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Encouraging
adaptation and
adoption

PEOPLE DO NOT change by just looking. Conservation agriculture will not necessarily spread by itself. Few innovations do.

The techniques have to be adapted to suit local conditions. Conservation agriculture has to be supported and actively promoted by government, extension services, development agencies and the private sector.

Not only that: a drastic mind shift has to take place, not only in the minds of farmers, but also among extension personnel, government officials, researchers, and others involved in agriculture. Conservation agriculture goes against many of the things they have learned and regard as “true”: not ploughing, for example, or leaving as much cover on the soil as possible.

Training and extension are important ways to achieve this mind shift, as well as to provide the skills and information necessary. But they are not the only ways. This chapter describes various ways to promote conservation agriculture and adapt it to local needs.

The effort is worth it. Millions of lives could be changed if the message of conservation agriculture gets out to struggling farmers.

This chapter is aimed at extension agents, development workers and trainers who are interested in promoting conservation agriculture.

Adapting conservation agriculture

You have visited a group of farmers in the neighbouring district, and have seen how they practise conservation agriculture. Their crops look healthy, their soil is rich in humus, and they get good yields. You’d like to help farmers in your area take up conservation agriculture. They just need to copy the farmers you have visited.

Right?

Not necessarily. Technologies that work well in one place may not fit conditions in your area. Your area might get less rain. Your soil may be sandier. Farmers in your area may want to grow different crops.

So you may have to adapt the conservation agriculture technologies to suit your area. You might even have to invent new methods. It is not a question of technology transfer, but of adaptation and experimentation.

Conservation agriculture is not one set of techniques. Rather, it is a set of **principles** that can be adapted to suit local conditions. It is important for farmers to experiment and learn, and to share their results with their neighbours. Farmers can do this on their own, but it is much easier if extension agents, development workers and researchers can help them.

Adaptive research is a way of trying conservation agriculture (or any other technology) in an organized, systematic way. There are many ways of doing

it. Researchers can test technologies under controlled conditions on the experiment farm. They can conduct trials on farmers' fields. Farmers and extension personnel can take the lead, with researchers providing advice and support. Or farmers can do research by themselves, perhaps with advice or inputs such as seeds from researchers or extension staff.

Adaptive research is best if **farmers are at the centre**. This has various advantages:

- The conditions are realistic, so the technology is tested in real-world conditions.
- Farmers can draw on their own experience, and will choose to test things that they feel they can do and afford.
- People learn best when they are actually doing something and discovering for themselves, rather than merely watching someone else. Farmers can go on to use the same approach to test other innovations.
- Their results carry more weight and will be more credible to other farmers than if researchers were conducting the research.

Collaboration between researchers, extension staff and farmers combines everyone's knowledge, resources and energies. Farmers who have never tried conservation agriculture will be more confident about embarking on the research, taking calculated risks. Extension workers learn research methods and can help spread them and the technologies tested to other villages. Researchers become better aware of the needs and specific conditions that farmers face. This in turn helps them make their research more relevant to farmers and communities.

Farmer field schools (see below) are a good venue for adaptive research.

Remember the three principles of conservation agriculture:

- *Disturb the soil as little as possible.*
 - *Keep the soil covered as much as possible.*
 - *Mix and rotate crops.*
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An undiscovered gold mine

Conservation agriculture is a gold mine, waiting to be discovered.

- Conservation agriculture unlocks nature's regenerative capacity.
- Farmers can reverse the downward spiral they are in. Once they do so, nature will help them.
- The key is to stop the damage and destruction. Let nature's power become a reality on your farm.

Anyone can practise conservation agriculture – even a blind person ([see page 197](#)). You can learn it too!

Demonstrations or adaptive research?

Many extension agents and farmers are familiar with on-farm demonstrations ([see below, page 211](#)). Adaptive research is different in two important ways:

- In research, no-one is quite sure what results to expect, because nobody from the community has ever used the technology before.
- Research usually compares several alternatives with each other, to find out which one is best.
- Research usually tries to build and compare a basket of options, rather than assuming one single technology will be best suited for all farmers.

Things to adapt

It is possible to adapt many aspects of conservation agriculture. Here are some ideas.

- **Crops and combinations** Which crops and which varieties grow best in your conditions? When is it best to plant the main crop and the cover crop? Is there enough soil moisture to plant earlier? Is it better to plant closer or further apart? Which crops and cover crops grow best together? How much compost or fertilizer is needed?
- **Soil cover** What is the best way to maintain soil cover? Are there dual-purpose cover crops that provide both food and fodder? Can traditional local cover crops be used instead of exotic types?
- **Equipment** Conservation agriculture equipment can be hard to find, too expensive, or not suited to local conditions. But artisans can adapt existing designs or make their own. Examples of such adaptations include the Zambian Magoye ripper, planter, subsoiler, the Ugandan AEATRI knife-roller and the Maresha modified conservation agriculture implements in Ethiopia.

