

Participatory Integrated Climate Services for Agriculture (PICSA)

A guide for use by lead farmers with farmer groups



Produced by the University of Reading under the United Nations Development Project-led:
“Saving Lives and Protecting Agriculture Based Livelihoods in Malawi: Scaling Up the Use of
Modernized Climate Information and Early Warning Systems (M-Climes)”

Introduction to PICSA

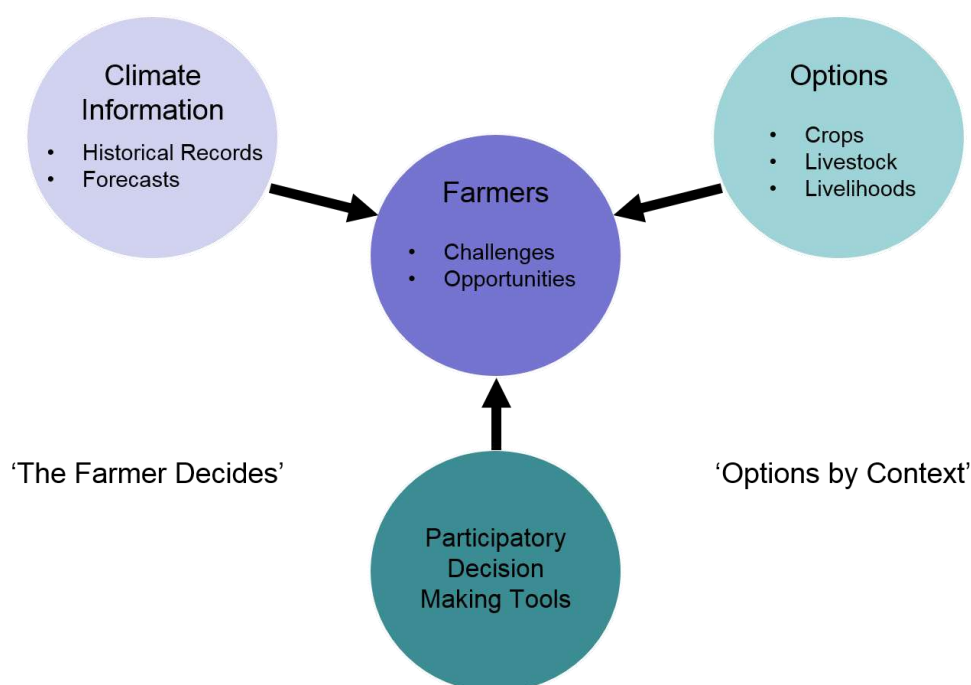
What is PICSA?

Participatory Integrated Climate Services for Agriculture (PICSA) aims to help farmers plan and make their own decisions using climate information and participatory decision-making tools.

PICSA does this through the following:

1. Providing and analysing climate and weather information with farmers - including historical climate information and weather forecasts.
2. Helping farmers to identify and explore crop, livelihood and livestock options that they are interested in, including their possible benefits and risks.
3. Introducing farmers to participatory decision-making methods so that they can use them to consider the information and options in planning and decision making for their individual contexts.

This is shown in the following diagram:



How is PICSA different to other approaches?

PICSA is guided by two participatory principles:

- 1) **The Farmer Decides** – individual farmers are best placed to make decisions about their agricultural practices, because they have detailed knowledge of their farm, system and environment, and they also face the consequences (whether good or bad) of their decisions.
- 2) **Options by Context** - different farmers have different contexts. This includes differences in wealth, education, land, goals, soil type, farm size and slope, and willingness to take risks. So, what works for one farmer might not work for another. Farmers should therefore make decisions that are right for their own contexts.

Your role as the lead farmer is to facilitate farmers to use the PICSA process. In doing so, it is important to keep these principles in mind. The aim is not to tell farmers what changes they should make, but to help them make their own decisions. It also involves considering how different people who work with farmers can work together to support farmer innovation.

How does PICSA work?

In practice, PICSA involves working through a set of 12 steps in a series of meetings with groups of farmers. The steps are summarised in the following diagram and will be explained in more detail in this booklet.

How to use this guide

The aim of this guide is to support you as you prepare for training your fellow farmers in PICSA. You will have been trained in PICSA by practicing and implementing each of the different PICSA steps and we would like you to take the same practical, learning by doing approach when working with your farmer groups.

Long before the season

Step A: What does the farmer currently do?

Resource Allocation Map (RAM)

Seasonal Calendar

Step B: Understanding the local climate and how it is changing

Historical climate information and farmers' perceptions

Step C: What are the probabilities and risks?

Probabilities and risks

Step D: What are the options for the farmer?

Crop info/options

Livestock info/options

Livelihood options

Step E: Options by context

Farmers choose options to consider

Step F: Compare different options and plans

Participatory budgets

Step G: The farmer decides

Select and amend RAMs and seasonal calendars

Just before the season

Step H: Seasonal forecast

Step I: Identify and select possible responses to forecast

Revisit crop, livestock and livelihood options, RAMs and calendars

During the season

Step J: Short-term forecasts and warnings

Step K: Identify and select possible responses to short-term forecasts and warnings

Revisit crop, livestock and livelihood options, RAMs and calendars

After the season

Step L: Learn from experience and improve process

Review season and PICSA approach

Meeting 1 (see pages 5-8)

Meeting 2 (see pages 9-12)

Meeting 3 (see pages 13-15)

Meeting 4 (see pages 16-18)

Meeting 5 (see pages 19-22)

Tips for successful facilitation of PICSA

As a facilitator it is important to always be thinking about your role, which is to enable shared analysis and learning by participants. As a facilitator you should:

- Make sure you have prepared for the meeting by revising the materials, preparing for questions and making sure you have all the materials for the meeting.
- Make sure you begin the meeting by explaining what you will cover, how long the meeting will be, and why the meeting will be useful for them.
- Guide your group to do the work, but do not do the work for them. It is often useful to provide an example that you have already prepared, but it is important that farmers complete the work themselves and learn by doing.
- Ensure easy understanding by using symbols instead of words as much as possible. These are more accessible for those with low levels of literacy. Also, 'a picture speaks a thousand words' – pictures are also often used and preferred by literate people.
- It is important that the opinions of all group members are taken into account. As a facilitator you will have to make sure this is happening by asking questions and encouraging all group members to participate.
- Bring a positive attitude. It is important to be friendly and honest with participants and to be respectful of participants' cultures, community standing and their level of knowledge.
- Manage your time well. Good time keeping is important to keep participants engaged and happy. Be clear how long you expect each activity will take.
- Respect the fact that the participants are all different and will come to different decisions for their farms, including if they decide not to change anything.
- Always keep in mind the two participatory principles of PICSA, the farmer decides and options by context (outlined on page 1 of this guide).

