

If a maximum of 12 varieties is used (= 12 plots), the total area needed (or: field size) is about 600 to 720 m² per crop. Note that one or two of the plots have to be allocated to farmers' popular varieties planted as 'control' varieties (explained in the next step).

Example:



Step 7.

Select a **local control variety** to compare with the 'new' lines received from the Breeding Institute.

One popular variety of the crop that is planted on the FFS site should serve as 'standard'. This is a control variety for the purpose of **comparison**. The lines from breeding institutes are needed to increase farmers' choices of varieties. These new varieties are most useful if these approximate or surpass the local best variety. Hence, the need for 'control'. The control variety should normally be the most popular, or the variety most commonly planted by farmers in the village.



control variety

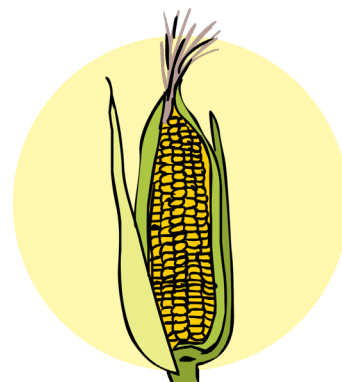
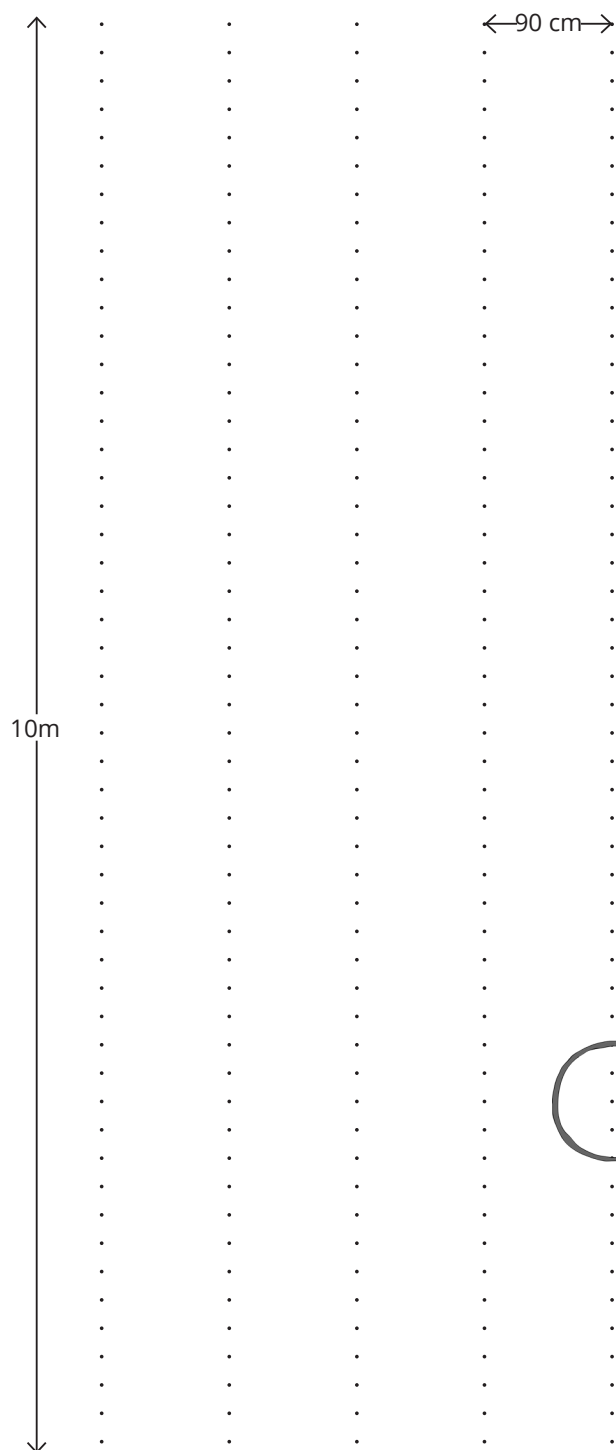
variety 2

