Farmer to Farmer

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Acknowledgements

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For the right to feed oneself

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The FSG is an innovative service organisation of the University of Natal. We serve farmers with limited resources including women and the poor. We help them to improve their lives by:

- managing natural resources in a productive and sustainable way
- developing their capacity for collective action, and gaining access to resources.

In order to achieve this, we collaborate with other institutions both within and outside the University to evolve improved strategies of providing service, education and training.

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Ending Injustices That Cause Hunger and Environmental Destruction

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I. INTRODUCTION:

This book has been produced to serve as a basic introduction to the Farmer to Farmer movement, its history, approaches and methodologies.

The Farmer to Farmer movement started in Guatemala, Central America in the mid-1970s. Over the years the approach has spread to Mexico, Nicaragua, Honduras, Costa Rica, El Salvador and Panama. It is estimated that between 7 000 and 10 000 peasants are now actively playing a role in what some call the Farmer to Farmer Movement. The movement grew out of the collapse of the Green Revolution in the 1970s, the political upheavals of the 1980s and the economic crises of the 1990s in Central America.

Farmer to Farmer is an approach to sustainable development and 'extension' which has proved to be very successful. This approach rests firmly on the principles of respect for traditional knowledge and promotion of farmer experimentation. "Extension" here becomes an activity of helping farmers to get together to share their knowledge and innovations. It is a completely different approach to agricultural knowledge systems, in terms of which the roles of the various players (government, farmers, NGO's, businesses) shift quite dramatically.

The book is based on a 3 week workshop series conducted in KwaZulu-Natal for the Farmer Support Group by Eric Holt-Gimenez[1]. The book is designed as a handbook for practitioners, each demonstration is followed by facilitators notes.

The following broad topics were covered:

WEEK I: The introductory session was held in Bulwer (KwaZulu-Natal). It included the history, and basic principles of the Farmer to Farmer movement and a cross-visit and sharing event run by the farmers of Stoffelton (Impendle).

WEEK II: A one week workshop was hosted for farmers from the Umzumbe area. Farmers from Cornfields, Thembalihle, Gannahoek and Stoffelton also came to visit and learn. This section of the training was focused on farmer activities and the practical implementation of the Farmer to Farmer approach and methodologies.

WEEK III: The workshop series was completed in Pietermaritzburg. Participants had the opportunity to develop learning materials using the experience of farmers and their sharing from the previous two weeks.

See Appendix II for the workshop schedules, as well as a list of participants of the workshop series.

[1]Eric Holt-Gimenez, (M.Sc.) has worked in soil conservation and agroecology in California, Mexico and Central America for the last eighteen years. He previously worked with the Mesoamerican Information Service on Sustainable Agriculture, Managua, Nicararagua and is presently working on his Ph.D. at the University of California at Santa Cruz.

2. THE BASICS

I. BACKGROUND

A. *Traditional Agriculture*

It is most likely that women invented agriculture, perhaps 8,000 to 10,000 years ago. Since then thousands of plants and animals have been domesticated by farmers through the use of trial and error. This process was enriched by the sharing of knowledge which accompanied the exchange of culture between peoples. Innovations such as improved tools, methods for cultivating and husbandry were simultaneously generated, shared, modified and spread across and between continents.

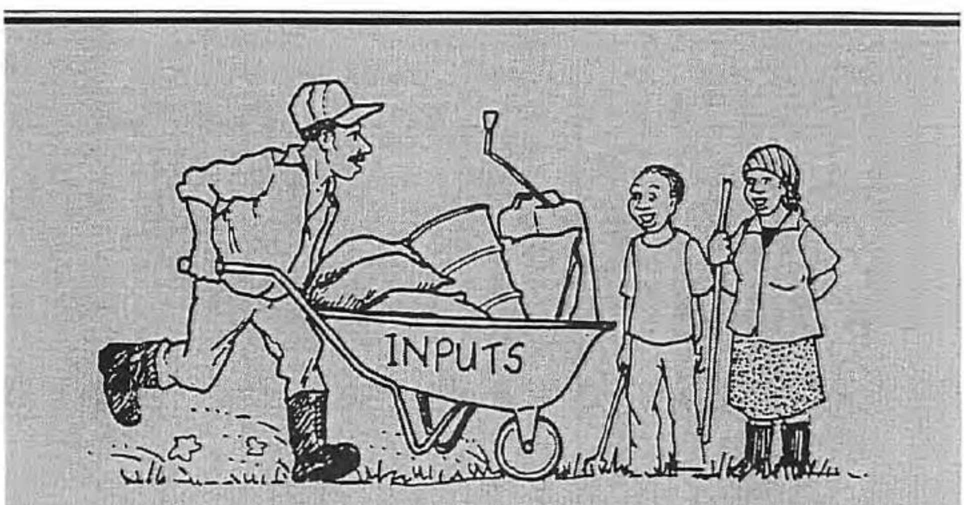
Women cultivating a field

Some of the most notable innovations which may be attributed to farmers are the spread of maize and potatoes across Africa and Europe and of cattle, ploughs and draft animals across the Americas.

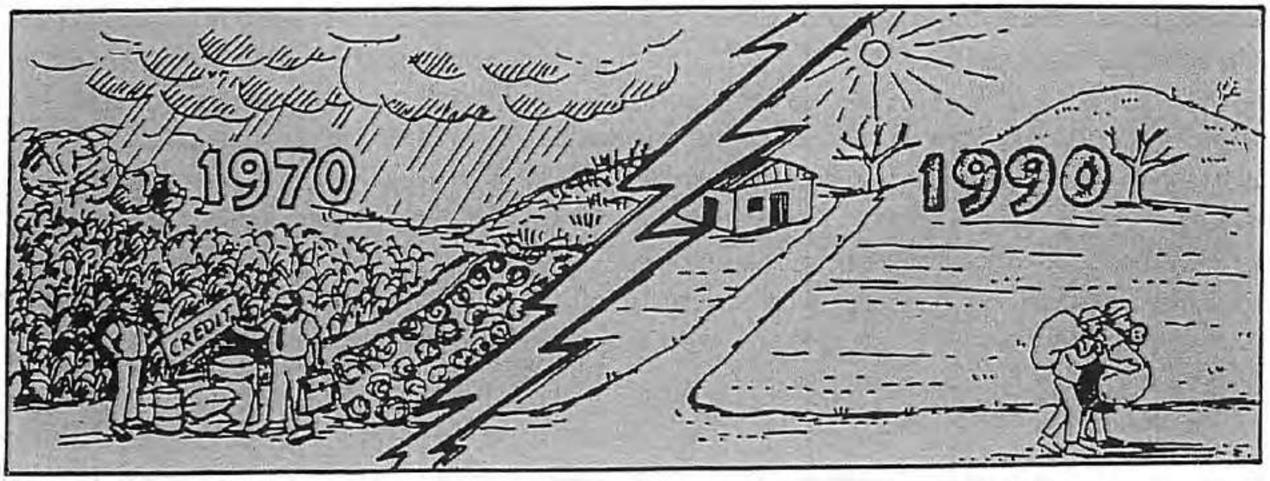
Traditionally, innovations and technology for farming were developed by the farmers themselves. From the ancient Egyptian plough all the way through to the appearance of the McCormick Reaper. The keeping of agricultural knowledge in ancient times fell to the priestly caste who guarded their secrets in rituals, ceremonies and sacred temples. Many modern-day festivals and holidays were originally based on these ancient rituals. Colonial expansion, the Industrial Revolution and World Wars resulted in the political and economic dominance of the First World and shifted the control of agricultural development from traditional knowledge systems to the research and development systems controlled by government and private enterprise. Priests and peasants were replaced by scientists, researchers and modern-day agricultural extensionists. The temple was replaced by the university and company laboratories.

B. *The Green Revolution*

The "Green Revolution" of the 1960's began as a genetic breakthrough which produced high-yielding crop varieties. With proper applications of water, fertilizer and insecticides, these varieties greatly increased grain production in northern climates of the First World. Farmers from the United States, were encouraged to double their production. The increased production was seen as a way to help feed the starving Third World. Massive amounts of cheap credit were supplied for land, machinery and inputs. The farmers borrowed heavily and production soared.



Unfortunately, the Third World was poor. People there were *unable* to buy the grain US farmers produced. The grain was stockpiled, prices were driven down and many United States farmers were unable to pay back their debt. As a result over half of the family farms in the United States went bankrupt in the 1970's.



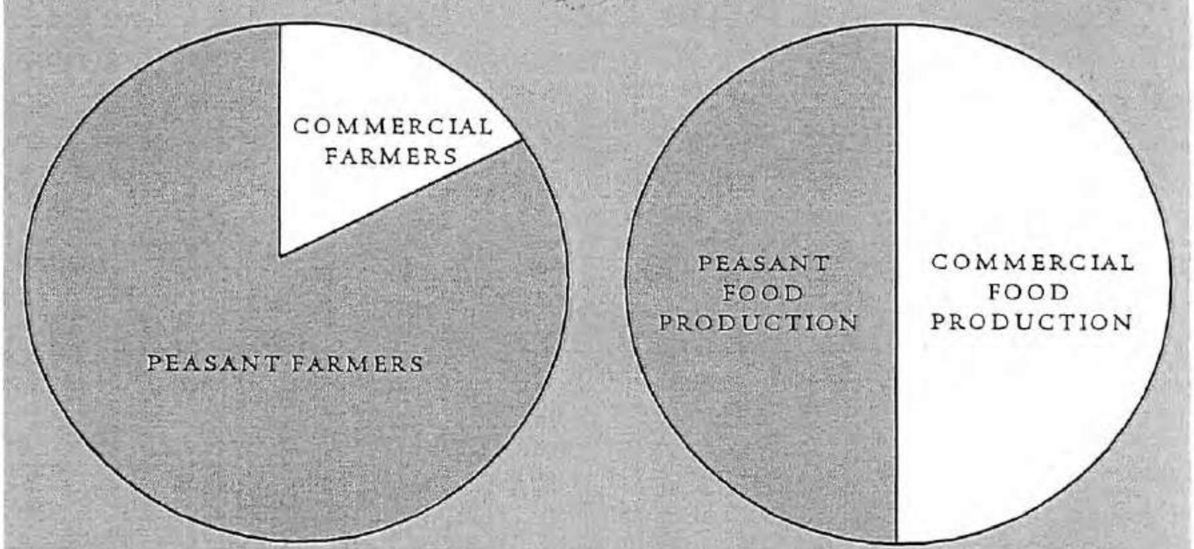
The same production strategy was promoted directly in the Third World. International research institutes were set up in Latin America and Asia. High-yielding crop technologies were generated by the research centres. These technologies were diffused throughout the Third World with the help of credit. Extension officers and technicians were trained at local universities and institutes to extend the Green Revolution technologies. However, because these technologies depended on costly inputs and needed prime agricultural land to function well, they tended to benefit the larger, commercial farmers who could afford to go into debt. Since the majority of the Third World's farmers are poor and farm marginal and ecologically fragile land, these technologies often did more harm than good, destroying the environment and further impoverishing the peasants.

In the thirty years since the introduction of the Green Revolution to Central America there has been more deforestation than in the 500 years since the Spanish Conquest of the region. Peasants pushed off prime agricultural land opened fertile forest soils to agriculture. As their plots lost fertility and became choked with weeds, they cut down more forest to open new areas to agriculture. In fact, the Green Revolution's claim to doubling production in Central America has more to do with the peasantry bringing new land into production than it does with the effectiveness of the techńologies.

It is estimated that at the current rate, Central America's forests will completely disappear within the next fifteen years. Pest explosions, weeds and the loss of fertility after the introduction of the Green Revolution have also resulted in a 50-70% drop in productivity for peasant farmers. Millions of tons of precious topsoil have eroded away. Over half of the region's population lives in extreme poverty. To complicate matters, under the more stringent conditions of the new economic strategies, most government services are being privatized.

This means that Central America's farmers will be left to their own devices as to how to solve the environmental, agricultural and economic problems that the Green Revolution has left in its wake. The same trends in production and economic management can be seen throughout Africa.

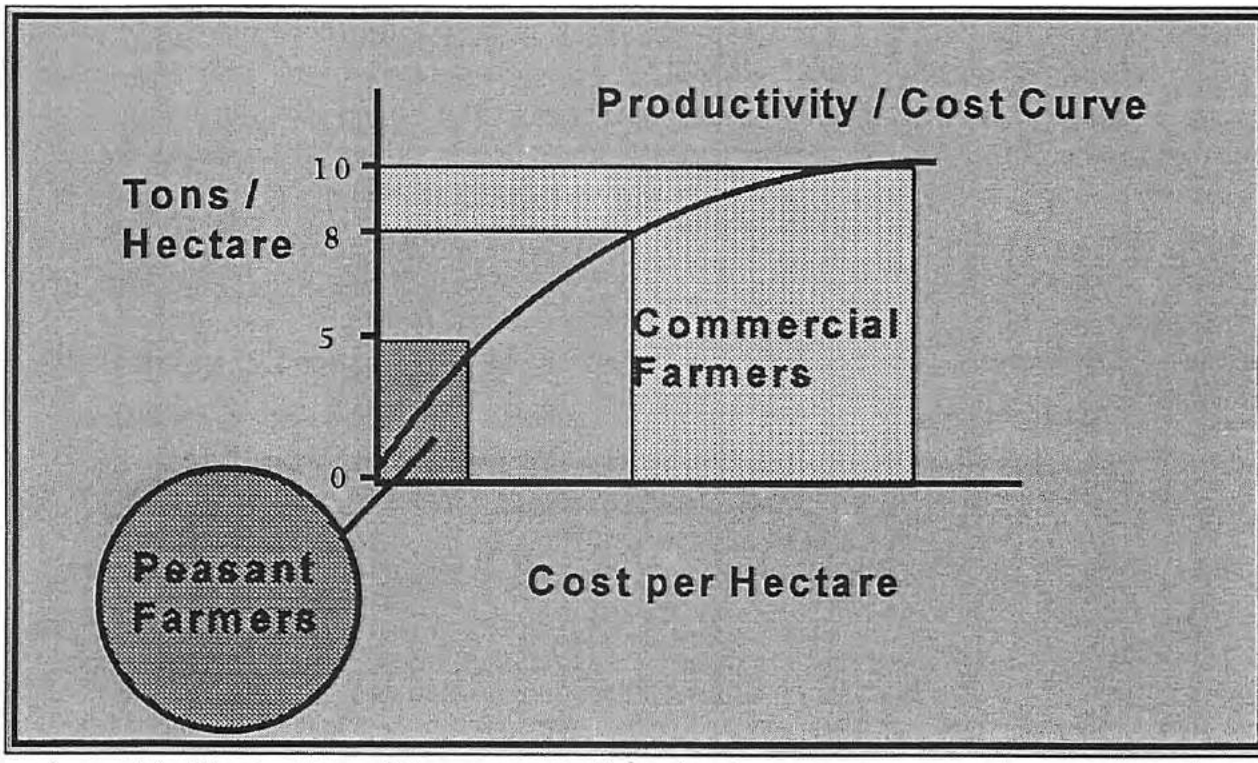
Doubling and even tripling world food production over the next generation is still a necessity. The peasantry is extremely important in this task. Though they produce at relatively low levels (1-2t/ha.), these farmers account for over three fourths of the world's population and produce nearly half of its food. Generally the factors limiting production are very basic (soil, water, organic matter, etc). When even one or two of these limitations are overcome, increases in production of 100 - 200% are not uncommon.



Proportion of peasant farmers compared to commercial farmers.

Proportion of food produced by peasant farmers compared to that produced by commercial farmers.

Capital-intensive, commercial farmers, however, are already producing at fairly high levels (8-10t/ha.). The factors limiting their production are often complex, obscure and tend to be costly to overcome. Even then, the increases in production are relatively small (2-10%), and tend to decrease as one reaches the productive "peak". But long before the productive peak is reached, the point of diminishing economic returns is reached.

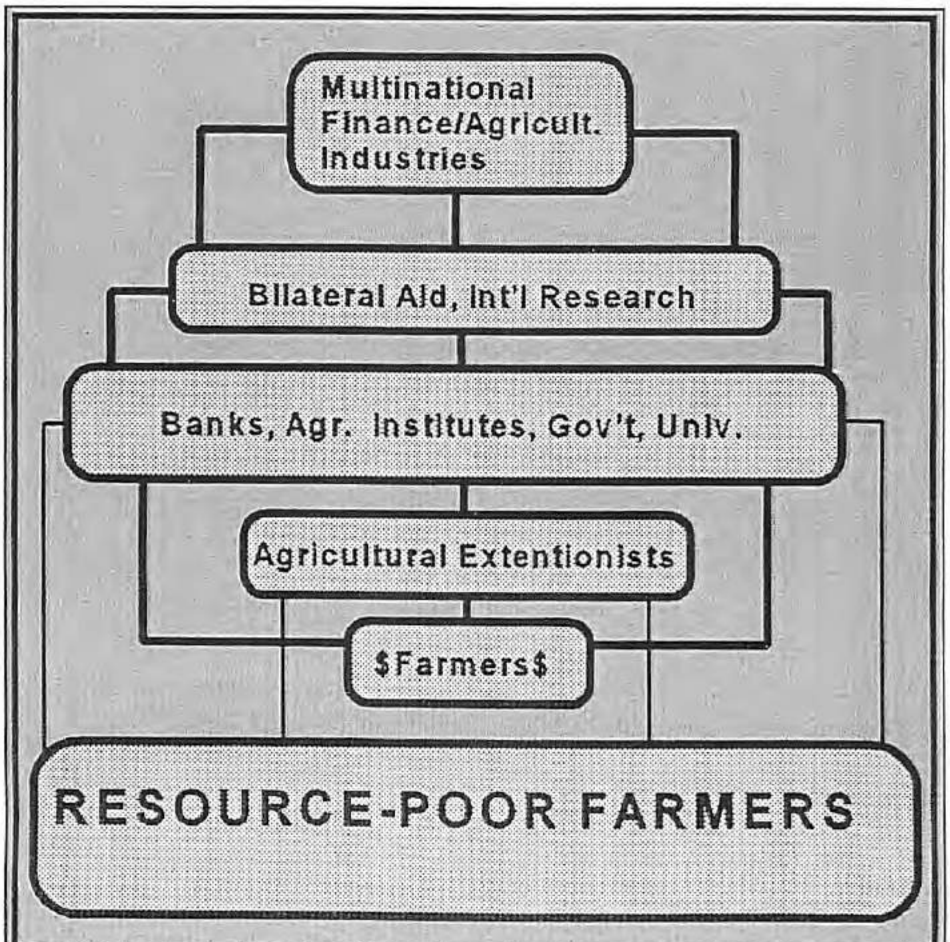


A graphic illustration of the concept of production versus economic returns, using maize as the example

In other words, doubling or tripling production is impractical if not impossible for the commercial farm sector. The peasant sector, however does have a chance to do so if the basic limiting factors can be overcome. But soil, water and organic matter are not easy limitations to overcome. Reaching the peasant sector is not easy either. The world's peasants live in hundreds of thousands of remote villages and dwellings with restricted access to communication, infrastructure and the service networks that help commercial farmers. Further, agricultural extension has not had a good record working with peasants. In most Third World countries, the state sector is privatizing. Agricultural ministries have turned the responsibility of extension over to the banks and agribusiness companies. Extension as a profession is shrinking, worldwide.

The structure of the agricultural industry worldwide was not designed for resource-poor farmers. This is because commercial farmers were seen as more efficient and easier to reach. Also, they had more capacity to borrow money and pay interest to banks; to buy agricultural products from machinery and chemical companies; and to produce standardized products in the large volumes marketing companies need to make profits. *In other words, commercial farmers were seen as being more able to provide a return on the investments multinational companies made in agriculture.*

In theory, with the help of government extension and agricultural ministries, goods and services would eventually "trickle-down" to resource-poor farmers, allowing them to become commercial farmers. This was a large part of the Green Revolution's extension strategy in the Third World. Unfortunately, the "trickle down" theory was more of a "dribble", though it benefitted some poor farmers for a short while. Eventually, for resource-poor farmers, the ecological and economical costs of the Green Revolution overtook the benefits. Now these meagre resources have all but dried up. While government and non-governmental organizations have introduced many projects to help resource-poor farmers, the old structure for services has not changed to favour resource-poor farmers.



The finance, aid, research, education, training and extension system facilitates the flow of capital, goods & services to commercial farmers (the minority). Resource-poor farmers (the majority) receive only marginal flows of capital, goods and services.