Step A – What does the farmer currently do?

i) Resource Allocation Map (RAM)

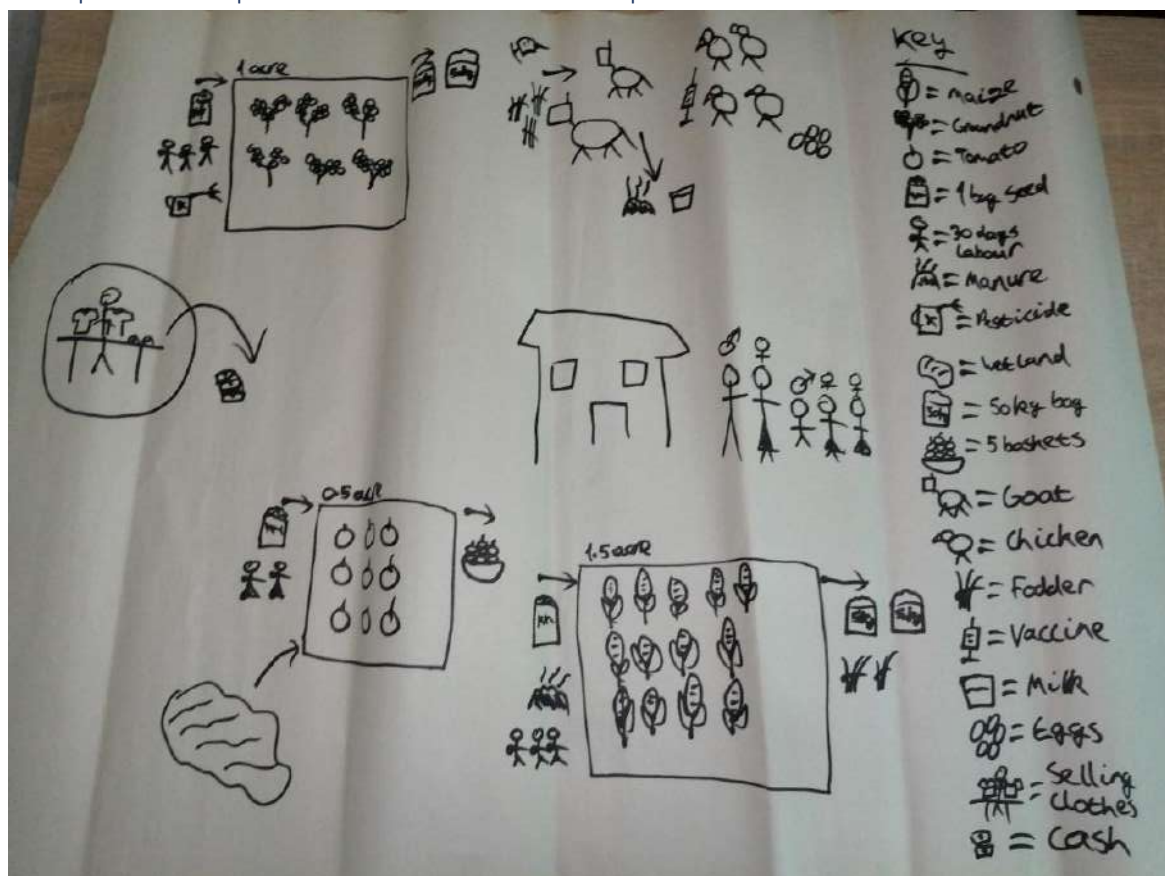
Aim

PICSA helps farmers to concentrate on their individual contexts, and drawing a RAM is an important starting point for that. The RAM helps farmers to describe their current main livelihood activities, resource uses and resource production on their individual farms.

Facilitation and Required Materials

You will need a flip chart and pens for farmers to draw their RAMs. Alternatively, they can be drawn on the ground using leaves, stones or other objects. Each farmer should draw their own RAM for their own individual farm. Each farmer should take their RAM home at the end of the session, as they will need to refer to them in later steps of PICSA.

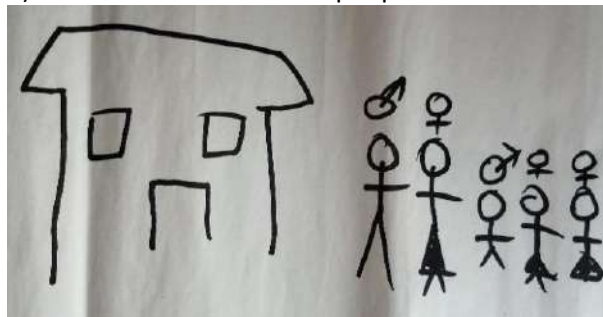
Example of a completed Resource Allocation Map



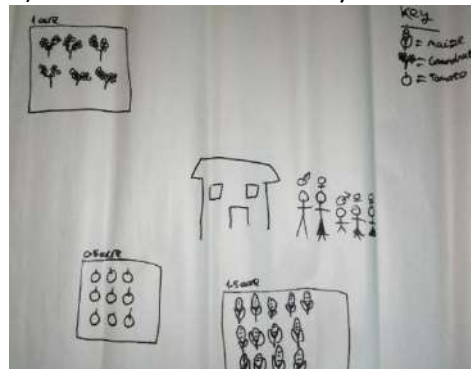
Suggested Procedure

Please ask the farmer to draw a RAM for their farm and livelihoods. To help facilitate the RAM, it can be useful to follow the order of steps below. Please remember the below pictures are just examples. Farmers should be encouraged to draw their own symbols that are easy for them to remember.

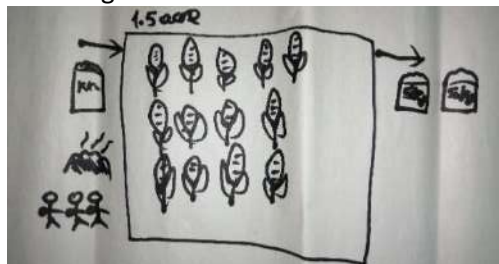
1) Their household and the people in it.



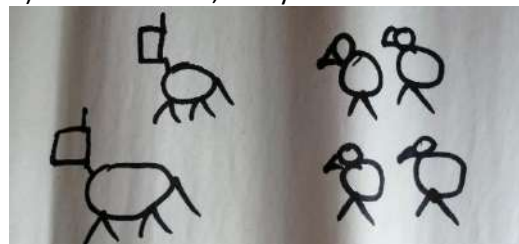
2) Their fields and what they are used for.



3) The inputs and expected outputs for each crop, including amount of labour.



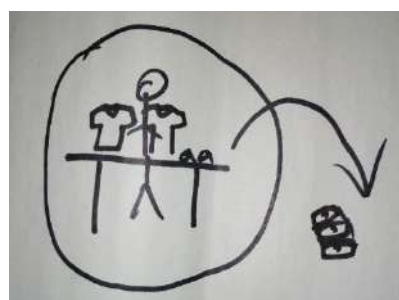
4) Their livestock, if any.



5) The inputs and expected outputs for each type of livestock.



6) Any off-farm income sources (this should be clearly shown as being off-farm).



7) Draw a key defining each symbol.



8) Encourage farmers to keep their completed RAMs, as they will refer to them in later steps of PICSA.

