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Handbooks for CIAT

Planning our experiment

HANDBOOK No. 05



Presentation

This handbook is the result of participatory research carried out by several institutions and rural communities. The handbooks were designed by farmers. The examples are based on real cases and form part of the experience of the Local Agricultural Research Committees (CIALs) that participated in the project from the beginning. The following CIALs collaborated in the preparation of this handbook: Cinco Días, El Diviso, Pescador, San Bosco, Sotará and Portachuelo in the state of Cauca, Colombia.

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**To plan an experiment
we need a clear objective.**



**Our objective explains
what we want to achieve
with our experiment.**

Having a clear objective is
as important as planting
good quality seed.

Once we have a clear objective we can plan our experiment.



Our Local Agricultural Research Committee wants to select varieties of maize that grow well under local conditions, mature more rapidly, and are more profitable than our current varieties. **This is our objective.**

We agree to compare new maize varieties with the ones we already grow.



In our experiment we compare what we already know with something new or different that we want to try.

We know the maize variety that we already grow in our community. We call it "**the control**".

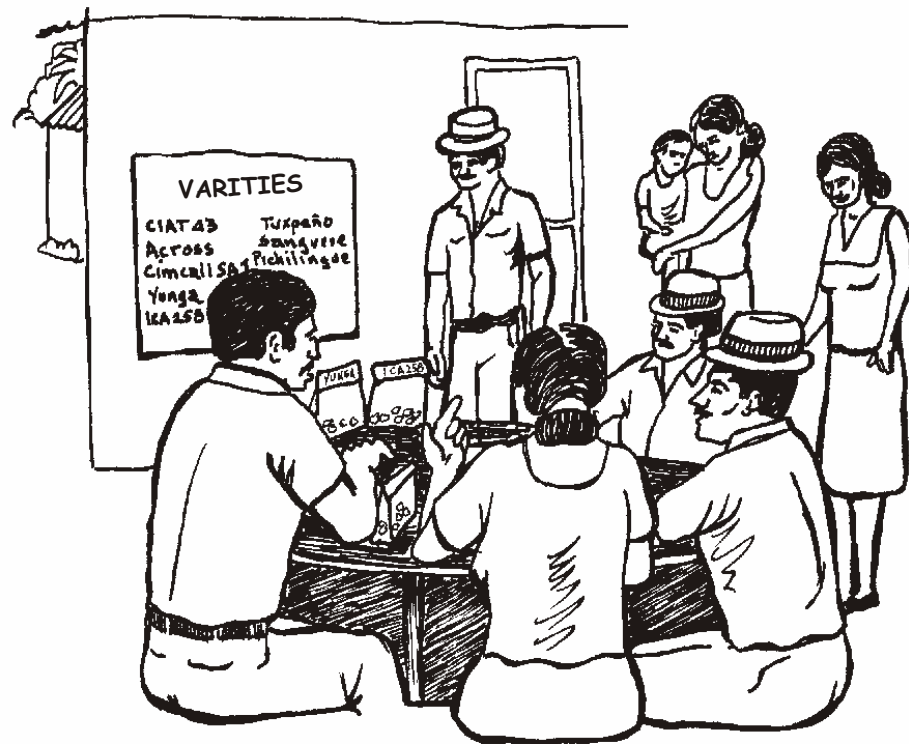
We don't know as much about new varieties. We call these **the "treatments."**

Some farmers in our community have been planting maize for many years.



Our "control" was Regional Yellow, a maize variety that farmers here have planted for many years.

Our community **wanted to try some new maize varieties.** Our research committee discussed the climate and other local conditions with our most experienced farmers and with the local extension officer.



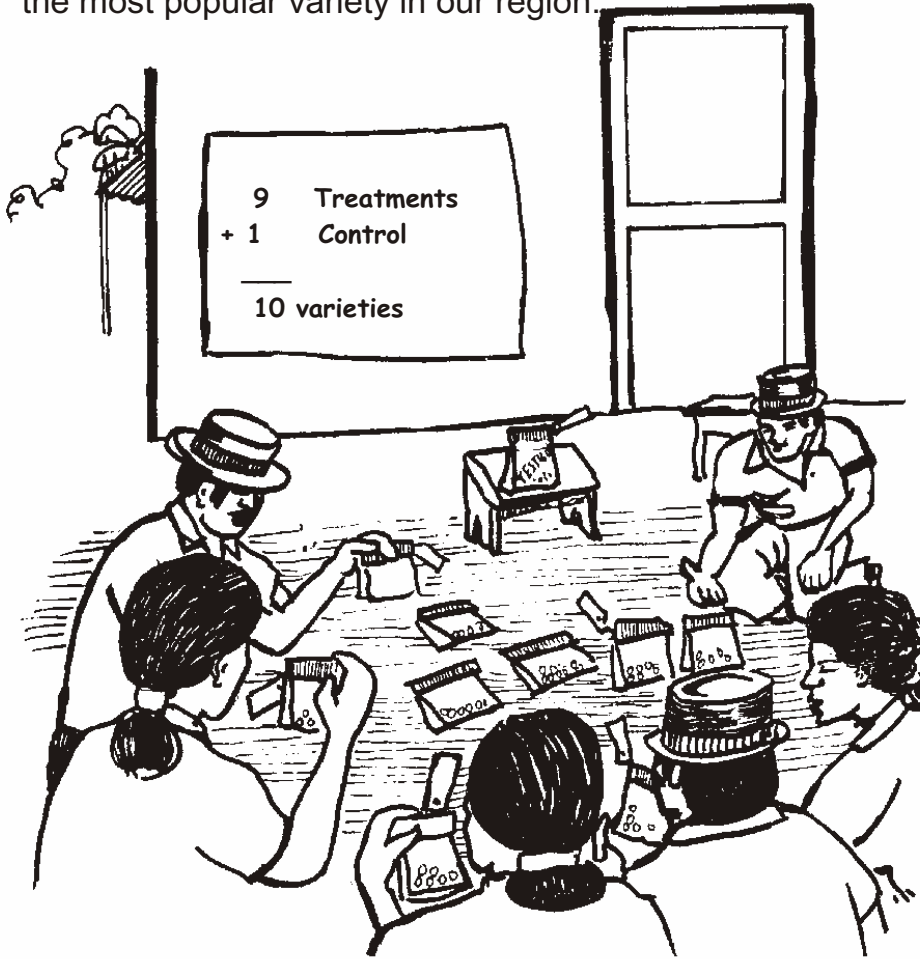
Our experienced farmers and the extension officer suggested 9 varieties for the Committee's experiment:

Golden Grain
CIAT 43
Across

Cimcali SA 1
ICA 258
Tuxpeno

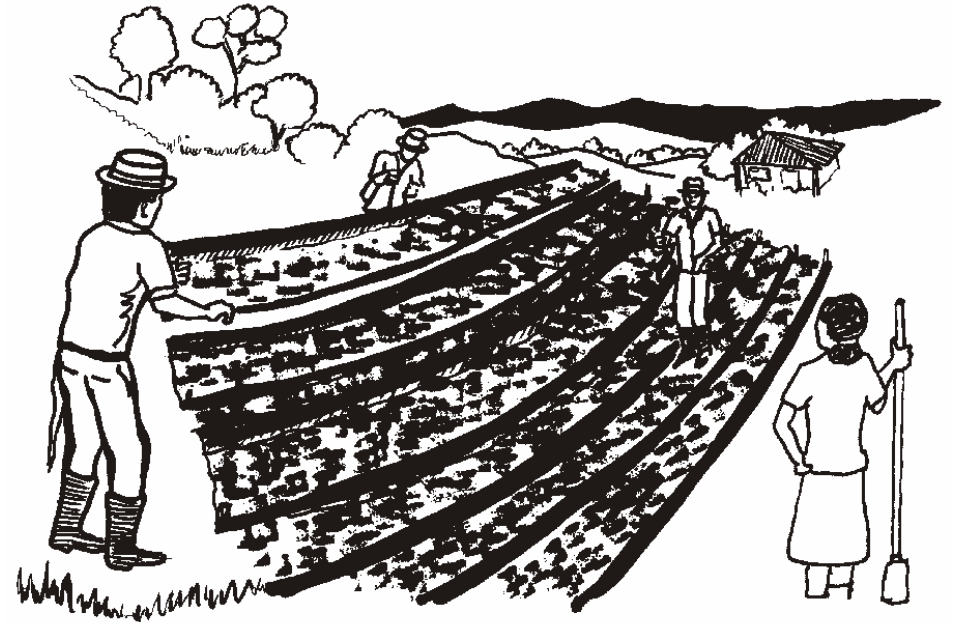
Sanguere
Pichilingue

In total they chose:
9 treatments or new varieties
and one control, Regional Yellow,
the most popular variety in our region.



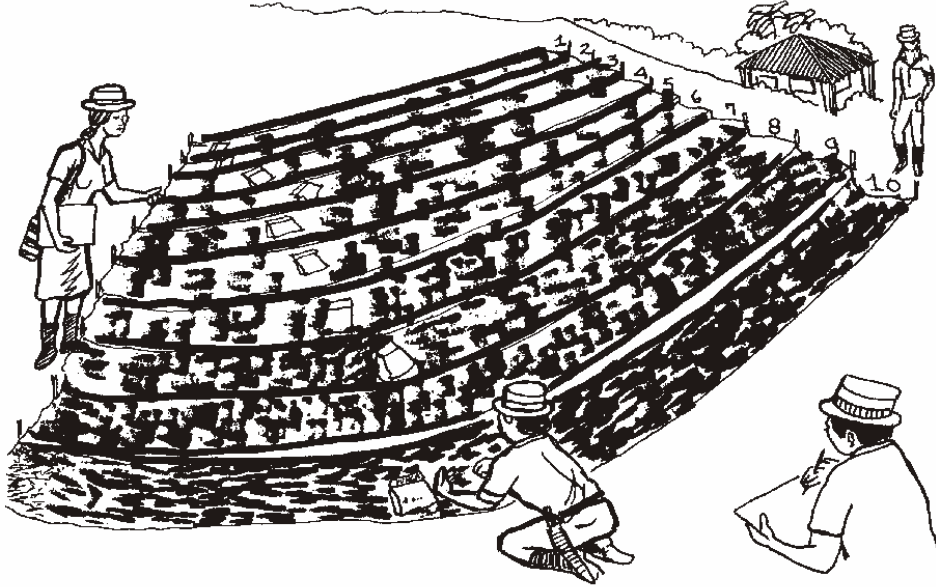
Our experiment included a total of 10 varieties.

In our research committee, when we want
to try several new things, we do a preliminary
experiment first.



When we try out new things we know
they might not work. To keep our risk small
we plant a small preliminary experiment
on a small-scale.

For our maize experiment,
we planted each new variety and
our control in a small section of a field,
called a **plot**.



We planted the same
experiment at the same time in
at least three different fields

This let's us compare results
from different locations.



We planted our maize experiment
at the same time on three different farms.

Let's choose the fields for the experiment.

We discuss what kinds of fields to choose.

Should they be on hillsides or in the valley bottoms?

Should they have black or red soil?

Should we plant in a field that we have just harvested, or in a new field?



We agree that the three fields should all be on the hillside and that they should be as similar as possible.