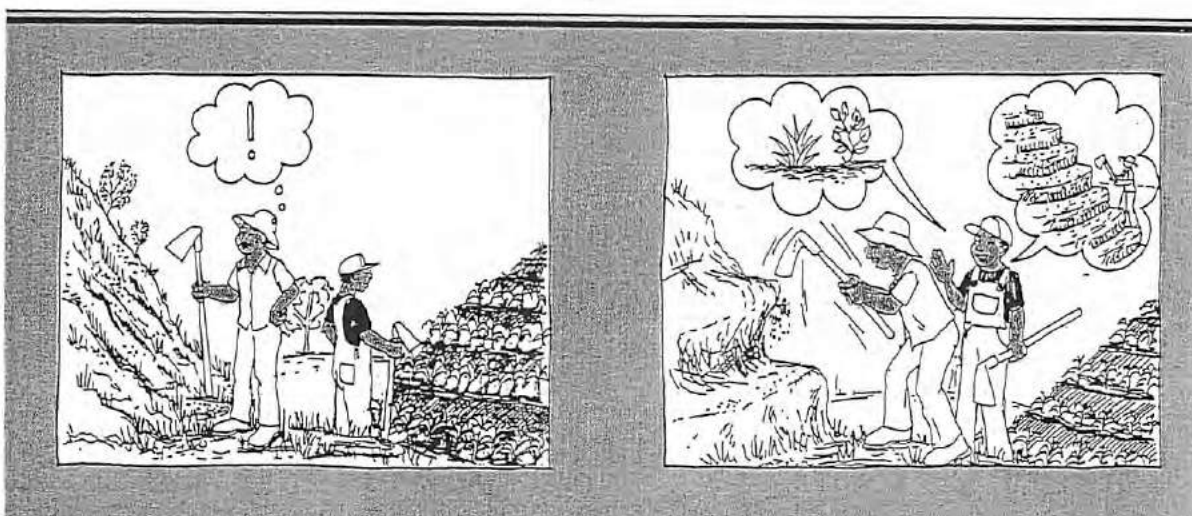
II. HISTORY OF THE FARMER TO FARMER MOVEMENT

A. *The Mayans*

The Farmer to Farmer Movement began over thirty years ago among the Cachikel Maya of the Guatemalan highlands. Don Marcos Orozco, a retired soil conservationist, taught resource-poor farmers to experiment with simple techniques for soil & water conservation, soil fertility and seed selection. The techniques were effective because they addressed the limiting factors to the peasants' food production: soil, water and organic matter.

The Mayans worked slowly, testing one idea at a time on small areas of their fields. When they were sure of a practice, they used it on the whole field. Because many of the practices were highly labour-intensive (stone packing, swales, catchments, composting, etc.), they organized themselves in traditional work-teams. One day they all worked on one team-member's land, the next day they all went to another's. New members were introduced into the group. New teams were formed. Peasants were taught on the condition they first test the new innovations. Then, if found to work, they applied it on a larger scale and taught the same innovation to others by using their own field as a living example.

Don Marcos did not speak the Mayan dialect and he relied on the peasants themselves to communicate the results of their innovations to the other farmers in the area.



Showing Innovations

Because the Mayans were poor, illiterate and had no knowledge of formal extension, the only way they could successfully communicate their new ideas was to demonstrate them practically in the field. The only way they could convince their neighbours that the innovations they were promoting were effective was to actually show recognizable success in their own field before making suggestions about someone else's practices. With Don Marco's help, they also invented practical demonstrations to communicate basic theoretical concepts in soil and water conservation.

Over time, the Mayans, Don Marcos and World Neighbours, (the supporting Non-Governmental Organization) developed a simple set of basic principles for people-centred agricultural development:

- Achieve Early Recognizable Success
- Start Slowly, Start Small
- Limit the Introduction of Technology
- Use Small-Scale Experimentation
- Develop a Multiplier Effect

(From "Two Ears of Corn- People-Centred, Agricultural Development", R. Bunch, 1982)

Ten years later, the small group of peasant-innovator-extensionists had grown to a group of over nine-hundred farmers organized in a service and production co-operative they ran themselves. Average production was doubled, then tripled. The co-op began to buy degraded farms from large coffee plantations. They distributed land to new members and taught them how to reclaim and conserve it. Peasant farmers from other areas of Guatemala and as far away as Mexico came to learn from the Mayans.

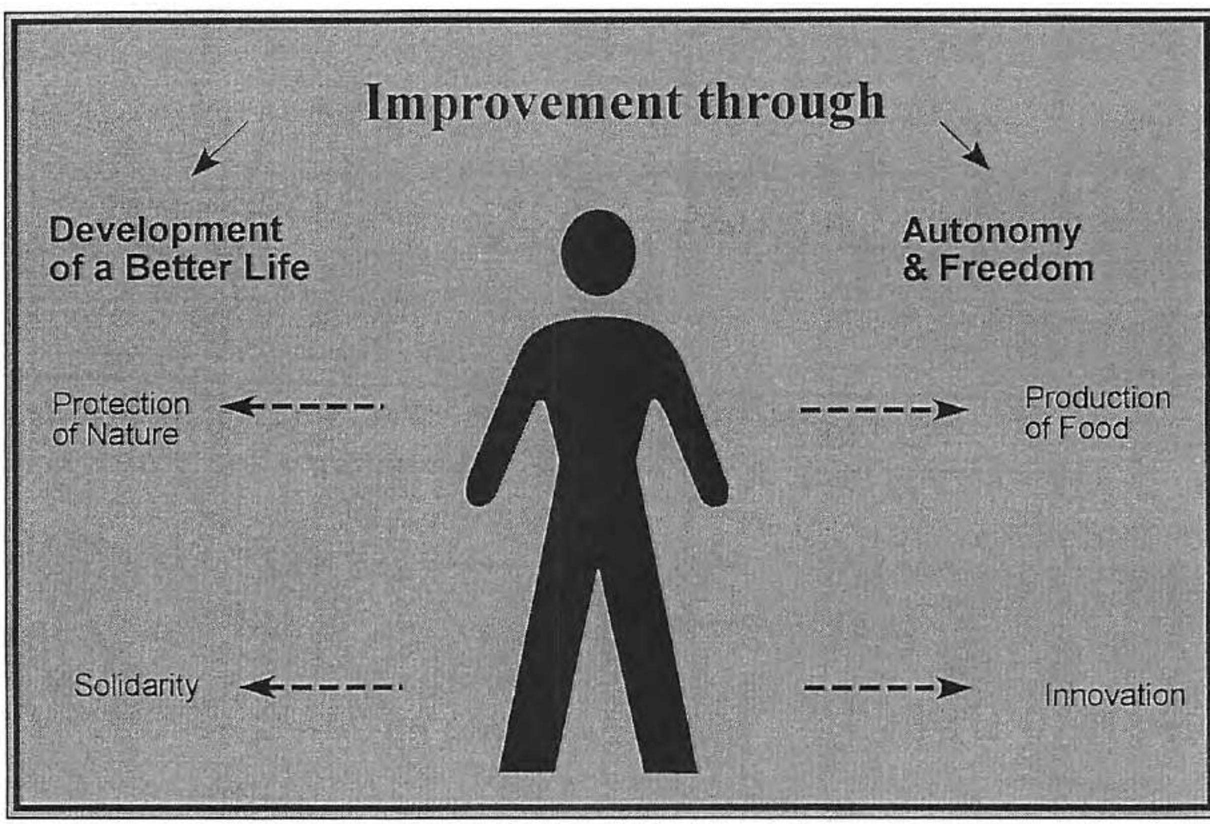
When war forced the Mayans to abandon their villages and seek exile, many took refuge in Mexico. There, they stayed with Mexican peasants who had learned from them years before. Mexicans and Guatemalan Mayans worked together to improve and spread the techniques.

In 1987 Mexican peasants working with the Mayans went to Nicaragua, another country in Central America which was promoting a sweeping land reform. By working with the UNAG Farmer's Union, the Mexicans were able to help Nicaraguan peasants raise production on their newly-acquired land. Because the Farmer's Union was working with members nationwide, the methods for small-scale experimentation and farmers helping farmers quickly spread throughout the country. Many new techniques were developed and shared. Peasants spread the new knowledge on their own or worked with many different Non-Governmental Organizations, While they often counted on crucial support from these organizations, their activities went beyond project and program areas. Farmers from other Central American countries came to learn and to share knowledge. With their methods, innovations and knowledge crossing institutions and borders, this effort by peasants to develop their own sustainable agriculture has come to be known as the ***Farmer to Farmer Movement (Movimiento Campesino a Campesino)***.

III. BASIC PRINCIPLES:

A. Innovation & Solidarity

The Farmer to Farmer Movement is said to "Walk on Two Legs". *Innovation and Solidarity.* It is also said to work with both hands: one for *Protection of the Environment* and another for *Production of Food.* These two pursuits can lead to more *Autonomy and Freedom* so that we may *Develop a Better Life.* Many call this process *Empowerment.* We say it works better from the bottom up.



What is Farmer to Farmer?

There are a number of games, demonstrations and dramatizations that have been developed 'to explain' the basic principles of Farmer to Farmer in a training situation. Some examples of what has been used are interspersed in the text throughout the rest of the book. The role of the facilitator is further described in notes following each picture story.

The importance of solidarity can be dramatized by staging this game:


In front of the object, the volunteers should touch it in the same place as before, but now all together.
?
?
?
This time they can converse with each other and exchange ideas.
It's a frying pan!?
It is a barrel!
It's a wheelbarrow!
Oh, yes!
No, it's a fender!
What is the secret of success?
What do you think?

Each one of us can understand a part of a problem. By sharing our knowledge, we can understand the problem more fully, and are better able to find a solution. This game demonstrates the importance of analysing common problems together. This concept is also important when carrying out farmer experiments to test innovations or solutions to common agricultural problems. We will develop appropriate sustainable technologies more quickly if we share the results of our experiments with others. Everyone benefits. As one farmer in a farmer-experimenter group said, "I came to share the results of one experiment... I left with the results of twenty others!"

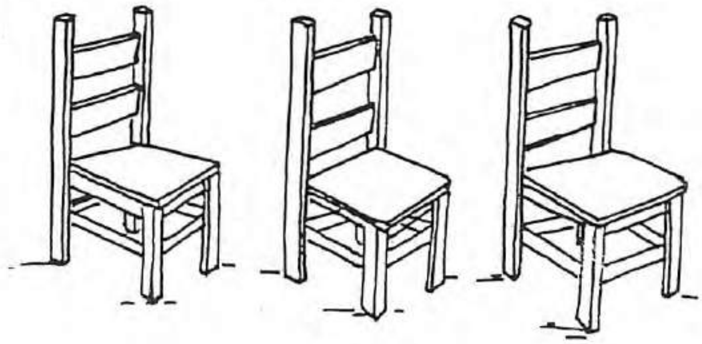
B. Equilibrium and Sustainability

Peasants in the Farmer to Farmer Movement know that the two hands of *Protection of the Environment* and the *Production of Food* are interdependent. One hand works better when it is in balance with the other. With protection and production in balance, we can attain a better life for ourselves and for future generations. We call this *Sustainability*. When we develop agriculture and protect the ecology, food production can develop in a sustainable way. We call this ***Sustainable Agriculture***.

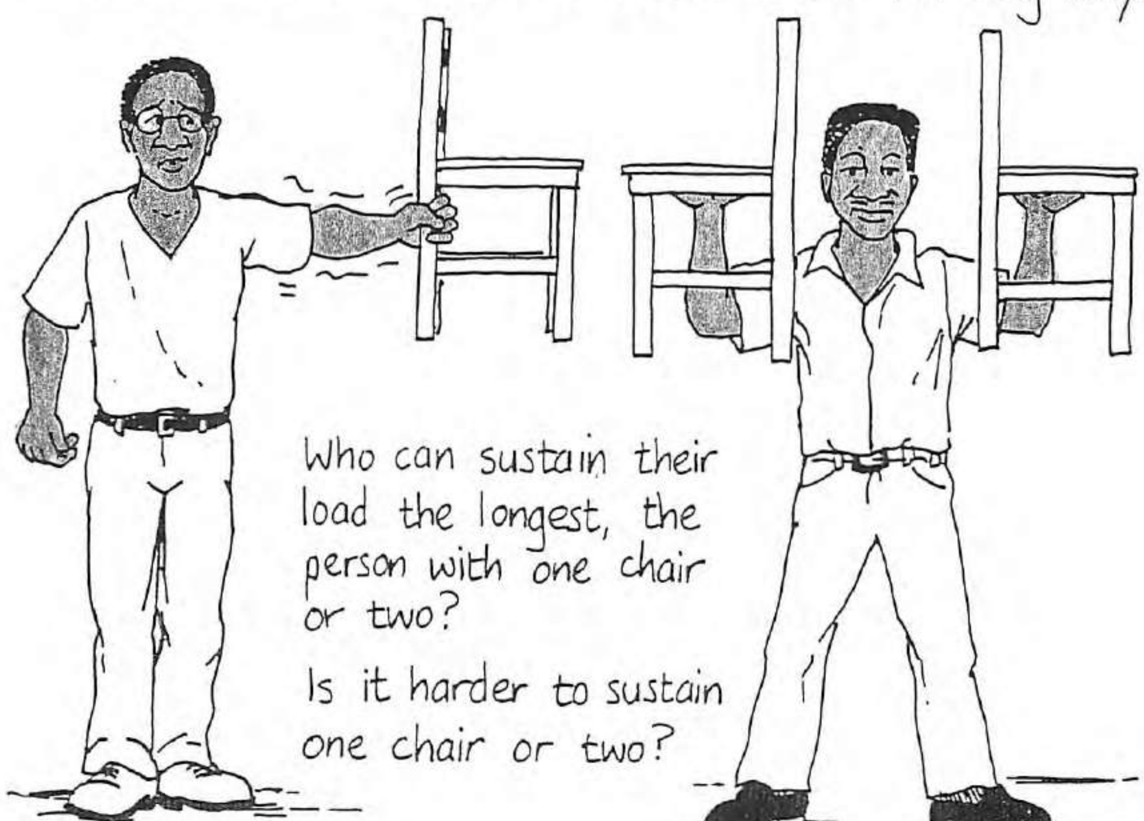
The concept of Sustainability through the balance of nature and agriculture can be shown with the following demonstration:

EQUILIBRIUM

For this exercise you will need 3 chairs and 2 people of the same strength ...



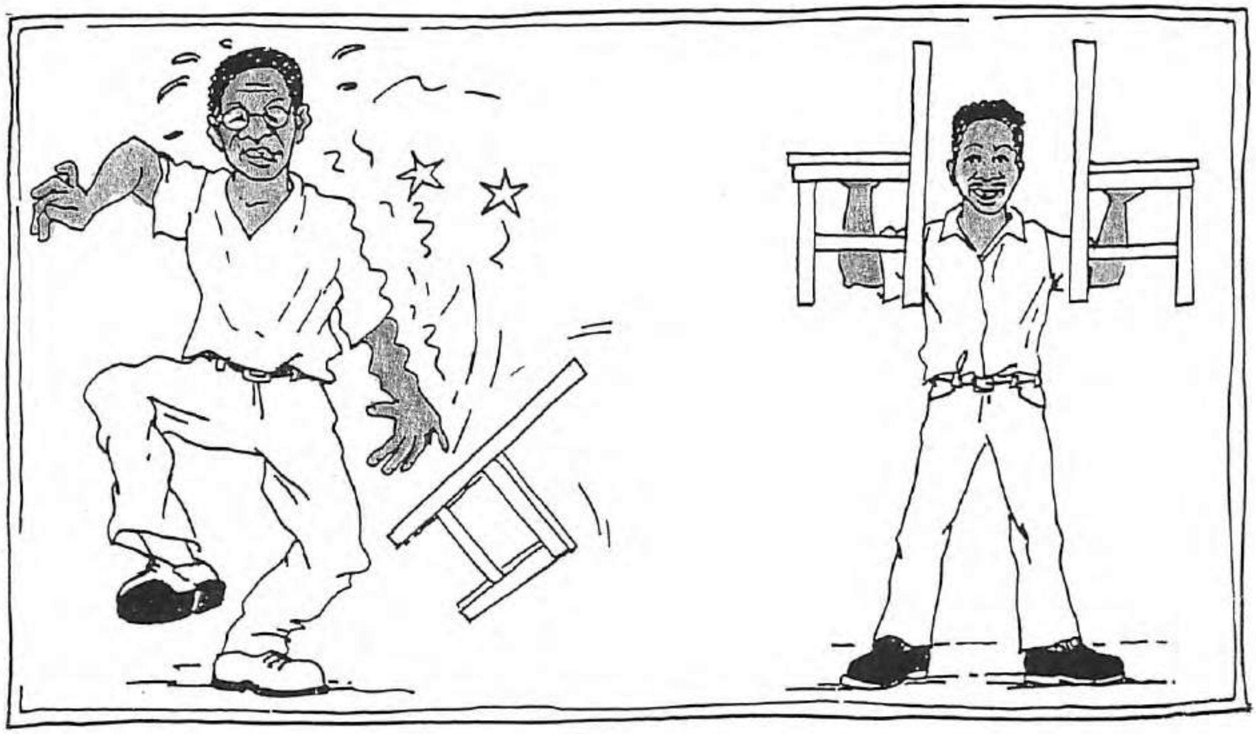
Then, with the help of another participant, the volunteers stand with their chairs in the following way...



Who can sustain their load the longest, the person with one chair or two?

Is it harder to sustain one chair or two?

The result:



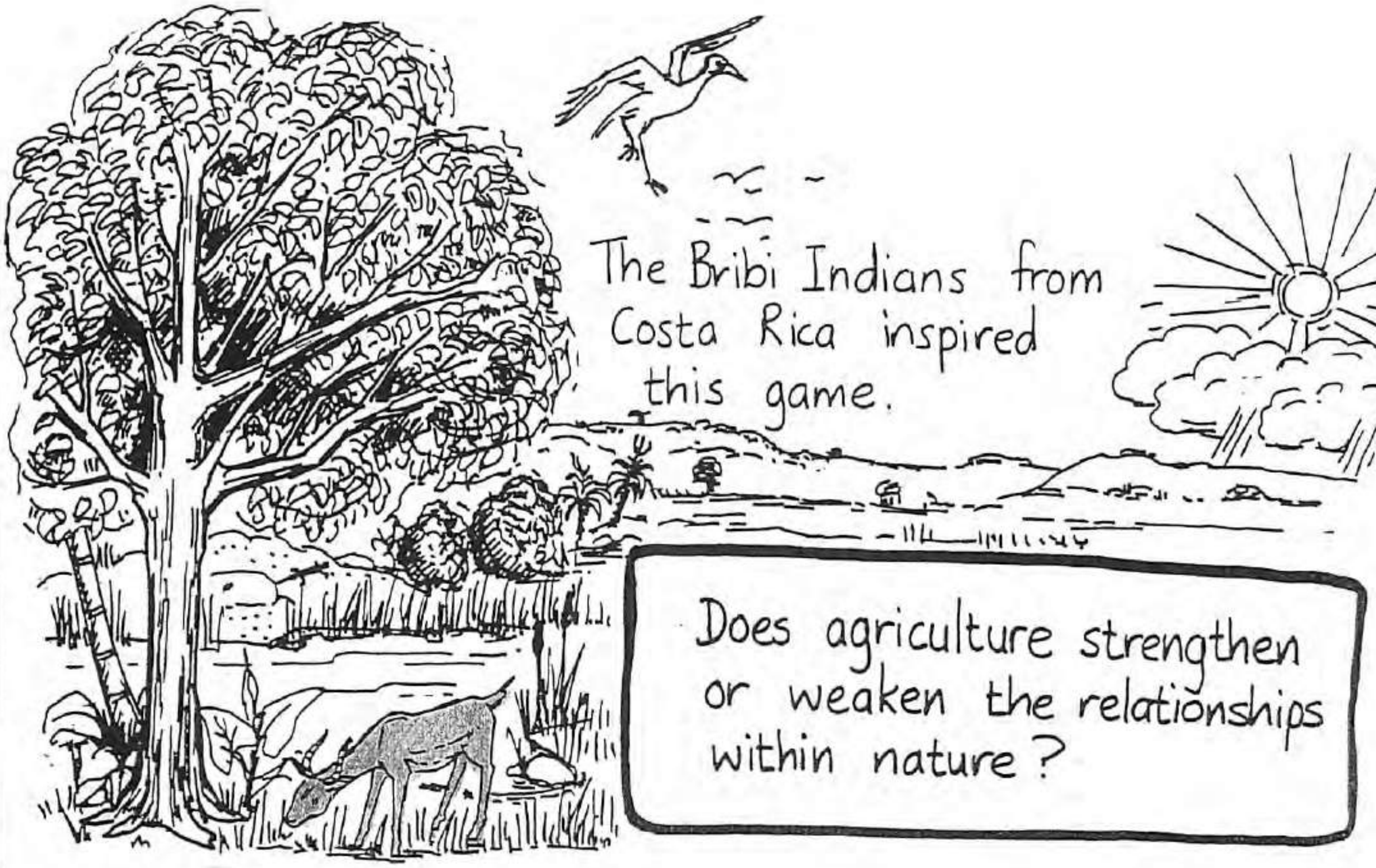
Facilitators notes:

The following questions to participants can further illicit an understanding of the game and its result:

** What do the two balanced chairs represent on our farm?*
** Nature and Agriculture. What happens when we only work with one hand?*
** How should we balance agriculture and the environment?*
** What do we mean by "sustainable agriculture?"*

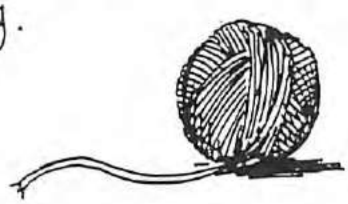
Many farmers work with only one "hand", that of agriculture. This has not proven sustainable, and has often caused great harm not only to the environment and to production, but also to the farmers who live from the land. Many peasants in Farmer to Farmer believe that agriculture should try to approximate nature rather than act simply as a rural mine or factory. Many of sustainable agriculture's principles are to be found in nature. To uncover them we need an understanding of *Ecology*. What is ecology?

