

Environmental care session plan:

Materials:

Conservation agriculture (CA).
Soil and water conservation manual for Eritrea (SWC).
Soil fertility and land productivity (SF).
Enclosures to protect and conserve (EPC).
Conservation agriculture in Zambia CZ).
Sustainable agriculture: A pathway out of poverty for East Africa's rural poor (SA).
Management of rangelands (MR).
Managing dryland resources (MDR)
More forage, more milk (MFMM)

Agroforestry:

Agroforestry in dryland Africa (ADA).
Teacher's manual, Agroforestry in dryland Africa (TADA)
Useful trees and shrubs for Ethiopia (UTSE).
Useful trees and shrubs for Kenya (UTSK)

There is a good variety of material in this topic. Some of the books give overviews of conservational methods, these will be your core texts which will provide basic understanding of the topics. There are also a number of case studies such as Conservation agriculture in Zambia CZ) and Sustainable agriculture: A pathway out of poverty for East Africa's rural poor (SA), these provide a good look at how other communities, comparable to your own, have employed these methods successfully. These are an important resource as they should help to bring the techniques and methods into a practical realm, making people feel they could try them as well.

The difficulty with teaching a topic such as this is that the benefits are long term, people need to be thinking at least one and even up to ten years ahead. It is difficult to get people thinking in this way when they are worried about feeding their families the next day or week. The case studies should help somewhat in achieving this difficult task. The final type of books is reference books: Useful trees and shrubs for Ethiopia (UTSE) and Useful trees and shrubs for Kenya (UTSK). These will be useful in helping people think about putting ideas into practice, they hold the answers to which trees and shrubs will grow in your area, how to prepare the seeds and what uses they have. Many of the case studies will talk about trees and shrubs used in the projects, you can use the reference books to look up those plants and see if they would be suitable for your area too. The reason the book for Ethiopia and Kenya have both been included is that the Kenyan book includes more relevant species and local names for the trees and shrubs, but is organised alphabetically making it rather hard to find which types are suited to dryland areas. On the other hand, the book for Ethiopia is organised by Agroclimatic zones so is easier to navigate and still includes many relevant species, thus you should use the Kenyan book when you know which species you want information on and the Ethiopian book when you are wondering which species to use.

Session 1: Degradation

There are no materials for this session. You are interested in what the group has to say and what they can see in the land around them. That is not to say that you do not need to prepare, you should still create a session plan to help you guide and facilitate the discussion of the group.

For this session try to get a varied age group, for young people the landscape simply is how it is, older people will remember it being different and thus better illustrate changes which have occurred.

In this session you want to find out about the group's knowledge of environmental care and their interest in it. If you find that there is little interest in it then this is your opportunity to create some. Clearly point out the direct links between the environment and their livelihoods. If these are known but people have accepted degradation as a natural, unavoidable consequence then make it clear that it is not so; it can be avoided and even reversed.

Ideally this session would be a field trip where you go to an area which has suffered degradation and discuss what you see around you. The discussion should include the impact which it has on the community as well as the land, for example:

- trees being felled, increases erosion, reduces soil fertility and makes the collection of firewood more difficult and time consuming
- over farming causes reduced soil fertility which in turn reduces yield which in turn causes hunger

Make a list of the things which people have noticed changing, why they are changing and what effect the change is having. This list will provide you with good guidelines as to what people are most aware of and disturbed by. Finish the discussion with the topic of prevention, have any preventions been attempted? Have they been successful? If not why (Did goats eat tree saplings? Did some people not agree to leave a patch of land ungrazed?...)?

Session 2: What causes land degradation

(Chapter 1 SF, p 13-19 CA, Chapter 3 SWC, p36-39 MDR,)

In the last session you explored the state of the surrounding land and how it had changed over time. In this session the focus should be on why it has happened. Identifying the problem is a big step towards resolving it. Get people thinking about what it is that causes erosion and degradation? You should get responses like: farming, too much grazing or cutting down trees. These are correct, but they are only the beginning. In this session you want to explore at why these practices lead to land degradation.

For each identified causal agent create a cycle of effect which is as detailed as possible. Draw one up before the class as an example, chose something which you know will be mentioned such as the felling of trees. Get the class to talk through the cycle step by step. If you feel that they are grasped the cycle concept well, then split them into groups and give them each a causal agent to draw a cycle for. If you do not feel this will be easy or efficient then create cycles as a class. If possible do these on flip chart paper leaving room for regenerative measures to be added later.