In some situations, it may not be possible for farmers to use a full conservation agriculture approach. But they can still introduce some of its elements and benefit from improved yields and reduced soil erosion. Some examples:

- **Tillage methods** It may be impossible to introduce zero tillage, especially when tef is the main crop. Alternatives may be strip tillage, minimum tillage or a single ploughing (rather than multiple ploughings). Farmers can still improve the soil structure and fertility by rotating crops. They can control weeds and obtain livestock fodder by planting cover crops.
- **Livestock** It may be impossible to keep livestock off the conservation agriculture fields – especially in semi-arid areas where large numbers of animals are hungry in the dry season. Farmers may have to compromise with livestock owners – for example, to allow the animals into the field for a limited time only, so some cover is still left as mulch. Both farmers and animal owners have to protect cover crops, just like a field of food crops.

A story of on-farm research

Below is a story about how one group of farmers tested a new conservation agriculture technology on their farms. They followed a number of steps, from identifying a problem to assessing the results.

This story is fictitious, but it is realistic. It shows that things do not always go as planned – but that farmers can conduct research and that they can learn a lot from it.

Identify the problem to study

At a meeting, a group of 10 farmers agree that a key problem is to find the best time to plant lablab in their maize field. Only one of them has actually planted lablab, and he got mixed results. Some think they should plant as early as possible; others have heard it is better to wait a little. But nobody, including the extension agent herself, is quite sure!

Identify the alternatives that may help solve the problem

The farmers discuss the issue extensively and get some feedback from a researcher working nearby. They and the extension agent decide to test three planting times: (1) planting the maize and lablab simultaneously; (2) planting lablab 2 weeks after maize; and (3) planting lablab at the first weeding, about 1 month after the maize.

Decide on the details of the experiment

The farmers and extension agent decide that three farmers will do the experiment during the next growing season. Each one will plant two of the three alternatives, as well as a “control” plot without lablab, which is what they are used to. Each farmer will plant a small plot 15 rows wide by 40 m long for each of the two alternatives and the control. They decide to monitor lablab germination and growth, the labour costs, any signs that the maize might be suffering from competition by lablab, as well as maize and lablab yields. Each farmer will need to record the corresponding information. Since two of them do not know how to write, they will need to ask for help from their children.

The group decides to organize three field tours for the group members: 1 month after planting, at maize flowering, and at harvest time. The extension agent and the researcher will attend as well.

Establish the experiments

The extension agent and farmers help the farmers establish the experiments. Things go almost as planned, even though the extension agent showed up 2 hours late. Fortunately, the researcher was there on time. The only worry is that one farmer planted 3 weeks later than the others, because she was not feeling well.

Monitor the experiments and conduct the field tours

The monitoring is not easy. One farmer forgot to record the information about labour and about competition. Another got confused and recorded the information in a rather chaotic manner. But fortunately, the third farmer did what was expected, with the help of her older son. The three field tours are quite a success, even though not everybody came, and not all fields looked great. And the researcher missed the third tour because his car broke down. But the tour took place anyway, and everybody had a lot of fun.

Continued...

A story of on-farm research (continued)

Assess the results and take a decision about how to plant lablab

With all the results available, the group and extension agent meet to look at what happened. The researcher is invited, as well as everyone else in the village. Flipcharts are presented, and there are even a few photographs. Of the three experiments, one did not work well: the farmer who planted late got sick again, and could not control weeds. Her lablab did not produce anything, and her maize yielded little. But the other two experiments worked well: they show clearly that it is better to wait before planting lablab.

Farmers agree indeed that planting lablab at the first weeding is best, because it saves labour. The maize produced more in the plots with lablab than without.

At the end of the meeting, everybody is quite satisfied. Some farmers who are not part of the group ask for some lablab seed. The group itself wants to keep experimenting next season, but on something different. They ask what other cover crop they could plant in their maize fields? They have heard of pigeonpea and mucuna. Some wonder if fodder trees would be better than lablab, because they have trouble feeding their livestock. They ask the researcher to come back with information on all this, and they ask him to get as many different seeds as possible. The researcher promises to do his best.

Ways to promote conservation agriculture

Conservation agriculture may be difficult for people to accept because it goes against many of their cherished beliefs. The biggest obstacle is to get people to understand that ploughing destroys soils and the environment. Once they accept this, they may be willing to try something new.

It is not just farmers who have to change their thinking. Universities, agricultural training institutions, extension providers, researchers and the farming community itself must also change. Training is key to bringing this about.

Ironically, conservation agriculture practices are not totally new in Africa. Many are traditional practices that have been forgotten. It is time to bring them back.

Conservation agriculture can be promoted in many different ways:

- **Training** Training is necessary for various groups, including farmers, implement makers, input suppliers and extension personnel.
- **Extension** The government extension service advises farmers on farming technologies. It provides advice and training, and manages demonstrations and field days. It can be an important promoter of conservation agriculture.
- **Demonstrations** Demonstrations enable farmers to see conservation agriculture in practice before they try it out themselves.
- **Farmer field schools** This is a participatory extension approach in which farmers get together to study farming in their own fields.

