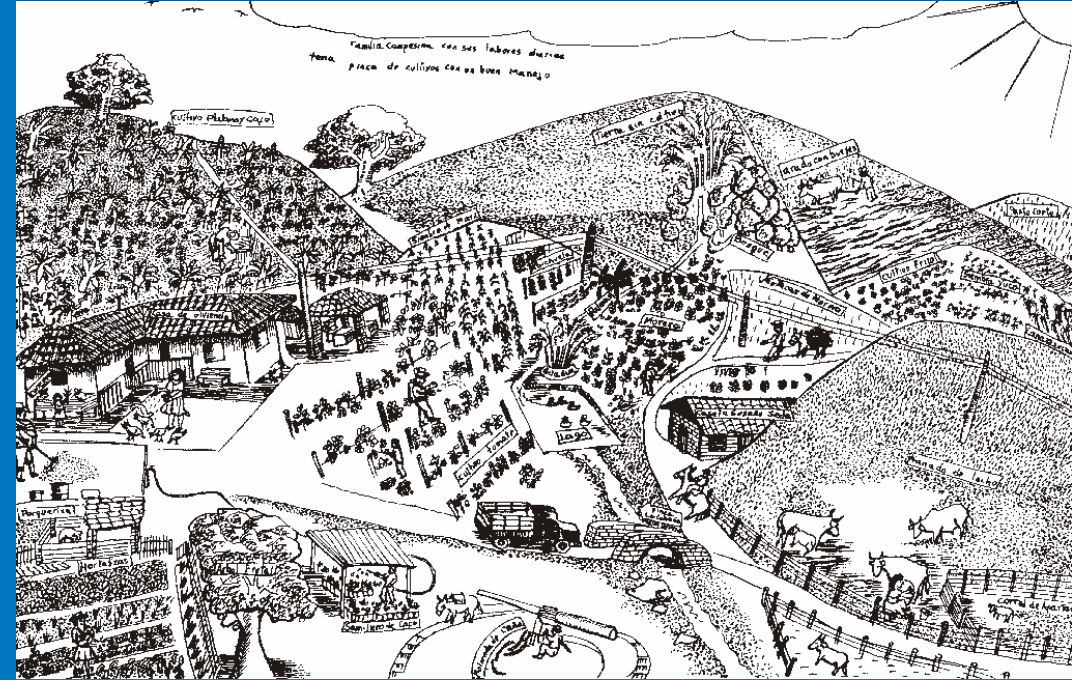


Evaluating Our Experiment

06



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The International Center for Tropical Agriculture (CIAT) is dedicated to the alleviation of hunger and poverty in tropical developing countries, through the application of science to increase agricultural production while conserving natural resources. CIAT is one of 18 international centers of the Consultative Group for International Agricultural Research (CGIAR). The CGIAR is a group of 40 countries and international agencies that support agricultural research for development in the tropical countries of the world.

Participatory Research in Agriculture (IPRA) is a CIAT special project created in 1987 with the objective of developing methodology for involving small-scale farmers in the design and evaluation of appropriate agricultural technology. IPRA is sponsored by the W.K. Kellogg Foundation.

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Hanbooks for CIAL

Evaluating Our Experiment

HANDBOOK No. 06



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.

**In Local Agricultural Research Committees
we observe and evaluate our experiments
in order to improve our decision-making
and our farming.**

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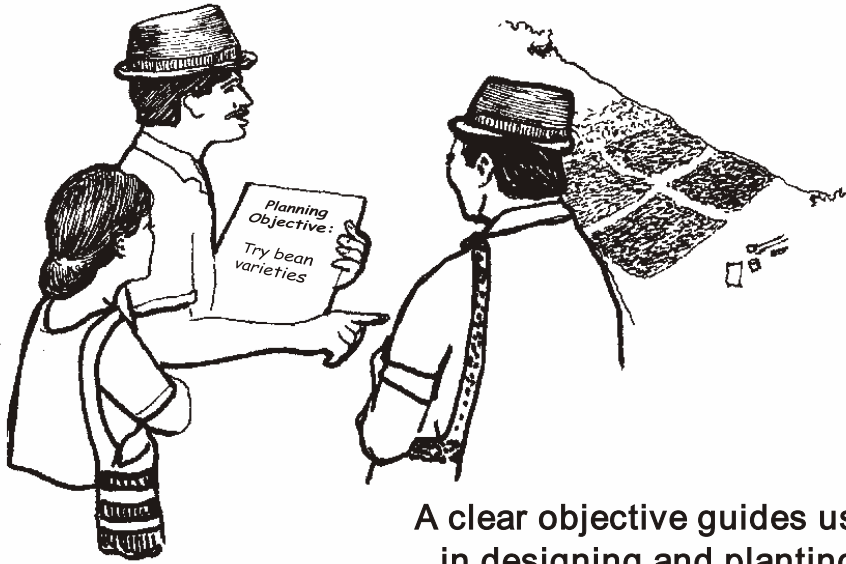
IPRA Project (Participatory Research in Agriculture). 1996. CIAL Handbooks; Local Agricultural Research Committees (CIALs). Handbook No. 06. Evaluating Our Experiment. Centro Internacional de Agricultura Tropical (CIAT), Cali, Colombia. 11p.

