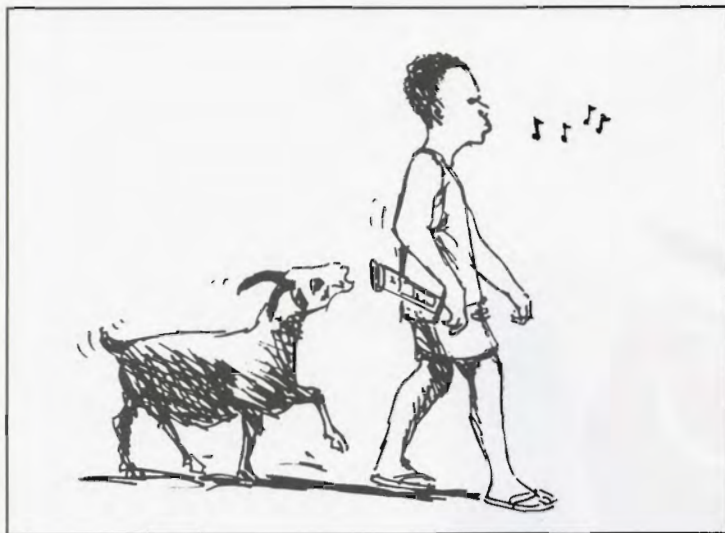


Prepare a map of the experiment.

The experiment map should show exactly where the plots are located. This will make the job of the field staff much easier. Mark 'North' on the map. Include all obvious features, such as a road, a stream or a house. Check that everyone involved in the experiment understands the map.



Make more than one copy of the map.

It is essential to have extra copies of the map in case the one you use is eaten by a goat or blown away in a gust of wind, or simply lost. Put the copies of the map where they can be found easily and another copy where only you have access to it. Do this as soon as the map is drawn.

Know the quality of your seed.

Sowing poor quality seed is a waste of your time and effort! You may have a good species for your area, but if the seed is dead, there is no point in sowing your

experiment.

Before sowing your trial, do a simple germination test to check the quality of your seed for each variety being sown. The result will help you decide whether you need to increase your seeding rates, treat your seeds to improve germination or obtain new seeds. The procedures for doing a simple germination test and treating your seed to improve germination are included in the back of this manual on pages 38 and 39. The germination test should be done as close to the sowing date as possible, as seed quality can decline rapidly if it is not stored in cool, dry conditions. If you suspect the seed has low germination, test the seed when you still have enough time to replace it, if the results show low germination.

Be careful when weighing treatments for each plot, such as seed or fertiliser.

Ask someone else to double-check your calculations. For example, mistakes can easily be made when converting sowing rates from kg/ha to g/m². A simple error like this is impossible to fix once the experiment has been sown.

If you are applying fertiliser, make sure that it is clear whether the quantity being applied refers to the fertiliser or to the element the fertiliser contains (for example, is it 100kg/ha urea or 100kg/ha of N?).

Decide on the appropriate sowing rates.

If you are comparing different species, it can be useful to adjust the sowing rate according to the size and quality of the seed to obtain similar plant densities in each plot. For example, when working with forage legumes, you might use 5 kg/ha for small seeds such as *Stylosanthes*, 10 kg/ha for medium-sized seeds like *Centrosema*, and up to 30 kg/ha for large seeds such as *Arachis*. In grasses, low viability (% of live seed) or low germination percentage may mean you need to increase the sowing rate.

Prepare and label as much as possible before going to the field.

Prepare seed, vegetative planting material, fertiliser and labels indoors before going to the field. Labelling and weighing your seeds outside would be disastrous if sudden gusts of wind or rain storms occur.

Prepare and label one treatment at a time. For example, if you are testing different species, weigh and label



one species at a time. On each label, check that the species and the plot number coincide with the map of the experiment. If you are using tags, they should be strong and not easily torn off or fall apart when wet. A second tag inside each bag may be used as a 'backup' in case the outside tag is destroyed. Use waterproof ink that will not rub or wash off.



Use waterproof bags.

Place treatment materials, such as seed and fertiliser, in waterproof bags. Paper bags can fall apart when placed on wet ground or caught in a sudden rain storm. Label the bags clearly and permanently. Place all the bags for each block into a larger waterproof bag to prevent the smaller bags being damaged or lost.

Prepare backup treatment materials.

Treatment materials, such as fertiliser and seed, may be spilled or lost when being applied. If your experiment site is located a long way from the source of the material, the experiment may be delayed. Where possible, bring extra materials with you to the site.