- **Farmer champions** Farmer champions are people who have adopted conservation agriculture methods and can demonstrate their success to their friends and neighbours. Because they farm locally, their neighbours are likely to listen to them and copy what they do. The champions can provide advice or seed, and can help organize other farmers into interest groups to further promote conservation agriculture.
- **Farmer-to-farmer extension** Farmer-to-farmer extension involves using farmers as extension agents.
- **Farmer organizations** Farmer organizations can provide vital support to conservation agriculture efforts, especially when it is still new in the area.
- **Schools and churches** Schools and churches can play a key role in promoting conservation agriculture.
- **Other ways to share experiences** include field days, exchange visits, videos, and even radio programmes.
- **Farming as a business** Conservation agriculture offers an opportunity to encourage farmers to see their farms as a business, rather than merely a way to feed their families. Changing these attitudes can also promote conservation agriculture itself.
- **Multiple stakeholder partnerships** Partnerships between extension, NGOs, various levels of government and the private sector are needed to promote conservation agriculture.
- **Entrepreneurs** Conservation agriculture may require some new types of equipment (rippers, planters) and agrochemicals (especially herbicide). People who make this equipment and who sell the inputs needed are vital if farmers are to have what they need to use this approach.
- **Policy support** Governments can promote conservation agriculture, or it can hinder it. Experience in other countries has shown the importance of appropriate policies for the success of conservation agriculture.

The rest of this chapter discusses each of these approaches in turn.

Training

When planning a training course on conservation agriculture, think of the participants' particular needs.

- **Farmers** need practical skills in preparing the field, planting, controlling weeds, and so on.
- **Group organizers and extension agents** may need training on how to organize farmer field schools or use other extension methods.
- **Equipment manufacturers** need to know how to make and use different types of equipment.
- **Extension workers and researchers** need training in technical aspects of conservation agriculture – on the principles as well as on how to do it.

The entry point and coverage of training courses will also depend on what the participants already know. Build on their existing skills and knowledge. The training should give them information they can use directly in their own work. It should be as practical as possible. Training is best done not in the classroom, but on the ground – in farmers’ fields, with farmers.

Planning a course on conservation agriculture for farmers?

Here are some of the most important topics to cover when teaching conservation agriculture to farmers. The appropriate sections of this manual are in *italics* in the list below. Choose the topics you need for your particular group of participants.

- **What is conservation agriculture?** ([Chapter 1](#))
- **Addressing the problem** Soil fertility and erosion, destructive role of ploughs ([Chapter 4](#))
- **Change of mindset** ([Chapter 12](#))
- **Field preparation and planting** Direct planting, permanent planting stations (making and using strings, making holes, seeding rate in holes), ripping, subsoiling (training animals, correct spacing, correct seeding rate in lines) ([Chapter 3](#)).
- **Conservation tillage tools and implements** Operation principles, adjusting and maintenance ([Chapter 3](#)).
- **Training work animals and users** ([See the next box](#))
- **Soil cover** Use of cover crops, dry vegetation and crop residues as mulch ([Chapter 5](#))
- **Crop rotation**, choosing crops and crop combinations, seeds, integrated pest and disease management, agroforestry ([Chapter 6](#))
- **Improving soil fertility** Manure, compost, inorganic fertilizer, making compost ([Chapter 4](#))
- **Weed management in conservation agriculture** Mechanical, herbicides ([Chapter 7](#))
- **Rainwater harvesting, soil and water conservation** ([Chapter 8](#))
- **Integrating livestock** into conservation agriculture ([Chapter 9](#))
- **Weed management** ([Chapter 7](#))
- **Conservation agriculture as a business** Planning a business, record keeping ([Chapter 11](#))
- **Promoting conservation agriculture** Working with groups, management of farmer field schools ([Chapter 13](#))
- **Social and cultural issues** Gender, HIV/AIDS, food and nutrition, schoolchildren, youths, physically and mentally challenged farmers ([Chapter 12](#))

Training on draught animal power

It is necessary to train both the draught animals and their handlers on conservation agriculture. Here are some topics to cover.

- Selecting and caring for draught animals.
- Making yokes and harnesses.
- Harnessing draught animals.
- Roping, yoking, walking in pairs and in pegged rows, pulling light weights and progressively increasing the load.
- Using equipment safely.
- Health of work animals.
- Feeding work animals, including supplementary feeding.
- Challenges in integrating animals in conservation agriculture operations, including cover crops.
- Using and transporting conservation agriculture equipment (direct planters, knife-roller, ripper, sprayer, subsoiler).
- Using equipment for managing crops, planting, ripping, spraying and transportation.
- Setting implements, calibration, and handling during field operations.
- Stripping and reassembling manual and animal-drawn tools and implements.
- Maintaining and replacing worn-out implement parts.

Training for blacksmiths and artisans

Implements such as rippers and subsoilers are still hard to find in many areas. With suitable training, blacksmiths and artisans can make them. Here are some topics to cover in a course.

- Blacksmithing problems that participants face in their workplace.
- Essential blacksmithing equipment and tools for conservation agriculture.
- Safety and organization in the workplace.
- Lighting the forge, managing the fire, and heating metal to the correct temperature.
- Blacksmithing operations and their application to conservation agriculture tools and spare parts. Provide designs for each implement showing how to make them from locally available materials.
- Importance of quality and standards, and interchanging implement parts.
- Making and using jigs and fixtures.
- Finding and identifying useful scrap materials.
- Setting up a rural blacksmith workshop.
- Pricing and marketing of products.
- Bankable smithing technology ideas.