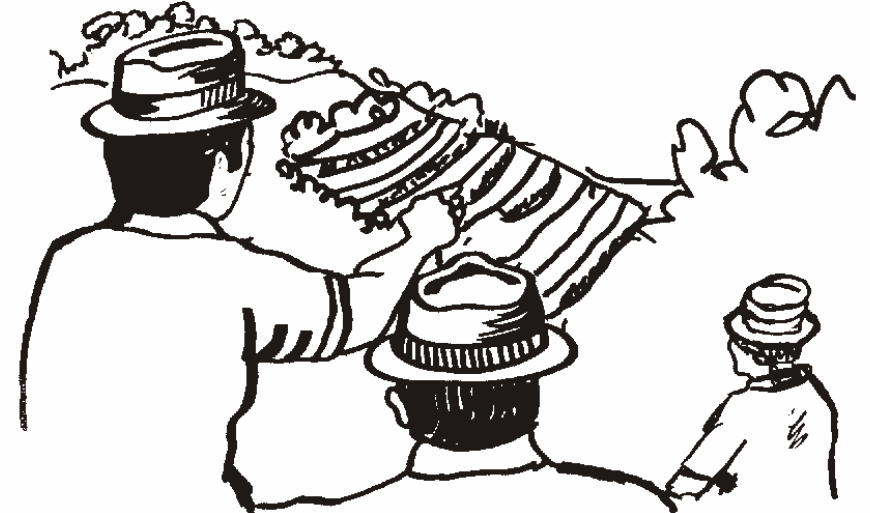
We decide when to meet to look for the fields.

We note down the date in **Activity Record** and in our **Experiment Diary**.

To try new varieties of a crop that we already know well, we choose fields where we would normally plant the crop.



If we are trying a new crop, we choose fields that might be used to grow the crop in the future.



For the maize experiment the Committee chose new fields on the hillsides.



Our community wanted to know if maize would grow well on that side of the valley.

We discuss how we will **prepare the field:**

with a plow?
with a shovel?
in rows?
in raised beds?



We decided to plant the maize in hills according to our tradition.

How should we plant the seed?

In holes?

Broadcast?



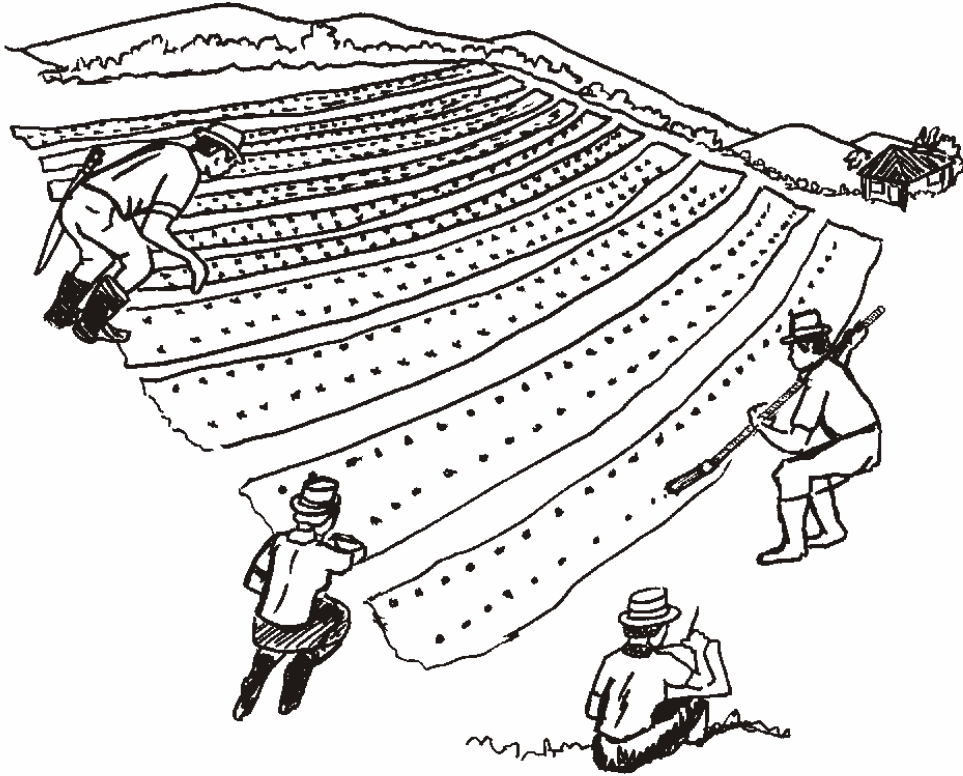
We decided to plant the maize in holes with 50 holes for each variety and 2 seeds in each.

What should be the **planting distance** for the maize experiment?

We agreed to leave 40 cm between holes and 80 cm between rows.



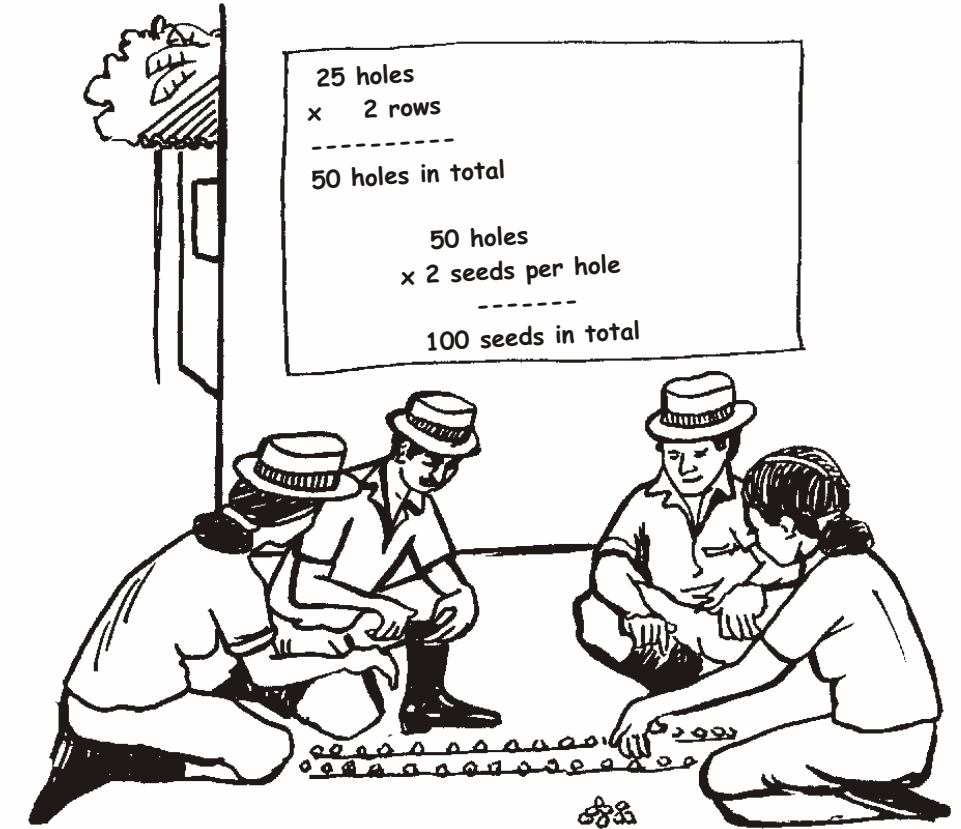
We decided on the number of control and treatment rows to be planted in each plot and in the whole experiment.