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The **objective** of our experiment explains what we hope to learn or improve.



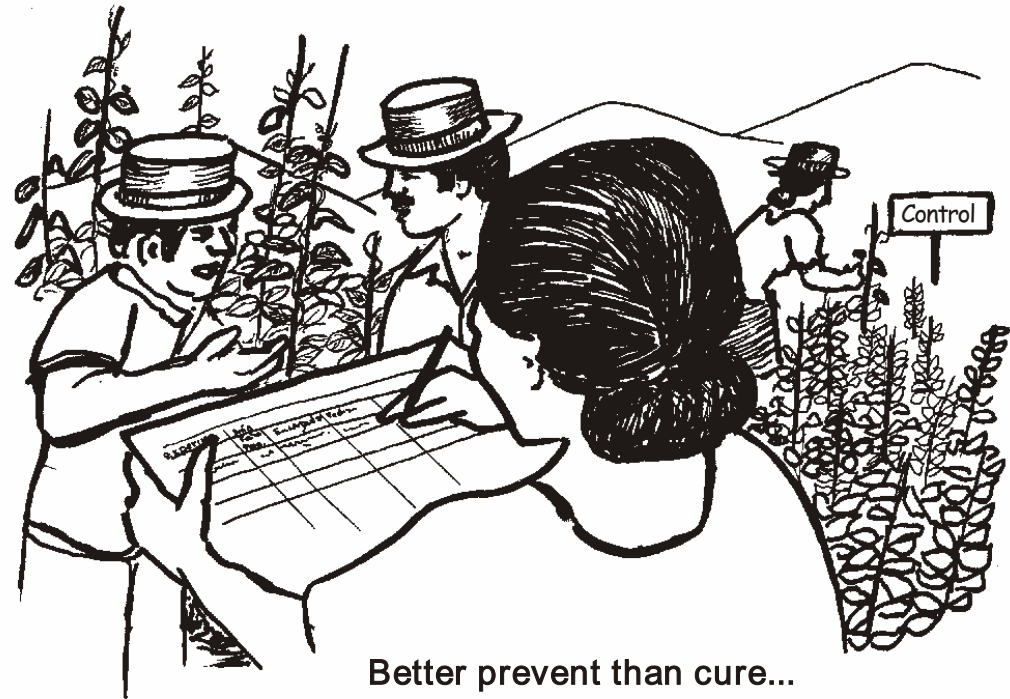
A clear objective guides us in designing and planting our experiment.



We visit our experiment regularly to observe and evaluate.

Evaluate means comparing our treatments with the control, according to the objective of our experiment.

We observe and measure the same things in the control as in the treatments.



Better prevent than cure...

When we visit our experiment regularly,
we avoid risks.

What would happen if animals ate the experiment?

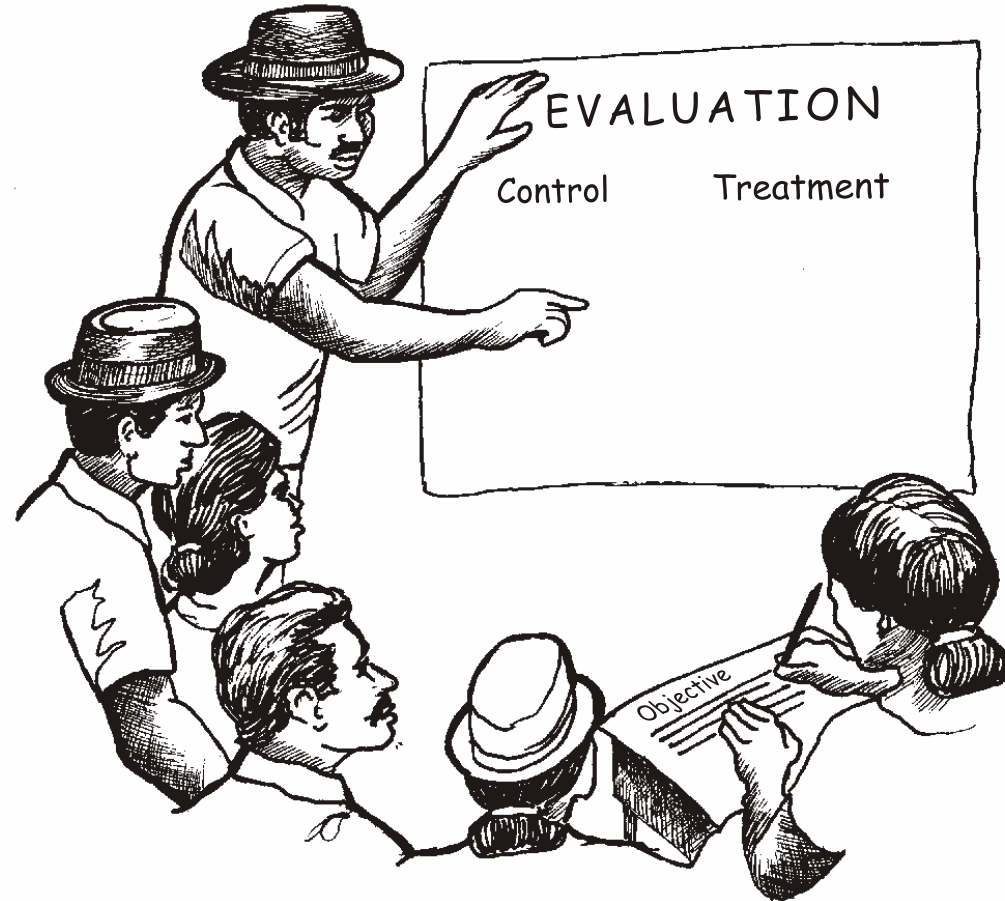
Or if someone stole from the plots?