variety 7



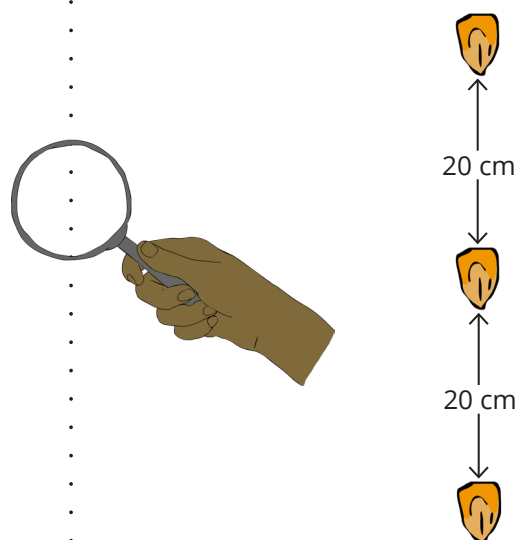
Step 8.

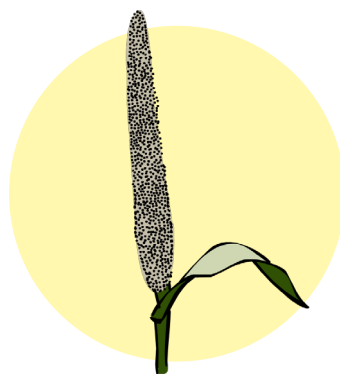
Planting density for maize, pearl millet, sorghum and groundnut should be either as per farmers' practice or as recommended below:



Maize

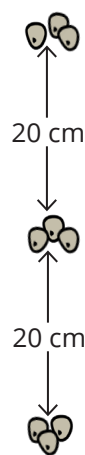
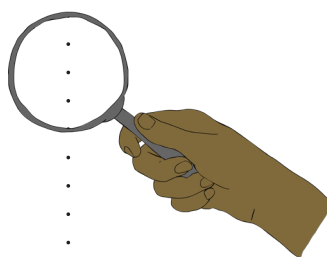
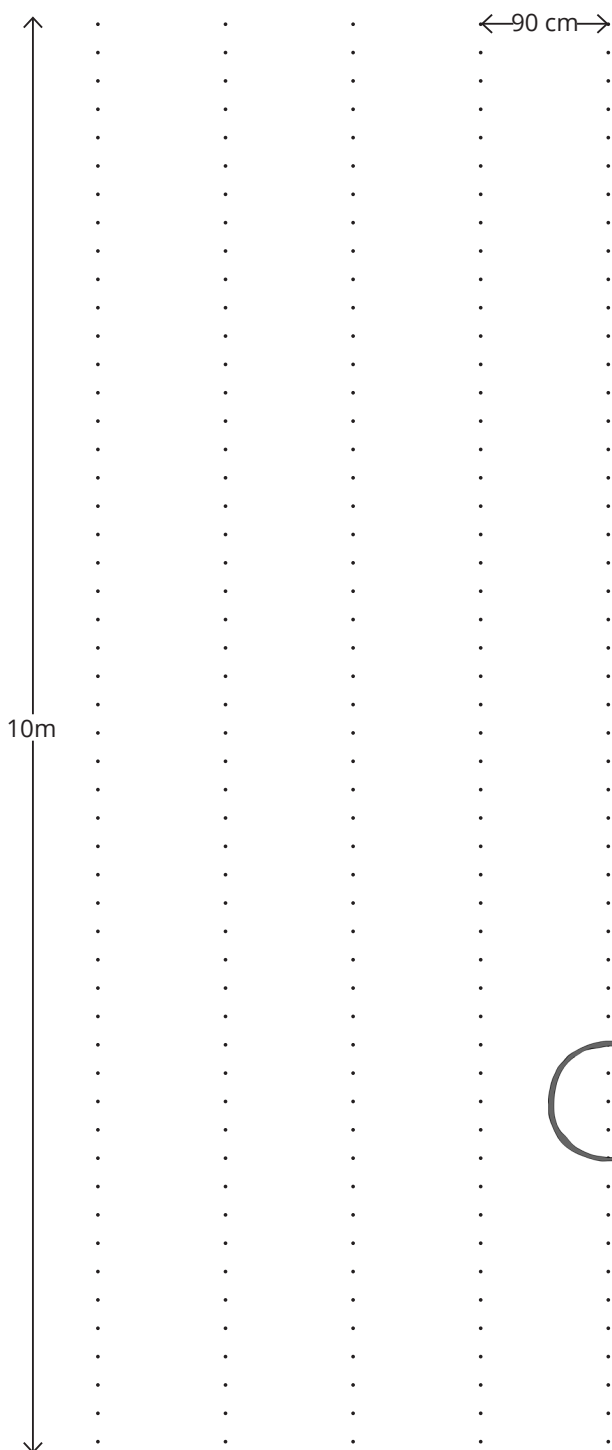
For maize, the planting density is one seed per hill, at a distance of 20cm between hills x 90cm between rows x 10m long rows, resulting in 278 plants per 50m² without thinning.