We agreed to plant 2 rows of 25 holes for each variety..

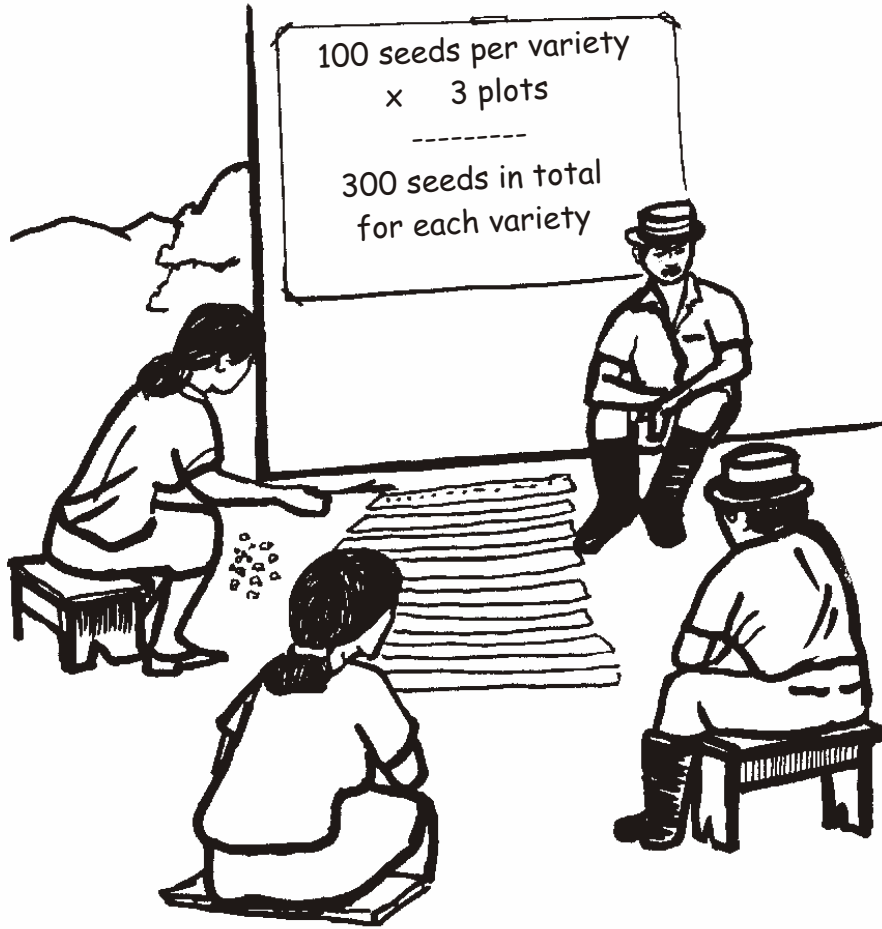
Knowing the number of plants per row we calculated **how much seed** we needed for each plot.

We calculated:



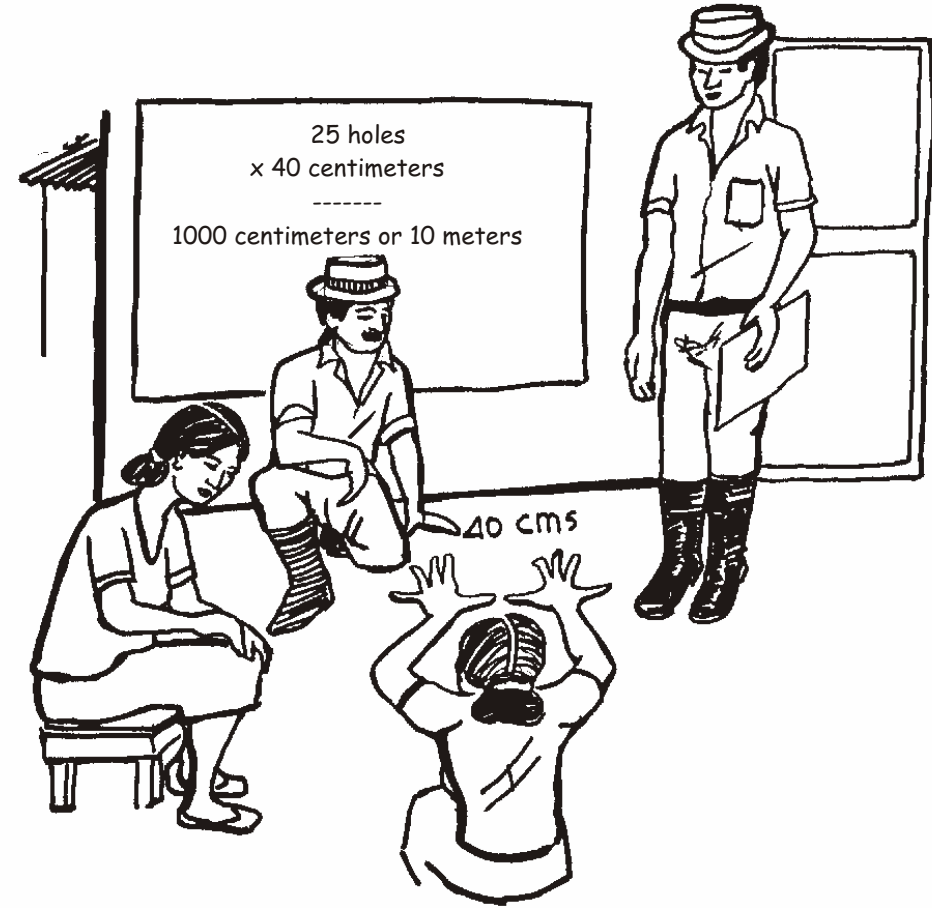
2 rows of 25 holes each = 50 holes
2 seeds each for 50 holes = 100 seeds

