CHAPTER 10

Tool 3 Village history and hazard timeline

Purpose A village history that highlights key natural hazards and their impacts in order to better understand vulnerability to extreme events and climate change.
The Village History and Hazard Timeline provides the basic details needed for the completion of Tools 4 and 5, which deal with how, where and when hazards and exposures affect a village. The Timeline is probably best carried out in tandem with Tool 4, Mapping Village Hazards. If you use only one village map, it's possible to split the work between two groups: one group can create the Timeline while the other group completes maps village hazards.

Output A timeline showing the history of the village as well as the most significant natural hazards and disasters.

Prerequisites No prior knowledge needed of any other tool but it is important to use the tool early in the process and in combination with the Village Map (Tool 1).

Materials A0 flipchart paper; pens.

Duration At least 30 minutes.

	Steps	Suggested commentary	Remarks
1	Start the timeline from the establishment of the village (or at least the past 40 years). Row 1: Population development and key events; Row 2: Key land-use changes; Row 3: Key natural hazards; Row 4: Key direct impacts of the hazard (physical and human damages, changes in land use as a direct consequence, relocation etc).	'When was the village established?'	
2	Start completing approximate population for each decade and mark key events (such as introduction of electricity, land allocations, major government support programs).	'How many households were in the village at X time?' 'How many households are there now?' 'How many households where there in the 1990s? In the 1980s?'	

3	Note major land-use changes.	'What are the most important changes in land use in the village (deforestation, reforestation, crops, harvests per year, tools etc) and outside the village?' 'How have these affected you?' ('Who cut down the forest?' 'When did this happen?' 'When did you replant?' 'Have you always grown the same crops as you do now?')	Once you have confirmed and noted these results on the village map, ask if there have been any changes *outside* the village that have caused changes in the village: upstream infrastructure (perhaps dam construction or mining affecting water levels?) or markets.
4	Note major natural hazards and disasters and responses to them.	'Can you remember any natural hazards or disasters that have affected the village?' 'What happened?' 'Where did it happen?' 'How large was the affected area?' Ask for details: 'Has there been any flooding in the village?' 'Was this rainwater or river flooding?' 'Once you have asked about flooding, move on to a different hazard.'	The locations can be shown on the village map or village hazard map, if available.

Notes

Do not push for a long list of hazards or the location of lesser hazards. Participants will remember the most significant events. Save the long, detailed list for Tool 5.

At step 4, it is useful to include questions about how the village recovered from major natural disasters. Recalling participants' resilience during previous events can help later in the process when discussing how they (will) deal with climate-related impacts.

Reference

Daze A, Ambrose K, Ehrhart C. 2009. Climate vulnerability and capacity analysis. Handbook. Geneva: Care International.

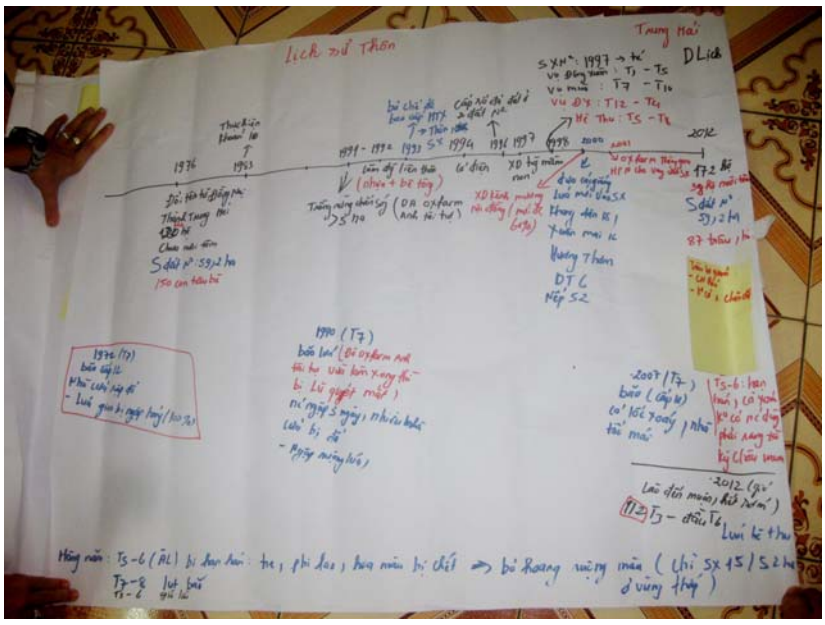


Figure 10.1: Example of a village history and hazard timeline in the process of being made

Note: It notes the years when major events occurred, the number of households (or total population), hazards and disasters, and important reforestation and development events.