We use the Ecology ball game to find out:



THE ECOLOGY BALL

For this game we need a ball of string about 3 - 4 metres long.



A group of participants gather in a circle. One asks a question: "What things are in Nature?" Another answers by naming some element of nature. The ball is thrown to that person.

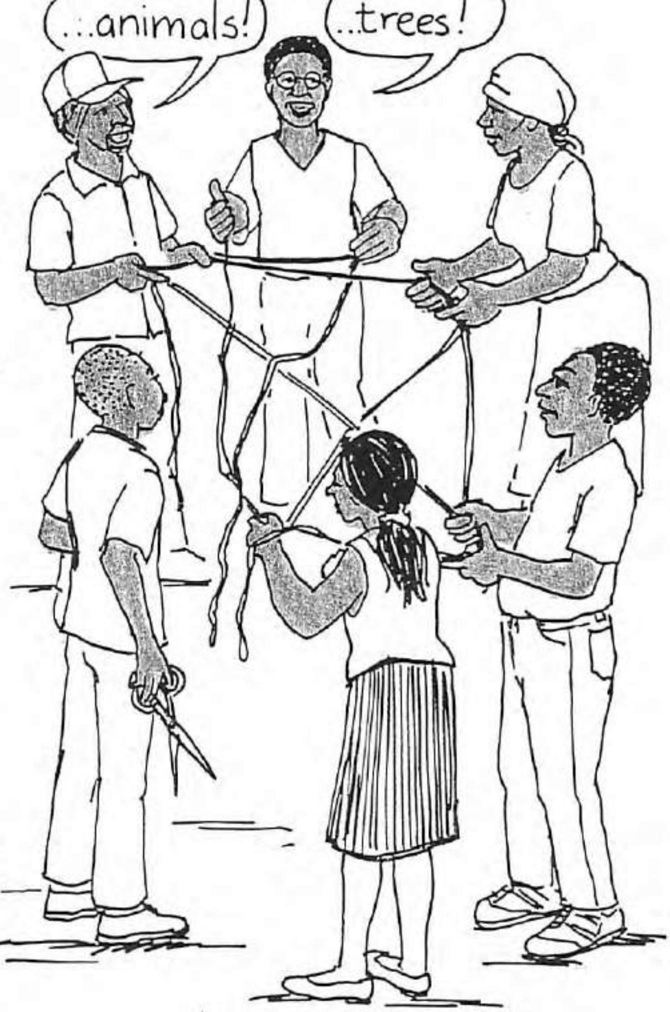
As people mention different aspects - rain; fish; soil; plants; pastures etc. - the ball is thrown and will be interconnected.

What does the ball represent?

What happens when one of the participants lets go of the string?

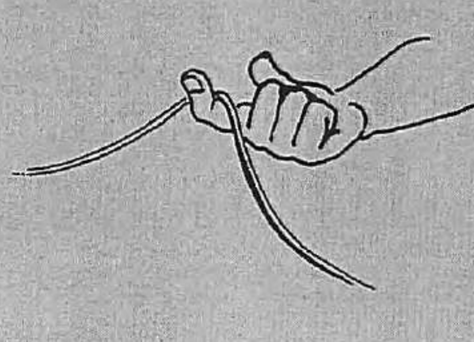
What if the string is cut?

What are the two principal aspects of ecology?



Facilitators notes:

Let the string run freely. While everyone must maintain the tension, only the first and last person should hold the string tightly.



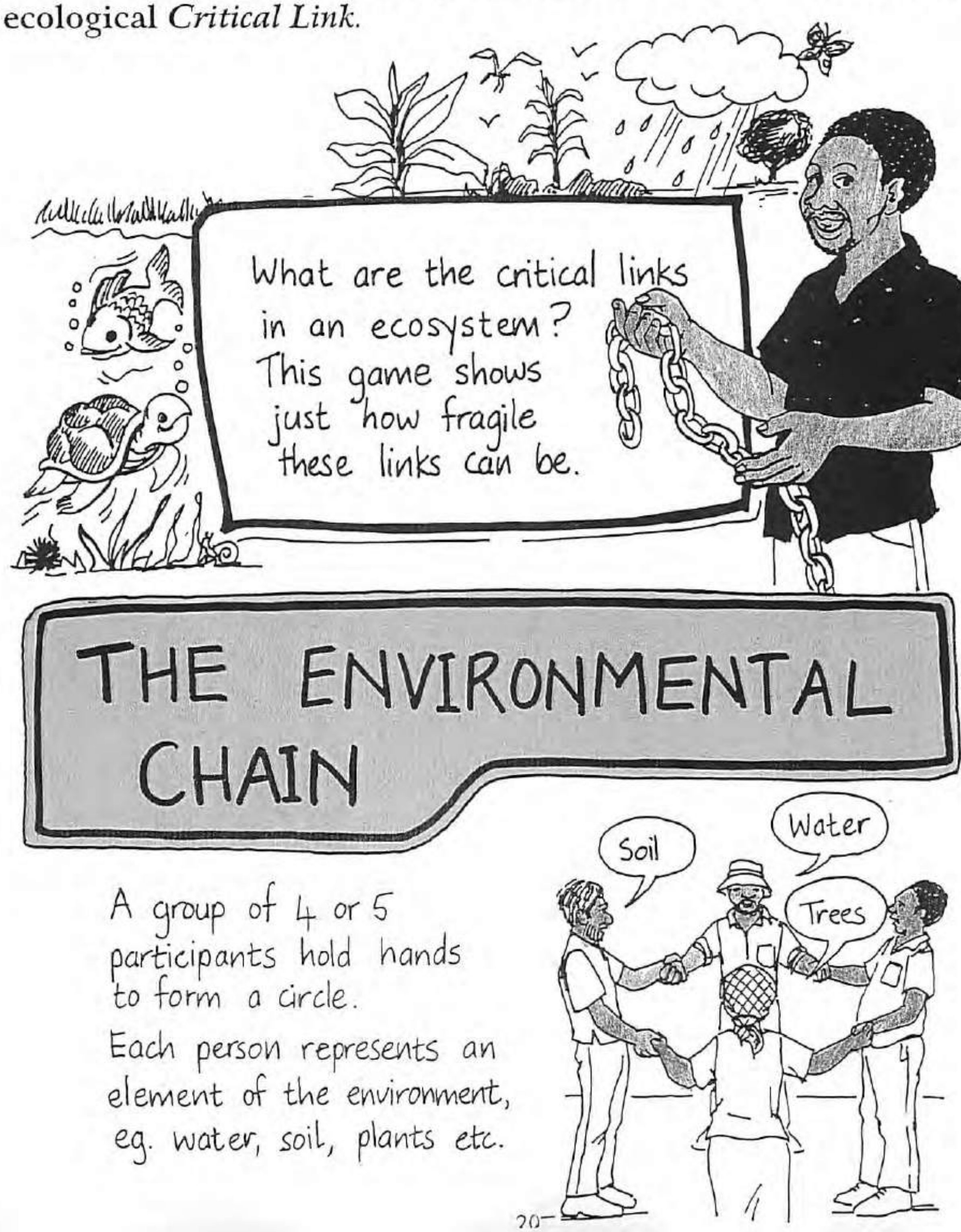
Discussions around the game can be prompted by the following questions:

What do all the people represent?
What does the string connecting them represent?
How do we define ecology? (All things in nature and the relationships between them).
What happens when we affect one part of the ecology?
Do we always know what the effect will be?

C. *Critical Links and Limiting Factors*

When the ecology is put under pressure, it can break down. This puts the land in danger and can have devastating effects on production. Erosion, desertification and pest explosions are examples of ecological breakdowns. How do we know when we are putting pressure on the ecology? Farmers can look closely at the ecology of their farm and their surroundings. Some aspects will be stronger than others. Some aspects will be more fragile.

The following group activity will illustrate what we refer to as an ecological *Critical Link*.



Other participants, who represent other factors (drought, erosion, deforestation) enter the circle and exert pressure outwards.

The chain will break when it can no longer support the pressure of so many elements.

What does the chain represent?

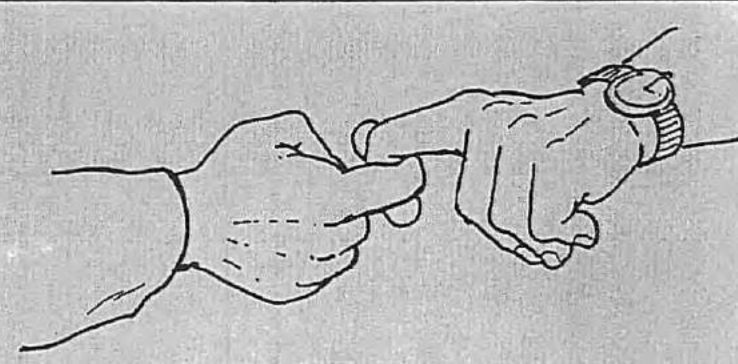
Where did it break? Why?

What does this mean?

An ecosystem will break at its weakest link!

Facilitators notes:

One person out of four should only hold with one finger.



By being aware of the critical link in the ecology of our farms and surrounding environment, we can make sure that pressure from our farming practices will not break the "chain" of the farm's ecosystem. In hillside farming, ground cover may be the critical link. When the forests are cut down, soil is easily eroded by rain. When the topsoil is gone, production of any plants or crops ends. **Instead of making the critical links weaker with our agriculture, we must make them stronger, otherwise farming will not be sustainable.** In the case of hillside farming, before destruction takes place, trees can be strategically cultivated and cover crops and mulches can be used between rows. Once topsoil is lost, and the ecology has broken down, the hillside itself becomes the critical link. We must restabilise it with soil conservation measures in order to re-establish soil and growth.

D. Achieving Rapid and Recognizable Results

Protecting the ecology by reinforcing it's weak links is also only "working with one hand" Farmers must also produce food. Food production is held back either because it has generally reached its capacity (like commercial farmers), or because there are problems seriously limiting production (like peasant farmers).

Among all the different problems which can limit the production in a farmer's field, there is one which is most limiting. We call this the *Limiting Factor.* If the Limiting Factor is solved first, before the other problems are taken on, often great increases in production may be obtained. But if other problems are addressed before the Limiting Factor, results will be less effective or nil. Soil could be the limiting factor on an eroded hillside, for example. The farmer could spend a lot of money applying fertilizers or insecticides, but if plants have no good soil to grow in, these solutions will have little effect in raising production.

Each time a Limiting Factor is overcome, we get a **Rapid Recognizable Result**, and can proceed to the next limiting factor. In this way we may develop our agriculture step by step. Try the next demonstration to dramatize the importance of overcoming the Limiting Factors first.

THE BUCKET
The limiting factor

Materials:
An old bucket or tin container
and a sharp object, like a screwdriver.

It is very important to know which problems are the ones that limit your production, so that you can solve your problems quickly.

Fill the bucket with water, then punch one hole in it.

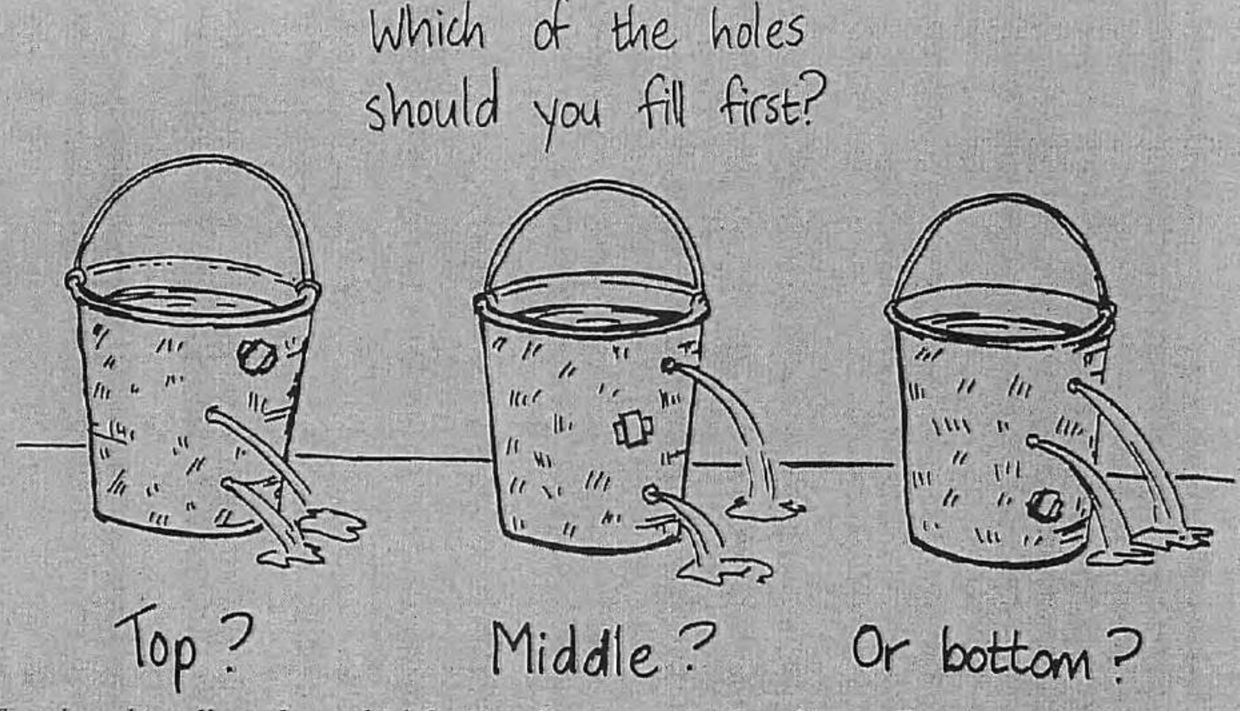
To keep the water from coming out of the hole, plug it with your finger, or some plastic or clay.

Have we solved the problem?

Now punch three holes in the bucket quickly.

Facilitators notes:

The following questions can stimulate discussion around limiting factors:



What does this tell us about which limiting factors need to be addressed?

"AGROECOLOGY"

Agroecology is the study and practice of agriculture as part of the environment. Rather than just relying on external inputs to increase production, agroecological farmers try to manage nature's processes to increase fertility, manage pests and control weeds. By understanding and managing the ecological qualities and interactions of plants, soils, animals in the farm environment, farmers can balance the objectives of food production with environmental protection.

Resource-poor farmers often farm degraded, ecologically fragile land, resulting in low yields. The ecology of their farms has "regressed" to a species-poor, eroded, infertile, pest-plagued ecosystem. The poor ecological conditions of the farm are actually limiting production. In other words, limiting factors and weak links are one and the same. **This means that to overcome the limiting factors of production, they must reinforce the weak ecological links in the farm agroecosystem.**

Farmers can help the ecology of their farm "evolve" to a species-rich, fertile and balanced system in many ways, For example, they can increase fertility with organic matter from compost , mulches or cover crops. By intercropping, alley cropping, they can increase the number and diversity of plants and crops. This will increase the number of ecological interactions, provide them with more management options like Integrated Pest Management and Companion Planting. This will help "buffer" their farm system against erosion, droughts, and pest outbreaks. Increases in yields obtained by increasing the ecological health of the agroecosystem help balance agriculture with nature and will tend to be more stable through time than conventional practices. We call this the Process of Agroecological Sustainability because it is alway changing, adjusting and looking for a balance between production and protection.

E. Innovation and Small-Scale Experimentation

How can farmers find solutions to the problems of ecology and agriculture? In large part by doing what peasants have always done for the last 6,000 years, *INNOVATION.* But the world does not have as much time as it once had. To triple food production, farmers must come up with solutions to the problems of production and protection in just twenty or thirty more years. One way to help speed up the natural process of farmer innovation is through *Small-Scale Experimentation*. In this way, farmers may try new ideas without risking their crops and livelihood.

F. Limit the Introduction of Technology

Another important principle in Farmer to Farmer is 'Limiting the Introduction of Technology'. We may think that introducing a lot of technologies or innovations to farmers is helpful because that way they will be able to solve more of their problems. But if we introduce too many things at once, we would be ignoring the importance of working specifically on limiting factors and critical links and might not attain the Rapid and Recognizable Results we need to get the innovative process moving. Further, we would not give farmers time to test and share innovations at their own pace. Another old adage says: *"Better one idea in one hundred heads than a hundred ideas in one head."*

G. Spread of Innovations

Innovations are spread among peasant farmers partly through example and partly by word of mouth. In fact, the process for innovation includes the cultural aspect of sharing which leads both to the diffusion of the innovations and their modification for specific environments. Farmer adaption and adoption of innovations is a self-enriching, cultural process which can generate even more innovations and diffuse them through a surprisingly large area in a completely unprogrammed and informal way. The following demonstration can be used to illustrate the difficulty that technicians have in spreading innovations because of different types of barriers which exist between them and their clients. These barriers can be cultural and programmatic and can include aspects of the technology, communication and the program for extension itself.

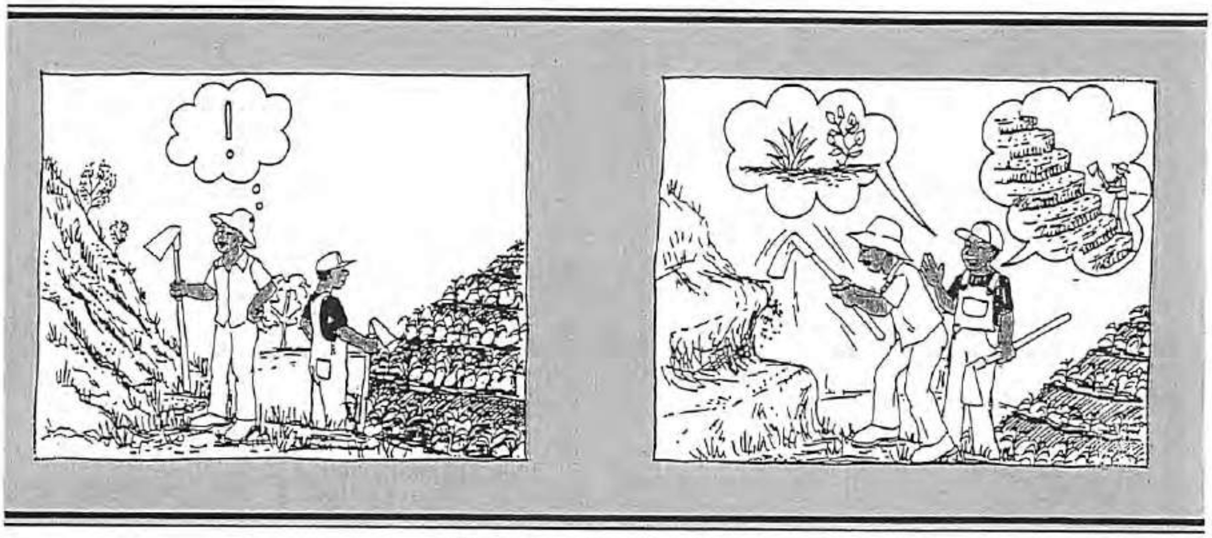
The following dramatization illustrates this point:


The Extensionist
THE BARRIER
The Farmer
Hi! I'm John.
EXTENSIONIST
(Technician in paper objects.)
And I'm Peter.
FARMER
(Paper objects champion.)
The two can hear but not see each other, because of the barrier in between them.
Each person has a piece of paper to construct an object.
What happens when one works in this way? Do you think they will understand cach other?
Let's see what happens...
Materials: A blanket or curtain. Pieces of paper.
Let's see... Do you know about convex figures?
Well, no... but continue.