Or if we realise too late
that a disease or pest
has invaded the experient.

Before we evaluate our experiment we review
the objective that we recorded in the Record Book.

Our objective tells us what we should observe,
compare and measure in order
to evaluate the experiment.



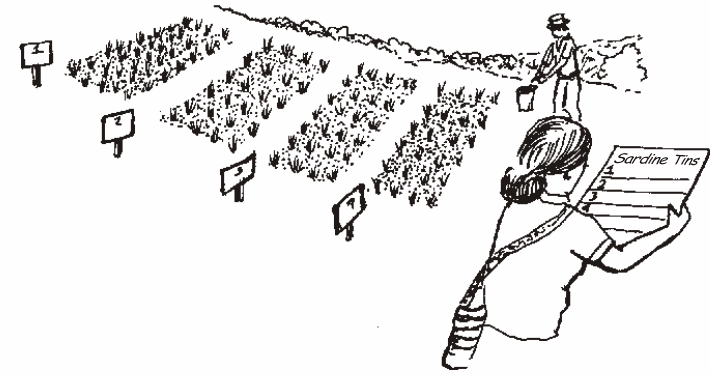
A Committee's **objective** was to find potato varieties that produced more than the local variety.

The objective of this Committee related to **yield**, so they weighed the harvest and compared the yield of all the varieties planted in the experiment.



Another Committee wanted to know how much **chicken manure** was needed to grow carrots.

So they observed the growth, development and yield of carrots fertilized with different amounts of manure.



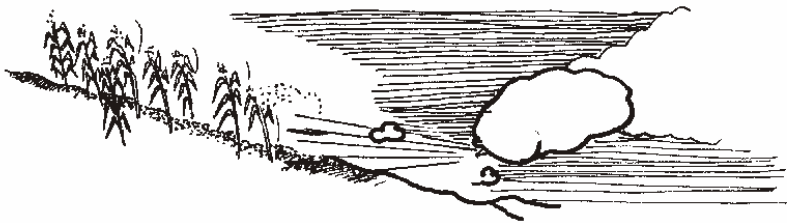
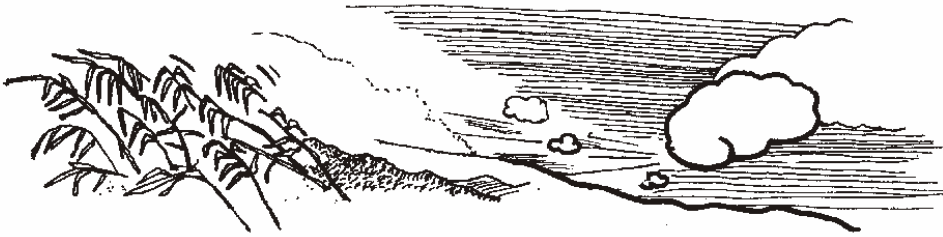
Another committee wanted to find a bean variety good for feeding the family. They compared the taste of different varieties.



A clear objective also tells us when to evaluate....

If the objective is to produce more, we evaluate at harvest.

If we want to know how well maize resists lodging, we need to observe the experiment during windy periods.



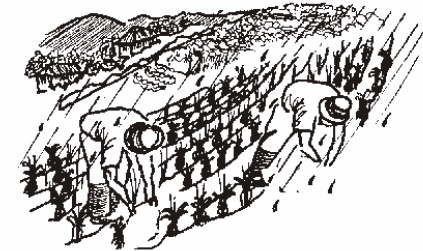
To evaluate the development of crop plants we must choose the right moment...

When we hill up?