Training for input dealers

Local shopkeepers and dealers may need training so they can sell the right item to farmers, and so they can advise their customers on how to use them. Some topics they may need training in:

- Using equipment (so they can demonstrate to their customers).
- Adjusting planters and sprayers so they deliver the right amount of seed, fertilizer or herbicide.
- Using herbicides correctly and safely.
- Maintaining and repairing equipment.
- Characteristics of crop varieties (so they can advise farmers on what crop and variety to buy).
- Storing and planting seeds.
- Storing fertilizers and other agrochemicals safely.

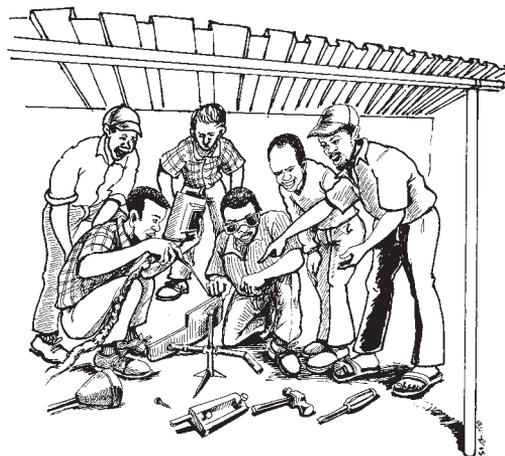
Training for extension staff

Here are some topics to consider including in training courses for extension personnel – in addition to the topics [in the box on page 208](#).

- **Situation analysis** Analysis of local conditions for conservation agriculture, e.g., identifying problems, socioeconomic issues, SWOT (strengths–weaknesses–opportunities–threats) analysis.
- **Participatory approaches** such as participatory rural appraisal.
- **Organizational capacity building** Training on leadership skills, participatory planning skills and participatory monitoring and evaluation.

Because conservation agriculture involves a change in attitudes, it is important that participants come to “own” the approach. This is best done by enabling them to test technologies themselves, empowering them to decide what to try out, and through networking: providing them with ways to get more information.

Joint training, with extension staff and farmers learning together, is a good way to spread the message of conservation agriculture. The farmers hear and understand certain issues, and the extension officers others. During discussions, the two groups remember dif-



Practical training is vital if blacksmiths are to learn how to make conservation agriculture equipment

ferent issues, and they complement each other. The result is generally considerably better than if the extension staff or farmers are trained separately. It is quicker to pinpoint mistakes and correct them when working together.

Training on conservation agriculture is also needed in schools and universities. This means revising the curriculum and designing new courses for schoolchildren, agriculture students and trainee extension agents.

Extension

The government extension system provides essential advice to farmers on a wide range of topics. Extension staff should understand and appreciate conservation agriculture, so they can support and promote it where appropriate. This understanding is also important so they do not discourage farmers or contradict the efforts of people promoting conservation agriculture. So extension agents should learn about conservation agriculture as part of their regular training.

Agents should promote conservation agriculture in their normal extension work with farmers. They can do this in many ways. As with all types of extension work, practical demonstrations in farmers' fields are better than "chalk-and-talk" in the classroom or village meeting room. The agents can help organize farmer field schools – which are ideal opportunity for the agents themselves to learn about the potential and intricacies of conservation agriculture. They can also organize visits by farmer groups to farmers who are already practising conservation agriculture, arrange for demonstrations of equipment such as rippers and weed wipers, and facilitate supplies of seeds, herbicides and other inputs that farmers may need.

Participatory extension approaches are important to reach farmers effectively. These approaches enable everyone involved to work together: farmers, extension agents, local leaders, etc. These people can analyse their needs, problems and opportunities. They can decide on their priorities, and explore possible solutions to the problems. They can draw on their own knowledge and skills, and add new ideas from outside. This strengthens their ability to solve other problems they may face.

Demonstrations

Demonstrations are a valuable way for farmers to see a new technology for themselves before they are ready to take the risk of trying it. Demonstrations are best done on farmers' fields, rather than on land owned by the extension agency or research institute. It is important to select the right farmer cooperators to demonstrate the technologies. They should be progressive and well-respected in the community. Try to find someone who is already using many

of the components of conservation agriculture – for example, certified seed, fertilizer and herbicides. This farmer will not have to make too many changes to introduce other components of conservation agriculture, so may be more willing to try them, and the demonstration is more likely to be a success. Avoid absentee farmers or weekend farmers, as they will not have the efficient day-to-day management skills on the farm to ensure success.

To start a demonstration programme in a village, select a few farmer cooperators to work with. They should farm near each other so they can visit each others' fields easily – perhaps every 2 weeks. Since they live in the same village, they can discuss the ins and outs of conservation agriculture easily, and can reassure and learn from one another. A group of 5–8 farmers attracts more attention from others than if only one or two farmers are testing the technology. The extension agent can focus effort in this village, rather than trying to cover too wide an area. If the agent has only one demonstration a season, he or she may take several years to learn from the mistakes made.

The members of a farmer field school (see below) may welcome the opportunity of hosting demonstrations.

When first introducing conservation agriculture, choose villages that are easily accessible. This makes supervision easier, allows more people to come to see the demonstrations, and makes it easy for input suppliers to deliver what the farmers need on time. Once the community has adopted the approach on a wide scale, the agent can move on to neighbouring areas – inviting farmers there to visit successful conservation agriculture fields in the initial village.