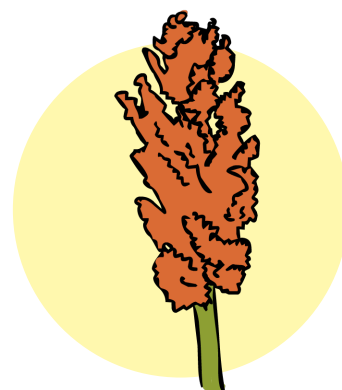




Pearl Millet

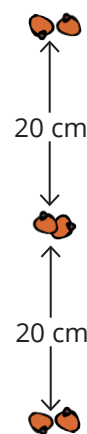
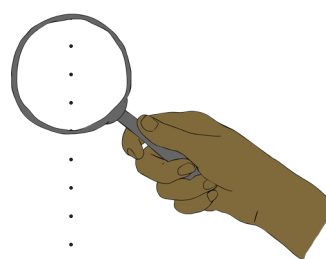
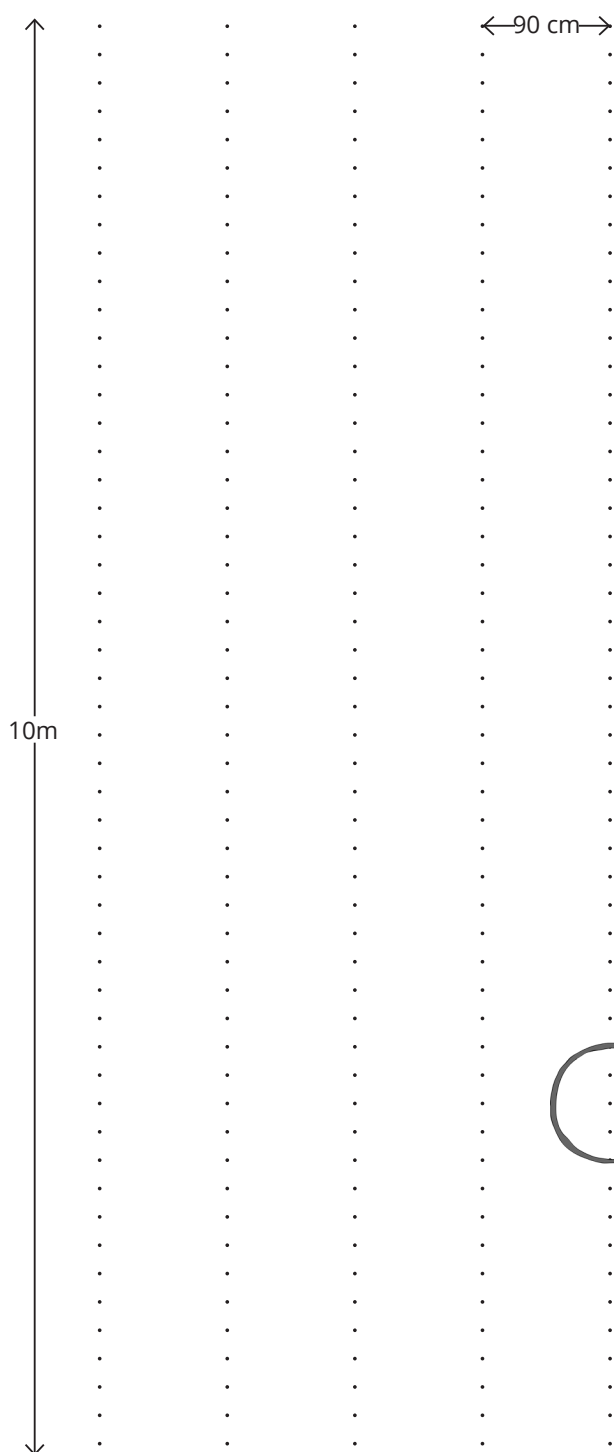
For pearl millet, given that seeds are small, the planting density is three seeds per hill at a distance of 20cm between hills x 90cm between rows x 10m long rows, amounting to 834 plants per 50m². However, two seedlings per hill are thinned out one week after emergence of the crop, thereby reducing plant population to 278 plants per 50m².