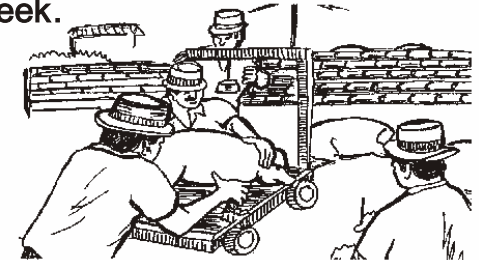
30 days after planting?



To evaluate if a barrier of pineapple plants controls soil erosion, we observe the experiment during the rainy season.



To evaluate weight gain in pigs, we weight the animals each week.



One Committee was looking for maize varieties that were well adapted to local conditions. To them this meant varieties that matured more rapidly and had higher yields than the regional one.

The farmers observed

...which varieties yielded more

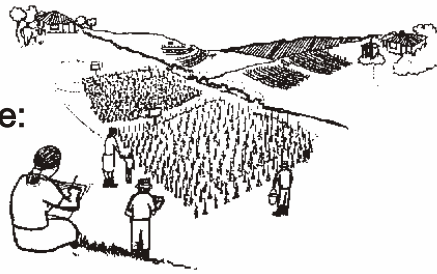
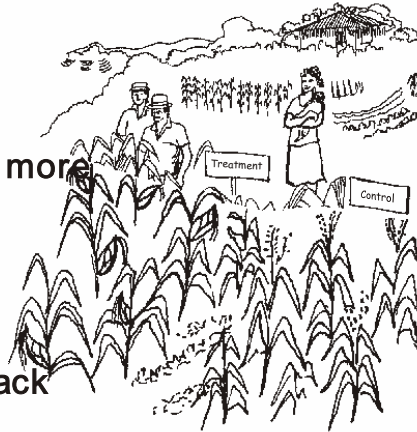
...which formed cobs the fastest

...which suffered less attack by pests and diseases

...which could be dried most rapidly

This Committee decided to evaluate:

- ...the fresh cobs
- ...the dried cobs
- ...the dried and shelled grain

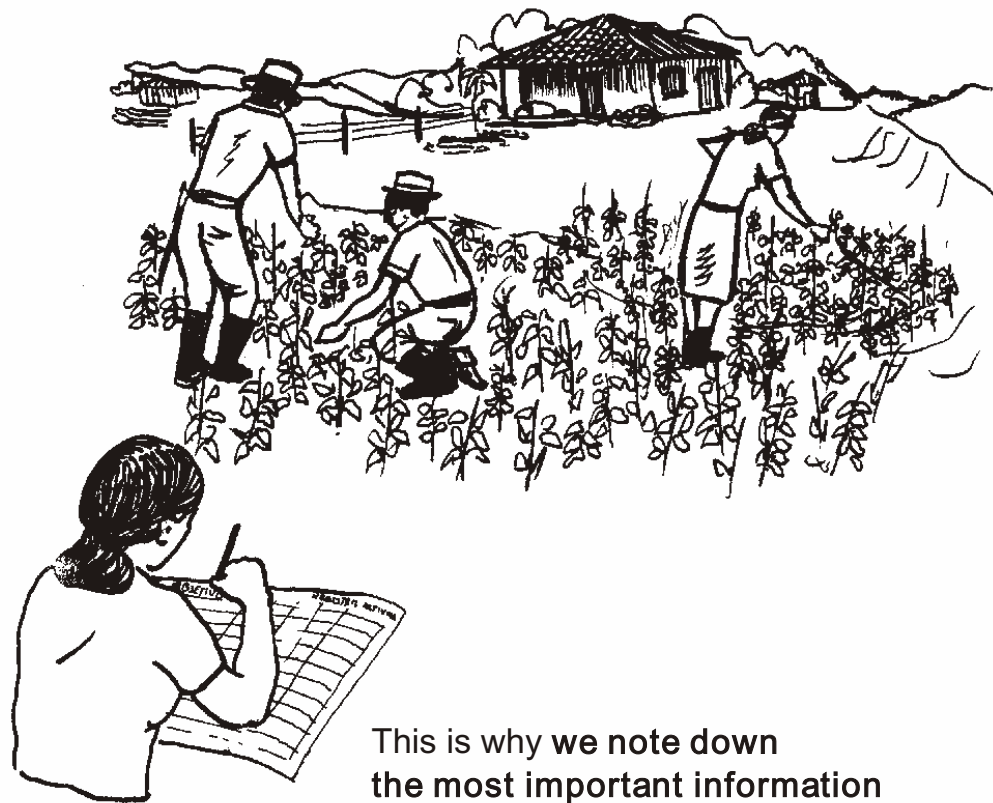


They checked the experiment frequently for pests and diseases.

It's better to have a little information that relates well to the objective of the experiment than lots of unrelated information.



The things we learn by comparing our control and treatments is important for our community and for other farmer research committees.