Farmer field schools

A farmer field school is a partnership between farmers and extension personnel, and perhaps the private sector and researchers. It consists of a group of up to 25 farmers who have identified a problem and agree to meet with a facilitator to discover solutions to it. The farmers meet regularly – perhaps every one or two weeks – throughout the cropping season, in their own fields. They learn by doing: they observe what is happening in the fields, analyse and prioritize problems, discuss and implement possible solutions, and evaluate the results.



People remember 20% of what they hear, 40% of what they see, and 80% of what they discover themselves

Farmer field schools in western Kenya

The first delicate lilac blossoms of water hyacinth spelled disaster for the fisherfolk of Kusa in western Kenya. The aquatic weed had invaded the Nyando District shore of Lake Victoria, choking their fishing grounds. The fishers were forced to start farming to earn a living.

But their problems did not end there. The rain is unreliable, and erosion is severe. AIDS has taken a heavy toll on the younger generation, causing a shortage of labour.

In search of solutions, RELMA (the Regional Land Management Unit, now part of ICRAF) sponsored 20 farmers to go on a study tour in a neighbouring district. There, they learned about conservation agriculture, and they decided to form a group to use these methods on their own land. The farmer field school approach offered an attractive, affordable way for them to learn and test the new practices.

In 2003, the first year, an agronomist from the Kenya Agricultural Research Institute (KARI) branch in Kisii guided ten field-school groups. Each group had about 20 members. Each group selected a "model farmer" to host the main demonstrations and to take responsibility for guiding the other farmers. The model farmers learned how to use the Magoye ripper and tested two cover crops, lablab and mucuna, on small plots.

They tested five different conservation agriculture practices and adapted them to the local conditions. They liked using planting basins for growing fodder crops such as Napier and bana grass.

Training in the general principles of farmer field schools put the Kusa farmers at the centre of the learning process. This essential step was followed with on-farm trials to test intercropping or relay planting of the new cover crops with maize, residue management, and minimum tillage.

The farmer groups also worked with Ministry of Agriculture extension staff to test new varieties of maize and beans. The field schools made the extension officers' work easier because it allowed them to try the new varieties in a structured setting.

The farmer field schools cost outside agencies fairly little. Their main inputs were transport for the senior trainer from KARI, seed for cover crops, and four Magoye ripper/sub-soilers imported from Zambia.

There was not enough cover crop seed in the first year. One model farmer, Mr Owalla, harvested enough lablab seed to sell (at KSh 50 per kg) at least two kilograms of seed to each of the other members of his group. Farmers have now planted at least 50 acres to lablab, so there is plenty of seed to go round.

There are still challenges with promoting this approach. There is no source of Magoye rippers in Kenya. Local welders in Kusa tried to make them, but could not find the high quality steel needed.

A strong local organization is needed to organize such field schools. In this case, the Kusa Community Development Society performed this role, but such organizations do not exist everywhere.

But perhaps the main challenge to scaling up the use of conservation agriculture in places like Kusa is the lack of skilled, experienced facilitators like the one from KARI. His ability to motivate and train farmers is based on several years of work with the farmer field school approach, coupled with a strong knowledge of conservation agriculture practices.

More information: John Odingo

The emphasis is on farmers discovering answers rather than listening to lectures by an extensionist or researcher. The farmers learn by themselves and from each other.

Farmer field schools are an ideal venue to introduce a new approach such as conservation agriculture. The farmers can see and test a new technology before adopting it. The field schools can draw on the skills and knowledge of outsiders, such as researchers and technical advisers. These can advise on how to solve specific problems. The field schools are also ideal for doing research to adapt conservation agriculture techniques to suit local conditions.

The field schools can be combined with other approaches to extension. For example, the facilitator may arrange for the field school members to visit a research institute or farmers in a neighbouring district, and to host their own groups of visitors. The group's experimental plots make ideal locations for demonstrations.

Farmer champions

It is usually possible to find several farmers in an area who have tested and developed some sort of conservation agriculture on their own, however incomplete. Other farmers may be eager to try conservation agriculture: they like to keep improving their farm, and they have heard about conservation agriculture somehow.

From drug dealer to champion and trainer

By the time he reached his 30s, Molahlei was a dubious character. He would grow marijuana on his farm in Lesotho, and sell it over the border in South Africa. But in 2003 he was introduced to conservation agriculture. He saw its dramatic potential to increase his yield and income. He soon became a farmer champion in his area. His harvests rose by an amazing 1000%.

Molahlei is now an executive member of his community's conservation agriculture committee. He cannot give you a long CV of academic qualifications... but when he works with a group of farmers, you realize this is one of the best farmers you will ever meet. He is proud of being a farmer.

Molahlei and other farmers have put a series of comic skits together to convey the ideas of conservation agriculture. The skits are hilarious: the audience rolls on the floor with laughter. When they have loosened up the audience in this way, Molahlei and his friends start to teach them practical things.

This is one example of a farmer who became a champion, and who is training people far more effectively than his own teacher did.