We calculated the amount of seed needed for **each variety** for the replications on three different farms.



We calculated the length of the rows for the maize experiment.

We multiplied the number of holes by the distance between them.



For 25 holes we'll need 1 row of 10 meters

To test 10 varieties we'll plant 2 rows of 10 meters for each variety.

2 rows per variety
X 10 varieties gives 20 rows in total.



We planned to plant 20 rows in each plot.
Each row would be 10 meters long with 20 cm between the rows.

We looked for fields where they could plant 20 rows 10 meters in length.

We discussed fertilizers.

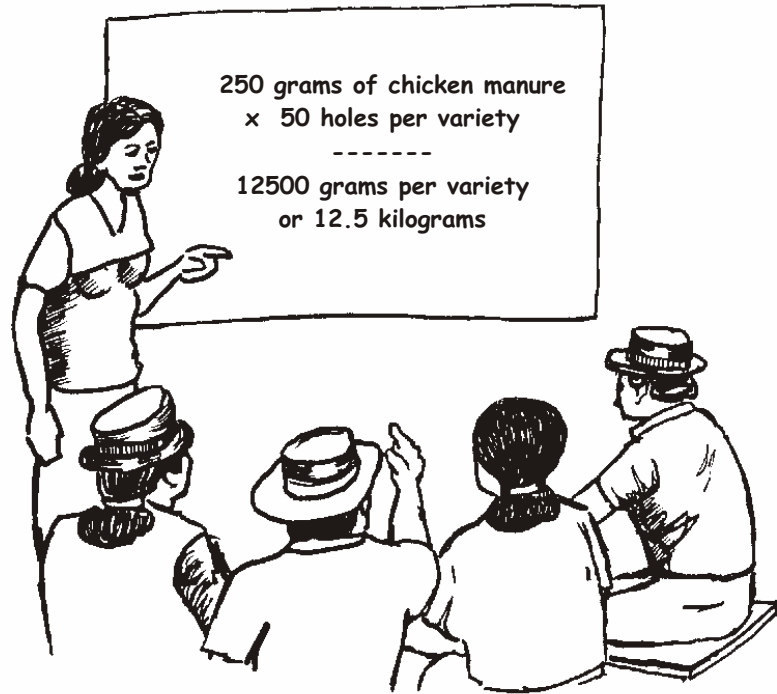
Chemical?
Chicken manure?



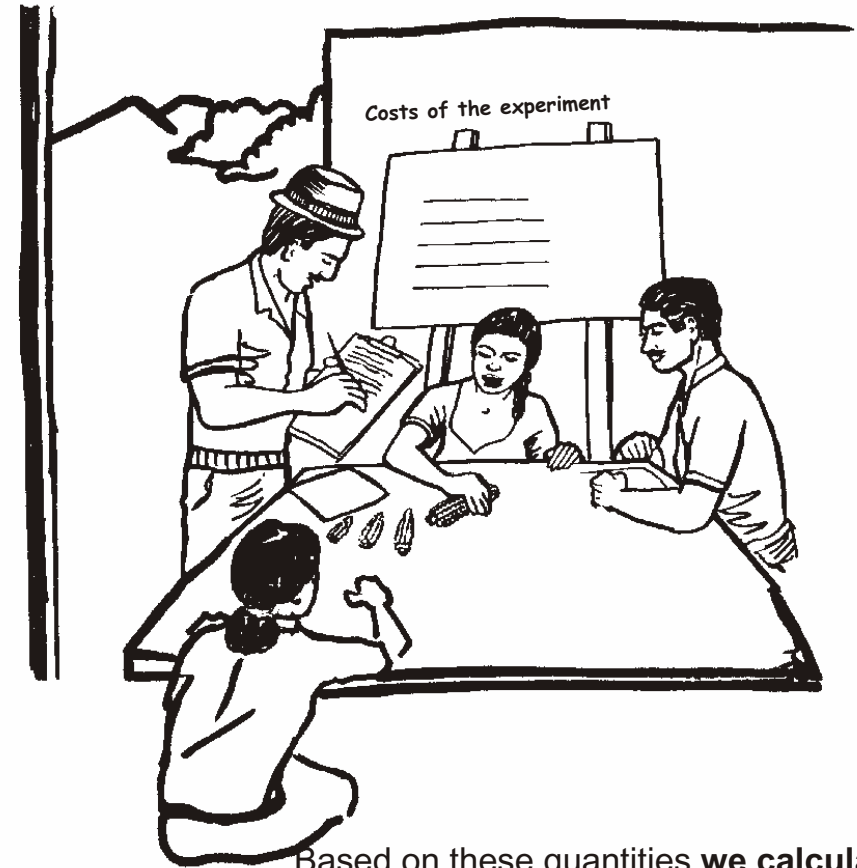
We chose chicken manure for the maize experiment.
We know from experience that we get better results with manure than with chemical fertilisers.

