Session 14: FARMER EXPERIMENTATION

Objectives
1. To adopt experimentation as a tool for developing and selecting sustainable agriculture techniques that are suitable for your environment and socio-economic circumstances.
2. To improve experiments through improved designs, so that meaningful conclusions can be made about the results.

Let us start this session by looking back at previous study circle meetings and recap the sustainable agriculture techniques that we have learnt. Discuss the various techniques in small groups and group the techniques into:

a) soil fertility improving techniques
b) disease and pest management techniques.

Which techniques did you find interesting and which ones are you going to adopt?

Question before you adopt

You may find the question on adoption difficult to answer because there are some questions still going through your minds. Questions that remain unanswered may include:

? Do I have sufficient skills and resources to implement the techniques?
? The techniques sound good, but which ones are most suitable for my area and fields?
? How do these techniques fit into my farming systems without calling for major changes?
? What assurances do I have that the techniques will do well and will give me a good harvest?
? Who has tried these techniques and succeeded in my area?

These are practical questions, which may be difficult to answer unless we move from a position of fear and suspicion and start trying new things. Like children we have to start trying out some things in order to prove whether they work or not. Children start walking by trying out one step at a time! On proving that it works, they will start walking faster, until one day they change the pace so that they start running. We as farmers can also take a lesson from children and start experimenting with the techniques that we have learnt so that we prove for ourselves which techniques work well for us and which ones do not. Start small (walk one step at a time) before you start running. This is where the idea of farmer experimentation comes in.

**Is the concept of farmer experimentation new and do farmers experiment?**

In the past, experimentation has been the preserve of highly educated government officials. The duty of the farmer has been to adopt techniques as directed by extension officers. Flow of information was in one direction, with extension officers being the only source of agricultural knowledge and farmers being recipients and users of the information. However, while complying with government regulations in public, farmers have always experimented with new technologies in their backyards. The concept of intercropping, agroforestry and many more, which are now being promoted as sustainable practices, originated from farmer experiments. At this stage, let us think about the experiments that we are doing back home and share them with others. Try some of the ideas that you have learnt from your colleagues when you go back home.
Why do farmers experiment?

There are many reasons why farmers experiment. Here are some:

- To find solutions for current pressing problems, such as shortage of resources for soil fertility improvement
- To adapt techniques to local conditions and to the farmers interests and preferences
- Some farmers simply carry out experiments to earn themselves fame and respect in the community
- Farmers may experiment out of curiosity just to try out an idea that comes to mind.
- Farmers may have seen or heard a solution and want to test it in their local environment. For instance, this manual presents a number of options for sustainable agricultural development. You may want to test some of these solutions on your homesteads or fields.

Why should farmers experiment with new technologies?

Farmers should experiment with new technologies because:

- The contrast between on-station and local practices is often substantial. A technique that gives good results on-station will not necessarily give good results under farmer conditions.
- There are too many site-specific problems and challenges, which can never be adequately addressed by on-station research. Farmer experiments are adapted to the local environment in terms of soils, available resources and social conditions.
- Farmer experiments strengthen farmers’ confidence and capacity to solve their own problems.
- Farmers’ experiments allow a process of building on indigenous knowledge, (and hence the things farmers are already doing).
Limits of farmer experiments

The following are some of the limitations to farmer experiments. Read them thoroughly and think about how these limitations can be handled.

**Poor experimental design**

- Farmer experiments are usually conducted without controls, with comparisons often being made on the basis of previous season’s yield or to a crop nearby. The role of controls will be discussed later on in this session.

**Lack of dissemination strategies**

- Farmer experiments often benefit a few people as results are not shared or disseminated for the benefit of others.
- Experiments are usually not documented, thereby reducing their usefulness.