This is why we note down the most important information in our Committee's Record Book.

Our objective should also tell us how to evaluate the experiment.



If we are looking for flavorful beans we cook all the varieties the same way. We taste them, comparing flavor, and choose those we like best.

To work out **the most profitable amount of fertilizer**, we weight the harvest from the treatment and control plots.

Then we calculate the cost of the fertiliser.

We check the value of the harvest at the market.



From the value of the harvest we subtract the cost of the fertilizer.

This way we can determine the amount of fertiliser that gives us the highest profit.



One way of evaluating is to rate the treatments and control.

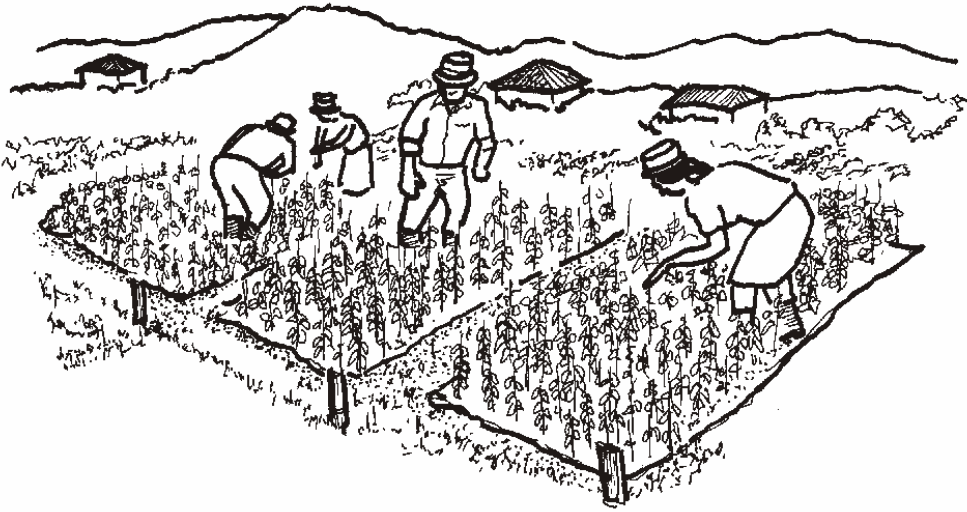
One committee wanted to look for a disease resistant maize variety.



They worked with their local extension officer to learn how to identify different bean diseases.

They tested **4 treatments** or new varieties of beans that had not yet been released for commercial cultivation:

RIN 3 T 46 VAR 9 NAY 25



The **control** was the regional variety.

In total they compared **5 varieties**.

The most common bean diseases were **mildew** and **blight**.

Some varieties were more affected than others.



The Committee counted the number of sick plants in the treatment and control plots.

They rated the varieties according to the health of the plants...

Strong varieties had no sick plants.



About half the plants were sick in the **average** varieties.



Almost all the plants were sick in the **weak** varieties.



The committee evaluated the varieties affected by **blight** in all three replications.

They rated Regional Yellow as **average**.

RIN 3 turned out to be **strong**.



T 46 was **weak**.



VAR 9 and NAY 25 were **average**.



RIN 3 resisted blight better than any of the others.

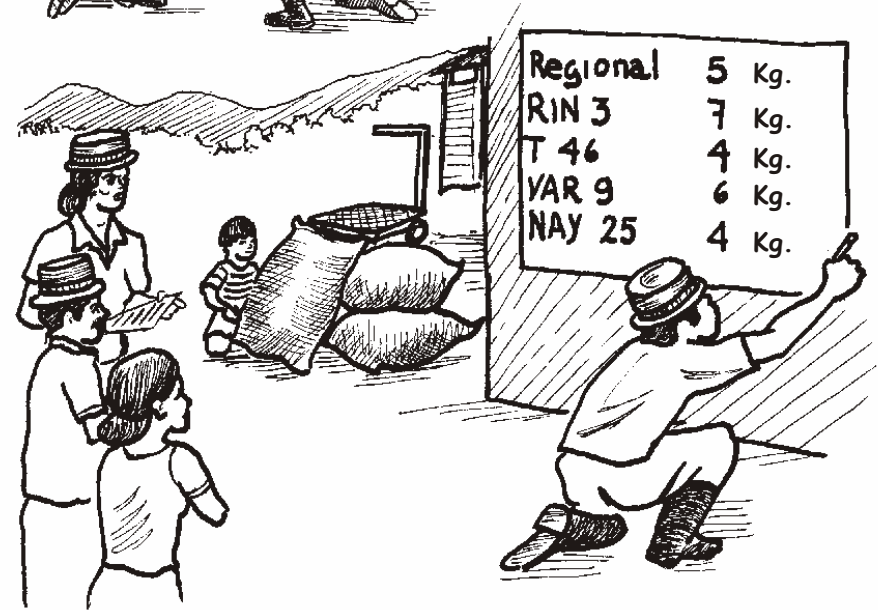
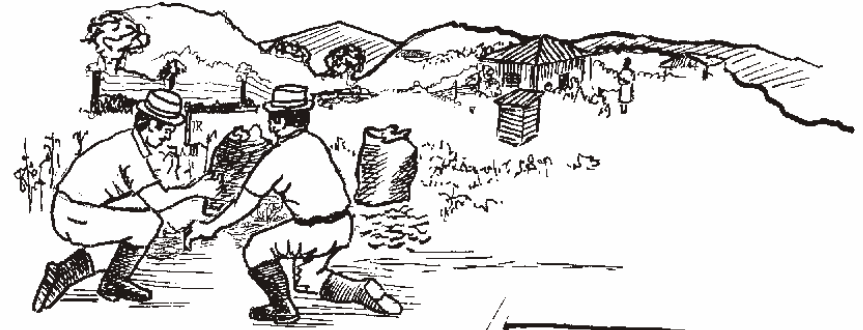
The Committee observed how each bean variety reacted to mildew:



Regional Yellow	Average
RIN 3	Strong
T 46	Weak
VAR 9	Average
NAY 25	Strong

RIN 3 and Nay 25 were the varieties least affected by mildew.

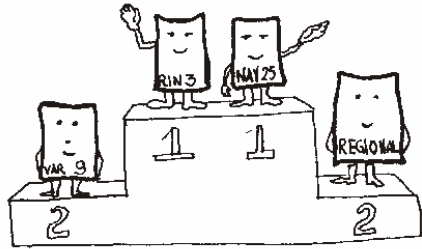
To compare the yield, the Committee weighted the harvest.



RIN 3 had the highest yield.

RIN 3 and NAY 25 resisted the diseases.

VAR 9 and Regional Yellow took second place.

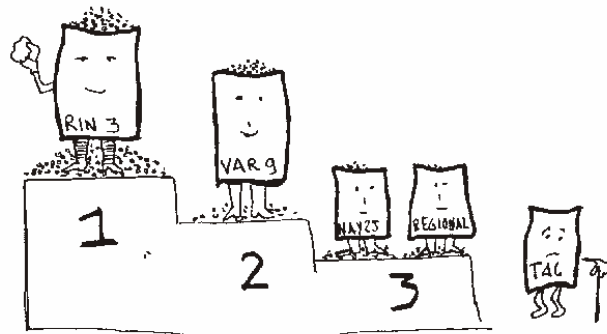


RIN 3 yielded the most

with VAR 9 in second place,

Regional Yellow in third

and T 46 in last place.



The Committee analysed their results:

T 46 was heavily attacked by both diseases and yielded very little, so the committee decided to discard it.



Then they did check experiment to compare Regional Yellow with RIN 3, VAR 9 and NAY 25.

In one community they had problem with maize.

Some of their varieties were tall and fell over in windy weather.



Others were very short and were overgrown by weeds.

The farmer's research Committee did an experiment to find better varieties of maize.

They defined different categories of varieties according to their height.

Very short

In very short varieties the tassel is at eye level.



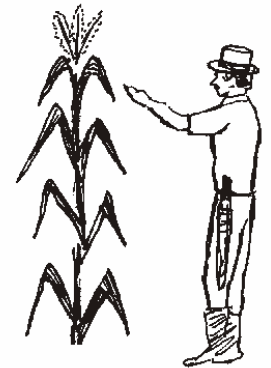
Very tall

The tassel of very tall varieties is beyond reach.



Good height

The tassel is above eye level, but you can touch it with your raised arm.



They compared the height of the treatments and the control:



Treatment 1
Very short



Treatment 2
Very tall



Treatment 3
Good height



Treatment 4
Good height



Control (Regional Yellow)
Very short

The Committee did a check experiment to choose the variety best suited to their conditions.



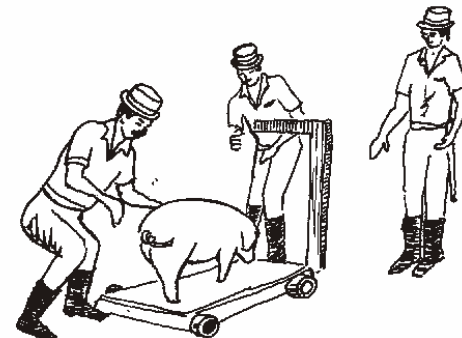
We can also evaluate experiments using **measurements**.

One committee wanted to compare the traditional way of fattening pigs with a new way suggested by Mr. Luis, a farmer well known in the community for his experiments.



They bought 10 pigs for the experiment and fattened 5 with the traditional diet and 5 with Mr. Luis' diet.