How much fertiliser should we apply?

The farmers decided to place a sardine tin full of chicken manure in each hole.
A sardine tin holds about 250 grams of manure.



For 10 varieties we needed 125 kilos of chicken manure for each of the three plots. We bought four 35 kilogram sacks.



Based on these quantities **we calculated the cost** of the experiment.

We considered all our expenses so that **we know how much the experiment will cost.**

We chose **the people** who would work with the Committee on this experiment.



We chose experienced farmers who know this area well. They can help us reach our objective.

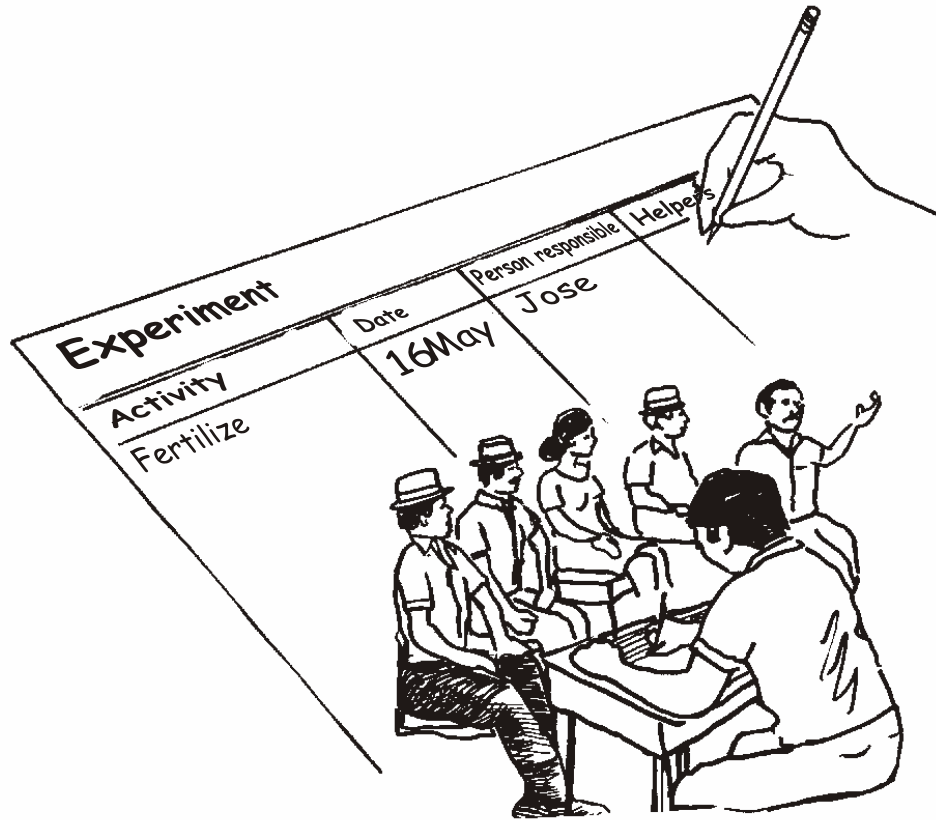
We invited several farmers from the village to help us design the experiment.



Three experienced farmers offered their hillside fields for the experiment.

We went to see their fields.

We agreed on a **planting date** for the experiment. We also **planned dates for fertilizing, weeding and evaluating the experiment** and noted these in our **Record of Activities** and in the **Experiment Diary**.



We planned what we would use to measure quantities for the experiment.

To measure 30 grams of 10-30-10 fertilizer we would use a brandy cup.



To measure 10 grams of urea we would use a soup spoon.

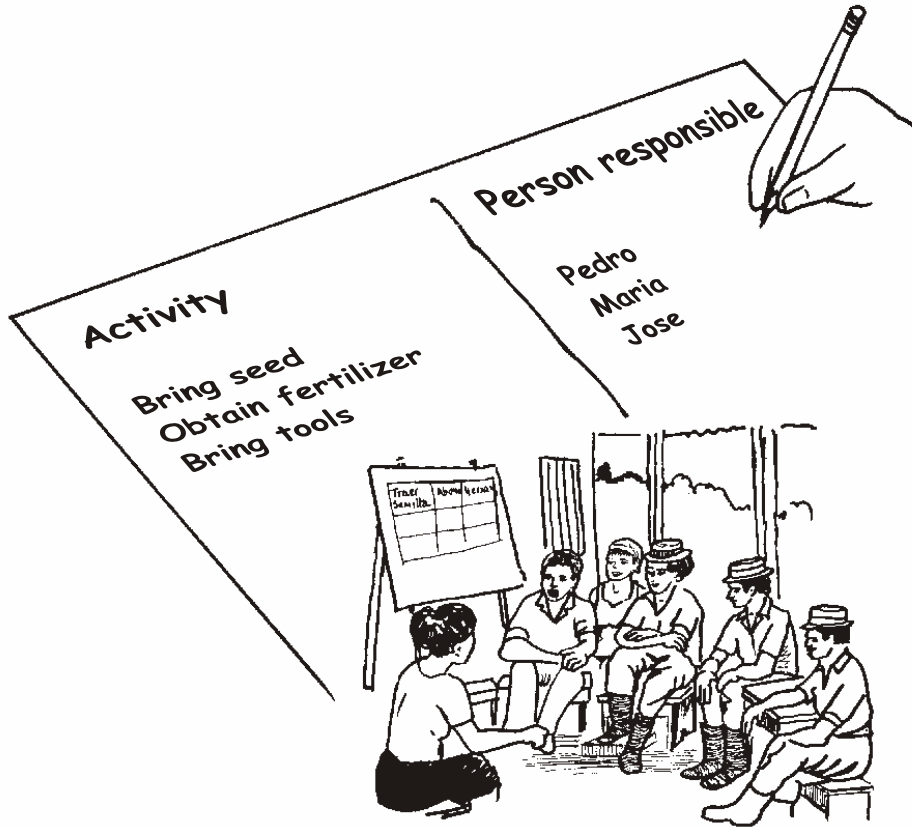
We planned ahead to be well prepared when the time came to plant the experiment.