Good, Step ①: Counterplace the surface "a" to side "b" of your sheet of paper so that both extremes...
Let's see, I double fold the whatsit by the other half of the paper... easy!
Step ②: Now we have 2 parts in order to obtain the following: On the inferior side, execute a triple fold and that's it!
Hey, this is great!
At the end, they compare what they have produced.
But that's not what I said!
I did this just the way you explained.
I said a convex figure!
Well, I did this one!
What happened? Why was there no communication?

H. Develop a Multiplier Effect

The *hands-on, learning by example approach* to learning is important to the Farmer to Farmer principle of sharing and developing a *Multiplier Effect.* Farmers who are sure of their innovations through direct experimentation can show them to other farmers, using their own fields as a living example of the innovation in question. Contrary to what is usually believed about peasants, farmers who have gone through the process of small-scale experimentation are usually greatly motivated to share their new discoveries.



Showing Innovations

These farmers become *'promoters'* and teach through living example. This has a profound impact on those farmers learning and teaching the innovations. For the learners, being taught by other farmers is often easier because both parties share a rich array of cultural concepts and expressions which aid in communication.

By seeing that another farmer like themselves has successfully tested and implemented an innovation, the learners will have greater confidence that they will be able to do it themselves. They are often inspired to innovate and share as well. For the teachers, being able to teach innovations to others raises their self-confidence and usually confers respect, admiration and prestige on them in the eyes of other farmers. This encourages them to innovate more and to share more. The resulting *enthusiasm* for developing their own agriculture is basic to Developing the Multiplier effect.

The following table is meant to be descriptive rather than normative, and gives an idea of how this methodology can be organised and implemented on a project level.

STEPS IN FARMER-LED EXTENSION:

NO	STAGES	ACTIVITIES
1	Getting Started	▸ Diagnosis, site selection, identifying key farmers, innovators and possible promoters ▸ Visits to farmers fields ▸ First promoter-led workshops, promoter-led field surveys ▸ First problems assessment ▸ Extensionist support
2	Identifying Useful Small-Scale Elements	▸ Promoter-Led workshops on conservation ▸ On-farm, farmer experimentation
3	Design of Experiments	▸ Promoter-Led workshops and group site visits for experiment selection and design based on farmer-identified problems and possible solutions
4	Sharing Experiments	▸ Group visits to field experiments ▸ Follow-up by promoters and/or extensionists
5	Sharing Results	▸ Group and community field visits, local and national ▸ Local seminar of farmer experimenters ▸ Publication of results in local and national farmer newsletters and magazines, radio and T.V.
6	Spreading and Consolidating the Movement	▸ National & International farmer events and visits ▸ Local transects ▸ Community workshops

(Adapted from "Farmer to Farmer: the Ometepe Project" in Linking with Farmers, IT Publications 1993.)

I. Start Small, Go Slowly

Once an innovation has been tried and established the farmer may begin experimenting with other innovations. At the same time, he or she may teach the innovations already implemented to others.

When technology is introduced slowly by overcoming limiting factors one by one, farmers have a chance not only to test, implement and share the innovations, they also build up strong "circles of knowledge" amongst themselves. These energized, peasant knowledge systems are much more important than the innovations themselves.

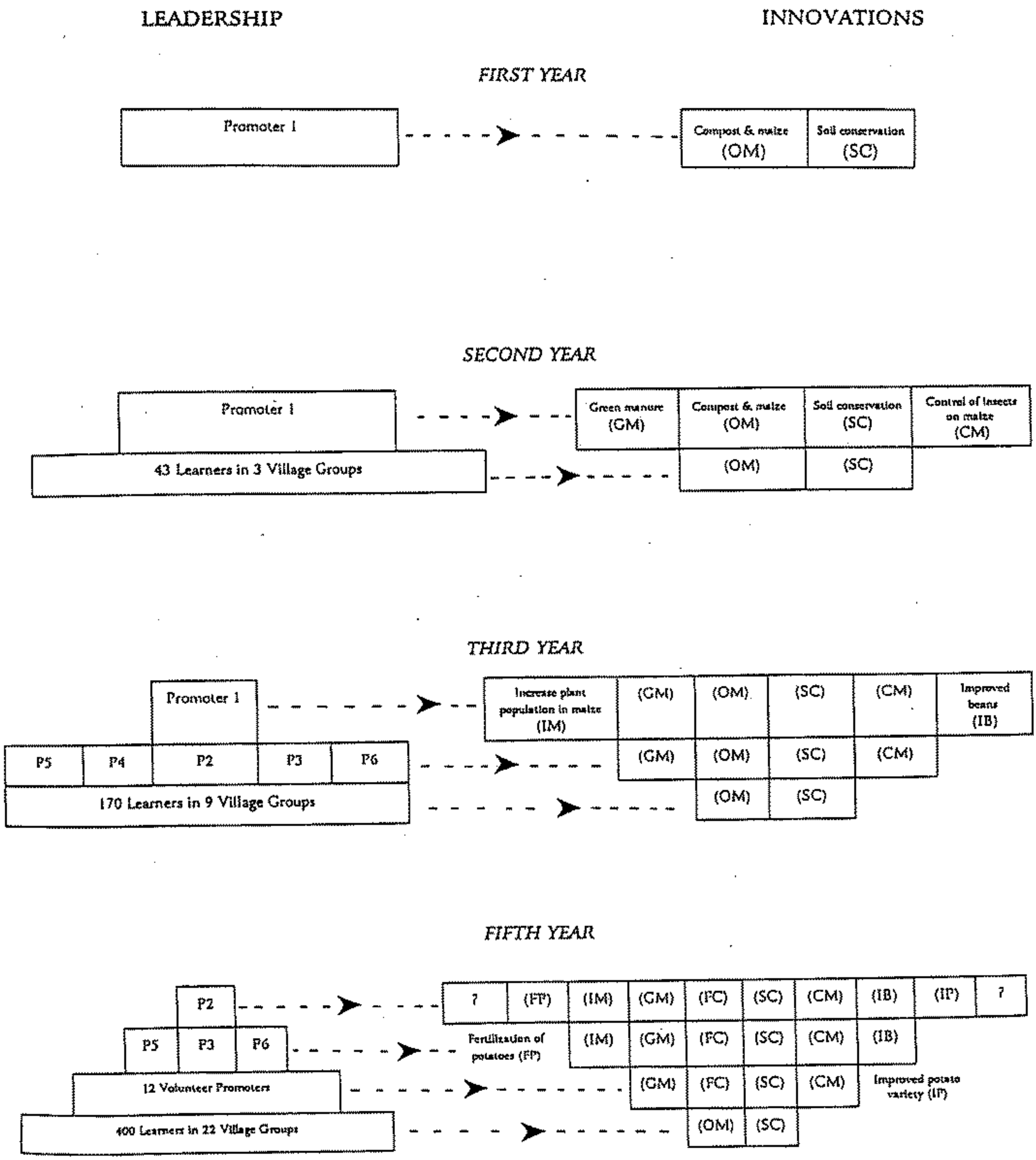
Once the limiting factors are overcome, many innovations can become obsolete. Further, agriculture is always changing: crops change with respect to markets, seeds degenerate, new inputs come and go... For agriculture to be dynamic, farmers must have the capacity to respond to change.

Therefore, it is much more important to develop the local capacity for innovation than to concentrate on the innovations themselves. If farmers are capable of innovating and sharing, they will always be able to respond to change and crisis.

An important principle in building and reinforcing this capacity is to Start Small, Go Slowly. The following diagram of a 'Technological Pyramid' is an example of how this can be done within the context of a Farmer to Farmer program for sustainable agriculture. This diagram builds on the 'Steps in Farmer-Led Extension' described under developing a multiplier effect. It depicts the way in which innovations are built-up over time, after the first experiments have been tried and promoters identified.

(Adapted from the technological pyramid in "Two Ears of Corn", by R. Bunch, 1982)

THE TECHNOLOGICAL PYRAMID

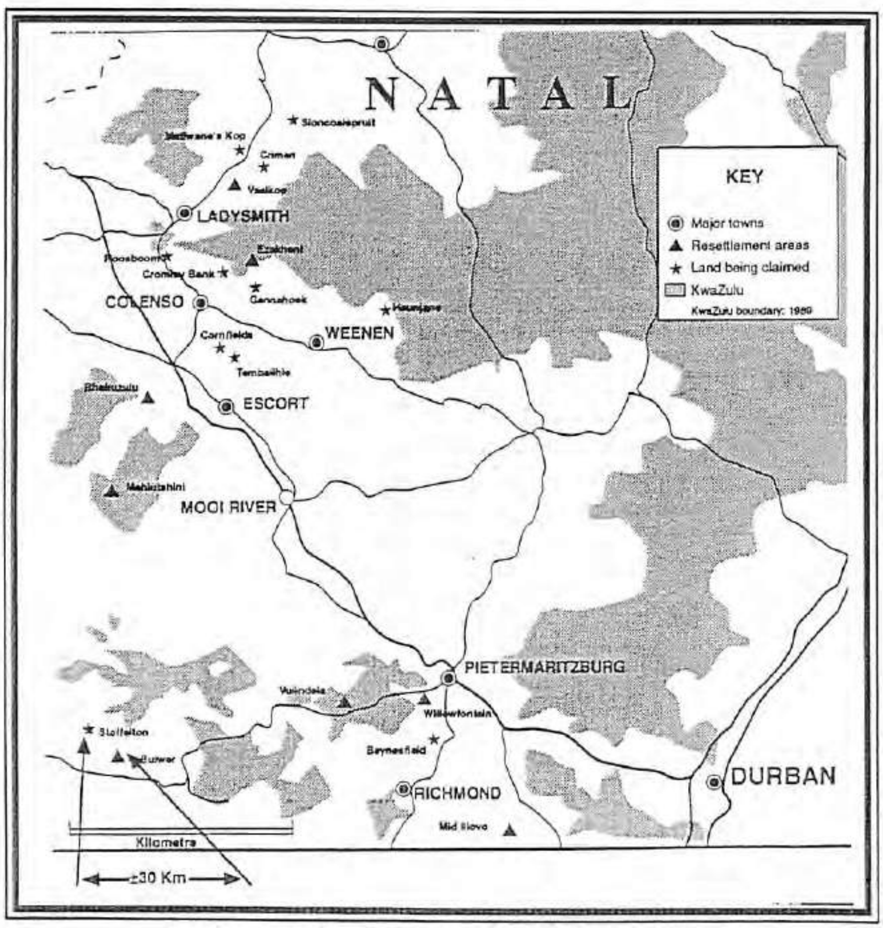


J. Example: The Field Visit to Stoffelton

This is an example of a Farmer to Farmer sharing and learning event held in the Stoffelton community in the Midlands of KwaZulu-Natal.

1. Stoffelton is an area of about 250 square kilometres that lies between Himeville and Bulwer in the Impendle District. The population is between 12 000 and 13 000 people. The community was established by Basotho people who had served the British armed forces. Land was purchased by people in the early part of this century. Between 50 and 60 landlords and their tenants cultivate maize, beans, potatoes and pumpkins and rear cattle.

2. The profile of the community is typical of impoverished rural areas, with dense settlement due to the influx of farm workers. Most of the men migrate to work, and there is little or no work for the youth in the area. Older people receive most of their income from relatives and pensions.



Map of Stoffelton, KwaZulu Natal

3. Stoffelton is divided into eight wards. Two representatives from each ward are elected onto the Stoffelton Advancement Committee (SAC), which is made up of both landowners and tenants who live in the community.

About 60 families in Stoffelton have been working on the rehabilitation of the most badly eroded areas on their farms. Three work teams were supported financially by the National Economic Forum and worked for a period of 2½ years. They were led by three indunas and two Community Agricultural Facilitators. At the beginning of the initiative Government Departments (Agriculture, Department of Water Affairs and Forestry), Parastatals (Forestek), and the Farmer Support Group assisted with suggestions for possible technical solutions. People were trained and set to work. Very soon they settled into their own rhythms and variations and innovations started to appear.

Here is an example of an innovation where the farmers decided to build cross ridges (ties) in their swales (contour bunds) so that they could create small dams and prevent large amounts of water collecting in one part of the swale.

People were learning about catchment management and rehabilitation by being involved and by becoming enthusiastic about healing their land.

Towards the end of the project it was agreed that it could be valuable to share their work and skills with other farmers like them, as well as the participants on the Farmer to Farmer course. People from Stoffelton that were not involved in the project were invited, as well as representatives from neighbouring areas and people from other areas that were known to be interested.

On the first day, the work that had been done was shown to the visitors. They went to see the nurseries, stabilized dongas, rehabilitated grazing areas and fields and managed woodlots. People took their time to discuss the situations, ask questions and make comments. Below is a check list of possible questions for such cross visits:

CROSS VISIT: FARMERS VISIT FARMERS

OBJECTIVE: Farmers share innovations and discuss problems and possible solutions.

INNOVATIONS:
What problems does it address?
What limiting factors does it address?
What critical link does it address?
How was the innovation discovered, introduced, implemented?
Can it be easily taught?
Is it economically viable?
Is it environmentally sustainable?
Does it provide a rapid recognizable result?

PROBLEMS:
What are the major limiting factors?
What are the major critical links?
Why hasn't the farmer addressed the problems?
What resources could we bring to the problem?
Is it a common problem?
Are there problems he/she doesn't recognize?
What are the possible causes of each problem?

POSSIBLE SOLUTIONS: (Suggested by farmers and visitors)

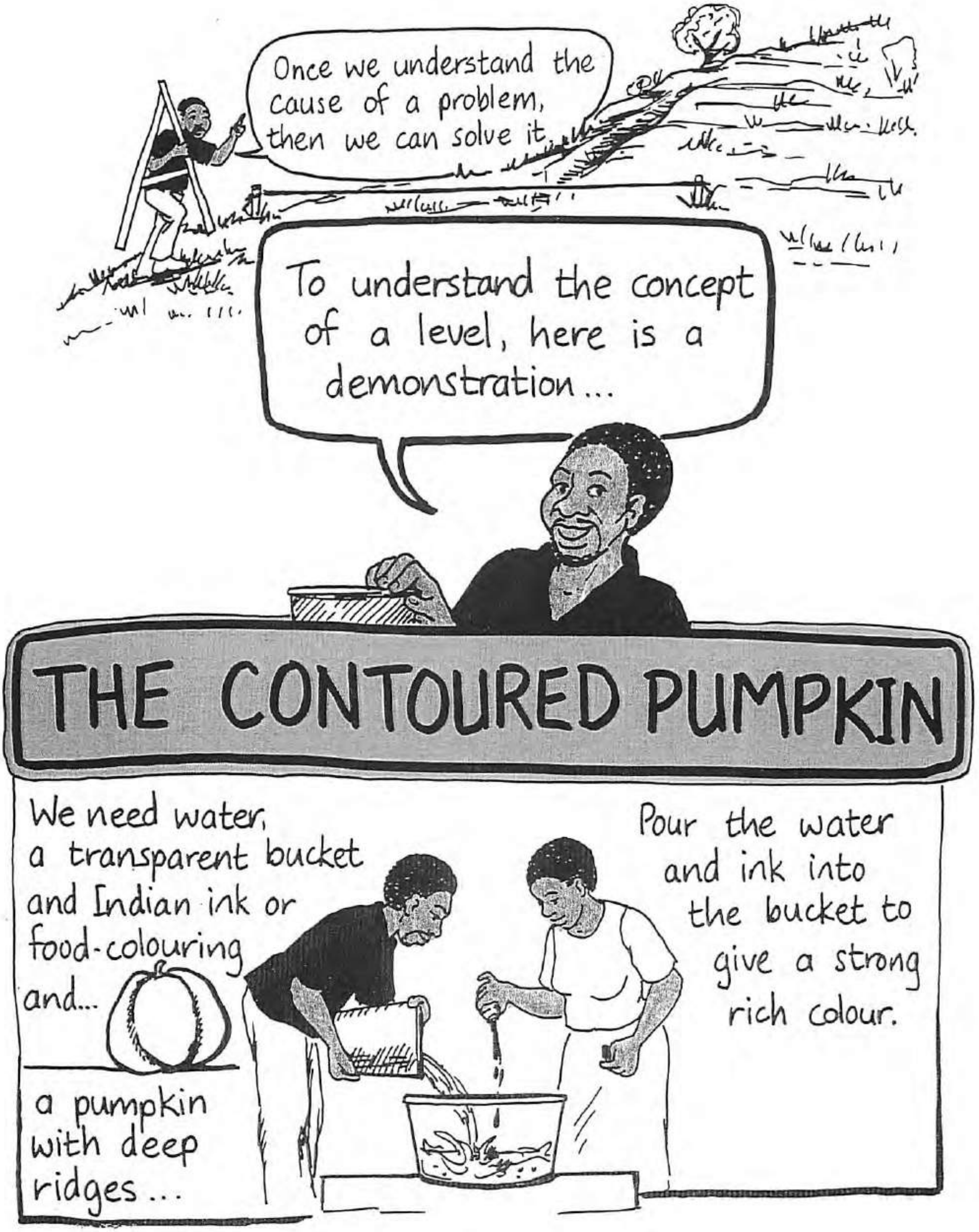
The discussion of problems and innovations used then leads to suggestions of possible solutions and evaluation of these. See the table below:

STOFFELTON: AGRO-ECOLOGY

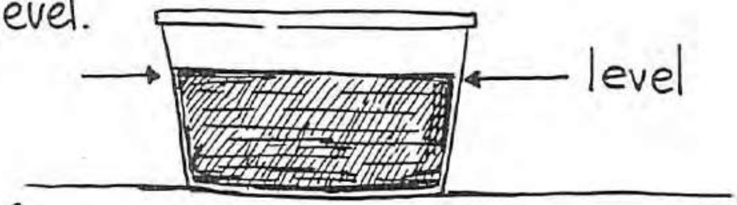
PROBLEM	*CAUSE*	*INNOVATION POSSIBLE SOLUTION*	*SUGGESTION EVALUATION*
1. Lack of water in vegetable gardens	- Bad distribution of rain - No irrigation	- Small dams (micro-catchments, haifir) mulch - Instal weirs	- Costly people resist using - no technical knowledge Farmer to Farmer cross visit to working weirs.
2. Low fertility in vegetable gardens	- Site selection - Poor soil	- Composting	- Hard work, need water
3. Overgrazing	- Grazing patterns	- Plan grazing system with community	- Community is divided - Fencing is expensive
4. Erosion in grazing areas	- Overgrazing - Lack of skills in cattle management - Bare ground from burning	- Training in cattle range management - Stop burning - Introduce cover crop	- Experts? - Cross visits? - Long time lag for results - People resist - Weeds choke - No seed for cover crop.

On the second day, the Community Agricultural Facilitators and a few farmers hosted a practical farmer training event, where they demonstrated the construction and use of A-frames and hose-levels.

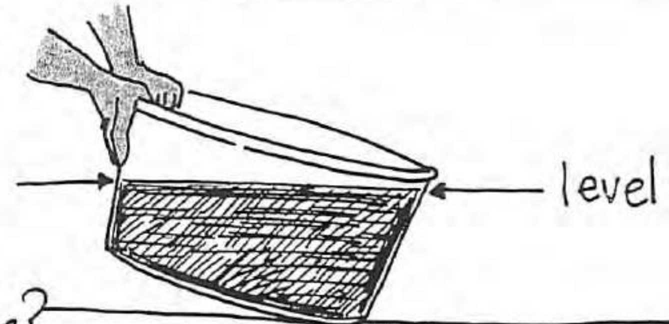
A demonstration that can usefully be done to explain the concept of a contour follows in the next picture story.