If you have enough treatment materials, it may be useful to take some pre-weighed backup treatments with you to the site.

Do your legumes need inoculation?

Most legumes have bacteria, called rhizobia, on their roots that provide nitrogen from the air to help the legume grow. Many forage legumes will nodulate freely with native rhizobia in the soil. This can be a major advantage for smallholder farmers who can neither buy nor store inoculant. However, some legumes may have to be inoculated with a culture of special rhizobia. A simple procedure for inoculation is included at the back of this manual on page 43. If no inoculant culture is available, you can use the soil from around healthy, nodulated plants of the same species.

Our Plots



4

Laying Out Plots



Calculate the size of the experiment carefully.

When calculating the overall size of the experiment, don't forget to leave space for pathways between the plots and around the boundary. It is useful to include spare plots within each block in case you later decide to add more treatments.

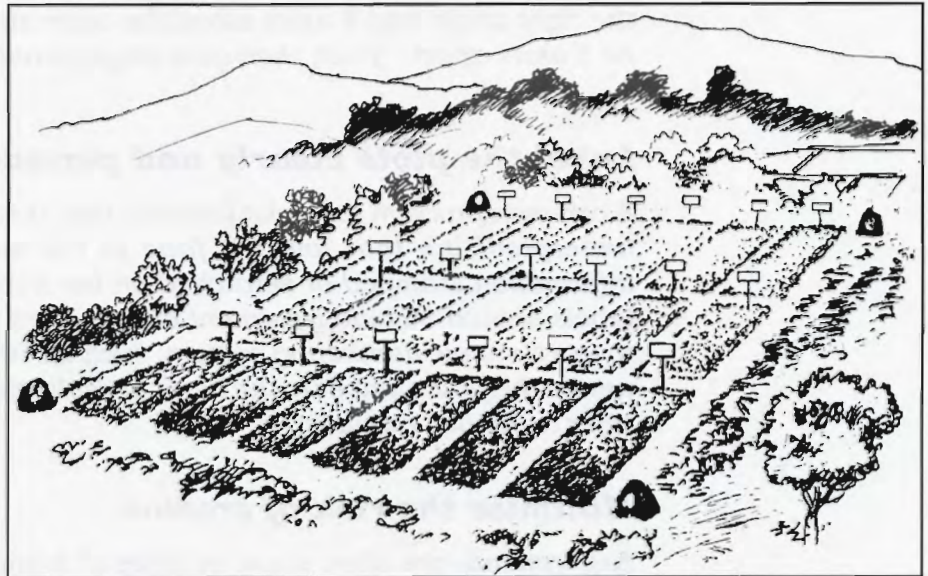
Double-check your measurements and calculations.

Someone else can usually pick up mistakes you may have made even though you have checked it yourself many times!

Mark the experiment site clearly.

Use easily recognised and long-lasting markers, such as small steel rods with plastic labels tied to them, white-painted pegs or rocks at the corners of plots so that they can be seen from a distance. Wooden pegs may be cheap but they can easily be eaten by termites. Paper labels are lost when it rains.

As well as plot markers, it is useful to have permanent markers, such as large rocks, in at least two fixed points on the site. This will help you find the exact position of the plots if you come back to the experiment site after some years.



Choose the size of plots and plot management to match the aims of the experiment.

Plot sizes will depend on the number of treatments and the aims of the experiment. Plot sizes in forage experiments may range from single rows in small plots for initial species evaluation to very large areas for grazing trials.

Manage the plots in a way that matches the aims of the experiment. For example, if you are evaluating a forage species for fallows in maize crops, do not use management practices that farmers would not use (such as raised beds or trenches around the plots).

Measure your plots carefully.

Guessing the size and shape of your plots can result in large differences in area. Measure each plot when laying it out. A simple way to make right-angles is to use the '3-4-5 rule'. If you mark a point 3 units along one side of the right angle and 4 units along the other side, then the two points should be 5 units apart. If not, then your angle is not 90°.

Label the plots clearly and permanently.