**Improving farmer experiments**

**Setting objectives**

For experiments to be meaningful, the purpose of the experiment must be clear to the experimenter and other interested people. Questions like what is to be tested and why should it be tested, should be asked. The question on what should be tested can be answered by formulating expectations and fears about the technique, which will be tested. An example of some expectations and fears formulated by some farmers in Zimbabwe when they were planning intercropping experiments involving maize and a legume crop for the 2002/03 season were as follows:
<table>
<thead>
<tr>
<th>Expectations</th>
<th>Fears</th>
</tr>
</thead>
<tbody>
<tr>
<td>Good germination</td>
<td>The occurrence of a drought</td>
</tr>
<tr>
<td>Good performance of the maize crop</td>
<td>Problems with pests and diseases</td>
</tr>
<tr>
<td>Good harvest of maize</td>
<td>Reduced yields due to pest incidences</td>
</tr>
<tr>
<td>Improved soil fertility due to nitrogen fixation by the legume crop</td>
<td></td>
</tr>
</tbody>
</table>

From the table above, it is clear that expectations are the positive results expected by the farmer before he or she embarks on the experiment. If the experiment produces results that match the expectations of the farmer, the farmer will have reasonable grounds for adopting the technique on a bigger scale.

Fears are things or situations that may affect the successful implementation of the experiment. They need to be monitored closely. If the problem is of diseases and pests, then they must be monitored and controlled. However, if the fear relates to a drought, there is very little one can do to minimize the effect of a drought. The experiment may have to be repeated during a normal season.

**The role of controls**

In legal cases, which are tried in the courts of law, witnesses are required to give evidence on the cases that are being tried. In the same way, an experiment involving the trial of a technique whose performance is not known requires a witness to give evidence on whether the new technique is performing better, the same or worse than an existing technique. If for example, a new variety of maize yields five tonnes per hectare and a traditional variety yields three tonnes per hectare, all other things being equal, the experimenter
can conclude that the new variety performs better than the traditional variety in terms of yield. Another example would be the same variety of a maize crop divided into two parts. One part is fertilised with chicken manure and the other part is fertilized with the same quantity of cattle manure. If the crop which is fertilized with chicken manure yields better than the one fertilized with cattle manure, all other things being equal, the experimenter can conclude that chicken manure is better than cattle manure in terms of increasing maize yields.

**Site selection**

For cropping experiments, it is important to select experimental sites in such a way that results of the experiments will not be biased.

Selected sites should be fairly uniform as follows:

- Soils of the site where the experiment will be conducted should be of the same type and of the same depth. Areas where two different soil types merge should be avoided.
- Planting dates and weeding dates must be the same.
- Slope of the land must be fairly uniform on the experimental site.
- Avoid areas where parts of the experimental site could potentially be shaded by trees.
- Avoid field edges, areas close to the road and areas near rock outcrops.
- Avoid sites close to homesteads where one portion could potentially be fertile due to rubbish that is dumped on it and the other one infertile because it is not getting the same treatment.
- Select land that has the same land use history. If you decide to use land that was previously cropped to a legume, then all experimental plots must be located on that portion of the land.

There are many factors that can introduce bias to an experiment. The experimenter must ensure that the playing field is even before
the experiment begins so that correct conclusions can be made about an experiment.

**Experimental layout**

Farmer experiments should be kept simple. A pair-wise experiment, where one treatment (for example a new variety of maize) is evaluated against a control (a traditional maize variety) is recommended. Simple trial plots, measuring 10m x 10m, and laid side by side should be used. The plots should be placed on the same position on the slope, and should never be laid one above the other.

**Correct Layout**

- Technique being tried
- Control

**Incorrect Layout**

- Technique being tried
- Control
Experimental management

Good experimental management is critical for meaningful conclusions to be drawn about an experiment. It is important that both the experimental plot and the control are given the same management treatment throughout the trial period. For example, if the experimental plot is weeded clean, the control must also be weeded clean on the same day.

Monitoring experiments and data collection

The experimenter must monitor the trial regularly, and record his or her observations. It is important to record all data that will enable the experimenter to evaluate performance of the experiment. Data that is collected must enable the experimenter to assess expectations and fears (whether they become a reality or not). Some of the data to be recorded include:

- Planting date
- Varieties planted
- Plant population or spacing
- Germination percentage
- Pest infestation and pest control method
- Problems encountered
- Yield

Dissemination

Experimental results must be disseminated for the benefit of others in the same area. Results can be shared through field days, organised farmer workshops, study circles or written pamphlets. What ever happens, let others know about the success or failure of your experiments. Information sharing is critical for sustainable agriculture development.
Questions to discuss on experimenting:

1. Are there any new techniques you wish to experiment on?

2. What would be the benefit of experimenting before you adopt the techniques large scale?

3. How will you set up the experiments?

4. What are your expectations? What are your fears?