Table 10.2: Example of a refined linear village history and hazard timeline

	1970s	1980s	1990s	2000s	2010s
Catchment	Dam construction	Electricity TV	Road		internet
Village	Founded in 1971, 7 households	Electricity 13 households	Land tenure 17 households	Market established 22 households	26 households
Uplands **Forest land** **Agricultural land**	Deforestation Shifting cultivation (ShC): hill rice 3 years crop/5 years fallow	ShC: hill rice 2 years crop/4 years fallow	Reforestation (species) ShC: hill rice 2 years crop/2 years fallow	Reforest No ShC since 2003	Selective cutting
Homestead	Bamboo huts		Brick houses		
Livestock	1 buffalo/ household			Dairy cows (5 households)	No buffalo
Home gardens	Banana trees	Mangoes	Longan		Mangoes die (heat?)
Paddy field	Local varieties, no fertilizer; 1 crop/year	Local varieties	Improved varieties Fertilizer; 2 crops/year. 50% of fields irrigated	All fields irrigated	
Agricultural fields		Allocation			Reallocation
Hazards		Flooding 1986			

Note: It is structured by decade and by landscape, catchment and land-use units

CHAPTER 11

Tool 4 Village hazards map

Purpose Identification of areas of high exposure to natural hazards and impacts. It presents the geography of exposure. Understanding the association between partiular impacts and particular types of terrain and land use helps to identify key areas for action in future land-use planning.

Output An additional layer to the village map, showing the risk areas for extreme weather events and natural disasters.

Prerequisites A copy of the village map; and possibly the village history and hazard timeline.

Materials Village map; A0 flipchart paper; pens (black, blue, red).

Duration 40 minutes.

	Steps	Suggested commentary	Remarks
1	Mark the names of the different fields on the village map.		Named fields are useful points of reference when marking vulnerable locations.
2	One by one, mark (in red) the areas that are usually affected by flooding, drought, storms, landslides, cold spells etc. Make sure each type of impact is marked consistently (use a legend and/or colour code).	The village history and hazard timeline shows that you had major floods in years x, y and z. Can you mark on the map which fields are usually affected by flooding?	Keep the exposures in mind when making the list of exposures in Tool 5, or vice versa, if Tool 5 is done before Tool 4. Note the connections between certain terrains and land uses and various impacts and exposures.
3	Draw a table that links the name of fields with time periods (in decades) as columns on a separate sheet of paper. Note impacts under the year when they occurred.	How often are these fields flooded? What time of the year does flooding occur?	The individual fields can be grouped into zones.

Notes Mapping village hazards can be done directly after the Village Map tool is completed. Focus on the geographical location and frequency of impacts during the discussions that are part of Tool 4. Try to avoid asking detailed questions that are better raised later in the process.

Reference Regmi BR, Morcrette A, Paudyal A, Bastakoti R, Pradhan S. 2010. Participatory tools and techniques for assessing climate change impacts and exploring adaptation options. Kathman du: Livelihoods and Forestry Programme Nepal.