We decided what each person would do and when.

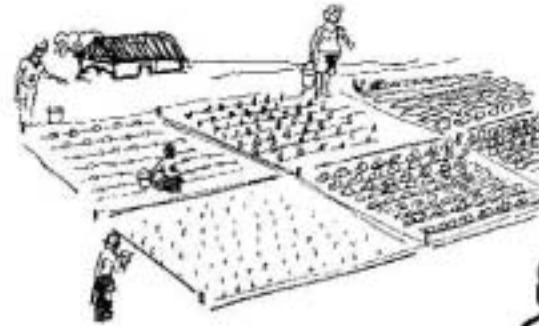
Who would provide the seed and when?

Who would obtain the fertilizer, and by what date?

What tools were needed and who would bring them?



In our experiment we work as a team towards the same objective.



The best way to do this is to make clear plans together in advance.

Before planting we discussed

Who would prepare the plots?

Who would weed them?

Should it be the owner of the field or the Committee?



What would we do with the harvest?

Should we sell it?

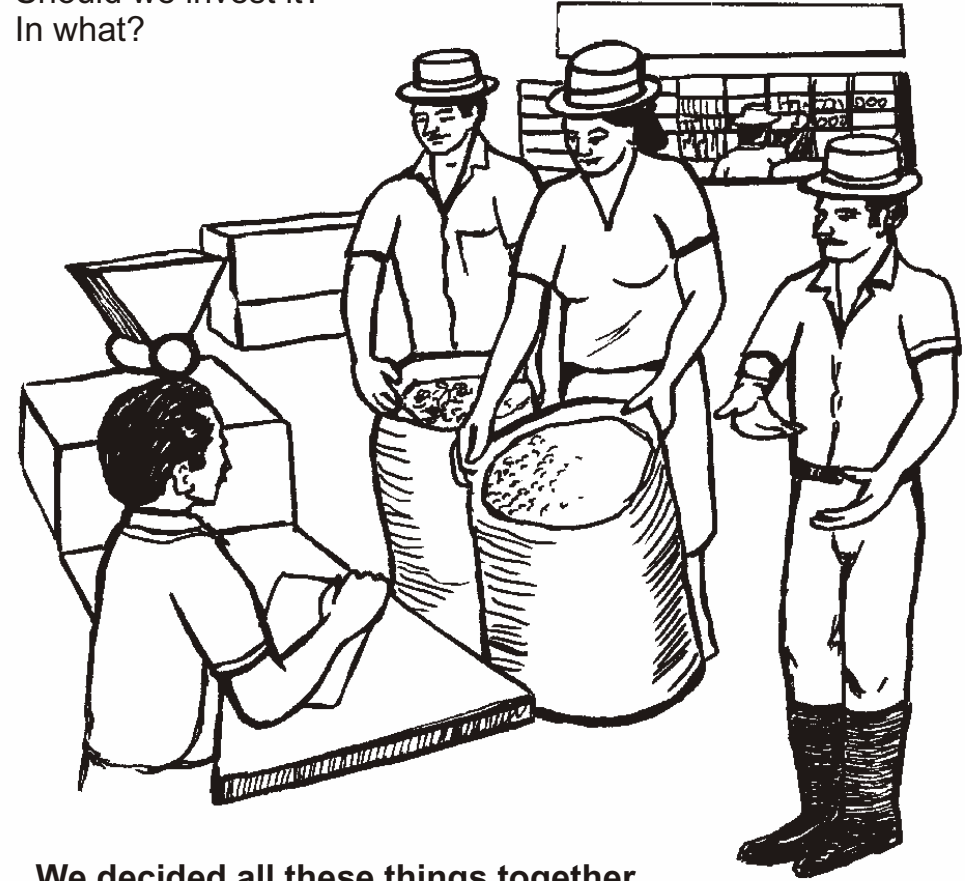
If so, what should we do with the money?

Should we share it?

Among whom and how should it be divided?

Should we invest it?

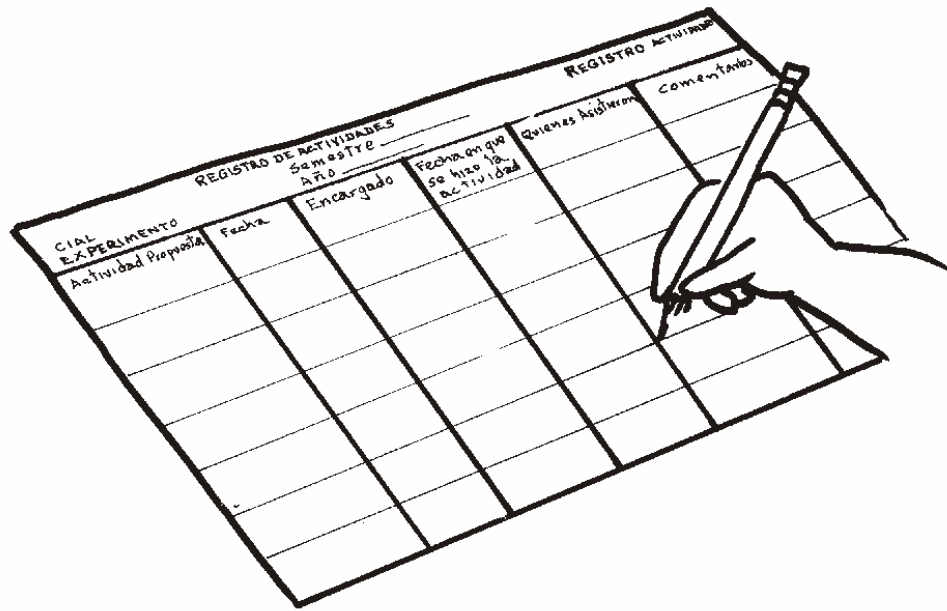
In what?