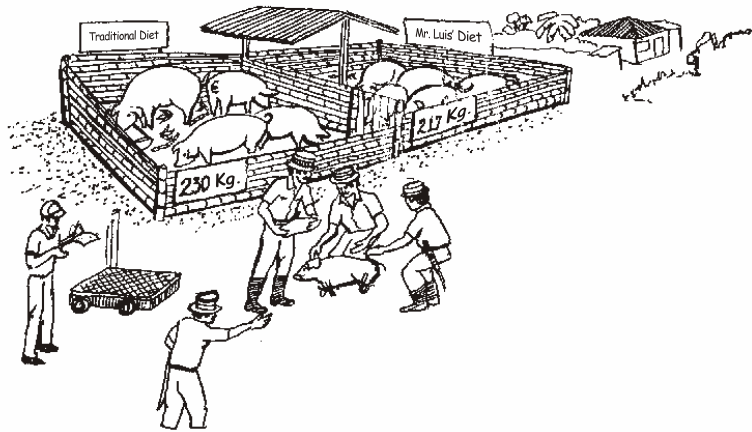
To compare the diets they weighted the pigs after 2 months.



The 5 pigs fattened on the traditional diet weighted a total of 230 Kg.

The 5 fed Mr. Luis' diet weighted 217 Kg.

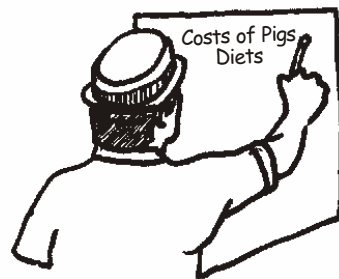
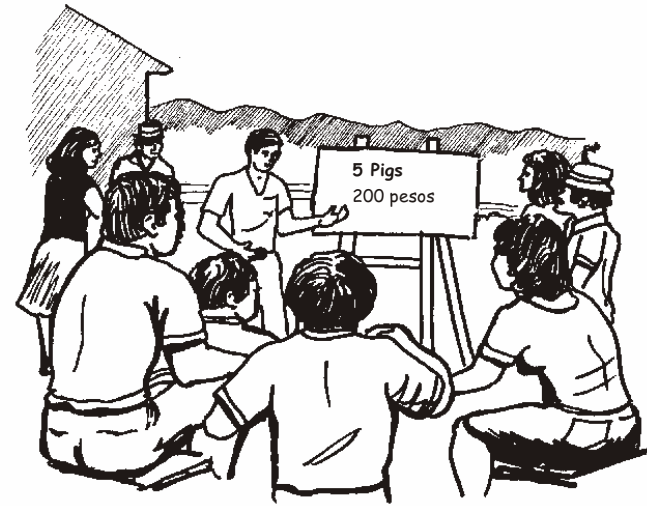
They used 375 Kg. of feed in the traditional diet. Each kilo cost 200 pesos.



$$\begin{array}{r} 375 \text{ Kg.} \\ \times 200 \text{ pesos} \\ \hline 75.000 \text{ pesos} \end{array}$$

The difference was small.

The Committee decided to compare the costs of the two diets to see which was most economical.



It cost 75.000 pesos to fatten 5 pigs on the traditional diet.

They fed the pigs 300 Kg. of Mr. Luis' diet.
 Each Kg. cost 100 pesos.

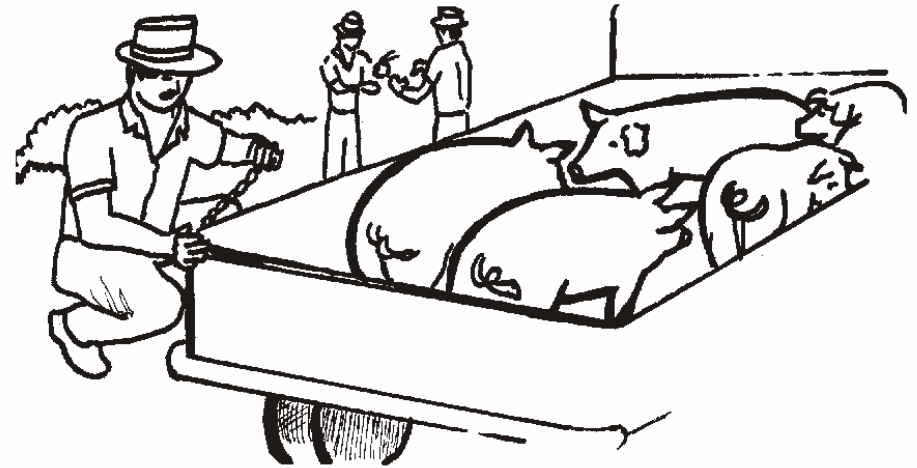


$$\begin{array}{r}
 300 \text{ Kg.} \\
 \times 100 \text{ pesos} \\
 \hline
 30.000 \text{ pesos}
 \end{array}$$

Fattening 5 pigs with Mr. Luis' diet
 cost 30.000 pesos.