Although it may seem unconstructive to have a whole 2 sessions on problems without discussing possible solutions, it is a complex issue and one that can not be resolved without good comprehension of the problem. If people begin to ask

why you are not talking about solutions, explain this and tell them that now that this understanding has been established you will begin to describe conservation agriculture methods, agroforestry possibilities and ways to manage rangelands all of which can significantly contribute to preserving and regenerating land.

Session 3: Enclosures to protect and conserve.

(EPC, UTSK, UTSE, p114-122 ADA, 10 TADA)

Review the ideas discussed in the first 2 sessions of this topic, the cycles of land degradation. The key message that must be understood is: "bare land leads to erosion and as the land erodes, less and less grows as more and more soil is swept away". An effective way to avoid this happening and to regenerate eroded land is to create protected enclosures. The pamphlet provides grasses and trees that could be planted in such enclosures. This is a very short pamphlet but it is well and simply written and provides all the detail needed about the suggested plants.

Discuss with the class if they have tried doing this before, if so what problems did they come up against? How might these be overcome? Use questions from 10 TADA to get people thinking about the importance of trees. Ask how they will help in regenerating land? How do they help the community? Enclosure would be a good place for trees to be planted as they would be protected from grazing animals.

Get people thinking about individual, group or community action to make protected enclosures, they are necessary to truly regenerate land and the results can be amazing. They also can help to produce fodder for animals which can lead to greater numbers of healthier livestock, to increase the amount of firewood and to increase the value of the land.

If the group is small enough make this an outdoor session where you walk around a little, looking at the grasses which you could collect seeds from; or the types of trees you would try to plant. Perhaps suggest a few areas which could be protected. If you have a large group then bring in some grasses which you have picked, show them pictures of the trees in the reference books, draw out the village and surroundings and with the help of the group try to find an area which could be protected.

If people are positive, immediately get into practical questions. How many people would be involved in each protected area? Would it be families or family groups? Who might build the fence? Who would maintain it? Who would collect the grass seeds? How would the animal fodder be shared? Where would the tree saplings come from?...

Session 4: Agroforestry an introduction

(Chapter 1 ADA, section 1, 3 and 4TADA)

What is agroforestry and what are its uses? Start by having the discussion outlined in the teacher's manual. Then ask the class if they know about any agroforestry practices, if so get them discussing what they know and think about them, if not outline some to be discussed. If you know areas where agroforestry is being practiced, go and visit a site with the class, maybe you could have the discussion suggested in the TADA about that area instead of the picture. Briefly review and discuss what you think are the agroforestry practices most relevant to your area and group. Then look at 1.3 ADA the role of agroforestry. Do people agree with the importance attributed to agroforestry? Review the importance of

tree planting from the last session, are all those important points still relevant here? What is the difference between agroforestry and tree planting?
Now complete section 3 and 4 of TADA. Make sure you have read enough of ADA to know the answers to all the questions.

Session 5: Conservation agriculture an introduction

(Chapters 1, 2 and 4 CA, Chapter 2 SF)

Revive the issue of soil fertility from the previous session and look at it in more depth. Why is it important? What causes its degradation? What effects does it have on farming? Once these issues have been established introduces the ideas which conservation agriculture is based on.

- Disturb the soil as little as possible
- Keep the soil covered as much as possible
- Mix and rotate crops

Ask the class why they think the practices would help improve soil fertility. Make sure these points are clearly stated and understood:

- Protects soil from erosion (by wind and rain) and limit weed growth
- Prevents hardpans from forming
- Increases soil's fertility and ability to retain moisture
- Minimises likelihood of pests and diseases thriving

Added bonuses:

- Reduce production cost
- Overcome shortage of labour and farm power

CA includes a nice table (p11-12) comparing conventional and conservation agriculture. You could make this into a game whereby your audience helps you fill in the blanks, start by having them tell you what is done at each stage in conventional agriculture and you provide the counterpart, once they have got the hang of it try to get them to come up with ideas about what the conservation step might be. It does not matter if they do not get it quite right; the important thing is to get them thinking about how to farm with the 3 key ideas in mind.

Session 6: conservation agriculture and introduction cont.