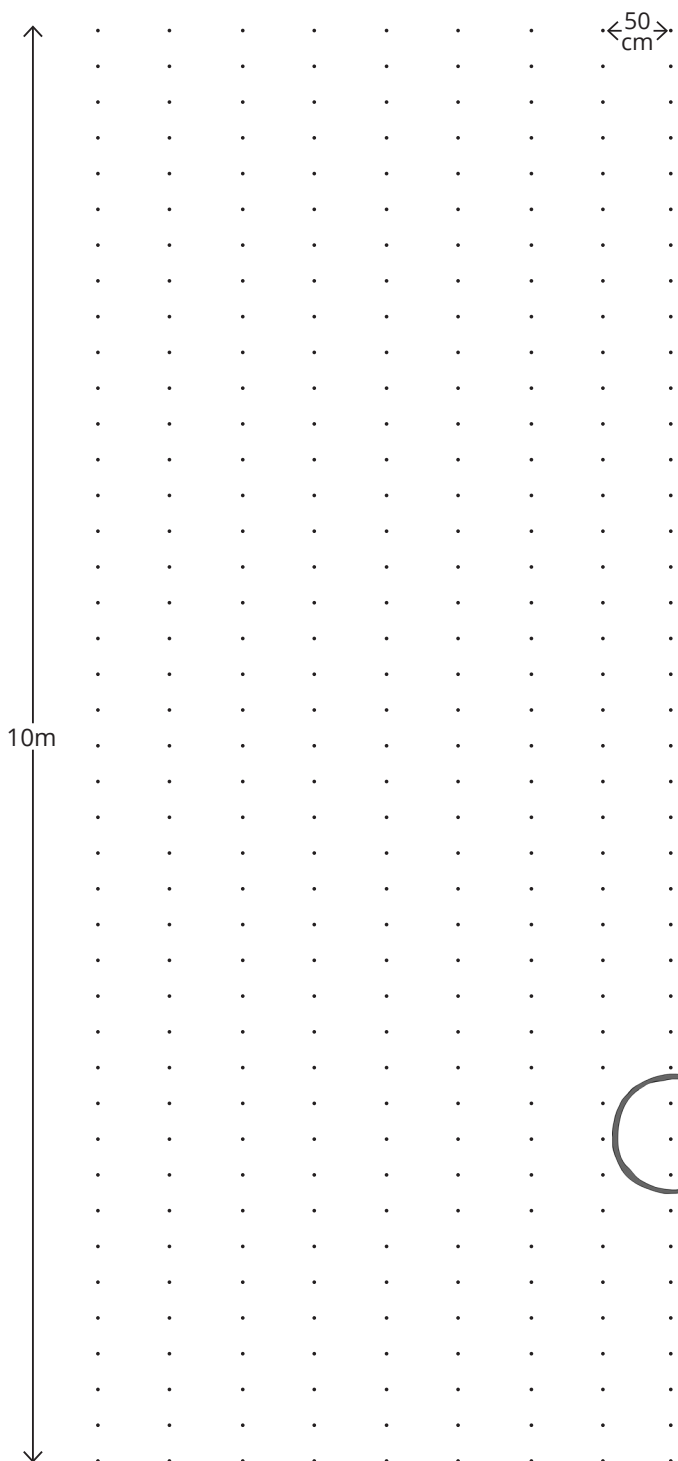
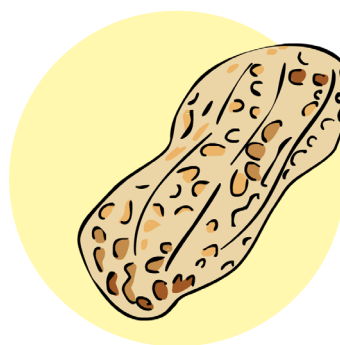