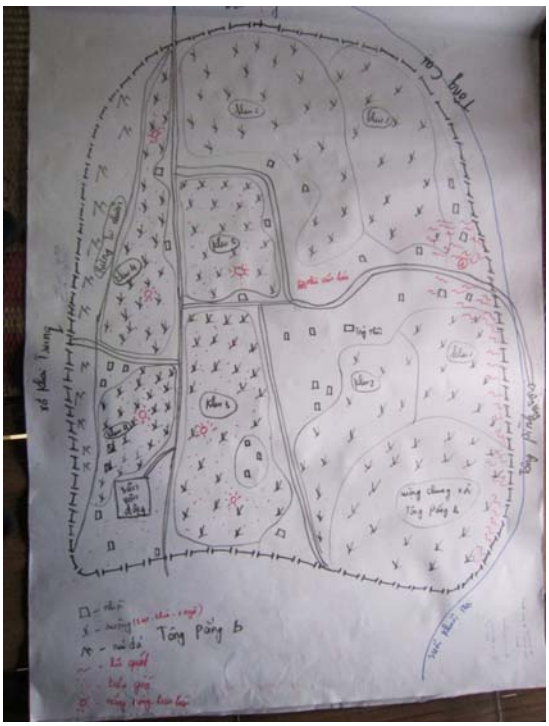


Figure 11.1: Village map marked with areas most exposed to natural hazards

Table 11.1: Example of table showing which hazards are added to the village map

Field in village map	Beginning of village–1979	1980–1989	1990–1999	2000–2012
Paddy field 'A' or 'local name'	1959: flooding from river	1986: big flooding		2008: hydropower dam broke, flooded whole village → villagers temporarily relocated → early warning system at dam
Paddy field B or 'local name'				
Maize field C or 'local name'				2005: rainstorm, land slide
Forest D (plantation?, natural regeneration?, natural forest?...) or 'local name'			1993: storm → fell all trees	2005: rainstorm, land slide → trees fall down → replanting
Homestead, home garden, livestock				2008: Cold spell → buffaloes die → Government support Program A to repair fences and elephant grass for feed; Program B on ensilage to store for winter feed
Pond			First ponds established no problem	Many households have ponds → polluted water
...				

Note: Mark names of fields on the village map and link with hazards: type of hazard impact of hazard any changes in land use or management as a direct result of that particular hazard?

CHAPTER 12

Tool 5 List of exposures to extreme weather events

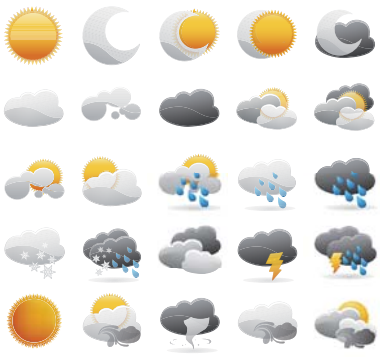
Purpose Identification of exposures to extreme weather events and when they most commonly occur.

Output An extensive list of extreme weather events and their frequency, which is used as the starting point for subsequent work. Local definitions of these exposures are included to enable ease of discussion.

Prerequisites No prior knowledge needed of any other tool. Many of the exposures will already have been mentioned during previous discussions.

Materials: A0 flipchart paper; pens.

Duration: Minimum 30 minutes (without definitions); maximum 60 minutes (with definitions).

	Các bước	Dẫn giải đề xuất sử dụng	Ghi chú
1	The facilitator transfers all the exposures already mentioned onto a flipchart. Participants list all the remaining exposures they can think of, what month(s) they usually occur, where they occurred, and what crops were affected.	'According to the village history and/or the village hazard map, you have experienced floods, droughts and landslides [facilitator lists these on the top left of the flipchart]. What months do they usually occur?' (Facilitator notes frequency under each heading.)	
2	We would expect the following exposures to be mentioned: ✓ Drought ✓ Hot Spell ✓ Cold Spell ✓ Early onset of rainy season ✓ Delayed onset of rainy season ✓ Flooding (from rain) ✓ Flooding (from river, lake, pond) If they are not listed, ask participants about whether they have experienced them.	'What other extreme events affect your village or your livelihoods?' ✓ Landslide ✓ Flashflood ✓ Heavy rainfall ✓ Hail ✓ Typhoon ✓ Heavy storm ✓ Forest fire ✓ Salt water instrusion ✓ …	Make sure that flooding owing to heavy rainfall and flooding from rivers are listed separately. 