(Chapters 1 and 13 CA, Chapter 2 SF)

Review what was covered last session. Hopefully this will involve very little input from you, ask leading questions to get the class to tell you what conservation agriculture is all about.

Then go on to the next table which looks at the effect of conventional agriculture vs conservation agriculture (p14-18 CA). If in the last session people enjoyed doing the table as a class and you feel this exercise worked well continue in the same way. If only a few people were talking and the others looked bored or tired then you could make this a small group exercise with each group being given 2 or 3 titles (e.g. erosion and soil structure) and either the effect of conventional farming or conservation farming. The group then need to figure out the effect of the other. It is important that you look closely at the effects of conventional farming as well as those of conservation farming as many people will simply be farming in the way they always have without really thinking about the impact of each process.

If it was a small group exercise, have presentations and then a group discussion. Otherwise just have a group discussion to review what has been covered and air any questions.

Your next topic is "challenges of conservation agriculture" some of these may come up naturally in the discussion, address them as soon as they do and introduce those that haven't, also outline the risks involved this will help people see that you are speaking transparently, not just trying to paint a rosy picture. Everything has risks, being open about them early will help ensure that they are minimised and that no one is wrongly held accountable. You may have time for this in this session if not create a whole session around it.

Session 7: Converting to conservation agriculture

(Chapter 2, 11, 13 CA and CAZ, SWC, SA, Chapter 4 SF this seems like a lot of reading, don't worry! You do not have to read it all, just look through the different case studies available and chose a couple)

Outline the 3 suggested stages of conversion. This is your opportunity to get people planning a realistic way, or at least establish who is interested, and have them thinking about forming groups.

If they do not ask the "questions to ask" (p28 and Chapter 11 CA) bring them up, get them thinking and talking about them as real possibilities. Outline the content of CA, the detail which is available should they want to try conservation agriculture. This would be a good time to introduce a case study or two. You need not go into great detail, give an overview of one or two which you feel people would relate to.

As an activity you could get groups to produce an action plan of the steps that would need to be taken to start conservation agriculture. Try not to get details in these plans, not in what they would plant but in what kind of farmers group they might put together, where they might try it out, what they would need to acquire in terms of materials, what kind of expenses they would incur...

Then have presentations after which you would look into the differences between people's plans and why they chose to do it in a certain way. If they seem interested propose a session looking in more detail at the case studies or the practicalities of conservation farming.

Where to go next?

If there is high interest continue with conservation agriculture sessions, look in depth at each of the steps of conservation agriculture. For this you could have a session for each of the chapters 3 to 10 CA. If people are not interested do not do this section yet, leave it until there is a demand. And skip to session 14.

The aim of the following sessions is to outline in detail the steps of conservation agriculture so that people can see the changes they would have to make. It is unrealistic to think that people will go away from these theoretical sessions and know exactly how to practice conservation farming. What is realistic is that people decide they like the sound of it, understand it, can picture themselves doing it and would like to learn more.

As much as possible you should intersperse the sessions with mentions of the case studies, these provide examples of how the generic model of conservation agriculture has been personalised to different locations. With your goal in mind you will have to be somewhat selective with the material, so as not to bore people with technical detail which they can not picture. The primary activities for these sessions will probably be group discussions giving people a chance to digest the new ideas and share their thoughts on them. These would probably be best done as a class to get maximum input, however if you do not feel the group

discusses well as a whole, you could have them as small group discussions. If and when people decide they would like to start conservation farming you will have to provide further support, giving lessons in a more practical arena.

Session 8: Field preparation and planting

(Chapter 3 CA, CAZ)

Refer back to the tables which you produced earlier so that the students can see where this fits in the grander scheme and which effects each stage relates to. Then outline the different planning processes to the class. Once you have outlined them all have a discussion about the pros and cons of each one and which they think would be effective here.

At this stage you could also mention the conservation agriculture adaptation made in Zambia. You are not telling them about these for them to copy them, it is simply to show that adaptations can be made to the generic ideas to make them more suitable to different areas.

You may want to leave the section on weeding till session 11.

Move on to using the right amount of fertiliser. Find out what people use now, would this save or increase their output. Discuss with the group how they feel about these aspects of conservation agriculture?

Session 9: Keeping soil healthy

(Chapter 4 CA, Chapter 3, 4 SF)

Refer back to the tables which you produced earlier so that the students can see where this fits in the grander scheme and which effects the stage relates to.