Sorghum

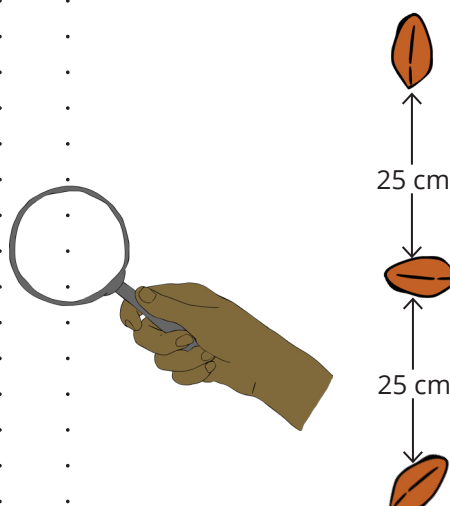
For sorghum, given that seeds are relatively small, the planting density is 2 seeds per hill at a distance of 20cm between hills x 90cm between rows x 10m long rows, totaling 556 plants per 50m². However, one seedling per hill is thinned out one week after emergence of the crop, thereby reducing plant population to 278 plants per 50m².





Groundnut

For groundnut, given that seeds are relatively bigger, the planting density is one seedling per hill at a distance of 25cm between hills x 50cm between rows x 10m long rows, amounting to 400 plants per 50 m²; no thinning is required for this crop.