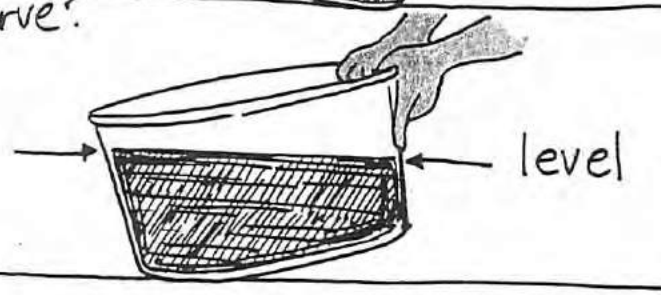
Then put the bucket on top of the table, and check that the water is level.



Lift up one side of the bucket.
What happens to the water level?

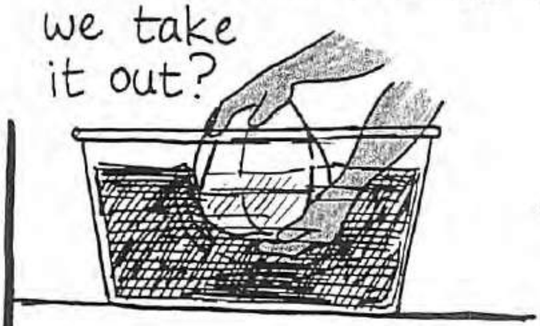


What do we observe?



Now place the pumpkin in the coloured water.

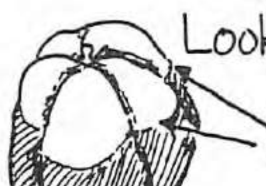
What can we observe when we take it out?



Looking from the side...

How does this resemble the contour lines on a hillside?

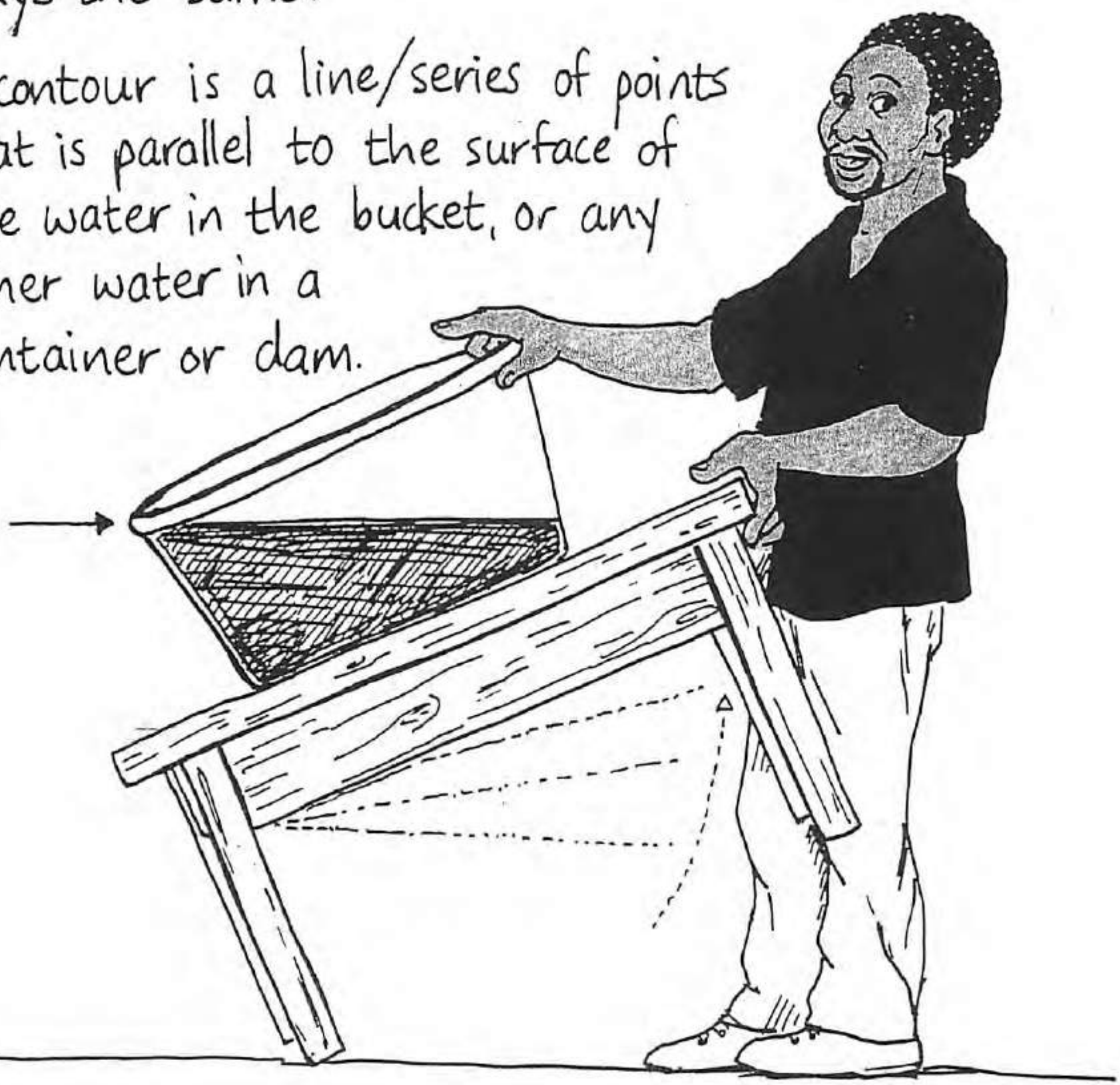
Looking from above..



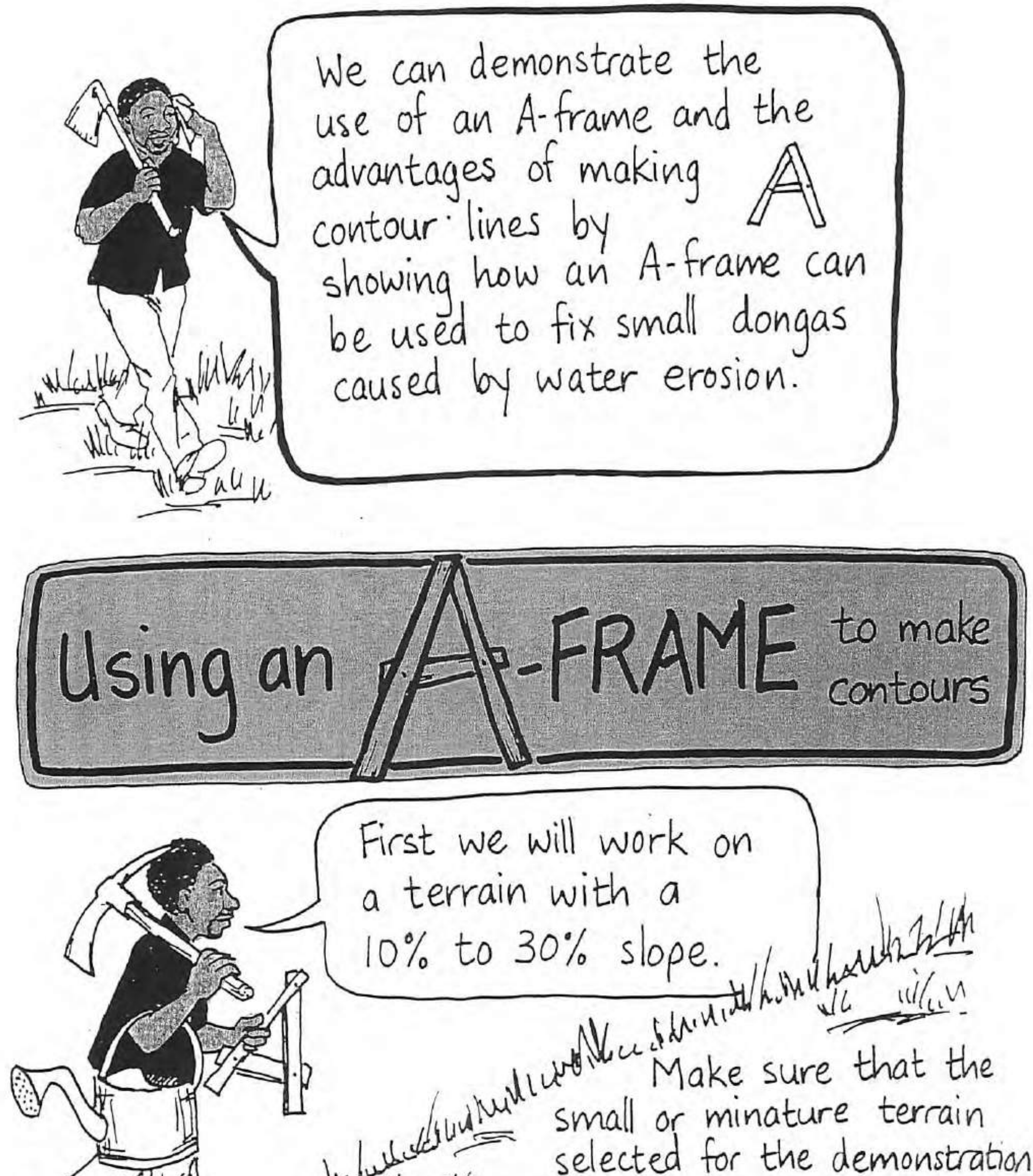
What happened?

We notice that even if we lift the table and the bucket, the level of the water always stays the same.

A contour is a line/series of points that is parallel to the surface of the water in the bucket, or any other water in a container or dam.



This picture story describes how to use an A-frame to make contours and why it is important to have contours at all.



On a terrain/field where there are small gulleys and dongas...

We can see what happens when we pour some water onto the ground on top of the gulley: It flows from the surrounding vegetation into the gulley with increasing speed.

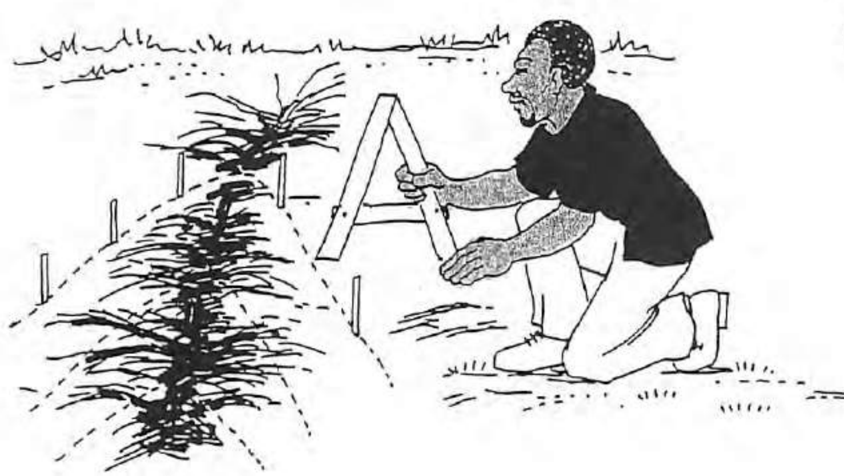
Now try and make straight lines across the gulley about 20 to 30cm apart.

Make about 3 to 5 lines.

Again pour water along the top of the gulley.

The lines/bumps will break at their weakest/lowest point.

Now use an A-frame to make actual straight/level lines across the gulley.



If you now pour water across the top of the gulley, the water will be diverted by the parallel lines.

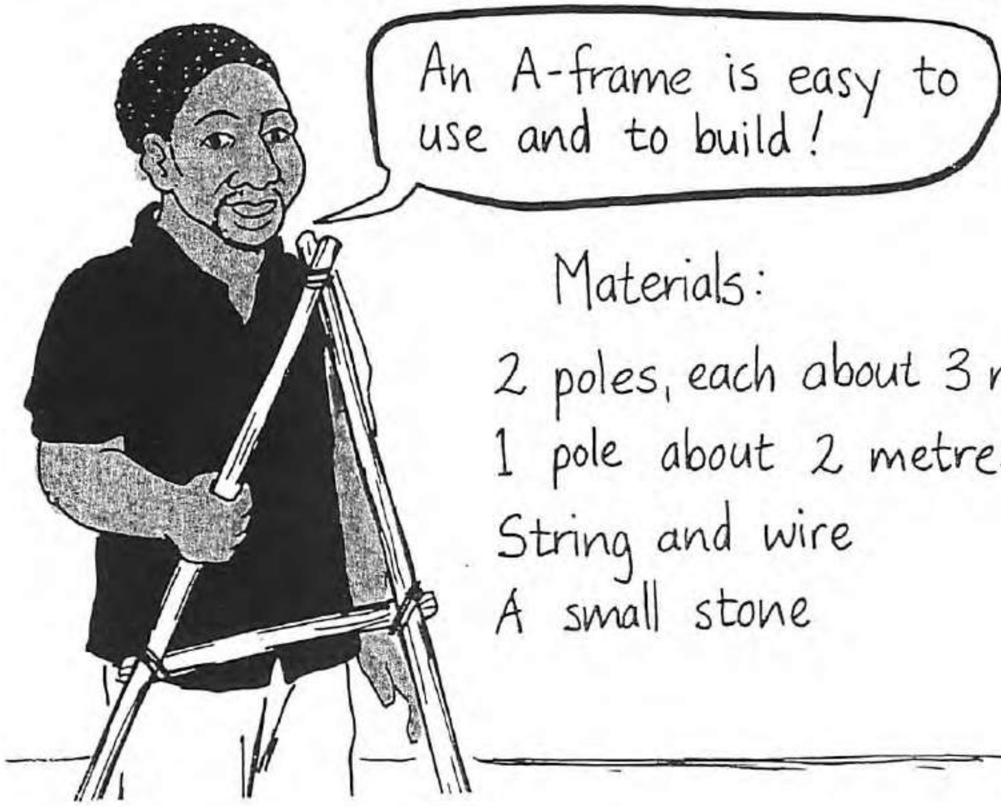
The stoffelton people demonstrated the planting of Vetiver grass lines on the contours they had marked using an A-frame.

Mr Dladla showing course participants how to prepare Vetiver grass for planting on contour lines.

Following are instructions on how to construct the A-frame:

People in Stoffelton demonstrating how to build an A-frame

How to build an A-frame



Materials:

2 poles, each about 3 metres long
1 pole about 2 metres long
String and wire
A small stone

First, take the two poles of the same length and tie them together at one end, using string.

Next, tie the third pole across between the two other poles, about one metre from the bottom.

Now tie a piece of string on at the top. Tie the stone onto the end of it so that if you hold the frame up it will hang just below the bottom pole.

Hold the A-frame upright on a level floor. Mark the place where the string crosses the bottom pole. This place should be in the middle of the pole.

Facilitators notes:

Checking the accuracy of your A Frame:

When you have constructed the A frame, before you mark the place where the string crosses the horizontal pole, mark where each foot of the A-frame touches the floor. Now mark the place where the string crosses the horizontal pole. Next, turn the A-frame around, reversing the position of the feet on the marks on the floor. If the string again falls across the mark on the horizontal pole, the floor is level and the A-frame will give a true level reading in the field.

How to mark your A frame if the floor is not level:

If switching the feet indicates the A-frame is off, first mark the new place on the wood where the string fell. The correct level mark should be exactly between the first and the second mark. To test this, one of the marks on the floor should be built up slightly with a shim (a thin board or piece of wood or even a sheaf of paper) until the line falls across the middle mark. Then switch the feet again. The line should fall across the middle again. If it doesn't, then the A-frame itself is inaccurate and must be rebuilt.

What to do if the A frame is not accurate:

Start all over again, making sure that both upright poles are the same length, both feet are equidistant from the point where the poles are tied, and that the cross pole is the same distance from the floor on each of the A-frame's legs. Once you have reconstructed it, check it as above.

The participants were also shown how to construct and use a hose-level for making contours.

Hose-level construction in progress.

3. FARMER ACTIVITIES

The second week of the Farmer to Farmer workshop was organized around an extended cross-visit between farmers from Cornfields, Thembalihle, Stoffelton and Gannahoek with farmers from Umzumbe. First, farmers and technicians paid an informal visit to several fields and gardens in the area supported by Lima, an NGO. Specific issues regarding outside assistance to farmers, self-help, appropriate technologies, sustainability and financial viability were discussed.

Once the farmers were acquainted with the area and with each other, the workshop was held indoors to review the history and principles of Farmer to Farmer Movement and to introduce different sustainable agriculture concepts. The concepts of ecology, equilibrium and sustainability (as described earlier in this book) were explored. They then went on to discuss:

I. Soil Conservation and Organic Matter

From the initial discussions with farmers it was clear that poor soil conservation and little organic matter were major constraints to production. During the workshop demonstrations highlighted the issues and opened discussions for future action. For soil conservation and organic matter the following three demonstrations were done: ***The Ramp, The Scales, and Ground - Cover***

A. THE RAMP

This is a demonstration designed by a Nicaraguan farmer to show how the presence of contour bunds/swales on a steep hillside will slow down water and soil. It consists of an adjustable wooden ramp, with slots for small cross-bars and a small ball (which represents water and soil) that is rolled down the ramp.

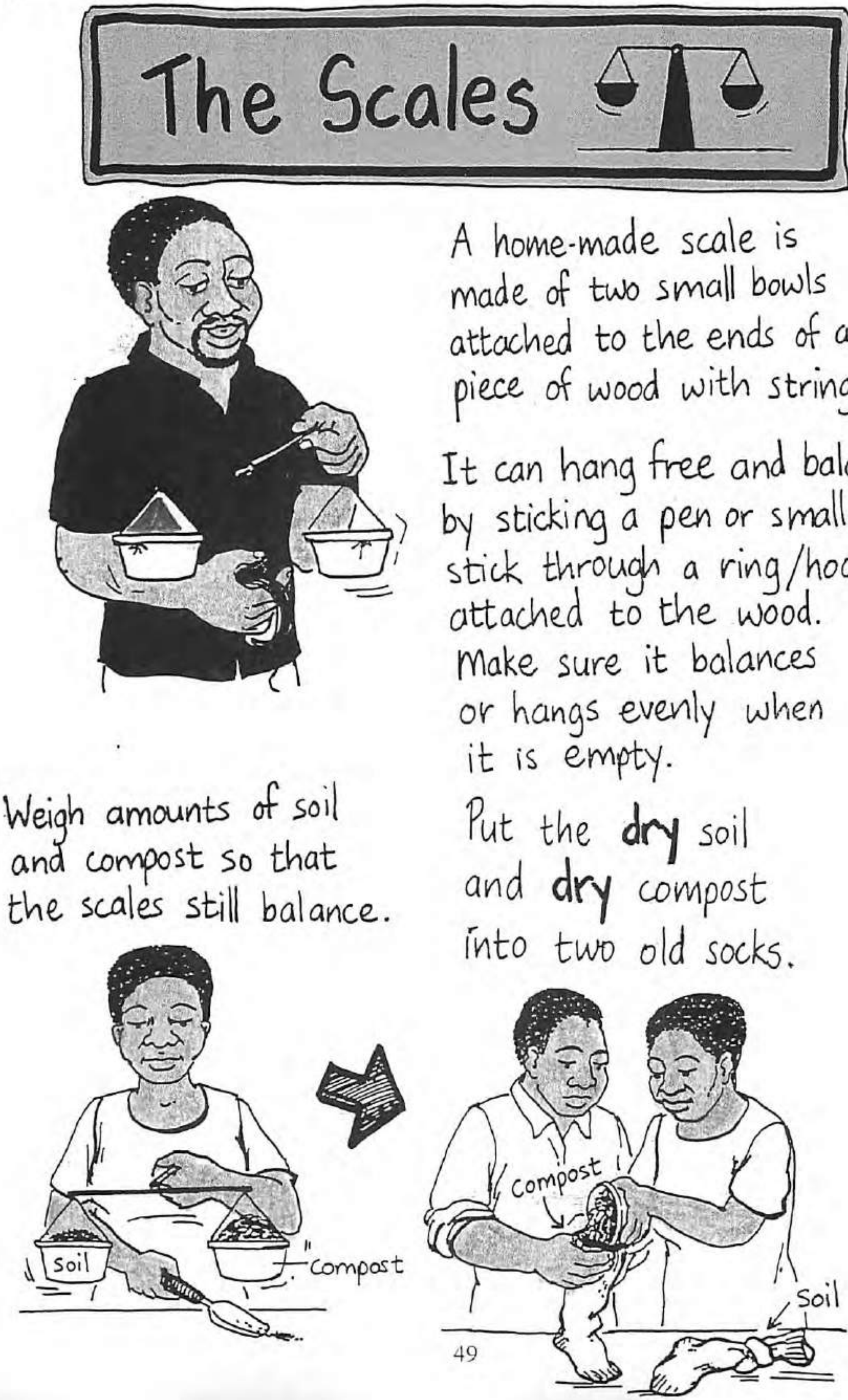
If the ball is rolled down the ramp and there are no obstacles (swales) to slow down its movement

It will end up stopping very far away from the ramp. WHY?