Have a short discussion about what makes soil unhealthy and its effects on productivity. Try to get people talking about their personal experiences.

Explain what organic matter is and how to make soil healthy again.

Have a discussion about whether they already do any of these things? Ideally you want to relate these new ideas as much as possible to what they already do so that the changes do not seem too big.

Then outline the section about how to keep soil healthy. Look through the case studies in chapter 4 of SF and see if any are appropriate to use here to illustrate these methods in practice and discuss with the group.

Session 10: Soil cover

(Chapter 5 CA)

Refer back to the tables which you produced earlier so that the students can see where this fits in the grander scheme and which effects the stage relates to.

Discuss in detail and add clarification to what crop cover is and why it is important. Then move on to explaining the importance of choosing the right crop cover, do not just go through the list. Look at it carefully and choose a few plants to talk about, you will notice there are few which are suitable for arid area, this is an important problem to discuss. Are there ways around it? Could crop residues or prunings be used instead? Have any farmers tried to grow these plants before? Were they successful?

Next outline the issues on p92-96 and discuss them briefly. Then move on to the concept of mulch, outline its different sources. Discuss where it would be likely to come from in your area, you need not narrow it down to one but there may be sources which are more prolific than others, try to identify these.

Last look at the challenges of maintaining soil cover, which are the farmers worried about? Are these issues insurmountable? Probably not, but solving them will take imagination, as a group start thinking of ways around them.

Session 11: Crops and cropping systems

Refer back to the tables which you produced earlier so that the students can see where this fits in the grander scheme and which effect the stage relates to.

Outline the different cropping systems and find out what people do. Outline the pros and cons of each one. Crop rotation is one of the key principles of conservation agriculture, ask the group why they think this is and complete their reasons if any are missing.

Next move on the issue of selecting crops and varieties, discuss what people already grow and what they might like to grow. Then go through the points to consider when choosing a crop. With these points in mind ask people what they think might be successful crops and rotations to chose.

Lastly move onto the challenges and as before think about their importance in your case and how they might be overcome.

Session 12: Agroforestry in croplands

(Chapter 4 ADA, 7,8,9 TADA)

The major constraint on the growth of young trees is grazing animals. With conservation agriculture animals are kept out of the fields thus providing an ideal space for planting trees. Trees grow well with most crops as they have deeper roots systems and therefore there is no conflict for nutrients or water. Ask people what they think would be the benefits of growing trees with their crops. In dry areas where cover crops are hard to grow, trees could provide an alternative source of mulch, they could also be used for fodder...explore these ideas with the class.

Next briefly outline the 5 options for agroforestry in croplands. What are the pros and cons of each one? Does one stand out as being best suited to this area? Think back to the session on enclosures, which might be appropriate trees? 7,8 and 9 of TADA have some good points to consider, go through them beforehand and decide if you want to use them as complete discussions following the outline of the relevant practice or if you want to pick and chose some questions from within them.

Session 13: Controlling weeds

Refer back to the tables which you produced earlier so that the students can see where this fits in the grander scheme and which effect the stage relates to. Have a discussion about what weeds are, what problems they cause to the crops and how people currently deal with them. What are the pros and cons of the methods people have outlined. People will probably have good knowledge on this topic so only add information if necessary, if they come up with the different methods and pros and cons themselves then content yourself with writing what they say down in an organised manner to provide them with a clear and complete overview.

Then outline the options for managing weeds which cover soil and crops. Explain that with conservation agriculture weeds can be a big problem for the first few years but if they are controlled well for that period, they will reduce so much that very few will grow. Weeding is one of the biggest challenges faced by newly converted farmers, be open about this in the interest of transparency.

If people are interested in using herbicides or use them already continue with the next section. If not you can skip it to keep people focused on the issues discussed.

Session 14: Conserving soil and water

(Chapter 8 CA)

Refer back to the tables which you produced earlier so that the students can see where this fits in the grander scheme and which effect the stage relates to. You should also emphasise that in dry areas this should be combined with water harvesting methods. If these have not yet been covered you could give a brief overview and inform them that there will be sessions on these methods.

Explain that the conservation of soil and water are linked, a method that conserves one almost always conserves the other as well. Find out if they currently use any conservation methods and if so what are they? Then outline the various soil conservation methods. Discuss which would be best suited to your area? Are there a few different ones that could work or is one the clear winner.