Tips for facilitating RAMs

- If farmers are not confident holding the pen, reassure them that there is no right or wrong way to draw the symbols and remind them that the RAM is for their own farm, so there are no right or wrong responses.
- Farmers should focus on their own farm, when drawing the RAM. Everyone should draw their own, however, it may be useful for farmers to build confidence by working in pairs and small groups.
- Some farmers may not wish to disclose their resources. It is okay for them to just provide an indication, rather than providing exact details.

ii) Seasonal Calendar

Aim

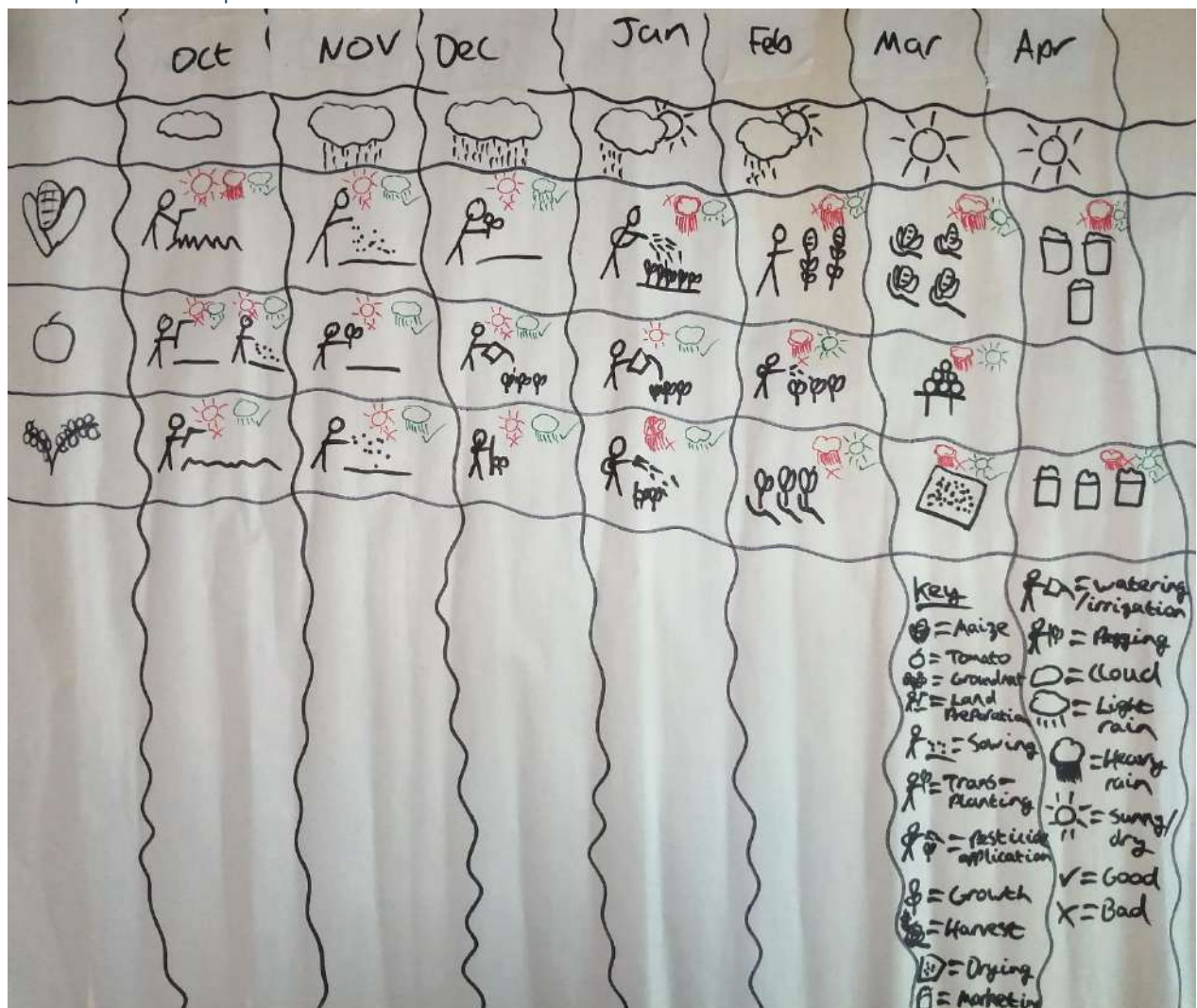
To help farmers explore:

- 1) the timing of the main crop, livestock and livelihood activities that they carry out on their farms,
- 2) how these activities are affected by weather and climate at different times,
- 3) how extra information about the weather and climate may be helpful.

Facilitation and Required Materials

You will need a flip chart and pens for farmers to draw their Seasonal Calendars. Alternatively, they can be drawn on the ground using leaves, stones or other objects. Seasonal Calendars can be used by groups or individual farmers. Seasonal Calendars should be kept, as farmers/groups will need to refer to them in later steps of PICSA.

Example of a completed Seasonal Calendar

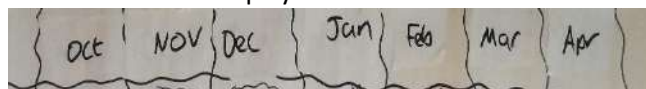


Procedure

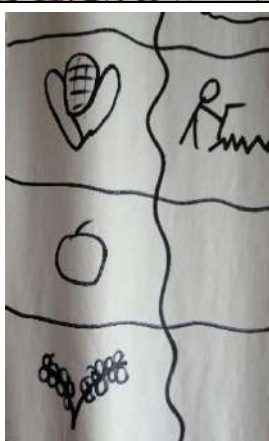
To help facilitate the Seasonal Calendar, it can be useful to follow the order of steps below. Please remember the below pictures are just examples. Farmers should be encouraged to use their own symbols that are easy for them to remember. The below example is for crops, but the Seasonal

Calendar should also consider livestock and other livelihood enterprises, which may be more appropriate to look at over the course of a year, or multiple years.

1) Draw a line at the top to show the season. Split this into time periods that the farmers are familiar with (e.g., local names for months or parts of seasons). Make sure that there are enough time periods to cover the whole crop cycle.



3) Draw rows across the flipchart and draw a symbol for one crop on each row. Make sure there are enough rows for all the main crops grown on the farm.



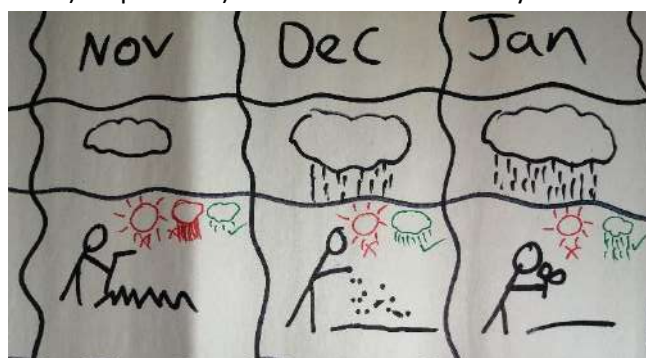
2) Draw another line below, and then mark the types of weather conditions that are expected during each time period.