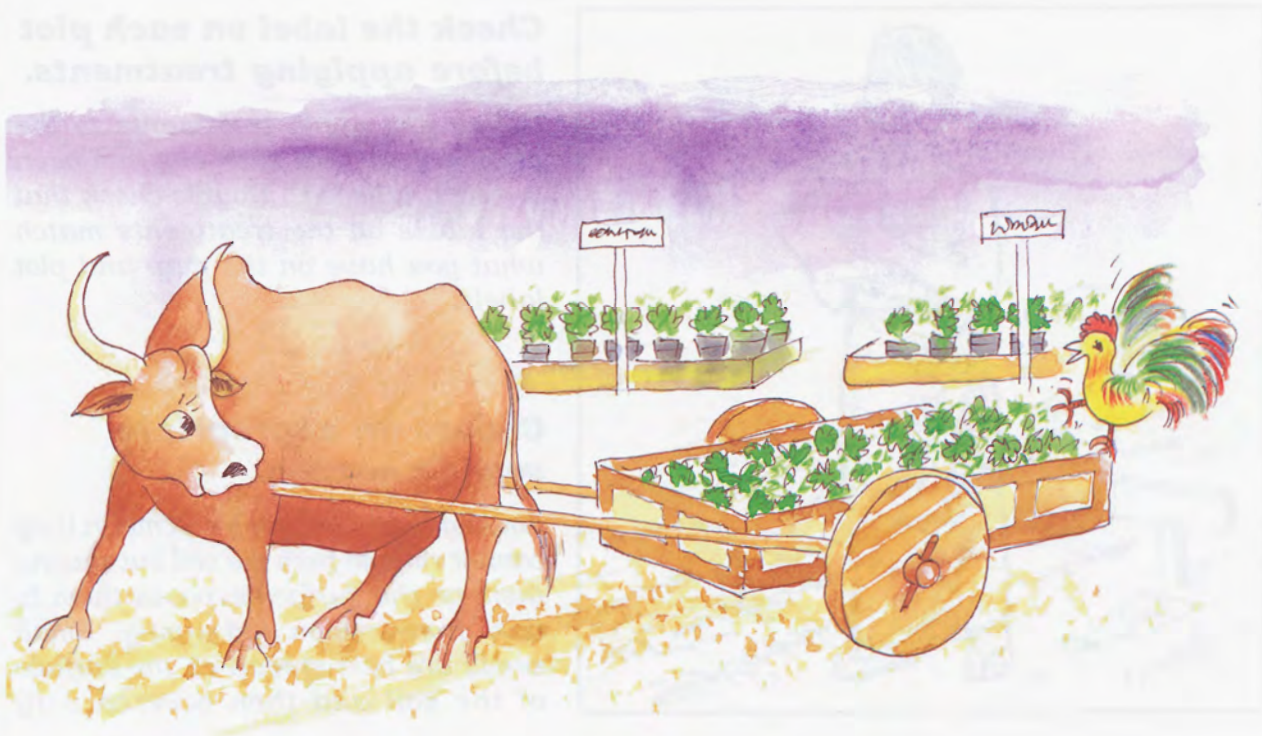
A common problem with plot labels is that they do not last long enough. Use waterproof ink that will not fade in the sun, or use metal labels with information stamped or scratched on the surface. Where appropriate, plot labels should include treatment and species information. It may be useful to use a simple numbering system, such as 101, 102, 103, 201, 202, 203, ..., where the first number is the block or replicate and the second two numbers refer to the plot number.

Minimise the risk of erosion.

Experiments are often sown at times of heavy rain, causing erosion which could damage or ruin the experiment. Where possible, avoid such sites. Otherwise, assess the risk of erosion damage on your site and take measures to reduce that risk (such as planting along the contour, maintaining ground cover in strips (such as paths between blocks) or using diversion drains above the experiment).

5

Managing the Experiment



Always carry a copy of the experiment map.

If labels have been lost, you can still identify plots with the experiment map.

Put all treatments, such as seed packets, on the plots before applying them.

By doing this, you can check that the treatments will be applied to the correct plot. If you have small packets of seeds and fertilisers, put a stone or clump of soil on the packets to stop them being blown away. If it is likely to rain or the work cannot be completed in one day, put all the treatment packets out onto the plots one block or replicate at a time. Do not leave packets of seed exposed to the sun for too long as this can kill the seed.



Check the label on each plot before applying treatments.

Before you apply treatments to the plots, ensure that each plot has been correctly labelled. Double-check that the labels on the treatments match what you have on the map and plot labels.

Choose an appropriate sowing method.

Sowing seeds too deep will mean they cannot emerge from the soil but sowing them on the surface exposes them to risks from erosion and drying. Small seeds are best spread on the surface of the soil and then covered very