Then move on to the water conservation, explain the 5 ways in which conservation agriculture helps conserve water. Then outline techniques which can be used to harvest extra water, follow this with a discussion about which of these might work in the area. In this chapter there are a few small case studies, share some these with the group, they are short you can read it to them as a story. Do these shed any light on which technique might work here?

Session 15: Agroforestry with soil and water conservation.

(Chapter 5 ADA, 11, 12 TADA)

For this session follow the teacher's guide. You will have to write the lecture part of the session from the reading in ADA but the manual will guide you through the discussion parts.

Session 16: Agroforestry with soil and water conservation cont.

(Chapter 5 ADA, 13, 14 TADA)

For this session follow the teacher's guide. You will have to write the lecture part of the session from the reading in ADA but the manual will guide you through the discussion parts.

Session 17: Livestock

(Chapter 9 CA, 3,4,5,6,7 MFMM, EPC and UTSK)

Refer back to the tables which you produced earlier so that the students can see where this fits in the grander scheme and which effect the stage relates to. For many the changes made to livestock care will be big. Discuss current livestock care, most will probably say that the animals graze on crop residue, however, in conservation agriculture they should be kept out of the fields. Some crop residue can be used to feed the animals but people will most likely need to start supplementing their diets. The idea of spending time getting food for animals is foreign to many and it can be difficult to convince them to change their ways.

Discuss in detail the reasons why animals need to be kept out of the fields, these are the topics that have been covered in previous sessions so should be fresh in people's minds. Outline and discuss alternative sources of feed and their practicalities. Provide details of different fodder plants and shrubs which might be appropriate for your area and how they can be grown. Although not mentioned in this book *Acacia tortilis* is a tree very well suited for drylands from which the pods and dried leaves can be used as fodder. Also look up *Terminalia brownii*, *Zanthoxylum chalybeum* as trees and see EPC for potential fodder grasses. Briefly

outline the other benefit of planting these trees, but do not let it take up the session, it is covered in Agroforestry.

Use this session to gauge how receptive people are to the idea of feeding their animals as oppose to only grazing them. This topic will also be touched on in the livestock section so you will revisit it. If people are very opposed, spend sometime finding out exactly why before you next touch on it. If they are quite open to the idea make sure that next time you approach the topic from a very practical angle to try and get people doing it.

Session 18: Harvesting and people

(Chapter 10 and 12 CA, p 118-119 Community health worker's manual)
Discuss the harvesting in conservation agriculture and how it differs from what is currently practiced. There is then a section on food storage (complemented by the Community health worker's manual) people may not feel this is relevant information as it is not specific to conservation agriculture, if that is the case go over it very quickly or skip it. It is however important information so if there is interest, explain it well and get input from students about how they currently store food.

An important aspect of conservation agriculture is that it eliminates ploughing but increases harvesting and weeding. This can have the effect of leaving men with little to do and women with a much larger workload. Bring this up in the class, ask people about it. Is it a problem? Can the balance be redressed somehow? Is it a good thing as many men are working in town and so not able to plough anyway? Ask what other ways people can see that conservation agriculture will change their work patterns. Discuss these as a group.

Session 19: Rangeland Management

(p123-125 MDR, Chapter 1, 3, 4, 6 and 7 plus p35, 39 MR, p181-185 DCM)
This is also a very important topic for both the prevention of land degradation and the maintenance of livestock health. This topic is closely related to session 3 so review the ideas covered then.
Although RM relates to a different climatic area the ideas are all the same so just try to extract the messages about land management.

"Managing rangelands is managing natural vegetation for specific objectives or reasons. It is aimed at obtaining maximum sustainable livestock production from natural grazing resources without destroying them. Good management of grazing resources will achieve benefits by protecting and improving resources. It will promote continued welfare of the soil and vegetation and of the grazing animals. (p13 MR)". This is the message that you need to put across in this session.

Managing rangelands is best for the animals and the land. Discuss with the group whether they already do anything to achieve this balance. If so look at what is being done and see if it can be improved. If not then take them through the various techniques that can be used.

If you want to have some small group work then give each group a possible technique and have them review, criticise and improve it before presenting it to the group. Alternatively discuss the suitability of each one with the group, if none seem suitable discuss possible adaptations which could be made to increase their suitability.