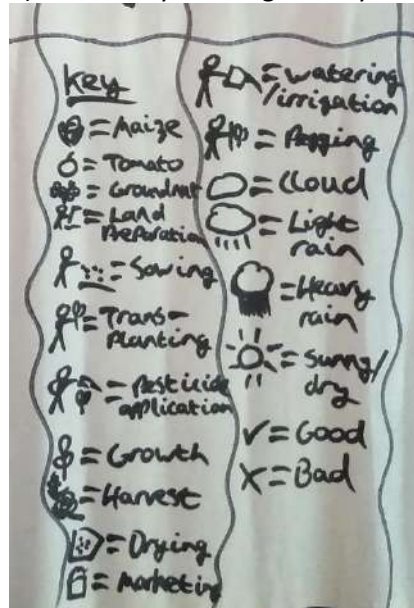
4) For each crop, think about when each activity for that crop happens (e.g., land preparation, planting, weeding) and draw a symbol to show that activity in the relevant month. You can include more than one activity in each month, where appropriate.



5) Above each activity, use a drawing and a tick or a cross to indicate which types of weather conditions are a) helpful or b) harmful for each activity.



6) Draw a key defining each symbol.



Tips for facilitating Seasonal Calendars with farmers

- Encourage farmers, if they have time, to complete Seasonal Calendars for livestock and other livelihood activities.
- Depending on the context, the Seasonal Calendars could focus on an agricultural season or an entire year. It does not necessarily need to start in January.
- You can help farmers to consider the influence of different weather conditions by drawing arrows to show how the timing of a specific activity may change due to different weather conditions.

Step B. Understanding the local climate and how it is changing. Farmers' perceptions and historical climate information.

Aim

To help the farmers you work with to better understand the local climate, how it varies from season to season and how it may be changing. This may provide new information and help farmers in making decisions about different crops, livestock and other livelihood enterprises.

Facilitation and required materials:

You need enough copies of historical graphs for your location so that all farmers can see them if they are in pairs or small groups. It will also be useful to show a copy of sheet B1a.

Procedure:

i) Where does Historical Climate Information come from?

1) The amount of rain that has fallen every day is measured using standard equipment.

How is the historical climate information recorded and presented?



Rainfall is measured in the field using a rain gauge.

2) The daily rainfall total is written down by Met Service staff at each of the weather stations.

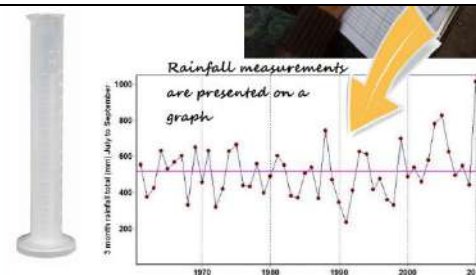


Rainfall measurements are recorded and stored



3) This information has been recorded for many years; often more than 50 years. The exact number of years depends on the location of the station.

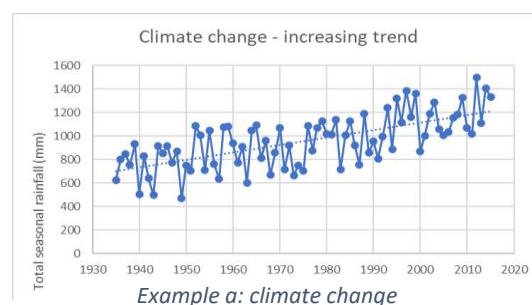
4) Daily rainfall totals and temperature measurements can be summarised and represented on graphs. These graphs provide a straightforward way to understand the conditions in your area over a large number of years.



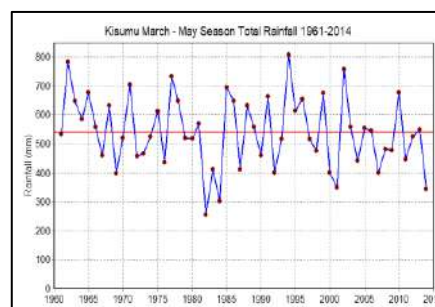
ii) Climate change and variability

It is important to help the farmers understand the difference between climate change and climate variability.

Climate change refers to a trend or a pattern of change over a longer period of time (more than 30 years). For example, the amount of rainfall may be increasing as time passes (as in example a) or reducing. Climate change may mean that crops grown in the past become more difficult to grow or that new or different crops may become options. Likewise, certain types of livestock may become more useful in supporting livelihoods.



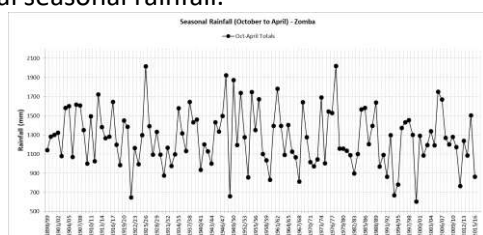
Climate variability refers to changes in weather conditions from year to year. For example, in one season you may receive increased rainfall and in another there may be reduced rainfall and even drought. This variability can make it difficult to grow the same crops each year. Considering climate variability is very useful for helping farmers to make decisions about the next season.



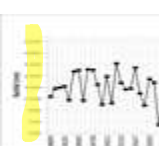
Example b: variability from season to season

iii) Understanding Historical Climate Information.

1) Begin by handing round the graph that shows total seasonal rainfall.



2) Explain that the horizontal line displays the years.



And that the vertical line shows the amount of rainfall in each year. The individual dots show the amount of rain that was recorded in each particular year.

3) To check understanding of the graphs, you can ask the farmers the following questions:

- What year does the graph show had the lowest rainfall?
- What year does the graph show had the highest rainfall?
- Select a particular year and ask, how much rain fell in that particular year?

4) Explore the graph for total seasonal rainfall with the farmers. You should establish whether or not:

- the graph shows that rainfall is consistently higher or lower in the last few years compared to 30/40 years ago (climate change)
- the graph shows that there are differences from year-to-year (climate variability)

5) Explore whether the graph shows recent year-to-year changes are larger, or smaller, than they were 30, 40 or 50 years ago.

- Does the graph show that, from year to year, the amount of rainfall varies more in the last few years than it did 30, 40 or 50 years ago?
- Does the graph show that, from year to year, the amount of rainfall varies less in the last few years than it did 30, 40 or 50 years ago?

6) Ask the farmers:

- Based on the graphs, what are the main challenges associated with the climate for this location?

7) Ask the farmers how this information compares with their perceptions of the weather and climate in the area over the past 30 years, or more. Specifically:

- Do you think weather and climate have changed in the last 30 years or more?
- Do you think rainfall is higher, lower or the same?
- Do you think the weather/climate is more or less variable?

** You need to consider your individual location with farmers but in Malawi, variability of rainfall is often an issue, more so than reducing rainfall. If the graphs show that rainfall isn't decreasing then discuss with farmers what the reason for this might be. While you can't do anything about reduced rainfall there are other linked issues that may be manageable or avoidable.*

8) After discussing the graph on seasonal rainfall, you should share and explore each of the different graphs with farmers.

9) After completing these activities, please find a public place where all of the graphs can be displayed, so that people can see and discuss them.

