Water harvesting session plan:

Materials:

Water from dry riverbeds (WFD)
Water from rock outcrops (WFO)
Water from roofs (WFR)
Water from small dams (WFD)
Conservation agriculture (CA)
Managing dryland resources (MDR)

Session 1

(WFD, WFO,WFR, WFD you need not read these manual page by page, skim through them to get good idea of the techniques and their requirements, MDR p111-118)
As with all sessions start by asking a question, get people talking.
What are the different water sources in your village?
What are the pros and cons of each water source?

Make note of what is said, ensure that all comments are acknowledged and try to come back to them as you go through the various RWH options.

Now briefly present the 4 key methods of RWH:

- water from small dams
- water from rock outcrops
- water from dry riverbeds
- water from roofs

For each option present:

- an outline of the design
- the materials needed to create it (both natural and unnatural, a riverbed, a gutter…)
- an idea of the amount of water that would be yielded
- the sustainability and cost

Show pictures and/or drawings of the structures. Try to have the options written up and presented in such a way that comparison is possible (perhaps side by side on a blackboard, or pined up on 4 big pieces of paper)

Then ensure everyone has understood the different options and ask them which they think might be suitable for this area. Make them think about their surrounding and the materials they have available. If they seem disheartened that they do not have the materials for any, then ask them which they think would be most suitable and least costly to do with hypothetical outside help.

This can be done as a whole group or you could split them into groups of 3 and four and have them discuss, decide and then present to the rest of the group which they prefer and why. This can be good for ensuring that everyone is heard and that the group does not become dominated by a few confident people.

The aim of this session is to establish one or two options as most suitable or popular.

Session 2

Have a quick review of the methods that they chose last session. Have the details in mind but try to get them to outline the methods and why they thought they would be good. If they are not forthcoming, then ask leading questions, get them talking.

Next delve further into the chosen methods regarding each in more detail. Present:

- Where they have been used (Africa, Asia…) emphasise that water harvesting is something big and widespread that has worked in different ways for different people and areas.
- Outline more of the options within each method, different tanks, structures, gutters.
- Start people thinking about who could make these?
- Introduce the important decision of how to work: as a whole community, in small groups or individually.

Either as a whole or in small groups have them outline what they think would be the pros and cons of community lead, small group or individual projects.

-Which do they think would work best?

-Does this vary depending on the method chosen?

-What rules might have to be laid down if community or group methods are chosen?

-How might working in groups help make options more financially viable?

-What problems might arise?

Irrigation session plan:

Materials:

- Managing dryland resources (IIRR): pages 100-111 (MDR)
- Soil and water conservation in Eritrea (SWC)
- Drip irrigation extension manual (ALIN) (DIM)

For a more technical view see:

- Drip irrigation, options for smallholder farmers in eastern and southern province (RELMA) (DI)

Try whenever possible to make these sessions active. If there is are examples of irrigation systems in your village try to integrate a trip to see it into the session. If there are no examples perhaps you could build demonstrations of irrigation systems which people show interest in.

Session 1: An introduction to irrigation

(Chapters 12-16 SWC, p100-111 MDR, Chapter 1 DIM)
As always start with a question, to allow you to assess their knowledge and to acknowledge their knowledge. Explore the questions;

What is irrigation?

How many different types there are? What are each one's pros and cons?

What do people use here?

What have they seen elsewhere?

Next give a quick overview of the different irrigation methods available. Present them in 2 groups:
Where water is plenty:
These may not apply to your area or it may only apply to your area during a certain season. Review them briefly so that those in the group can determine whether they are applicable, sometimes seeing the unsuitable options can make the better options look just right.

- Open canals and canal networks (Soil and water conservation in Eritrea)
- Furrow irrigation (Soil and water conservation in Eritrea)
- Basin irrigation (Soil and water conservation in Eritrea)
- Spate irrigation (Soil and water conservation in Eritrea)

Where water is scarce:

- Overhead sprinkling (Managing dryland resources)
- Watering (Managing dryland resources)
- Drip irrigation (Managing dryland resources or Drip irrigation and extension manual)

Follow this presentation by a brief discussion about the methods, ruling out those which people feel are inappropriate. Make sure that both small gardens and crops are being considered, ask whether irrigation methods should differ between the two.

Next ask what one needs to consider when choosing an irrigation technique ("Soil and water conservation in Eritrea" chapter 12 and "Managing dryland resources" chapter 4). For example:

- Soil structure, what is the soil like? How could they check? How could they improve it?
    - Increasing organic matter
    - Applying water slowly (drip or sprinkler irrigation).

Having talked about the factors which should influence your choice of irrigation system; return to your list of systems and review them to see if this has ruled any out or made any stand out as better.

Session 2: Drip irrigation

(DIM, DI Chapter 3,4)
If it was popular you may want to have a full session on drip irrigation. It is cheap and efficient and leads nicely on from water harvesting. The extension manual provides a nice simple overview and is short so read the whole thing to get a good rounded view of the technique.

Get the students to remind you of what drip irrigation is. Make sure the principles are clearly understood (p16-17 DI). Look at the benefits of drip irrigation (P16-17 DI), it can save time and allow people to grow plants which they could not normally grow, thus improving nutrition. What are the disadvantages? What are the difficulties? Often people will say that getting extra water will be a problem. Link drip irrigation to rainwater harvesting so that people do not fret about where they will find the extra water, these techniques are to be used in unison as often as possible. Go on to outline disadvantages such as cost, limitation, clogging, restricted root zone and salt accumulation in the root zone.

The next step is to look in more detail about what a drip irrigation system consists of. Go through the components in turn and how they vary depending on the system chosen. What are the pros and cons of each system? Discuss which

system/s people think would be most appropriate. Now that you have broken down the different systems are the materials available to them? Could someone learn to make them locally?

Then go into more detail about the considerations which need to be made, in terms of soils, crops and water availability. Which water harvesting system might you team drip irrigation with? What type of soil would are you dealing with here? Then outline some of the reasons why projects have failed in the past to ensure that they do not happen here. Most failing projects come down to inadequate planning so start now! If the class is enthusiastic start drawing up a plan for a drip irrigation project, the aim of this is not to create a perfect plan within the end of the class but to identify what would need to be taken into consideration.

Conservation agriculture:

The logical progression from here is to go on to conservation agriculture. You may want to teach the whole set of sessions or you may decide to chose only the ones which relate to water conservation. If you do decide to limit the scope to these you will have to alter the session somewhat to provide a good introduction to what conservation agriculture is and why it is important in the conservation of water. below are the 2 relevant sessions if this is the approach you decide to take it would be best to combine them into one session if possible.

Session 3: 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 4: Conserving soil and water

(Chapter 8 CA)
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?

Agroforestry:

Below are the two sessions relating agroforestry to water conservation. They have been included here as they follow on nicely from the above sessions about water harvesting and conservation agriculture. They are also embedded in the Environmental care topic.

Session 5: 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 6: 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.