If you now put some small cross-bars (swales) in the way of the ball and then roll the ball down the ramp; what do you think will happen? WHY?

B. THE SCALES

A very striking demonstration of the water-holding capacity of organic matter is the following:



Dunk the socks in a bucket of water.

Then weigh the two wet socks in the scales again.

Why do you think compost is heavier?

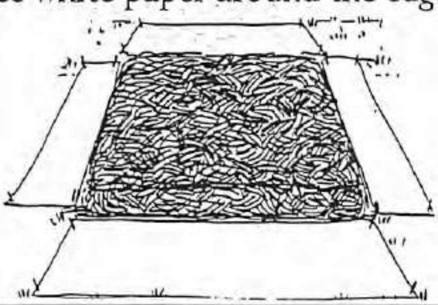
Facilitators notes:

Try putting the soil and compost into the socks ***before*** *weighing them. Fill a sock about one-third full with soil, place it in the scales, then keep filling up the other with compost until the two weigh in equally. The reason is that there is a minimum amount of soil & compost needed to make this demonstration work. This is about a bowlful of soil. But dry compost has so much more volume that it would not fit into the bowl to balance the minimum amount of soil needed in the experiment. The sock helps keep it all together. Doing it with the socks from the beginning also removes doubt about the weight of the socks themselves.*

C. *GROUND COVER*

This demonstration shows the importance of ground cover in reducing erosion and allowing water to sink in to the ground.

Start the demonstration by preparing four patches of soil 1m x 1m in size, in the following ways:

1. Mark out the 1m x 1m patch and place white paper around the edges. 	2. Mark out the patch on 1m x 1m. Cover the patch with a layer of mulch, dry grass works well. Place the white paper around the edges.
3. Mark out the patch on 1m x 1m. Loosen the soil with a fork or pick to about one spade depth. Cover the patch with a layer of mulch. Place the white paper around the edges.	4. Mark out the patch on 1m x 1m. Loosen the soil. Add compost to the loosened soil and mix it in. Cover this with mulch. Place the white paper around the edges.

Now: Take a one litre container that has small holes punched in the bottom and fill it with water from a big bucket. Gently "rain" the water over square 1. Count the number of litres of water the square absorbs until the water runs out of the square.
Question: What does this demonstrate?

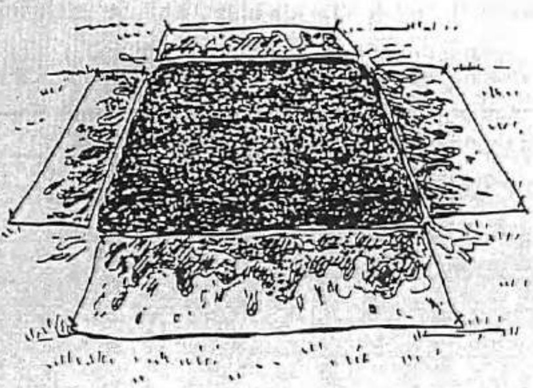
Then: Look at the white paper placed around each square.
Question: What do you notice? What does this mean?

Also: Dig down into the soil of each square until you reach dry soil. Measure the depth of wet soil in each square and compare.
Question: Which square gave the deepest wet soil profile? Why?

And: After watering the squares and comparing the "run-off", leave them "as is" overnight. Come back the next day and check moisture depths again.
<u>Question:</u> Which square has retained the most moisture? Why?

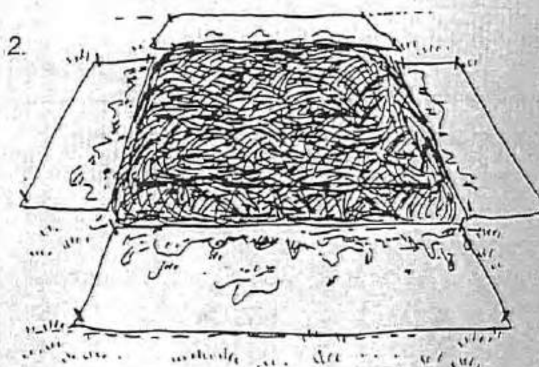
Facilitators Notes:

1.



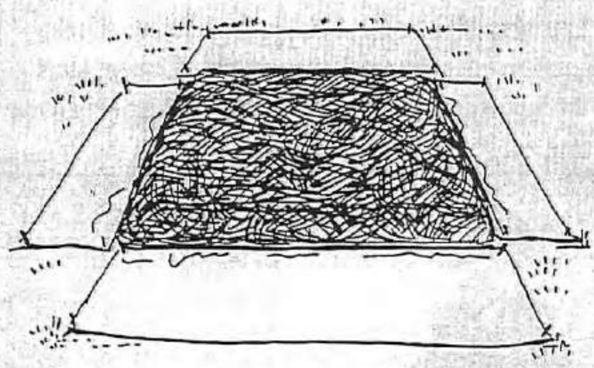
After one bucket of water, the water starts to run off the patch. A lot of mud is splashed onto the piece of paper.

2.



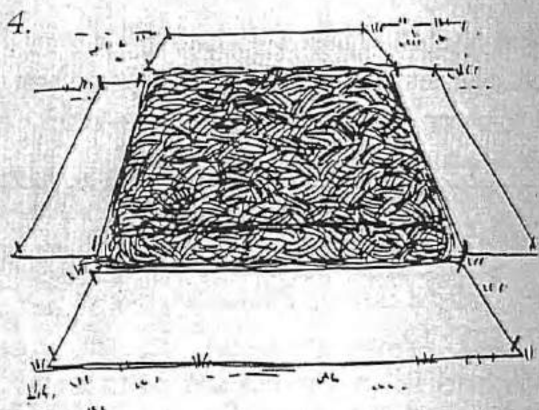
After two buckets of water, the water starts to run off the patch, but not as far as nor No. 1 Very little mud is splashed onto the piece of paper.

3.



After three to four buckets of water, some water starts to run off the patch, but much less than for No. 2. No mud is splashed onto the piece of paper.

4.



After eight buckets of water the water is still not running off the patch! No mud is splashed onto the piece of paper.

There are five main points to this demonstration which should be brought up through questioning:

a) *Bare Ground: The impact of falling raindrops loosens soil and splashes, forming mud. Mud seals the pores in the soil surface so water is unable to filter into the soil.*

b) *Covered Soil: By covering the soil with mulch or vegetation, we protect it from the impact of the raindrops. This allows the water to filter into the soil and become absorbed.*

c) *Covering and loosening the soil permits more filtration of water into the soil.*

d) *Adding compost permits even more absorption and retention of water.*

e) *Mulch also prevents water from evaporating from the soil as quickly as it does from bare ground.*

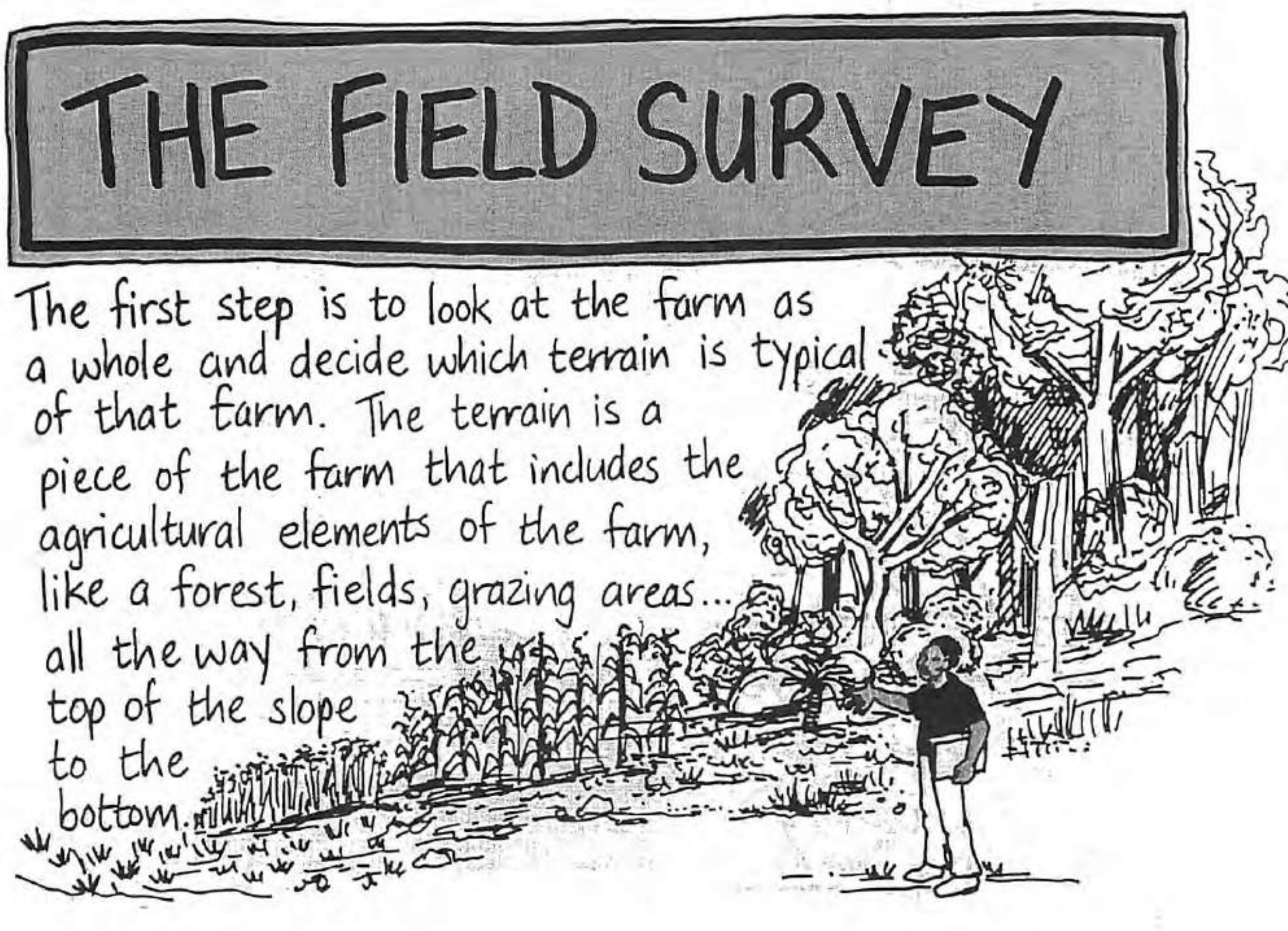
II. The Field Survey

A. Process

The basic principles of agroecology are applied by farmers and technicians to carry out a *Field Survey*. The purpose of the Field Survey is to *identify the farm's problems* and *diagnose their probable causes*. Then we can begin to look for and test possible solutions. The critical links and the limiting factors are identified by analysing and prioritizing the different ecological and agricultural problems observed in the survey.

Like a doctor who has to find out what the symptoms of a disease are before she can prescribe a cure, agriculturalists (farmers) first have to analyse the situation on the farm (terrain) before they can take action or improve the situation.

Following is a picture story of the general process of conducting a field survey:

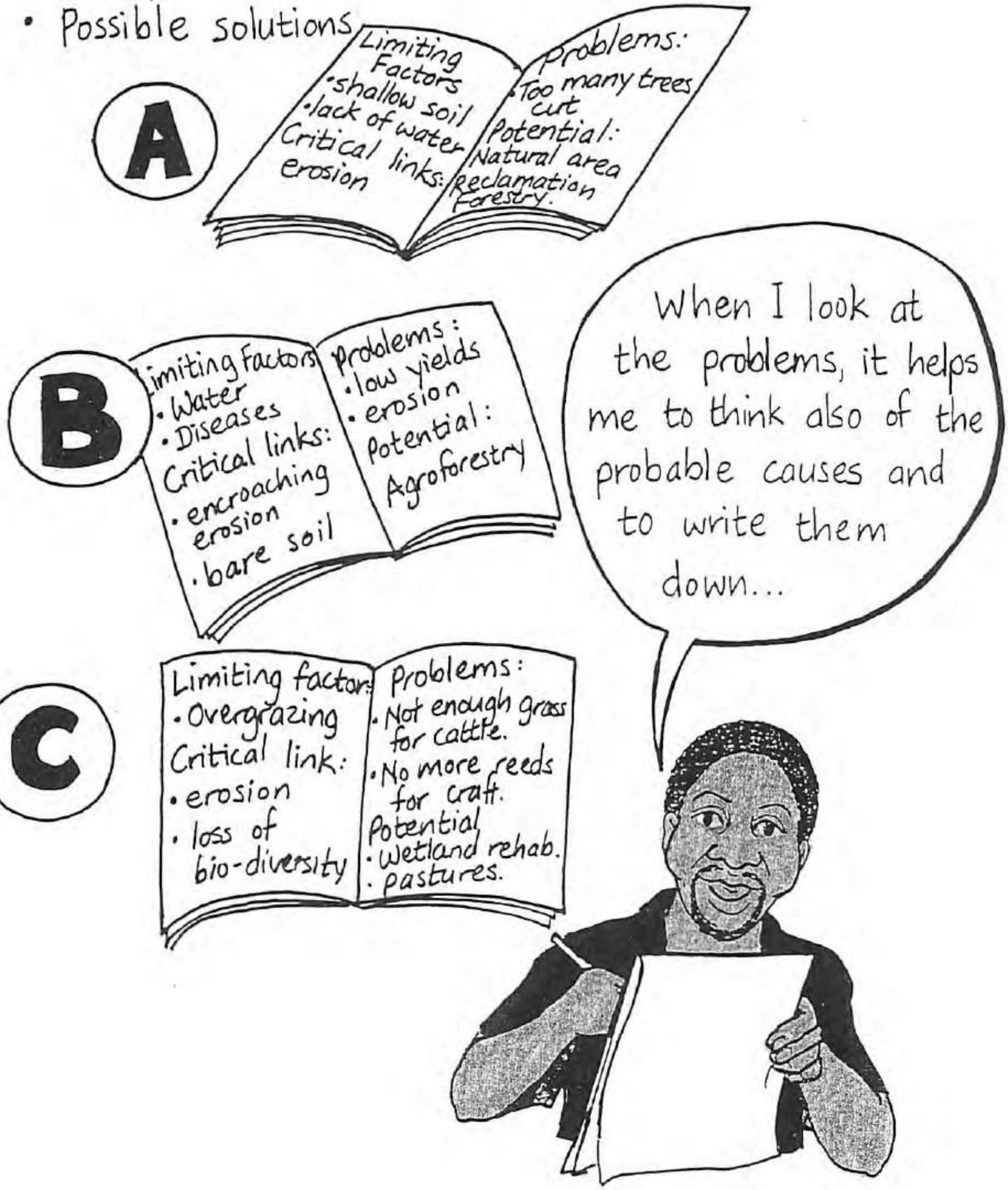



The participants are divided into 3 groups. Each group needs the following materials:
• tape measure • bushknife/panga
• pick • spade • waterlevel
• 6 tins or plastic packets
• paper and pens for recording.
We have all our materials - now we can start!
The 3 groups move to 3 different locations, usually the top, the middle and the bottom.


Each group makes observations and records the following...
A top
Slope: 10%
Relief/topography: undulating
Vegetation: forest
We can collect some of this soil to analyse later.
B middle
Slope: 40%
Relief/topography: smooth slope with contour bands.
Vegetation: Maize and Beans
Some weeds, Grasses and a wetland.
Using this A-frame is an easy way to measure the slope.
We must be careful to separate the top soil and the sub-soil for these samples.
Slope: 0 - 5%
Relief/topography: flat, to undulating with a stream.
Vegetation: Natural pastures
C bottom

Further, each group records the following:

- The limiting factors for production
- The critical links in the ecology.
- The problems
- Possible solutions



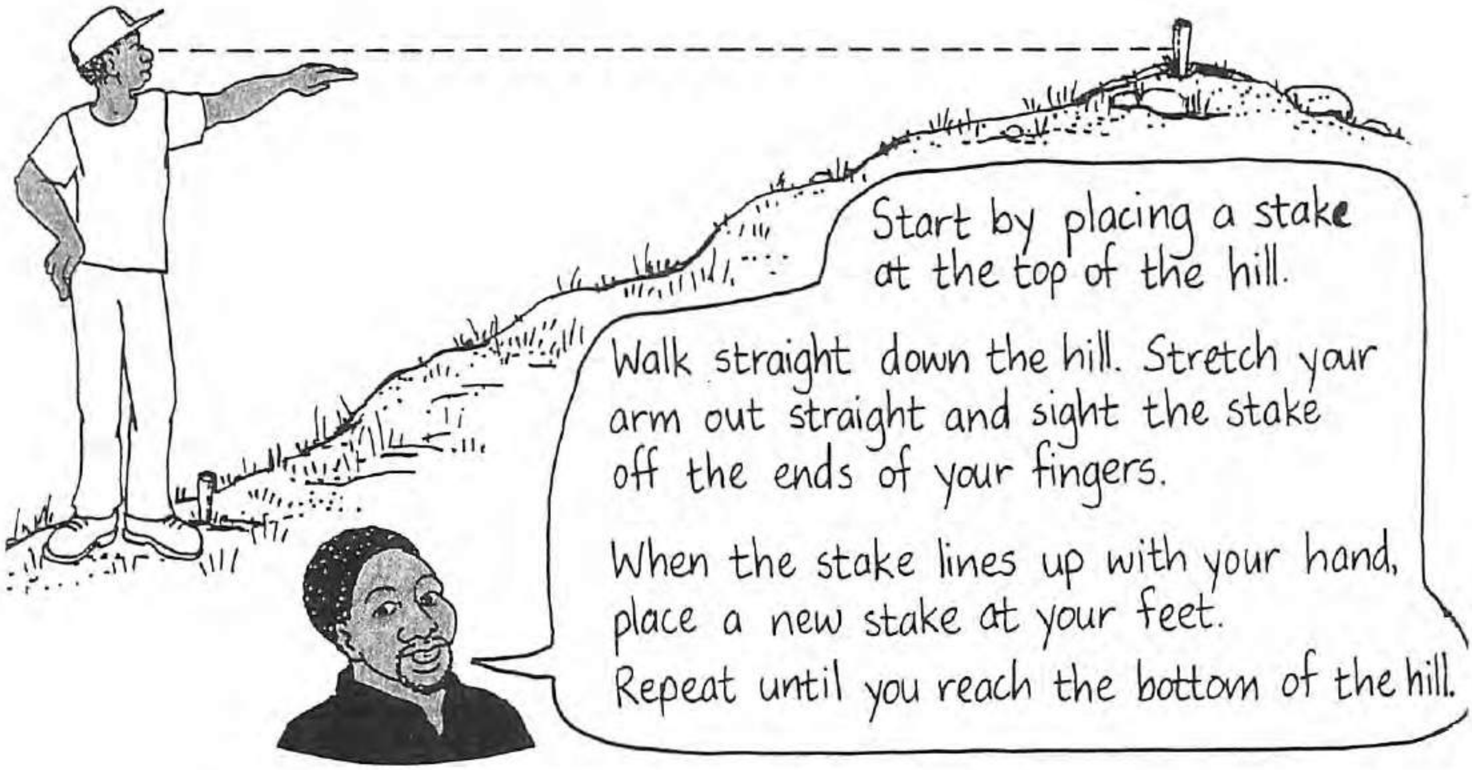

Then, the 3 groups come together to compile all their information.
Each group provides the information they have collected. This is written together on a big chart for everyone to see.
A
B
C
We have not finished gathering information yet! It is important also to know the history of the farm:
• When was the area first used?
• What have the yields been?
• What have the pest problems been, and how were they combatted?
• When were fertilizers and pesticides first introduced?
• Have the problems of the farm changed over time?