Step C. What are the opportunities and risks? Using graphs to calculate probabilities

Aim

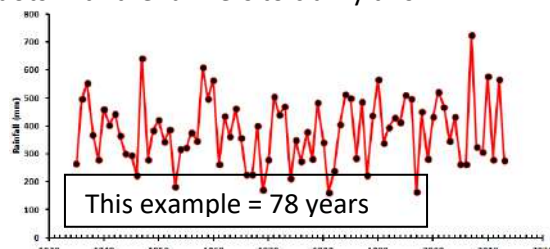
To help the farmers you work with to use the historical climate graphs to better understand risks and make informed decisions for the coming and future seasons.

Facilitation and required materials:

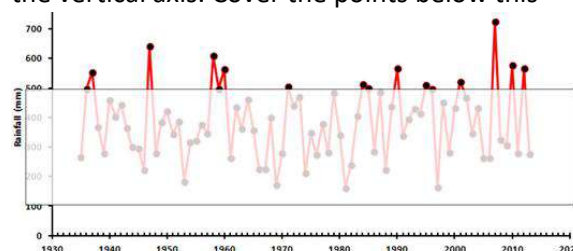
For part i) you need enough copies of up-to-date historical graphs for your location so that all farmers can see them if they are in pairs or small groups. For part ii) you also need enough copies of the crop information sheet for your location.

i) Working out simple probabilities

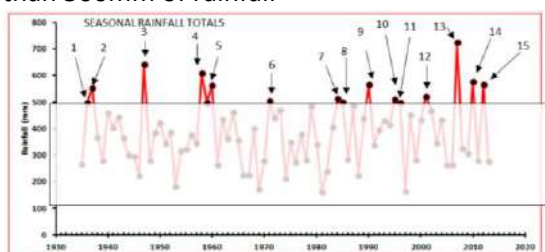
1) Remind the farmers what period of time is covered by the historical graphs – count the dots with the farmers to clarify this



2) Ask them to identify 500mm of rainfall on the vertical axis. Cover the points below this



3) Ask the farmers to count the number of points above 500mm. This tells the farmers how many times this area has received more than 500mm of rainfall



4) On a piece of flipchart or in a notebook write down the number of points above 500mm of rainfall (in this example, 15). Then, underneath this, write down the total number of years on the graph (in this example, 78).

This means that out of 78 years, 500mm or more of rainfall has only happened 15 times and is not experienced regularly.

In this example, 500mm = $\frac{15}{78}$

5) After completing the first probability, choose another rainfall amount and make a comparison. In our example above:

400mm = 33 occurrences so $\frac{33}{78}$ = has happened more regularly and farmers can be more confident that this amount of rainfall may happen in the future

600mm = 3 occurrences so $\frac{3}{78}$ = has happened much less frequently and, unless the climate is changing to suggest more rainfall then is unlikely to happen very frequently in future

6) You can use this approach for most of the graphs that you have to work with farmers:

- Season start date – how does the probability of the season start change at different dates?
- Season length – how does the probability change when you consider longer seasons?

7) Rather than concentrating on the calculation it is important to consider the important information that the probability is providing. How often do the probabilities show that you receive enough rainfall to have a successful harvest? How often do the probabilities show that season starts early enough to grow a crop that takes a long time to mature?

8) Note: if the graphs show evidence of climate change (increasing or decreasing values) then the probability calculated from historical occurrences is less useful and should be used with caution

ii) Linking probabilities to choices in crops

1) The individual probabilities calculated in part i) are useful on their own. Using our example graph, if a maize variety requires 500mm of water, we have already worked out the probability of receiving the required amount of rainfall during a season is 15/78. However, this probability is for the whole season, which may be longer than the length of time that the maize crop takes to grow. This means that some of the 500mm may fall outside the period during which the crop is growing. Any of rain that falls outside the period that the crop is growing is not helpful for its growth. Therefore, to help make decisions about which crops to grow it is useful to consider the timing of planting, the length of the season and the amount of rain that falls. These probabilities can be combined but this complex process would be too time consuming to do by hand. Because of this, we have provided the crop information sheet which is explained below.

2) Explain the crop information sheet: beginning with the different crops and varieties that are listed. Ask which ones are familiar to the farmers.

Crop	Variety	Days to maturity	Crop water requirement	Chance of sufficient rainfall if season starts on x (Early)	Chance of sufficient rainfall if season starts on x (Middle)	Chance of sufficient rainfall if season starts on x (Late)
Maize	Local	120	480	5/10	4/10	2/10
Maize	Pioneer xxx	100	350	7/10	5/10	4/10
Sorghum	Seed Co xxx	110	300	5/10	7/10	6/10

3) Explain that 'days to maturity' is the length of time that a crop needs to be in the ground to reach harvest and that the crop water requirement is the amount of water that a crop requires in that time. Each variety will have a different value for this.

4) Explain to the farmers how crop water requirement can be closely related to the seasonal rainfall graph (does enough rain fall in the season to reach the crop water requirement) and how days to maturity can be linked to the graph that shows the length of the season (are there enough days in the season).

5) The probabilities in the last three columns are the chance that a crop planted on a specific date (given at the top of the column) will receive a certain amount of rainfall or more (the crop water requirement) within a certain number of days after it is planted (the days to maturity).

6) Take care to explain why the probabilities may change dependent on the season start date. Different crops and varieties may thrive at different points in the season but those that take a long time to mature may only have a short window of opportunity early in the season.

7) Take your time to discuss with farmers the different crops and varieties that they think are most suited to the local climate information and include any other considerations that may be additional to the probabilities:

- Are the crops or varieties particularly affected by dry spells or diseases? Probabilities do not pick up dry spells in the season.
- Their individual farms may have quite different conditions (perhaps wetter or dryer than the station and so farmers should consider this when making decisions based on the probabilities).
- The crop water requirements are for a maximum yield under field trial conditions, which may be unrealistic and farmers may be satisfied with a yield that is achieved even if the full crop water requirement is not met.
- If the intention is to sell the crops, then is there a market for the crop or variety?

Step D – What are the options for the farmer?

Aim

To help farmers identify and explore available crop, livestock and livelihood options that could help them to deal with the local climate and associated risks that were explored in Steps B and C. It is important to remember that what individual farmers think is best for their household may vary widely, and could depend on their resources, wealth, gender, farm size and location, level of education, soil type and attitudes to risk.

Options Tables


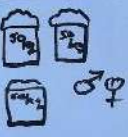





















Aim

This exercise helps farmers to identify locally known and new options that may help them to address climate, weather and other challenges in their location. It also helps farmers explore the benefits and drawbacks of different options so they can decide which ones they want to find out more about and to try.

Facilitation and Required Materials

You will need a large sheet of paper and a marker pen (alternatively, the table may be drawn on the ground using sticks and stones, cartons or other items). It is important to conduct this activity with a group of farmers but remember to let the farmers lead and encourage each farmer to explore options that they consider useful for their individual contexts.

Example of a completed Crop Options Table

Crop Option	Who does it?	Benefits + who benefits	Performance			Investment High / med / Low	Time to see benefits	Risks / Disadvantages
			Low	Med	High			
	♂ ♀					Low High	3 months	
	♀					High Low	4 months	—
	♀					High Med	6 months	
	♂ ♀					Med Med	3 months	

Suggested Procedure

Please ask the farmers to draw Options Tables exploring crop, livestock and livelihood options that are available in the local area. To help facilitate the Options Tables, it can be useful to follow the order of steps below. The below example is for crop options, but this can also be done for livestock and livelihoods, or a mixture of all three. Please remember the below pictures are just examples. Farmers should create symbols that are easy for them to remember.