We decided all these things together.

We wrote down our decisions in the Record Book and in the Experiment Diary.

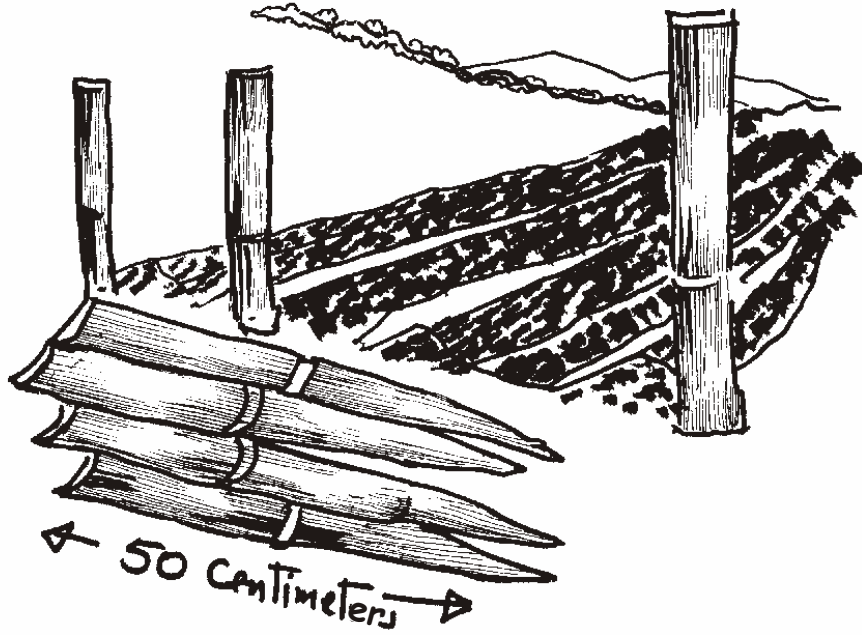
The Record Book and the Experiment Diary are like our memory. The secretary of the committee keeps them up to date and in a safe place.



We considered the slope and shape of the field as we laid out the plants. We marked them before planting the experiment.



We marked the plots with stakes.



We marked each plot with a stake.

This is how we organised our maize experiment.

Before planting we reviewed our plans.

We checked the Activity Record and the Experiment Diary to help us remember what we had decided.



Finally, it's time to plant! All of us are present and we have everything ready.



We plant the experiment according to our design.

To decide where to plant each treatment and the control we use a lottery.



We label small pieces of paper with the names of the varieties.
We fold the papers and put them in a hat.



In the Record Book we write down a number for each of the varieties in the experiment.

Someone chooses papers from the hat without looking.

We'll plant the first variety in the section of the plot marked with stake number 1, and so on, until all the varieties planted.



When we finish the lottery every variety will have a number.

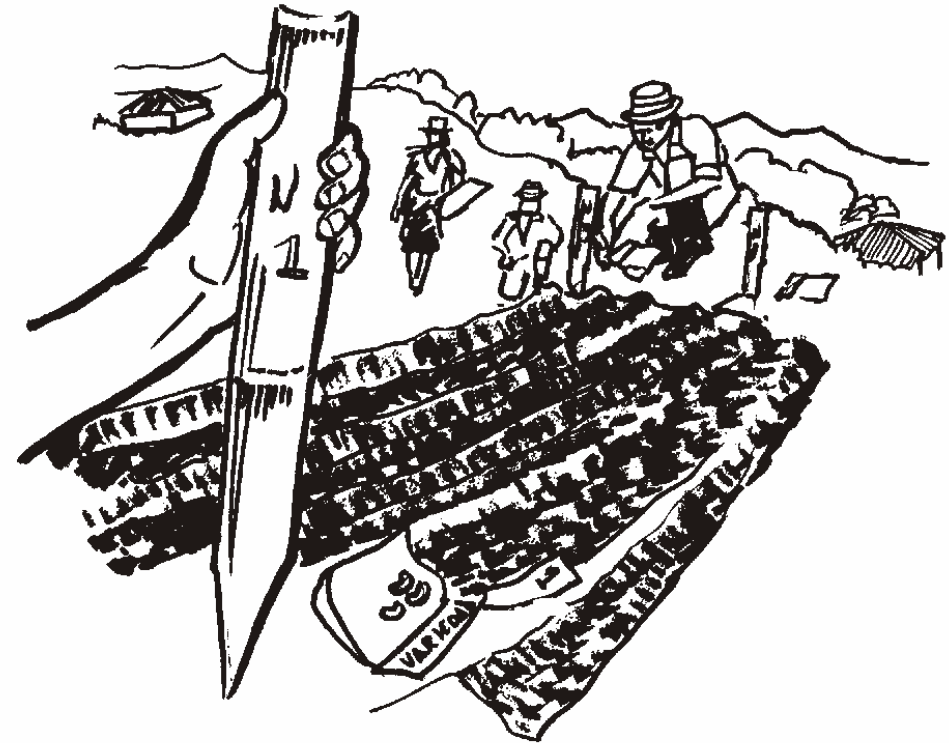
We use a pencil to mark the number 1 and the name of the first variety on a stake and we mark the first plot.



The secretary of the committee calls out the names and numbers of the varieties until all the stakes are labeled.

We put a bag of seed containing the correct variety next to each stake.

Now we're ready to plant.



Planting is easy, but it's also easy to get confused and make a mistake!



Each person plants one variety. This way we avoid mixing up varieties or planting the wrong number of seeds.

After we finish planting our Secretary makes a map of the experiment in the Experiment Diary. He writes down the order in which we planted the varieties in the experiment.





**It's time to watch our experiment
grow and to evaluate
what happens as the crop develops..**