Examples of the field survey forms and question sheets used during such an exercise are given in Appendix I.

B. *Techniques Used*

a. **Measurement of slope:** This is possible using either an A-frame or a hose-level. One has to measure the average slope of the hillside and then use calculations or tables to work out how far apart the contours should be constructed.

But there is a much easier way!



The stakes indicate where contours should be constructed. This gives about the same distance as in the tables.

b. **Analysis of soils and soil life:**

During the field survey we need to learn about the soils. Firstly we need to know the difference between top soil and sub soil. The upper layer of soil is called top soil. It is usually full of roots, compost/humus and worms. It can be very thin (a few centimetres) or very thick (more than a metre). It is usually darker in colour. Underneath the top soil is another kind of soil called sub soil. It is usually lighter in colour and lacks compost/humus. There are few roots or worms in it. It is usually not as fertile as top soil. We need to know how deep the top-soil is and what kind of soil is present. We also want to know about the soil life.

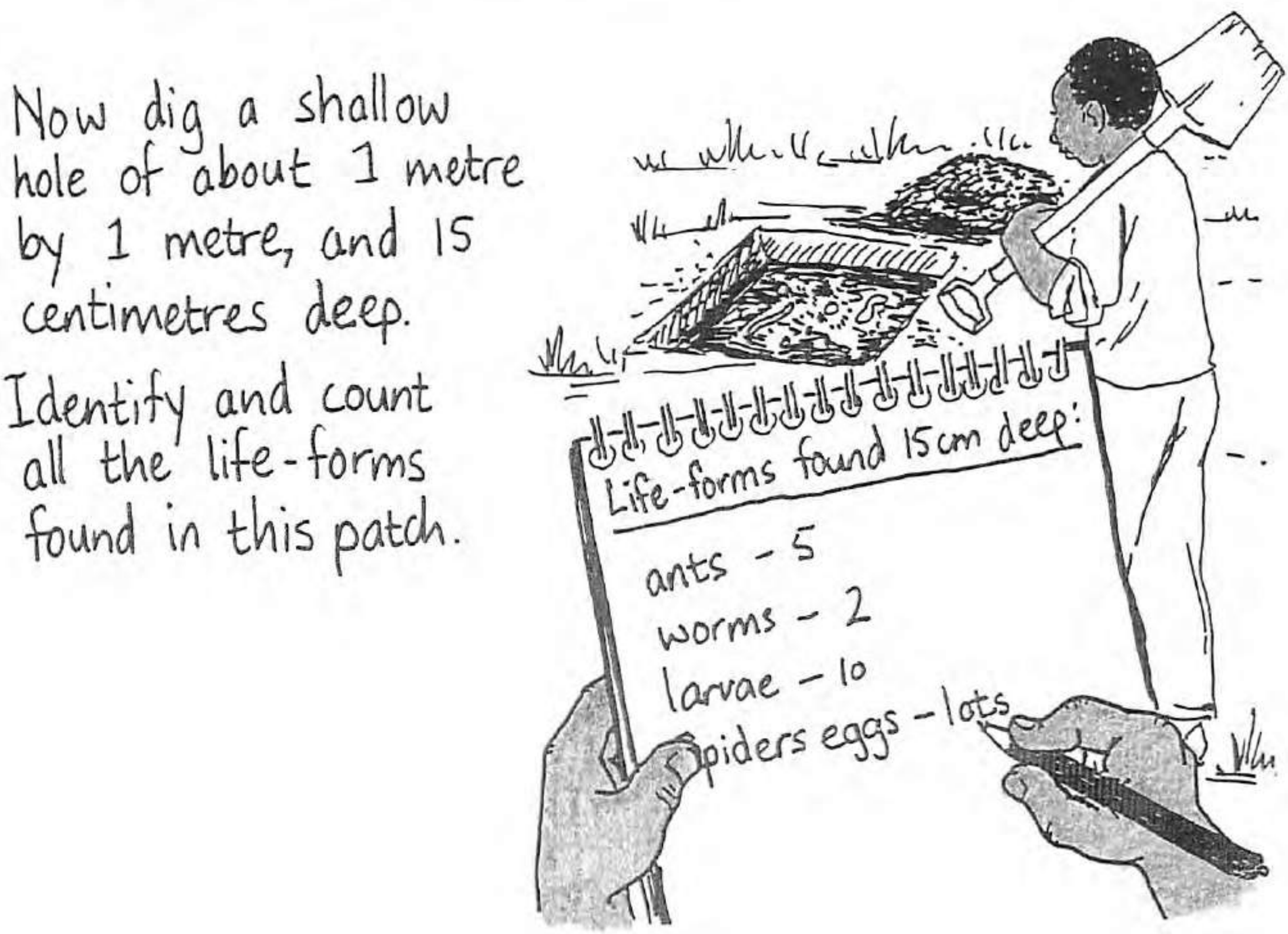
Then we can analyse the soil and make wise decisions about land-use and cropping.

By measuring and describing soil life in the first 15cm of soil, we can understand its health and its fertility. A healthy soil with a lot of organic matter will have many different bugs, worms and larvae which we can see with the naked eye. These are the "macrobiotic" life of the soil . The different kinds of macrobiotic life are called different "species". The number of species and the number of individuals in each species is called "species-richness".

Here is a picture story to explain how samples are taken and recorded for analysing soil.

To check the depth of the top-soil and sub-soil you will need to dig a deep hole of about 30cm². Measure how deep the top-soil is.


Take a sample of this soil, so that it can be analysed.
Keep on digging! Then measure the depth of the sub-soil as well.


Now dig a shallow hole of about 1 metre by 1 metre, and 15 centimetres deep.
Identify and count all the life-forms found in this patch.
Life-forms found 15 cm deep:
ants - 5
worms - 2
larvae - 10
spiders eggs - lots

Facilitators notes:

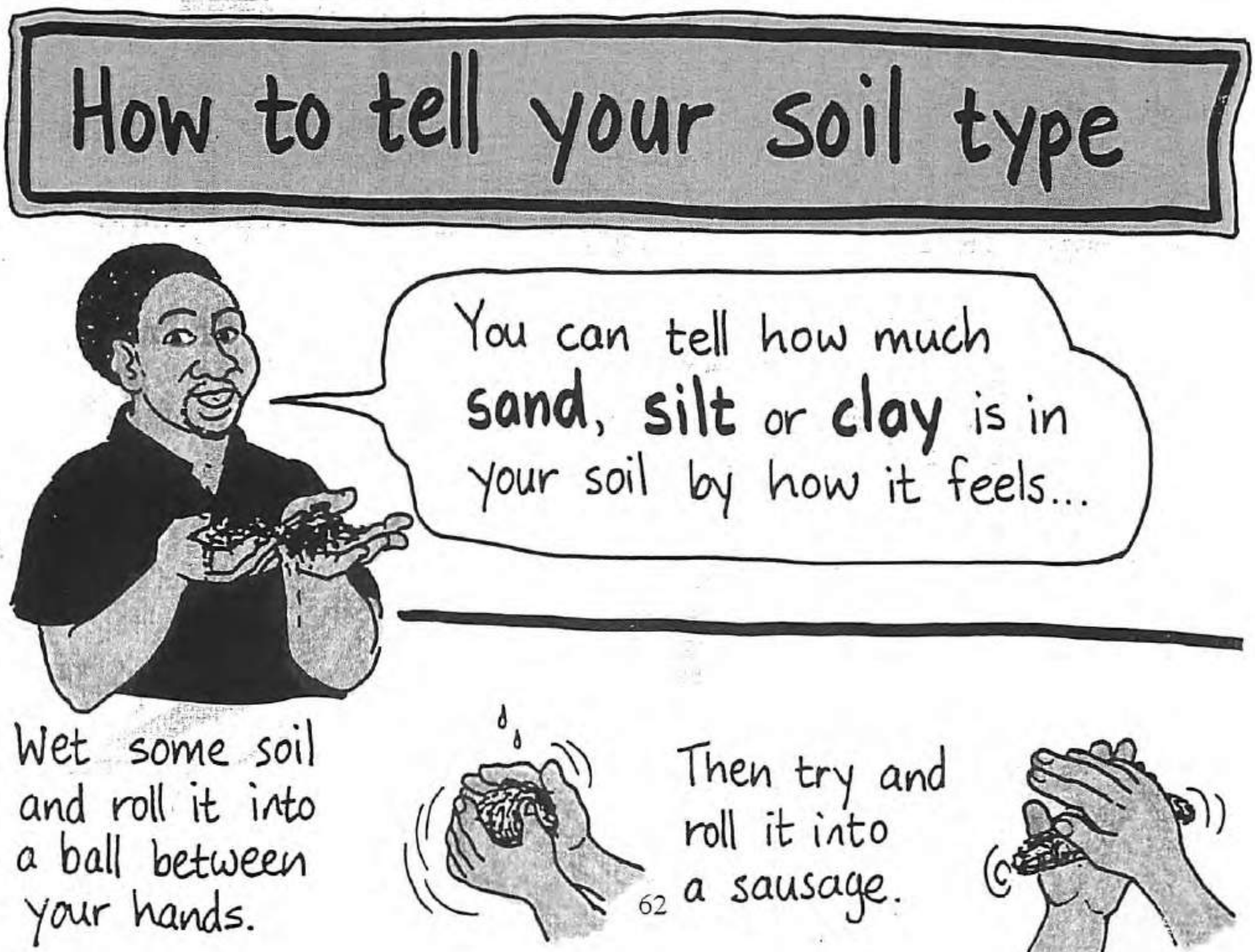
Use the following questions to stimulate discussion and analysis of the sample results:

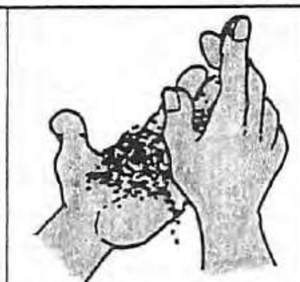
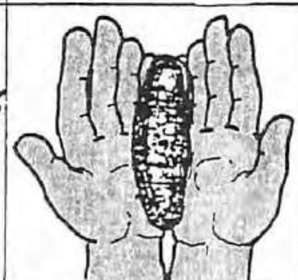
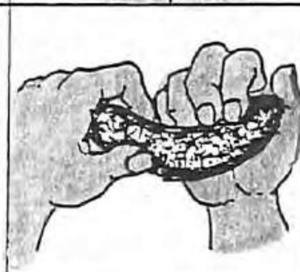
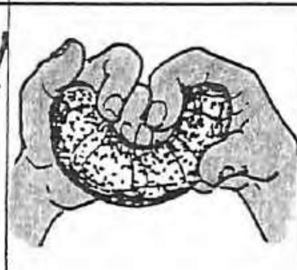
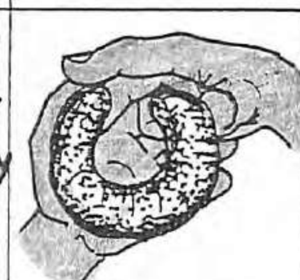
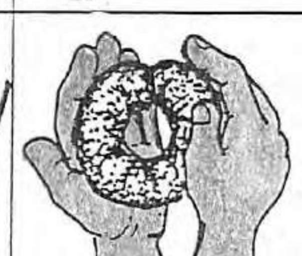
Species-richness is a reflection of soil fertility. Poor soils support fewer species and fewer individuals of each species. Fertile soils will have a high species-richness. In turn high species-richness also helps make soils more fertile. This is because many organisms help to turn organic mater into nutrients. Then, as organisms die and leave their castings, these decompose and add more organic matter to soil. While some organisms can be harmful to crops, with a high species-richness, they will be controlled by other organisms which prey upon them. "Good" and "bad" species will balance each other out and crop damage will be minimal. Also, if there is an abundance of organic matter, many larvae will prefer eating the organic matter instead of the crop roots or seeds. "Bad" organisms can become "good" organisms

Why do some soils have more kinds of bugs than others? Why do some soils have a lot of only one or two kinds? Which is better? To have a lot of different kinds? Or to have a lot of just one kind? Or to have nothing at all? Which soils are rich? Which are poor? Which have more organic matter?

c. **Analysis of soil texture:**

The mixture of sand, silt and clay particles in a soil is called "texture". Not all soil textures are the same. In farming, it is as important to know soil texture as it is to know soil fertility or soil health. What soil type does your farm have?



WHAT SOIL LOOKS LIKE	WHAT SOIL FEELS LIKE	WHEN ROLLED INTO A SAUSAGE		THE SOIL IS
VERY SANDY	VERY ROUGH	CANNOT BE ROLLED INTO A SAUSAGE		VERY SANDY
QUITE SANDY	ROUGH	CAN BE ROLLED INTO A SAUSAGE BUT IT CANNOT BEND		SANDY
HALF SANDY & HALF SMOOTH	ROUGH	SAUSAGE CAN BEND A LITTLE		SANDY LOAM
MOSTLY SMOOTH	A LITTE SANDY, QUITE SMOOTH BUT NOT STICKY	SAUSAGE CAN BEND ABOUT HALF WAY AROUND		LOAM OR SILT LOAM
MOSTLY SMOOTH	A LITTLE SAND QUITE SMOOTH AND STICKY	SAUSAGE CAN BE BENT MORE THAN HALF WAY ROUND		CLAY LOAM OR SANDY CLAY
SMOOTH	SMOOTH AND STICKY	SAUSAGE CAN BEND INTO A RING		CLAY

Facilitators notes:

Use these questions to stimulate analysis of soil types:

In a loam soil, sand, silt and clay are present in equal proportions. A loam is the easiest type of soil to work. It is also the most resilient to drought or flood. Some farmers think that they can adjust their soil type by adding sand, silt or clay to their soil until it becomes a loam. This is not practical. However, by adding organic matter in the form of compost or green manure, a farmer can make his or her soil act like a loam even if it is sandy, clayey or silty to begin with.

Which soil types are better for farming? Which are more fertile? Which drain or dry out faster? Which become waterlogged? Are some soil textures better for some crops than others? Which soils should go with which crops? Should all soil types be worked equally? What practices are not appropriate for sandy soils? Clayey soils? Silty soils? How can a farmer adjust the texture his or her soil type?

C. *Analysis of Findings / Results*

Field Surveys were carried out on three different farms and garden sites in the Umzumbe area, of Southern KwaZulu-Natal. The findings from the Field Surveys were discussed amongst the farmers to determine the most significant agroecological *problems*, their *causes* and their *possible solutions*.

The Field Survey helped the group understand that their water, fertility and pest problems were related to changes in the agroecology of the farms studied:

Pest explosions were understood to be caused by the development of resistance to pesticides by insects and the loss of insect predators. This was in turn caused by the overuse of insecticides on some predators, and the loss of habitat for other predators. Possible solutions suggested were the use of natural pest control methods such as rhubarb, ash, trap crops and bats (predators).

Fertility problems were understood to be associated with the high cost of chemical fertilizer which had become too expensive for farmers to use effectively. The general loss of natural fertility in the soil was thought to be caused by the lack of organic matter and the loss of nutrients from continuous cropping. Compost and cover crops were suggested as possible solutions.

Problems with water were various. In one case a spring used for hand-carried irrigation was drying up. The causes of its diminished flow were seen as originating in the loss of tree and ground cover in the catchment. In turn, these had been caused by overgrazing, and deforestation for firewood. There was some concern that the groves of gum trees at the top of the catchment may also have contributed to the drop in the water table. For the gardens drip irrigation, mulching and the building of small dams were identified as solutions.

The list of *possible solutions* to these problems were analysed to assess their appropriateness to the conditions and capabilities of the local farmers.

Here is a table to help one choose the best solution. In this table four different solutions to the same problem can be compared.

EVALUATION OF POSSIBLE SOLUTIONS

POSSIBLE SOLUTION	1	2	3	4	SCORE / RANKING
Felt Need?					Very strong-5; None-0
Financial Return?					1½ x Investment-5; Less than investment-0
Rapid Success?					O to I week-5; more than 2 years-0
Fit Local Pattern/Culture?					Yes-5; No-0
Utilise People's Resources? (eg. Land, water, skills, labour, materials)					All Resources-5; Only Land-0
Low Risk?					No risk-5; High risk-0
Labour Intensive?					A Little Labour-5; A Lot Of Labour-0
Simple?					Very easy-5; Complicated-0
Markets adequate?					Very good-5; Inadequate-0
Market Depth? (Different types of outlet)					High-5; Low-0
Ecological Impact?					Positive-5; Destructive-0
Communicated Efficiently?					Cheaply & Efficiently-5; Expensively & Inefficiently-0
Widely Applicable?					Any area-5; Only in 1-2 area -0
TOTALS:					

And an example of such a matrix constructed for the gardens in Umzumbe:

	Trap crops	Bat houses	Wood ash	Chilli & soap	Plant rhubarb
Felt need	5	5	5	5	5
Financial return	4	5	5	4	3
Rapid success	3	4	5	5	3
Fit local pattern/culture	5	5	5	5	3
Utilise people's resources	5	4	5	5	3
Low risk	3	5	5	5	3
Labour intensive	5	5	4	4	3
Simple	5	5	5	5	4
Markets adequate	5	5	5	5	4
Ecological impact	5	5	5	2	4
Communicated efficiently	5	5	5	5	5
Widely applicable	5	5	5	5	5
Totals	55	58	59	55	45

III. Small Scale-Experimentation

Farmers are natural experimenters. One only has to see them trying out new seeds, testing new products or trying different ways of doing things. Many times, women farmers are the first innovators, experimenting in their home gardens. Many new fruits, vegetables, herbs and fertilizers were first tested this way on a small scale before being taken to the fields.

Over the years, some farmer-promoters have perfected a method for small-scale, farmer experimentation. Here's what they suggest:

1. *Experiment to Overcome Limiting Factors:*

For agriculture to be more efficient and to produce more farmers have to experiment with alternatives which help to overcome the "Limiting factors" identified in their fields.

2. *Experiment on a Small Scale*

So as not to risk the whole crop of the family's food supply, experiments should first be tried out on a small piece of land (10m x 10m). In this way everything is not lost if the alternative fails. Something will still be learnt. The alternative may fail, but not the farmer!

3. *Experiment in Groups:*

Farmers cannot control the rain, frost, wind or even loose cattle and goats, sometimes! If a farmer experiments alone, many things can happen to affect the results of their experiment. When they are trying with something new, we should try it under many different situations to see where it does best. A group of farmers can experiment something new in many fields on different slopes, soils and conditions and then share their results with each other. As one farmer-experimenter said, "When I experiment with a group, I bring one experiment to share, but I take away the results from twenty more!"

4. *Experiment to Convince and to Promote:*

When a farmer experiments, he or she must observe, measure, compare, write things down and evaluate results. As the experimenter shares their results with others, this person is then an expert on the theme! If the experimenter has been careful with their experiment, they will be confident in their new knowledge. They will have clear arguments and explanations. They will be able to convince their neighbours of the advantages or disadvantages of the alternative they have tried. The very experiment itself will often convince others much more effectively than any speech or lecture.

5. *Experiment to Discover:*

Farmers are curious. Sometimes they aren't even trying to solve a specific problem, they are just "playing around" with new ideas or new tools. Sometimes when no one is looking "just for fun" they may try new seeds and different ways of planting, fertilizing or controlling insects, for example. Many important and unexpected discoveries arise this way. The home garden or house patio is often a good place to experiment in this way.

A. *Selection of Innovations*

Once the possible solutions have been scored/ranked each one of the farmers present decide which of the innovations they would want to try out. Usually they will choose one or a couple of the innovations suggested. Some farmers may even decide on some of the lower ranking suggestions as the most suitable options for them!

Here as an example is the ranking given by the Umzumbe farmers for the solutions suggested to their problems of aphids in their vegetable gardens.