3	When the list of exposures and high-risk months is complete, ask for the local definition (name) of each exposure.	'How do you define each of these extreme weather events?' Help the participants by referring to quantity (of water etc), duration, impact and other indicators. For example, for drought you might ask: 'How do you know there is a drought?' 'What is the difference between "just dry" and "a drought"? 'Are there different types of drought?' 'Is there a specific number of days without rain?' 'Is it when the soil is too dry?' 'Or is it when plants die?'	Definitions should be asked of all groups, as they might vary.
4	Transfer the list of exposures to another sheet for use as column headings for the subsequent exercises. If the list gets very long, select those events that have happened in the past 10 years or can be.		

Notes

In this tool, the term 'exposures' includes both extreme weather events (the actual exposure), natural hazards (the risk of impact during an exposure) and natural disasters (actual impacts on human livelihoods). Note that both natural 'hazard' and 'disaster' refer to the impact of a climatic or geological event. When facilitating the group discussion, try to focus as much as possible on the extreme weather event rather than its impacts. See the glossary of useful terms in Chapter 4 for a reminder of the distinctions between climatic exposures, natural hazards and natural disasters.

The facilitator should be aware of a number of points.

1) Forest fire is an impact (a natural disaster) because, by definition, trees have been lost. It typically occurs during dry weather (maybe drought) or is caused by lightning or human error.

2) Flooding and landslides (described here as extreme events) are usually (in)direct impacts of heavy rainfall. They occur when water cannot drain away fast enough, accumulates and bursts forth, damaging soil and/or plants in the process. In order to find the right solutions it is important to understand the source of the flooding. Is it simply rainfall (overland flow) or is it stream flow?

3) Scientists have various definitions of these terms, which we don't expect you to use here or even know. However, it is important that everybody becomes aware of the different understandings that different people have. A typical example is the various types of droughts: meteorological droughts (defined by rainfall), agronomic droughts (defined by soil moisture), technical droughts (defined by stream flow) and access droughts (when farmers lack the capacity to mitigate the impact of drought).

4) Farmers might not differentiate between a weather event and its impact (for example, they might not mention a drought unless the crops are damaged because farmers tend to talk about impacts rather than exposures).

Tool 5 should help to ensure that everyone involved in the project is aware of, and using, the same terms during the discussions.

Reference

Simelton E, Quinn CH, Batisani N, Dougill A, Dyer J, Fraser EDG, Mkwambisi D, Sallu S, Stringer L. 2013. Is rainfall really changing? Farmers' perceptions, meteorological data, and policy implications. Climate and Development.

Table 12.1: Sample list of exposures, months they usually occur and a local working definition

Exposure	**Month**	**Local definition**
Drought	March–April	No rain, soil too dry for planting
Hot spell	July, August	Above 38 ^{o}C
Cold spell	January	6–7 ^{o}C
Early onset of rainy season	March	Raining in March
Delayed onset of rainy season	May	No rain until May
Flooding (from rain)	July–August	Standing water, 20 cm for at least ½ day
Flooding (from river, lake)	...	....
Landslide, flash flood		
Heavy rain fall		
Hail stones		
Typhoon		
Heavy storm		
Forest fire		

CHAPTER 13

Tool 6 Calendar of climate and farming

Purpose This tool creates a climate and farming calendar for 'normal', 'dry' and 'wet' years. It provides a visualization of the range of variability in the current climate. Taking this into account, it also provides a flexible farming calendar.
The tool should help the transition of the focus-group discussions from extreme weather events and the resulting hazards towards longer-term climatic patterns and participants' perceptions of climate change (Tool 7).

Output An annual calendar for normal climatic situations (with some variability) and a paral lel farming calendar for the most common crops during these climatic situations.

Prerequisites You will need a list of crops grown in the village, drawn from the Village Map (Tool 1) and/or the Tree & Crop Suitability Ranking (Tool 10).

Materials: A0 flipchart paper; pens.

Duration: 40 minutes.