More information: August Basson

These farmers are a precious resource for conservation agriculture programmes. They are highly motivated, and may have already adapted conservation agriculture principles to local conditions. They can be excellent partners for extension agents and researchers to develop further options. Many farmers are happy to share their experiences with fellow farmers.

These farmers can become champions of conservation agriculture in their communities. They can become magnificent trainers and motivators, through their enthusiasm and success. They also have the unique ability to convince politicians and policy makers about the value of this approach.

Extension agencies and conservation agriculture programmes should help these farmer champions develop links with other farmer champions, and with farmer organizations and service organizations. They may need help to experiment further – for example, to obtain inputs or to cover the risk of an experiment failing. They may also need assistance in documenting and sharing their findings with other farmers.

Farmer-to-farmer extension

Extension agents are few and generally overworked. They have to serve large numbers of farmers, cover large areas, and deal with a vast range of topics. Plus, many have only limited direct experience in farming, so farmers naturally view them with some scepticism.

Farmers themselves can make excellent extension workers. They have practical experience and credibility, and with a little support, can train their fellow farmers in conservation agriculture, organize farmer groups, arrange activities such as field visits, facilitate farmer field schools, and so on. Farmer facilitators should not be seen as an alternative to the regular extension service; rather, they complement and reinforce the work of extension staff. Well-motivated farmer champions can make excellent facilitators.

Farmers' organizations

To succeed with conservation agriculture, farmers need to work together. Getting training or credit, buying equipment or seeds, setting up small trials of new techniques, learning – these are all easier in a group. Some things are possible only if people collaborate – banning burning of crop residues, for example, or establishing rules on grazing.

Local institutions such as community organizations or farmer groups may be able to support the introduction of conservation agriculture. Such groups may already exist, even though they may not focus on farming. For example, a community organization may enable credit, health or schooling. But such an institution may be able to add a conservation agriculture focus – perhaps by

creating a special committee among interested members. Otherwise, it may be necessary for farmers to create a new organization. Extension agents and development workers can assist them to do this.

Whether old or new, local organizations may need outside help so they can support their members adopt conservation agriculture. They may be able to benefit from technical training, participation in field days and exchange visits, linkages with other groups or institutions, and leadership development.

Schools and churches

Schools and churches can play a key role in promoting conservation agriculture.

Teachers can teach conservation agriculture as part of the regular curriculum, both in the classroom and on the school farm. They can organize agriculture clubs to involve children in growing food for the school.

Churches are also important promoters. An active priest or pastor can inspire an entire congregation to try out conservation agriculture as a way of lifting

Farming God's Way

One church in Lesotho teaches conservation agriculture as "Farming God's Way" – farming alongside nature, and not against it.

The pastor uses questions and answers like these to challenge people to start to think differently about agriculture:

- Who is the best farmer in the whole world? (*Answer: God.*) (*Genesis 2:8*)
- We are made in God's image, therefore we are co-creators with God. (*Genesis 1:27*)
- Would you like to become one of the best farmers in the world?
- If God is the best farmer in the world, we have to learn from Him.
- Have you ever seen God's angels, tractors or animals coming from heaven to plough up the soil?

The pastor invites his congregation to look for the lessons they see in nature, and bring the same principles to their farms:

- Nature does not turn over the soil, so you should not have to either.
- Nature produces a thick blanket of mulch on the ground. Your soil needs such a blanket (cover crop, mulch).
- Nature has a diversity of plants. So rotate crops on your farm.

"Learn from the best farmer in the world", the pastor urges, "and you have the potential to become one of the best farmers in the world."

More information: August Basson

School children promote conservation agriculture

A few banana plants and one teacher's determination have had big results in a school in central Kenya.

Mr Githiomi, an agriculture teacher at Gathunguru primary school, aimed to introduce pupils to intensive farming using the school's 2.5 acre garden. At first he tried several crops using conventional farming methods, but yields declined each year.

Then in 2001, he attended a field day on conservation agriculture organized by Makuyu Divisional Agricultural Office. Mr Githiomi was impressed. He explained conservation agriculture to members of the school's 4K Club (part of a national youth organization). The school's head teacher helped him buy 50 tissue-culture banana suckers from Jomo Kenyatta University of Agriculture and Technology. The club planted them in the school garden, using cover crops and other conservation agriculture principles.

The fruit yield was excellent. Many more children and several teachers joined the club.

The improved soil fertility stimulated the growth of many new banana suckers. Mr Githiomi and the club members gave some suckers to the children to plant in their parent's gardens back home. Some of the teachers and members of the Parent-Teachers Association were also given suckers to plant.

That year, the club added kidney beans, French beans, cowpeas, lablab, green gram and sweet potatoes as cover crops to the banana garden.

The club later decided that parents could take banana suckers but should donate maize grain to the school in return. This maize is milled and used to make school meals. For the first time, the school is able to provide lunches for its pupils.

The head teacher also decided to invite the local extension agent to teach new banana management skills to the teachers and children.

The Gathunguru school is not unique. Similar initiatives in four primary schools in Uganda through a Sida-funded programme called "Farm-level Applied Research Methods Research" also had a tremendous multiplier effect.

themselves out of poverty. Many Africans are very religious. They easily make the link between God, nature and good farming practices. Churches are ideal venues for promoting conservation agriculture. They are closely involved in the community, and have strong networks throughout the country. It is their responsibility to address poverty.