1) Draw the outline of a Crop Options Table.

Option	Who does it?	Benefits + who benefits	Performance	Investment	Time to Reap/Store/Disadvantages

2) Ask farmers to suggest options and draw these on the table. Please list as many options as possible before you start to fill in other columns. It is important to include a wide range of options to make sure all of the farmers, including men and women, wealthy and poor, can identify options that may be useful for them.



3) After farmers have finished suggesting options, you can suggest additional ones you think may be useful for the location.

4) For each option go through each of the following headings on the table and discuss with farmers. You can fill in the table by drawing symbols suggested by the farmers.

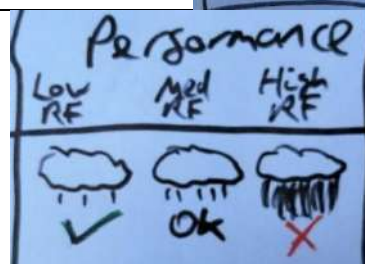
5) Who does the work involved in the option? (E.g. men or women).



6) What are the benefits of the option? (E.g. increased yield, improved crop health etc). Also, who benefits?



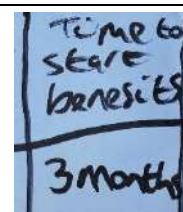
7) How does the option perform, in years with different conditions? (E.g. low, medium, or high rainfall). When thinking about performance, it is important to encourage farmers to compare options with what they are currently doing. Is the option better (✓), the same (OK) or worse (✗) than current practice?



8) What investments are required? (Time, money).



9) How long does it take from preparing the option to getting the benefits?



10) What risks and disadvantages are there? (E.g. cost of implementing the option, susceptible to pests etc).



Step E – Options by context

Aim

Help farmers understand explore and select options that may be suitable for their individual context. In doing so, it is important to remember the PICSA principles: **‘the Farmer Decides’** and **‘Options by Context’**.

Facilitation and materials

Use the Options Tables created in Step D. It is crucial that farmers make their own decisions as to which options they want to explore further.

Procedure

1) Explain the importance of ‘the Farmer Decides,’ and ‘Options by Context,’ to the farmers.

The Farmer Decides – individual farmers are best placed to make decisions about their agricultural practices, because they have detailed knowledge of their farm, system and environment, and they also face the consequences (whether good or bad) of their decisions.

Options by Context - different farmers have different contexts. This includes differences in wealth, education, land, goals, soil type, farm size and slope, and willingness to take risks. So, what works for one farmer might not work for another. Farmers should therefore make decisions that are right for their own contexts.

2) Referring back to the Options Tables created in Step D, ask farmers to identify options they think would be suitable in their individual contexts and select options to explore further. These options will be considered in Step F.

Step F – Comparing different options and planning using Participatory Budgets.

Aim

To help the farmers learn how to use participatory budgets to plan and identify which options they wish to try on their own farms.

Facilitation and required materials

You need flip chart paper, masking tape and a pen or pencil. You need the list of options that the farmers identified to explore further during Step E. Please make sure that you encourage each individual farmer to explore the options that they are interested in. The farmer should hold the pen and draw their own budget.

Procedure

- Ask the farmers to divide into small groups who want to look at the same options, and who are similar to each other in terms of farm sizes, access to resources etc. Later when farmers are confident how to do the budgets they can work on their own individually if they want.
- When the farmers are ready to start, explain to them how to do a Participatory Budget. Showing them an example is a good way to do this.
- There is a picture on the next page of an example Participatory Budget to help you (the Lead Farmer) to remember the main headings and columns, and the kinds of information that goes in them. *Please look at this in advance of the training to remind yourself how to do Participatory Budgets.* We have added some writing and labels to help remind you.
- Once the farmers have finished their budgets remember to ask them to look at some 'What if' scenarios (e.g. change the budget to see what would happen if the prices were higher or lower than expected).
- Ask the farmers to show each other their Participatory Budgets for the different options they have looked at. After the exercise it is important that the farmers keep the Participatory Budgets for themselves, so they can look at them in future if they want to.
- Farmers may want to do more Participatory Budgets on their own back at home.