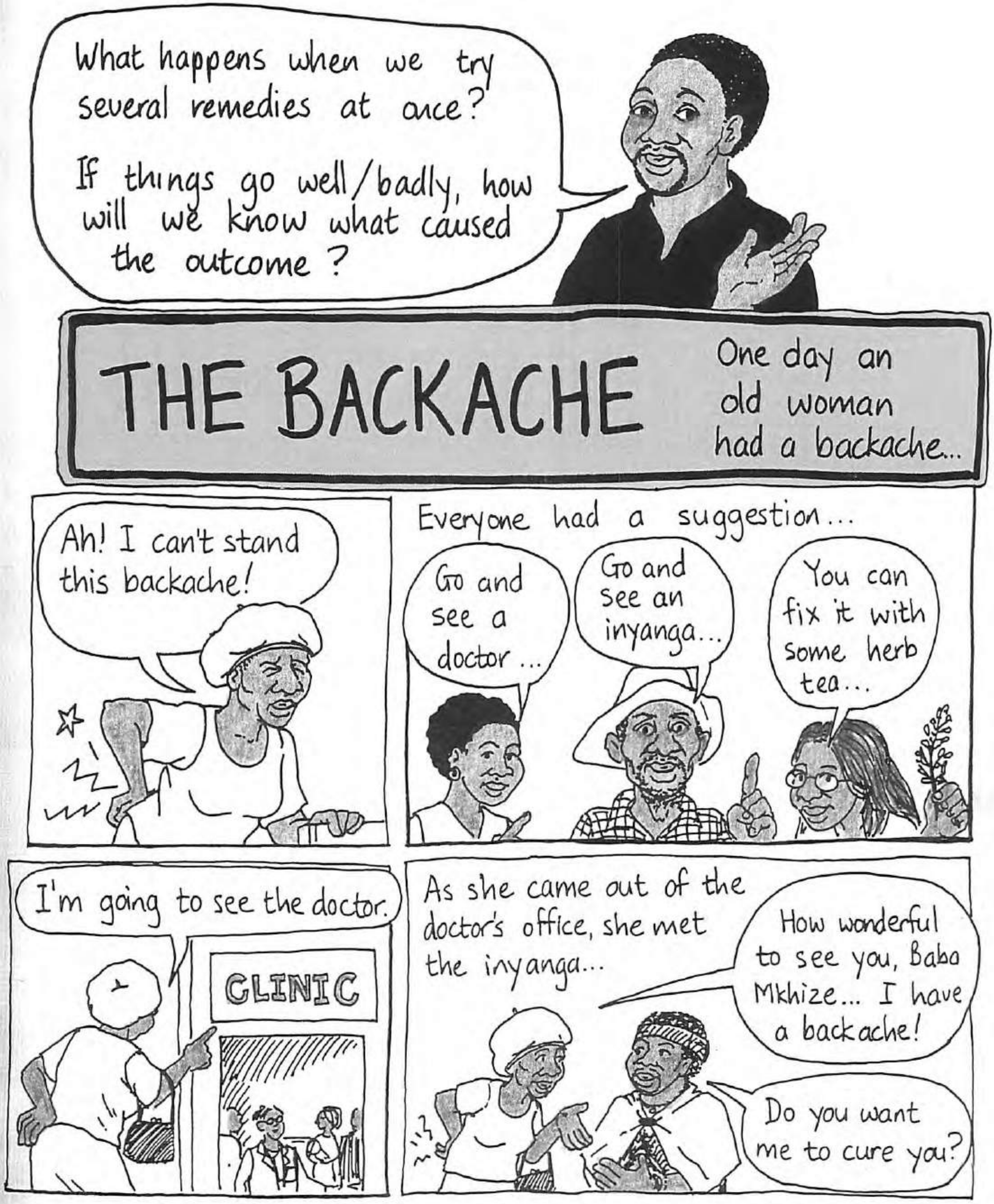
Score	Innovation	No. Of farmers interested in implementation
55	Trap crops	I I
58	Bat houses	I
59	Ash (Aphids)	I I I I I I I I I I I I I I I I I I
55	Chilli & soap	I I I I I I I I I
45	Plant Rhubarb	I I

Facilitators notes:

It is a good idea at this point to keep a track of the choices the individual farmers make. This will facilitate record keeping and the co-ordination of sharing the results of experiments.

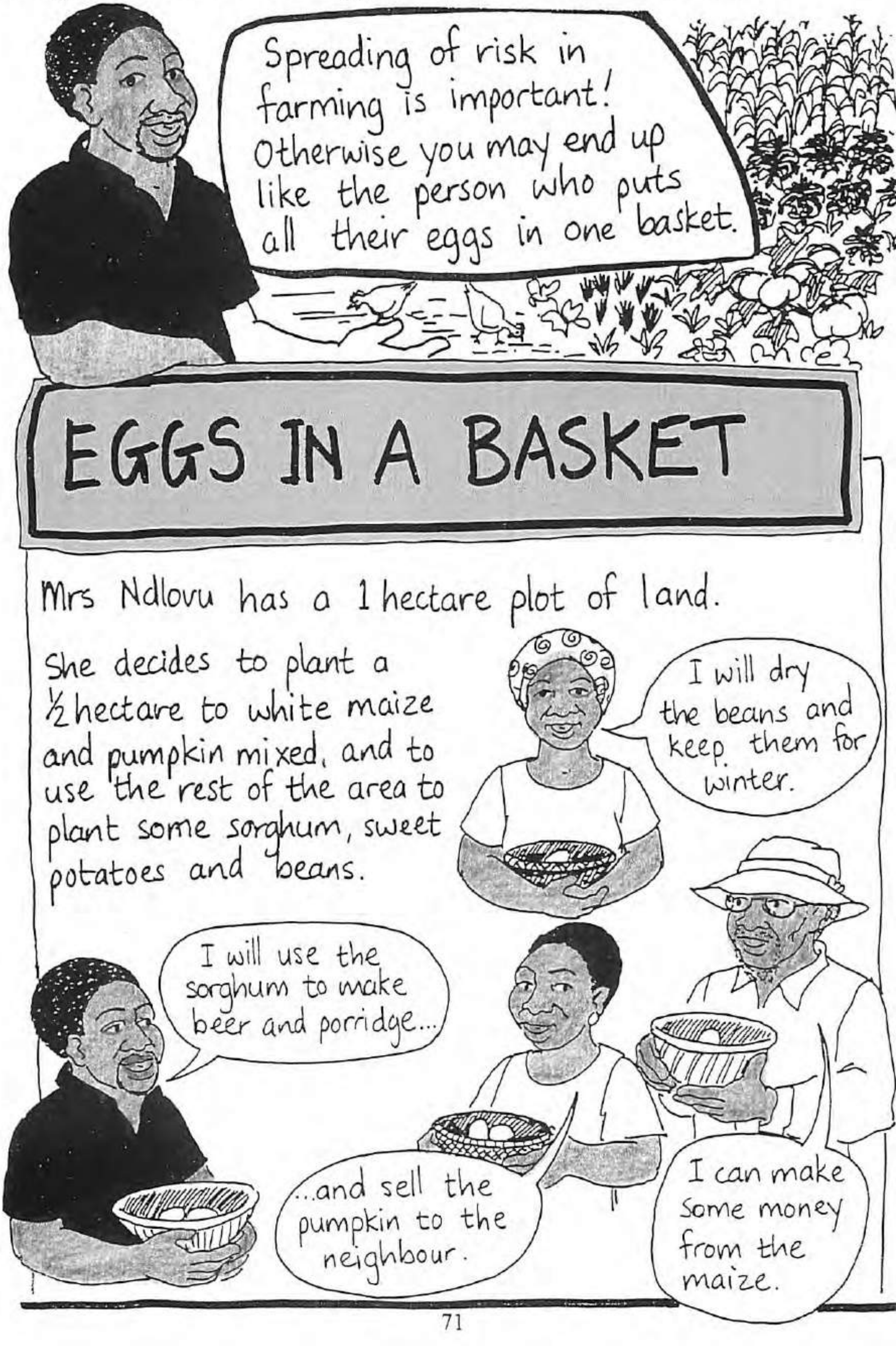
Before we try something new on a field or on the farm, we should test it in a small area first with a small-scale experiment. When we design the experiment, we must take care to measure and compare correctly or we will not be able to trust our results. One way of being careful is to test just one new thing at a time in each experimental plot.

The following story of the old woman with a backache illustrates why this is important:


What happens when we try several remedies at once?
If things go well/badly, how will we know what caused the outcome?
THE BACKACHE
One day an old woman had a backache...
Ah! I can't stand this backache!
Everyone had a suggestion...
Go and see a doctor...
Go and see an inyanga...
You can fix it with some herb tea...
I'm going to see the doctor.
CLINIC
As she came out of the doctor's office, she met the inyanga...
How wonderful to see you, Baba Mkhize... I have a backache!
Do you want me to cure you?

Ahh! The inyanga sorted me out...
INYANGA
The old woman went home and prepared the herb tea her friend suggested. She drank it with the medicine from the doctor and the muthi from the inyanga.
The next day...
Great! The pain has gone.
That's good! How did you do it?
Well, I guess it was the doctor, or the tea?
Or was it the inyonga?
Gogo! You took all the treatments at once. Now how do you know which one took your backache away?

The dramatizations of 'Three Blind Men' (see page 12 of this publication) and 'Eggs in a Basket' can also usefully be employed here to explain the importance of communication between experimenters as well as the importance of experimenting on a small scale, and spreading risk. Here is how the 'Eggs in a Basket' demonstration works:




Mr. Mkhize has a 1hectare plot of land...
This season I will plant the whole plot to white maize. I can sell this at great profit!
Now what will happen to Mrs. Ndlovu and Mr Mkhize if there is a drought?
The bean crop did very well.
I lost the maize...
...but some of the pumpkins grew!
The sorghum was attacked by birds but I will have enough for my family.
I have lost everything!
Which farmer would you rather be? Mrs Ndlovu or Mr. Mkhize?

Facilitators notes:

1) Introduce two farms: Mrs. Ndolovu's, (farmed by four family members), and their neighbour, Mr.Mkhize's farm (who farms alone).

2) Give each participant a basket. Say that each basket will represent a different crop

3) Give each farm six eggs. The eggs represent farmer economic investment and labour costs.

4) The family farm must decide which crops to grow and how much to invest in each crop. They must be creative (grow different kinds of crops). They must be wise (distribute their investment evenly over the different crops). This means they must distribute the eggs in all of the different baskets. Each basket represents a different crop (white maize, pumpkin, sorghum, beans).

3) Mr. Mkhize puts his efforts into one crop. He puts all six eggs into one basket (eg. White maize).

4) The participants then their baskets out in front of them.

5) Now flip a coin for each crop. Heads, the crop is good! The participant then raises the basket over their head. Tails, the crop is bad, the participant lets the basket fall to the ground! Flip first for pumpkin, then beans, then sorghum. Flip for white maize last. When the coin is flipped for white maize, the white maize baskets from both farms must rise or fall at the same time.

6) Count the number of good eggs left in each farm. Compare the farms. Which did better on their investment? Why?

The game is over when one farm breaks all of its eggs. That farm has gone broke and is the loser. If white maize does badly the first year, the game will be over right away. But if white maize does well, neither farm can lose the game right away. Continue playing. Pretend it is the following season:

7) Replace the broken eggs. Keep track of the number of broken eggs on each farm. Continue the exercise until one farm loses all it's eggs in one season. The game is over.(This will likely happen when white maize does badly and the white maize baskets fall. Then Mr. Mkhize will lose everything and the game is over.)

Facilitators questions:

Who lost more eggs? If Mrs. Ndolovu's farm lost more, why didn't it go out of businesses? Why did Mr. Mkhize go out of business? Whose farm was riskier? How does spreading risk increase the farm's chances of survival?

B Preparation of Experiments

From the list of innovations suggested, two were prioritised for small - scale experimentation during the workshop. The farmers design their experiments using the following plan as a guideline. They also drew a diagram of what they were going to do.

The diagram represents the layout of their fields and their experiments.

SMALL-SCALE EXPERIMENT PLAN
PROBLEM:
POSSIBLE SOLUTION:
WHY I THINK THIS SOLUTION WILL SOLVE THE PROBLEM (HYPOTHESIS):
HOW WILL I TEST THE POSSIBLE SOLUTION STEP BY STEP (PROCEDURE):
WHAT I WILL OBSERVE AND WHAT I WILL MEASURE:
HOW I WILL MEASURE THE RESULTS AND HOW I WILL COMPARE THEM TO MY USUAL PRACTISE:
DRAWING OF THE EXPERIMENTAL PLAN IN THE FIELD:

The one activity chosen as an experiment was the building of a compost heap. Farmers from Cornfields (near Estcourt, KwaZulu Natal) and Zimbabwe helped the farmers from Umzumbe to build their first heap.

Comments from farmers included:

"We have to be very careful about using fertilizer on some soils, because after years salt can build up in the soil. If this happens, it can rob the roots and the plants of water ..."

"I have seen that in the fields as time goes on, with fertilizer application, you find that it doesn't give you the same yields as it did when you first started using it."

"I think because we do not have so many livestock anymore, the only thing that could help us in nature to retain the ecology is to have a compost heap."

The second activity was around the use of alternative methods of aphid control. These included the use of woodash and a soap and chilli spraying mixture. One farmer from Umzumbe was assisted in setting up experiments using these methods. (See the pamplet inserts at the back of this handbook).

Facilitators notes:

Suggestions regarding experimentation:

1. *Measure carefully, don't mix different kinds of measurements and measure in multiples of ten. If you measure your land in hectares, the experimental plot should be 10 x 10 metres. This way, when you convert the results of yields in the 10 x 10 plot all you have to do is multiply by a hundred to know how much you would have yielded in a hectare.*

2. *Always compare the alternative practice in the experimental plot with the existing practice in a plot which is the same size as the experiment. If you don't compare the new with the old under the very same conditions you won't know if the results (positive or negative) are due to the superiority of the alternative or the different conditions. One way the two techniques can be safely compared is by placing the experimental plot in the middle of the field where the old technique is used. When it is time for harvest, first harvest the experimental plot. Then measure a plot in the field the same size as the experimental plot. This is the "control" measurement. Harvest this plot separately. Weigh and compare the results of the experimental plot and the control plot. If you have worked with a 10 x 10 metre plot, you will not only know your yield per hectare for the experiment but also for your field. (Now go ahead and harvest the rest of your crops.)*

3. *Don't try to test more than one practice in the same experiment. If you want to test a new seed and see how well compost works, for example, design one experiment for the seed and another for the compost. If you mix both into the same experiment, you won't know whether the result is because of the new seed or the compost. The advantage of doing small-scale experiments is that we can experiment with several new practices in the same field without mixing up the results.*

4. *Finally, **WRITE <u>EVERYTHING</u> DOWN!** Many farmer-experimenters who have trouble reading and writing get help from other family members in writing down their experimental design, observations and results. That's why we send the young ones to school, right? There are many expert farmer-experimenters who never had the opportunity to learn to read and write. Some older experimenters can no longer see well enough to read, but are still excellent farmers and innovators. Remember, with small-scale experimentation, each year we produce more experiments. Even people with very good memories soon forget important details as the number of experiments grow. By writing things down we can share our experiences with others for years to come, no matter how forgetful we may be!*

4. LEARNING MATERIALS

I. Principles of Farmer to Farmer Learning Materials:

One of the main principles of Farmer to Farmer is to disseminate information and innovations that farmers share, as widely as possible between them. In this way the information eventually serves to underpin a movement rather than an extension approach where the innovations continually need to be disseminated from a central point.

The information presented should be easily accessible and based on actual experience and examples. Usually the written information, taped interviews, photographs, slides and video footage are gathered and compiled during Farmer to Farmer events; during sharing of experimentation, results and innovations.

It may be necessary later to re-stage some of the steps and processes of the methods and innovations depending on the learning material being designed.

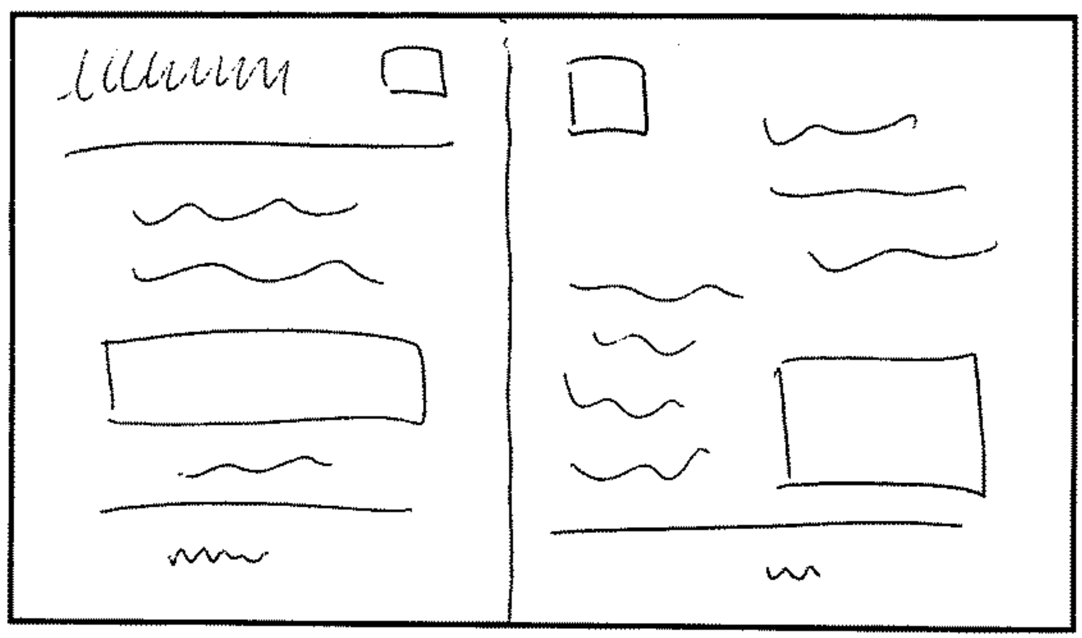
CHECKLIST OF BASIC PRINCIPLES:

1. Useful to peasant / small-scale farmers.
2. Based on actual experience.
3. Can be used by farmers / promoters to share with / teach other farmers.
4. Can be produced by promoters / farmers themselves.
5. Adheres to good adult education practise:
   - Caters for newly literate.
   - Most information can be gleaned from visual and audible input as well as writing.
   - Not too abstract and dense in terms of conceptualization.
   - Use uncomplicated layout and easy to read fonts / writing styles. (Tables, long paragraphs, too few headings, no pictures and newspaper text columns can all be confusing.)
   - Language should be easy to understand, sentences short and concise and flowery adjectives and adverbs should be kept to a minimum.
6. The material should be self-explanatory!

II. *Production:*

The steps involved in the production of learning materials are the following:

i. Identification of a farmer innovation.
ii. Gathering of material; written, slides, photographs etc.
iii. Analysis of material and re-staging if necessary.
iv. Design of learning materials e.g. a pamphlet.
- Design the layout and content using mock-ups of the actual pages. An example is given below.



Other learning materials produced during the workshop were a Farmer to Farmer video and slide show outlining the basic agroecological principles and fields activities of Farmer to Farmer.

APPENDIX I

Field Survey

A station is the place where the group stops to examine the soil, topography and vegetation in more detail.

OBSERVATIONS	STATION #1	STATION #2	STATION #3
Slope Steep Gentle Flat			
Topography Gullies Undulating Smooth			
Topsoil Depth Colour Organic Material (hi/med/low)			
Subsoil Colour Texture			
Soil Life No of different worms, insects and grubs in 1m² by 15cm deep hole			
Vegetation Density and types of trees, grasses, weeds, shrubs and crops			
Problems (Critical links and limiting factors)			
Possible Solutions			

FIELD SURVEY

Useful Questions:

Have the levels of production changed? For what crops? Why?

Is the depth and amount of organic matter of the soil different in different areas of the farm? Why?

Has soil depth and level of organic matter changed over time? How? Why?

How have the insects and weeds changed over the years? Why?

Did the introduction of fertilizers, pesticides and herbicides affect the production and the ecology of the farm?

Has the level of application of these chemicals changed over time?

How have the problems of the farm changed over time? (Remember to think in terms of the limiting factors and critical links)

FARM HISTORY

FARM NAME/OWNER: ______________________________ *GROUP NO:* __________

Earliest Memory of Farming:

- Vegetation types and density.
- Crops / stock.
- Farming techniques:
- Historical yields / stocking rates:
- Types and severity of pests / weeds:

First Use of Fertilizers, Pesticides and Herbicides:

- Vegetation types and density.
- Crops / stock.
- Farming techniques:
- Historical yields / stocking rates:
- Types and severity of pests / weeds:

Present Farming Situation:

- Vegetation types and density.

- Crops / stock.

- Farming techniques:

- Historical yields / stocking rates:

- Types and severity of pests / weeds:

PROBLEM ANALYSIS

GROUP NO: ____________ *FARM:* ____________________________

PROBLEMS	CAUSES	POSSIBLE SOLUTIONS