Pastors can draw on various passages of the Bible to support their points. For example, Genesis (*Gen 1:26*) says that God has set us as stewards of creation, and not to destroy it.

Other ways to share experiences

Because conservation agriculture has so many aspects, sharing experiences is important so farmers can continue to learn from one another. But sharing does not happen by itself. It has to be facilitated.

Farmers' organizations in Uganda

Farmers' organizations in Bisheshe sub-county, in Mbarara District, are promoting conservation agriculture. The organizations are organized in a hierarchy, from community level up to parish, to the sub-county, to the district and national levels.

Unlike most hierarchies, this one works from the bottom up. Groups of farmers in each village with the same problems and interests come together as "**common interest groups**". They pool their efforts to find ways of solving their problems. These groups each focus on one of range of topics: trees, livestock, horticulture, and soil and water conservation. Conservation agriculture is one of these topics.

The chairs of the various common interest groups are members of **coordination committees** at the parish and sub-county levels. Other committee members include civic leaders, opinion leaders and extension staff. The committee coordinates activities of the various common interest groups, and links them with service providers, extension agencies, NGOs and community organizations.

The common interest groups inform the parish coordination committee of their production problems and training needs. The committee then develops a parish **action plan** to respond to the various groups' needs. It identifies **community facilitators** (interest-group members who have been trained in the appropriate skills) to provide training. If the facilitators lack the right skills, the committee asks the sub-county committee to find an appropriate service provider.

The interest groups are members of a parish-level **inter-group association**. This association helps mobilize resources for savings-and-credit schemes and marketing. The associations took over the training and supervision of the common interest groups in December 2004, when ULAMP, a donor-funded project supporting them, ended.

More information: Anthony Nyakuni

Here are some ways to encourage and enable people to share:

- **Field days and visits to fields** where conservation agriculture is being used or tested.
- **Fairs, shows and competitions** are good ways to attract a lot of attention to conservation agriculture.
- **Exchange visits and exposure tours** among distant farmers' groups. These may last several days; the visitors may stay overnight in the host village or nearby.
- **Yearly meetings** of farmer-innovators, community leaders and extension officers. These meetings can present (as posters or orally) experiences and the results of experiments. Inputs such as seeds, products or implements can also be displayed.
- **Videos** can include interviews with farmers, and show various parts of the cropping cycle and farming operations that visitors cannot see during a single visit.
- **Drama and songs**, like the comedy skits used by Molahlei and his friends in Lesotho.

- **Question-and-answer sessions** with researchers, extension specialists or farmer champions.
- **Open meetings** (meaning everybody is invited!). These are a good opportunity for farmers, extension agents, researchers and others to share their experiences and motivate local people and technicians about conservation agriculture.
- **Radio and television programmes** can raise awareness about conservation agriculture among farmers, extension agents, development workers and decision makers throughout the country. Local community radio can help spread the news about conservation agriculture and enable farmers to share experiences with other people in the area.

With all these activities, it is important to follow them with concrete activities to make sure the momentum created does not evaporate.

Farming as a business

Conservation agriculture offers farmers an opportunity to see their farms in a new way: as a business. Extension agents and development workers should encourage them to do this.

Conservation agriculture offers this opportunity because it allows farmers to increase their yields, produce more than they need for subsistence, and grow new crops they can sell. It can offer a market and trading orientation, and enables farmers to find a pathway out of poverty.

To be successful, many farmers will need to change not only their attitudes. They will also need new skills – in choosing crops to grow for the market, in sorting, grading and marketing their produce, in post-harvest processing, and so on.

Growing tomatoes as a business

Hoplang is a young farmer in Tebellow, in the mountains of Lesotho. He farms an acre of land that his father gave him. He, his wife and small child live in a small house, measuring only about 4 x 5 m. He has little chance of finding work nearby, and he does not want to leave his family to look for work in the city.

Hoplang does not have much. But he is willing to work. He was introduced to conservation agriculture, and someone gave him some pipes so he could water his land.

He has taken the principles of conservation agriculture a step further than he was taught. He figured that if you can grow maize this way, you can also grow tomatoes. So he planted about 3000 tomato plants, along with other vegetables such as cabbage. In one season alone, he was able to sell \$1000 worth of tomatoes.

This young farmer has changed his single acre into a living example that conservation agriculture works, and that it can be a profitable business.

More information: August Basson

They will also need to develop links with traders, transport providers, input suppliers, and so on. They may need to organize themselves into groups to enable them to obtain supplies and services they need at an acceptable price, and to sell their crops in sufficient bulk to get a good price in turn.