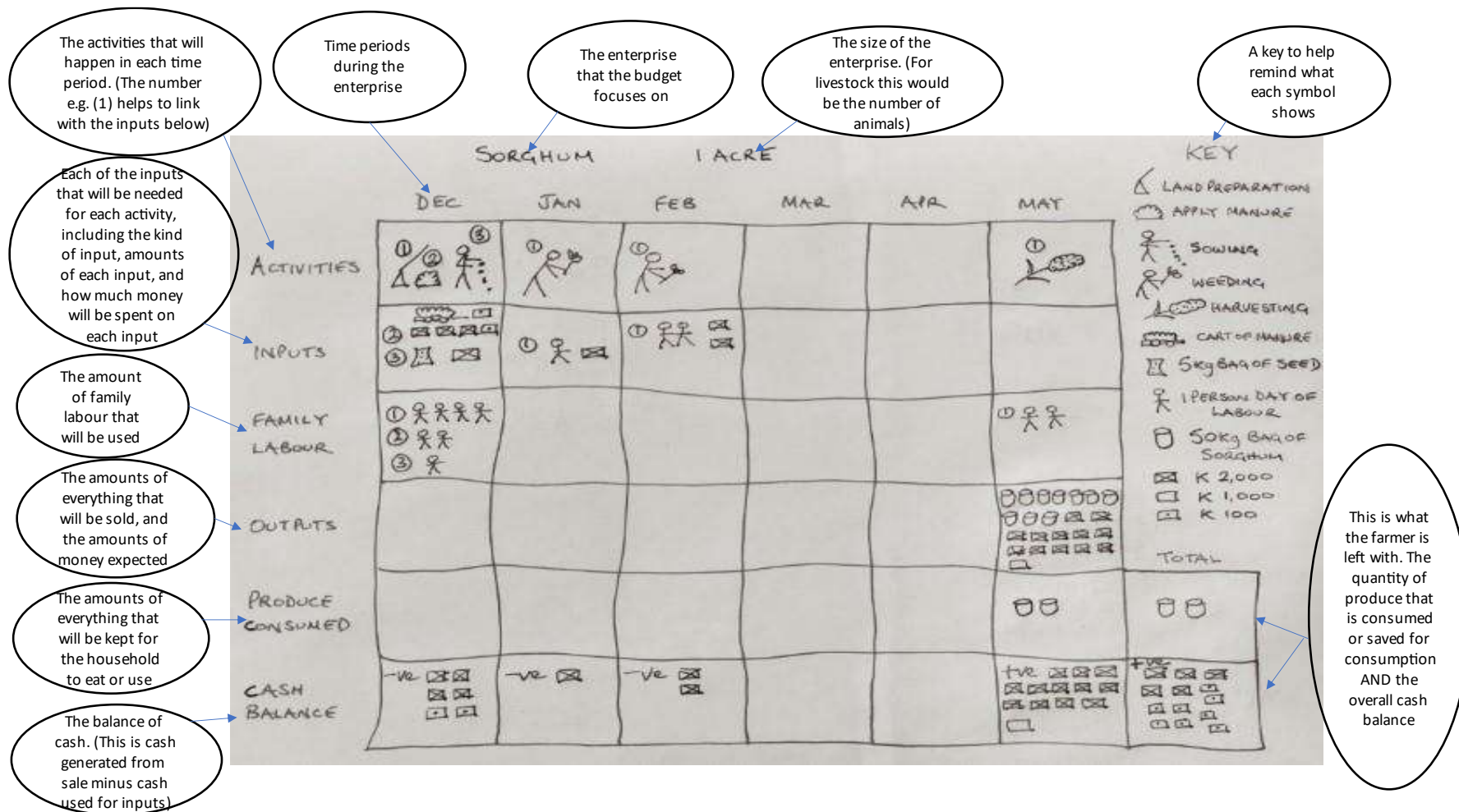
Tips for doing Participatory Budgets

Use symbols or pictures (so that everyone can understand the budget and check the calculations for themselves). Ask farmers to choose symbols or pictures that they will find easy to remember.

If you think that a farmer has made a mistake, rather than pointing out the mistake you can ask them a question. Often farmers will spot it and correct it themselves. If they don't see it then politely point it out.

Remember to show actual quantities of each input (e.g. how many days of labour) and output (e.g. how many bags of produce and size of bags).

Remember to show actual amounts of money (e.g. how many thousand kwacha).



Step G – The Farmer Decides

Aim

For each individual farmer to identify the crop, livestock and/or livelihood options that they would like to implement in the coming season or the near future.

Facilitation and required materials

You will need the outputs that farmers in previous steps. Please make sure that farmers bring the Resource Allocation Maps, Seasonal Calendars, Options Tables, and Participatory Budgets that they completed in Steps A, D and F.

Procedure

1. Ask each farmer to look at their Resource Allocation Maps and Seasonal Calendars.
2. Ask each farmer to look at the Options Tables and Participatory Budgets and then ask each farmer to identify which options, if any, they would like to implement.
3. Ask the farmers to note these changes on their Resource Allocation Maps and Seasonal Calendars (ask farmers to include detail on these for example the areas of the crops and the numbers of livestock).

Step H – The seasonal forecast

Aim

For each of the farmers to understand the seasonal forecast, how it is produced, the information that it provides and what it does and does not tell us.

Facilitation and required methods

You will need to have a copy of the seasonal forecast that has been produced by the Department of Climate Change and Meteorological Services (DCCMS). DCCMS produce a seasonal forecast ahead of every rainfall season – this is usually released in September or October. You should have been introduced to the seasonal forecast by your extension worker and it is important that you have a good understanding of it before you discuss it with farmers.

Procedure

1) Start by sharing the seasonal forecast for your district with the farmers. These steps include an example from Chiradzulu for the 2020/21 rainfall season.

A screenshot of a document titled 'Chiradzulu District Seasonal Forecast'. It contains several maps of the district for different months (October 2020, November 2020, December 2020, January 2021, February 2021, March 2021, April 2021) and a table of rainfall data. The document is from the Ministry of Forestry and Natural Resources.

2) The district seasonal forecast is split into four sections. The first of these is the overview of the season.

A screenshot of a document titled 'Overview of 2020/21 Rainfall Season'. It states that the 2020-2021 rainfall season is expected to be influenced by La Nina conditions. Chiradzulu district is expected to receive normal to above normal rainfall. However other areas are likely to receive below normal rainfall during 2020/2021 season.

3) The next section provides a month by month forecast of the rainfall. This includes a colour coded map indicating possible levels of rainfall for different locations. These maps are split by Traditional Authority areas.

A map titled 'December 2020 Rainfall Forecast' showing the district of Chiradzulu. The map is color-coded to indicate different levels of rainfall. A legend on the right shows a color scale from 0 to 250 mm. The map includes labels for various Traditional Authority areas (TAs) such as TA Chiradzulu, TA Likoswe, TA Mpama, TA Nkalo, and TA Chitera.

4) The third section – in the bottom right of the sheet covers the forecasted start (onset) and end (cessation) of the rainfall season. This also provides an estimate as to the overall length of the season.

Rainfall **onset** in Chiradzulu this season is expected in the first two weeks of December 2020. Rainfall **cessation** is expected between the last week of March 2021 and the second week of April 2021. The average seasonal length in the district is expected to be around 140 days.

The table and figure below shows monthly rainfall distribution for the season with a normal band in grey.

5) The fourth section provides a table and a graph that compare the forecast with 'normal' rainfall historically. 'Normal' rainfall in this context is the middle third of rainfall values that have been received in the past at that location.

A table and a graph for the Nasulu Forecast. The table shows monthly rainfall distribution for the season with a normal band in grey. The graph shows the forecasted rainfall for the season, with a normal band in grey.

6) So, if you have thirty years of rainfall collected the ten lowest would be 'below normal', the ten highest would be 'above normal' and the ten in the middle would be 'normal'.

See this example from Balaka:

A line graph titled 'Seasonal Total Rainfall for Balaka'. The graph shows historical rainfall data for the district of Balaka. The y-axis represents 'Total Rainfall (mm)' from 0 to 1900. The x-axis represents 'Season' from 1990/91 to 2019/20. The graph includes three horizontal lines representing the 'Upper tercile = 895mm', 'Lower tercile = 700mm', and 'Normal' (around 750mm). The data points are plotted as blue dots connected by a line. The graph is divided into three regions: 'Above normal' (above the upper tercile), 'Normal' (between the upper and lower terciles), and 'Below normal' (below the lower tercile).

Step I – Identify and select possible responses to the forecast

Aim

To enable farmers to consider the plans that they have made with the new information they have from the seasonal forecast for the upcoming season.

Facilitation and required methods

You will need to have a copy of the seasonal forecast for your location and the farmers will need to remember what they have planned for the coming season (it may be useful for them to bring their RAMs and participatory budgets for example).

It is important to note that farmers may also be aware of local indicators that they use to predict conditions for the season. These indicators may be relevant and it is important to acknowledge them and discuss them with farmers if they are keen to. However, please keep the session focused on explaining the new information that the forecast brings.

Procedure

1) You should have just explained the forecast to the farmers you are working with. Please make sure everyone understands this.

It is important to be clear that, whilst forecasts can be useful, they are not always correct. It is also important that farmers make their own decisions about how to respond to the forecast. If you tell farmers what to do and the forecast is incorrect then the farmers may take actions that have negative consequences for their livelihoods. This is, of course, bad for the farmer and they may also lose trust in you as a source of information and advice.

2) Ask the farmers to consider the plans that they have made for the coming season. Remind them that their plans were created based on a good understanding of the climate and weather in their area and that this understanding comes from recordings from many past years and their experience. These plans were also developed with consideration of other things, in addition to climate, that are important to successful farming (e.g. market, access to resources, position of farm, soils etc...).