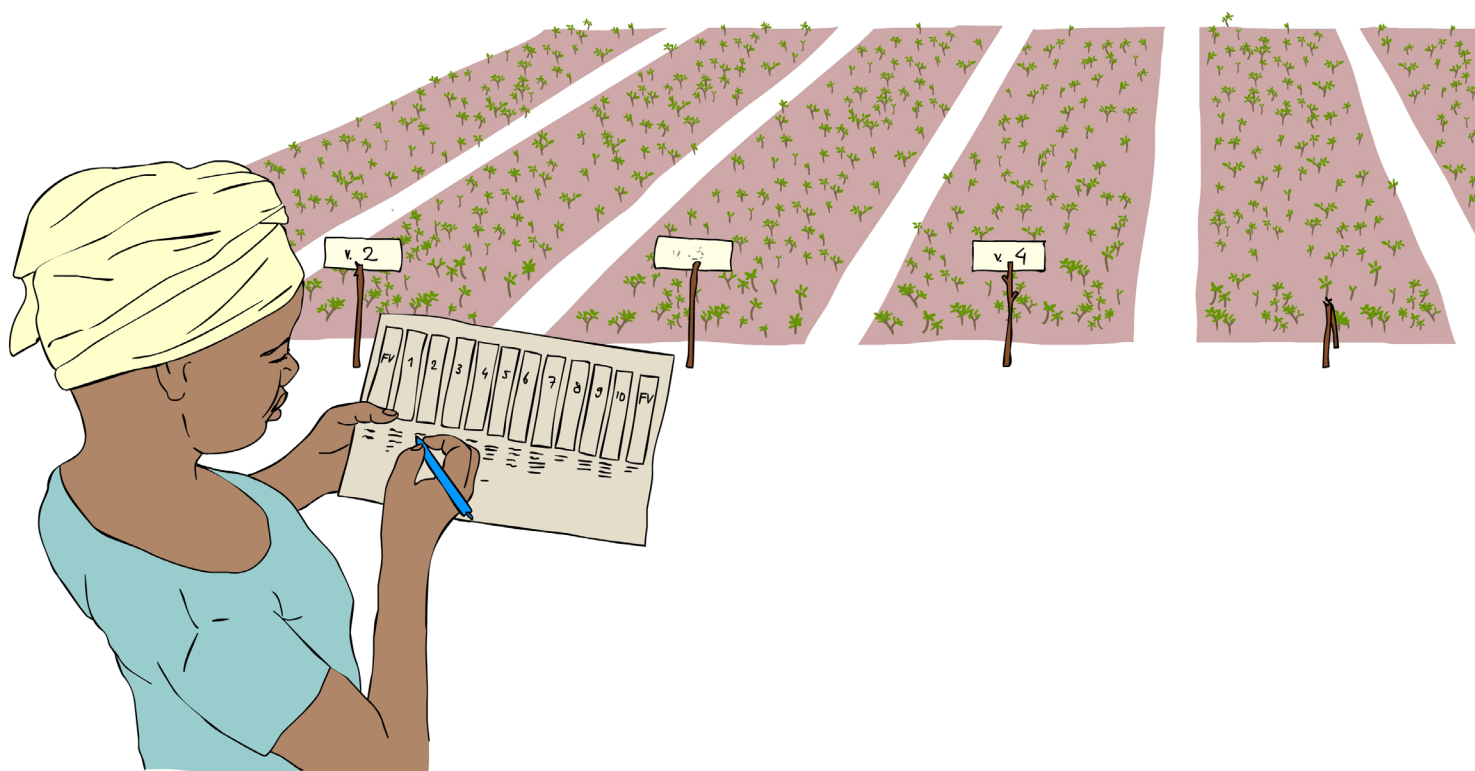


Mapping the FFS site

Step 9:

Properly **label the plots** and make a map or layout of the FFS site.

It is very important to properly label the plots with **durable sticks and tags** in order to easily identify the location of the planted varieties. In addition, it is useful to **make a map or layout** of the field and indicate on it where each variety is planted. When the markers in the field are lost, the written map can still be used as reference. The field layout may also **indicate the slope and the variation in homogeneity** of the field plots. If the site and its individual plots are sloping, then the varieties should be arranged in parallel to the direction of the slope. If the site is relatively homogeneous, then the varieties can be evenly distributed over the site.



Questions for group discussion

In a group discussion on site selection and plot design, the following questions can be discussed with farmers. These questions are examples.

- Should the FFS site have similar agro-ecological conditions as regular farmers' fields in the ward? Why?
- Should the FFS site be easily accessible or not? Why? Easily seen by non-participants or not? Why?
- How can the design of the site and the individual plots avoid distortion caused by factors such as slope and fertility gradient?
- How should the FFS site be subdivided in consideration of the number of small groups that have each been assigned their own sub-plots?
- What are the responsibilities of the small groups in the management of their plots, and in gathering data from each plot?
- What is the planting density (according to type of crops?)
- What is size of the total site and the plots within the site?
- Who shall be responsible in preparing the plots for planting?
- Who shall sow each plot?

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