Here are some ideas for how farmers can treat their farms as a business:

- **Choose the right crops** Farmers should consider growing high-value crops such as leguminous fodders and vegetables. They might grow a variety of crops to overcome oversupplied seasonal markets.
- **Organize** A group of farmers can organize to buy inputs such as seed and fertilizers in bulk, and save on the purchase price and on transport costs. As a group, they can negotiate for loans with a bank or credit institution. They can store produce and sell it more easily than as individuals – perhaps at a more distant market where prices are better.
- **Get information** Farmers often do not know how much their produce is worth. As a group, it is easier to find and share information about what crops are in demand, where to sell them, and at what price. Groups can also get information about new varieties and new techniques more easily.
- **Add value** Farmers should consider how to add value to their produce. This may mean something as simple as sorting and grading. It may also mean planting at a different time (to avoid the peak harvest time when prices are low), storing the produce until prices recover, arranging packing and transport so perishable produce arrives at the market quickly and in good condition, or processing produce to improve its storability or increase its value.
- **Keep records** Few small-scale farmers keep records of their crops or what they buy and sell. Good records are vital if farmers are to treat their farms as a business. Without records, they cannot tell how much profit they are making, or whether they would make more money by switching crops or adopting a new technology. [See Chapter 11](#) for more.

Multiple stakeholder partnerships

Conservation agriculture is not “business as usual”. It requires a number of radical changes in the way farming is done. Farmers must make some of these changes themselves. Others are needed at the community level (for example, organizing groups). Others involve input retailers (to sell herbicides, seeds and equipment), NGOs (to provide training, help with organizational issues, study tours, etc.), credit institutions, government agencies such as extension and research services, etc. And some may even require linking with institutions abroad – for example, to import no-till equipment.

This means the success of conservation agriculture will depend on many different people and organizations. It is important to form partnerships to promote conservation agriculture. Farmers, farmers’ organizations and commu-

nity organizations should, of course, be key actors in these partnerships. They are, after all, the ultimate beneficiaries of efforts to promote conservation agriculture. But they need to make sure that promotional activities respond clearly to their needs, and take into account their situation, knowledge and beliefs.

Extension staff and development workers are also key. They should be involved in almost every conservation agriculture-related activity.

Other stakeholders should work alongside them, depending on the nature of the activity.

Roles of stakeholders

Here are two examples of stakeholder partnerships, highlighting the roles played by each member.

Example 1: Conservation agriculture equipment

- **Farmers** and **extension staff** test the equipment.
- **Researchers** help design the equipment tests, and advise the equipment manufacturers.
- **Manufacturers** and **distributors** attend field days to see how farmers are doing. They discuss the equipment with them, how to use it properly, and check any potential improvements to the design.
- **Credit institutions** provide loans so farmers can buy the equipment.
- **Government services** may need to provide subsidies to enable farmers to buy the equipment.

Example 2: Field days

- **Conservation agriculture farmers** host the field days, describe their experiences and answer questions.
- **Other farmers** who have not yet tried conservation agriculture listen and ask questions.
- **Extension staff** help the hosts get ready for the field day – e.g., by helping them make flip charts. They also help prepare the logistics: transportation, refreshments, taking notes, etc.
- **Researchers** come to learn about conservation agriculture, listen to farmers' experiences, and provide technical information.
- **Community leaders, project personnel** and staff of supporting institutions help mobilize farmers and give a formal character to the field day.
- **Private input retailers** may be invited if products they sell have been used in the fields visited. They may cover expenses such as for signs, stationery and refreshments.
- **Politicians** may be invited to learn about conservation agriculture and the type of support needed from government.

Small-scale entrepreneurs and private business

The success of conservation agriculture depends on the availability of the right equipment (subsoilers, weed wipers, etc.) and inputs (such as herbicides and cover crop seeds). This offers opportunities to manufacturers and input suppliers to make these supplies available.

But there is a “chicken-and-egg” situation: manufacturers and dealers are unwilling to produce or stock equipment and inputs unless they are sure there is a demand for them. At the same time, farmers cannot buy these items if they are not on sale.

Development organizations can help by demonstrating the new techniques to farmers, liaising with manufacturers and dealers, extending credit to suppliers so they can invest in equipment or stocks, and guaranteeing initial orders for equipment (or subsidizing their price) until the demand has been established.

[See Chapter 10](#) for more on input supplies and equipment manufacture.

Policy support

Agricultural policies can do much to promote conservation agriculture. In countries such as Brazil where conservation agriculture has been widely adopted, such policy support was vital.

Agricultural policies should focus on improving access to market, credit and input supplies, and rural infrastructure. They should support the development of farmers’ groups. Incentives should encourage diversification and conservation agriculture practices, especially during the transition phase from conventional farming to conservation practices.

Appropriate product pricing can raise productivity per unit land and reduce pressure on marginal regions.

Inadequate policies and subsidies that support conventional practices might discourage farmers from adopting conservation agriculture. Land use and customary rights must also be taken



Secure tenure is important if people are to invest in their land

into account. They may have to be adapted to favour conservation agriculture.

Subsidies and other incentives can also support the spread of conservation agriculture. Subsidies may be justified because the government wishes to ensure national food security and prevent erosion and pollution.

Policies must guarantee farmers long-term rights to the land they farm. If they do not have secure tenure, they will not be willing to invest in improvements to the land through conservation agriculture.

Governments must also ensure that extension services and other agencies support and promote conservation agriculture. This may involve:

- Promoting **research** on conservation agriculture.
- Changing the **curricula** in extension training institutes and universities.
- Building conservation agriculture into the **extension programme**.
- Ensuring that the extension service becomes more **farmer-centred** – for example, to encourage collaboration with NGOs and facilitate farmer field schools.