It is important that farmers are aware that the plans they have made so far have a strong foundation in historical climate data and their own experiences and that the seasonal forecast can add to the information base they have built but should not necessarily outweigh it.

3) Ask the farmers to consider whether the forecast for the coming season has any implications for:

- a) the plans they have made and whether they wish to adjust them. For example, if they planned to grow a new crop and the forecast suggests that the season may start early then do they need to ensure that they get the seed early and the land prepared? Alternatively, if the forecast suggests that the season may start late and have 'below normal' rainfall then might they reconsider the type of variety that they had planned to plant (e.g. with a shorter maturity period and lower crop water requirement).
- b) their individual farms and contexts, for example, if the forecast is for above normal rainfall then a farmer who farms in a valley bottom may look to ensure that their drains are clear and working to reduce the risk of flooding and, if a farmer knows that their thatching on their poultry housing is getting old then they may look to repair it ahead of the season. These details will vary with different farmers and so each farmer should think about their own response on their own farm.

Step J – Short-term forecasts and warnings

Aim

For each of the farmers to understand the short-term forecast, the information that it provides and how they can access it. To facilitate farmers to identify ways that they can use and respond to these forecasts.

Facilitation and required methods

You will need to have example short-term forecasts that have been produced by the Department of Climate Change and Meteorological Services (DCCMS). DCCMS produce short-term forecasts on a regular basis and you should have learnt about where you can access these from your extension worker and it is important to note that farmers should be able to access very similar information from DCCMS via radio broadcasts.

Procedure

1) Start by sharing the example short-term forecast with the farmers. Remind them of the different sources and formats of this information including radio broadcasts. These steps include an example from 26th March 2021.

DEPARTMENT OF CLIMATE CHANGE AND METEOROLOGICAL SERVICES
MALAWI
26th March 2021

SYNOPSIS AND INFERENCE:
Expect thunderstorms and rain which will be heavy at times mainly over the north and center due to a rain belt which is lying over the northern half of Malawi.

ADVISORY: Avoid crossing flooded rivers or fast flowing waters!

FORECAST TEMPERATURES: Ngabu Min.22°C and Max.34°C

CITY	SUNSET	SUNRISE
MZUZU	17:52	05:48
LILONGWE	17:54	05:49
BLANTYRE	17:48	05:45

2) The daily forecast is split into six sections. The first of these sections is a broad synopsis which carries a general summary of the expected conditions over the whole of Malawi:

SYNOPSIS AND INFERENCE:
Expect thunderstorms and rain which will be heavy at times mainly over the north and center due to a rain belt which is lying over the northern half of Malawi.

3) The next section, if required, provides an ‘advisory’. This may be information about actions people can take or that they should avoid. In our example forecast the expectation of heavy rain and forecasts led to a general advisory not to cross flooded rivers or fast-flowing waters.

ADVISORY: Avoid crossing flooded rivers or fast flowing waters!

4) The third section is a more specific forecast for different regions of Malawi (Shire Valley, Southern Highlands, Central Areas, Lakeshore Areas and Northern Areas. This provides a forecast for the expected conditions with regards to rainfall and expected maximum and minimum temperatures.

SHIRE VALLEY (areas along Shire River and around Lake Chiuta and Chilwa)
Partly cloudy with hot conditions during morning. Expect sunny and hot conditions during the afternoon.
Forecast Temperatures: **Ngabu Min.22°C and Max.34°C**

5) The fourth section outlines the expected conditions for wind and also a brief forecast for the following day:

Wind: Variable but gusty and strong in stormy areas.....

Forecast for Saturday: Expect rain with thunderstorms over more areas..

6) The fifth section provides information on the sunset and sunrise for major cities:

SUNSET FOR 26th MARCH, 2021 AND SUNRISE FOR 26th MARCH, 2021

CITY	SUNSET	SUNRISE
MZUZU	17:52	05:48
LILONGWE	17:54	05:49
BLANTYRE	17:48	05:45

7) The final section provides contact information for DCCMS via a range of communication channels:

For further information, contact:
The Director, Department of Climate Change and Meteorological Services
P.O. Box 1808, Blantyre. Tel : (265) - 1- 822014/577 Fax: (265) -1- 822 215
Email: metdept@metmalawi.gov.mw Web: www.metmalawi.gov.mw
Facebook: <https://www.facebook.com/malawi.weather> WhatsApp: +265 995 155 050

Step K – Use of short-term forecasts and warnings

Aim

By practicing using example short-term forecasts farmers will be better prepared to deal with forecasts and warnings when they receive them during the season.

Facilitation and required methods

You will need to have a copy of some example short-term forecasts for dates that are at different points in the season so that they can consider the potential implications of the forecasts on different types of decisions. Ask the farmers to bring their Resource Allocation Maps (RAMs) and Seasonal Calendars.

Procedure

- | |
|---|
| 1) You should have just explained the short-term forecast examples to the farmers you are working with. Please make sure everyone understands them. Explain that the purpose of this exercise is to practice using short-term forecasts and warnings, and for farmers to identify how they might use actual forecasts as they receive them during the season. We don't know what the forecasts will be in advance, but practicing with examples will help to improve farmers preparedness. This will enable them to think about possible responses and learn from each other. |
| 2) Ask farmers to have their RAMs and Seasonal Calendars ready to look at. Using the first example forecast make sure the farmers are clear on the date of the forecast as this will help them to consider which decisions are likely to be made at that time.. |
| 3) Ask the farmers to interpret the forecast (discuss and agree what it means) and then to individually think about:
a) What effects, if any, the forecast could have on their farm? Consider each of the enterprises and the main options they have, and any activities they have planned for that period of the season.
b) What actions, if any, they might take in response to the forecast. |
| 4) Ask farmers to share and discuss examples for actions that they have come up with
Note: Again, remember that different farmers may decide to do very different things, depending on their circumstances, farm, aims, etc.. In many cases farmers may decide not to make changes or adjustments. |
| 5) Repeat this process with another forecast for a different point in the season and ask the farmers to go through the same steps of interpretation and consideration of responses. |
| 6) Once you have finished the examples and before you close the session make sure that all of the farmers understand how they can access the short-term forecasts throughout the season. |

Step L – Learn from experience and improve the process

Aim

To review the PICSA process with farmers, after the season, and identify lessons for the future.

Facilitation and required materials

It is useful to do this in a group meeting after the end of the season. You will need flip chart paper and pens.

Procedure

1. Please ask farmers to discuss the following questions:
 - a. In what ways (if any) did farmers find the training and use of PICSA useful?
 - b. Which parts of the process were the most helpful and why?
 - c. Did the farmers make changes in their selection or management of crops, livestock or livelihood practices? E.g. did they try something new or do something different to previous seasons as a result of using PICSA?
 - d. If farmers are happy to discuss these changes ask them to share their experiences – how things went, what they had to do to make the changes and how they may have improved their livelihoods. We can also learn if things haven't gone well, and it would be good to ask whether there were any changes that didn't work and why.
 - e. In what ways could the PICSA approach be improved, if used in future years?

Annex