Each pig cost 20.000 pesos.
 The 5 pigs on the traditional diet cost 100.000 pesos.
 The feed cost 75.000 pesos.
 The **total cost of the control** was 175.000 pesos.

They sold the pigs at 1.000 pesos per Kg.
 The 5 pigs weighted 230 Kg.,
 so the Committee received 230.000 pesos.







They subtracted the costs to calculate the profit.

$$\begin{array}{r}
 230.000 \text{ pesos} \\
 - 175.000 \text{ pesos} \\
 \hline
 55.000 \text{ pesos}
 \end{array}$$

The profit from 5 pigs on the traditional diet
 came to 55.000 pesos.

They made the same calculation for the pigs fed on Mr. Luis' diet.

	cost of 5 pigs \$100.000 pesos
	Cost of diet \$30.000 pesos
	Total weight of pigs 217 Kg.
	Sold at \$1.000 pesos per Kg.

They earned 217.000 pesos from the sale of the 5 pigs.
Subtracting the costs, they calculated the profit.

$$\begin{array}{r} 217.000 \text{ pesos} \\ - 130.000 \text{ pesos} \\ \hline 87.000 \text{ pesos} \end{array}$$

The profit with Mr. Luis' diet came to 87.000 pesos.

To analyze which diet was more profitable they compared the profits.

Mr. Luis' diet was more profitable than the traditional pig diet.

The Committee presented their results to the other farmers in their village.

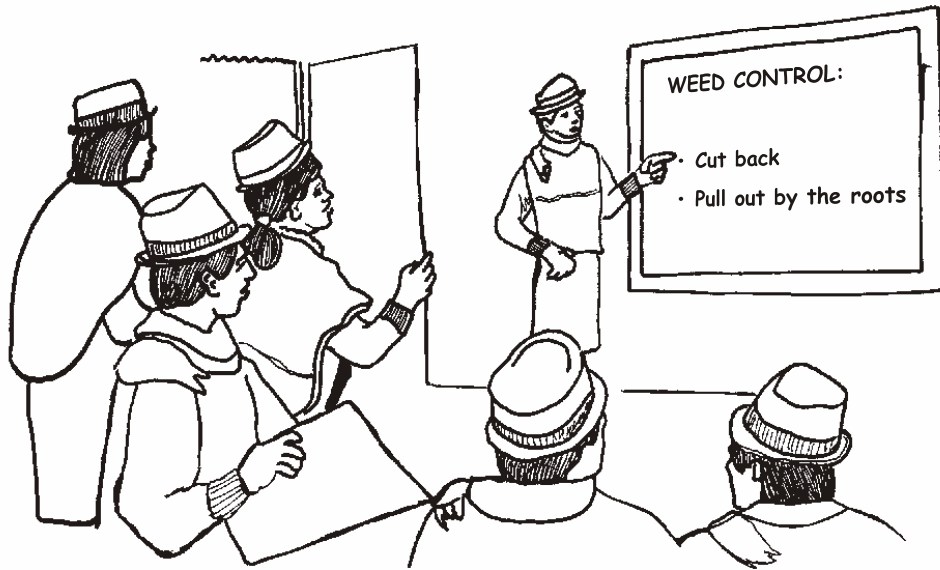


Many farmers took advantage of the Committee's experience. They're fattening pigs with Mr. Luis' diet and earning more money.

In another village a Committee did an experiment to find a way to control a weed that had invaded their potato fields.

The **control** was the traditional way of controlling the weed by cutting it back.

The **treatment** was to pull up the weed by the roots.



They chose three fields on a farm to see whether their results were consistent.

They divided each field into plots.

In one they cut back the weeds.

In the other they pulled them up by the roots.



They compared results

from the two fields.

They could clear the fields rapidly by cutting the weeds back, but they grew rapidly had be cut again every 2 weeks.

Pulling up the weeds by the roots took more labour at first, but, after the third weeding, there were hardly any weeds left in the field.



To evaluate the two weed control methods, the farmers compared the potato yield at harvest.



Where they had pulled the weeds up by the roots the yield was almost double.

And the plots were free of weeds for the next planting.

The yields were much lower in the plots where they had controlled the weeds by cutting them back.

The results were similar in all three fields.

The Committee organised a village meeting and presented their results.

They explained how they had tested two ways of controlling the weeds.



They recommended pulling up the weeds by the roots to other farmers, because this was more effective than cutting them back.

The results of our experiments are important for improving the farming in our community.



Our farmer research committee meets with the rest of the community at least twice each year.

We share our results to make sure that others can benefit and that the community remains interested in helping us with our experiments.

The results of each experiment shows us a path to follow.

Should we do more experiments to check what we have learned?

Or should we investigate something new?



With the results of our evaluations we can plan our next experiment.

By doing experiments with clear objectives comparing and analyzing the results and sharing our experiences.



Our farmer research Committee contributes to improving the farming in our community.