	Steps	Suggested commentary	Remarks
1	Draw 13 columns. Column 1 is for the list of items that will be discussed. The other 12 columns are titled with the months of the year (see Table 13.1, below). Agree which months correspond with which seasons and mark these at the top of the table (this will also determine the seasons for Tool 7).	Ask the group which months fall in winter, spring, summer and autumn. This may vary in different areas.	Decide whether to use lunar or solar calendar months. Choose the system that the participants most commonly use.
2	For rainfall, mark the 'normal' rainfall months, ranked from most rainfall through light showers to dry months. Use different shades of a colour to show these variations (see Table 13.1). Then indicate which month the rain starts in a year considered to be 'dry' or when the rains have come late. For temperature, mark the coldest and hottest months. For wind, mark the windiest months (including typhoon), wind directions etc.	When does the rainy season usually start (beginning/middle/end of the month)? What months are usually the wettest? What months are the driest? If rains are 'early', when do they come? If rains are 'late', when do they come? Which months are hottest? Which months are coldest? Which months are windiest? What directions do the winds come from? Do you have names for the different kinds of winds? Can winds (or other signs) be used to predict weather? Can winds (or other signs) be used to predict harvests?	If feasible, ask if the participants have the tools and knowledge to 'measure' rainfall or temperature (indigenous methods, signs, buckets, something else?) Keep separate notes of all the detailed answers if there is not enough space on the flipchart table.

3	In column 1, list the most common annual crops. Make the farming calendar. Include items such as land preparation, fertilizer inputs, planting, flowering and harvesting.	How do you know when it is time to plant? List details of soil type, moisture, depth of planting, date, natural indicators, forecast on radio/TV/other media, recommendations from community farming groups or NGOs etc. Do you change your planting schedule if the rains come late or early? Are there any crops you don't plant if the rains come late?

Notes

It is not necessary to follow the same order of temperature, rainfall and wind etc as is shown in the example below. List the items in an order that comes naturally to your particular group.

It is useful if participants are able to agree on a more detailed calendar, which marks the beginning, middle and end of each month. Only do this, however, if the group is willing and there is sufficient time. Crops with similar planting patterns can be grouped together. For clear results, it can be useful to give a separate calendar row to different varieties of the same type of crop.

References

Nguyen Q, Hoang MH, Öborn I, van Noordwijk M. 2012. Multipurpose agroforestry as a climate change resiliency option for farmers: an example of local adaptation in Viet Nam. Climatic Change 117(1–2):241–57.

Simelton E, Quinn CH, Antwei PA, Batisani N, Dyer J, Fraser EDG, Mkwambisi D, Rosell S, Sallu S, Stringer LC. 2011. African farmers' perceptions of rainfall. Working Paper No. 73. Leeds, UK: Centre for Climate Change Economics, University of Leeds.

Simelton E, Quinn CH, Batisani N, Dougill A, Dyer J, Fraser EDG, Mkwambisi D, Sallu S, Stringer L. 2013. Is rainfall really changing? Farmers' perceptions, meteorological data, and policy implications. Climate and Development. doi:10.1080/17565529.2012.751893

Table 13.1: Example of a climate and farming (solar calendar)

	Winter			*Spring*		*Summer*				*Fall*		
Month	**D**	**J**	**F**	**M**	**A**	**M**	**J**	**J**	**A**	**S**	**O**	**N**
CLIMATE												
Rain	*dry*	*dry*		*End March if early*		*Mid May if Late*						
Temperature												
Wind		*China wind*							*Laos wind*			
FARMING												
Rice				*First Crop*				*Second Crop*				
Maize					*First Crop*			*Second Crop*				
Trees				*Mangletia Acacia*					*Sơn tra*			
…												

Legend: Black indicates most rain; dark grey indicates less rain; light grey indicates just light showers; blue indicates months with the coldest temperatures; red the months with the hottest temperatures.

CHAPTER 14

Tool 7 Table of perceptions of changes in climate and weather patterns

Purpose To understand how farmers perceive climatic changes and changes in weather patterns.

Output A systematic analysis of participants' perceptions of changes in climate and weather patterns. The resulting qualitative data can be used for comparisons with standard meteorological data.

Prerequisites Tool 7 does not require the use of any other tool but the background information provided through the Village History and Hazard Timeline (Tool 3), the List of Exposures (Tool 5) and the Calendar of Climate and Farming (Tool 6) will be helpful in generating a lively and well-informed discussion.

Materials: A0 flipchart paper; pens.

Duration: 50 minutes.

	Steps	Suggested commentary	Remarks
1	Prepare the table as shown in Table 14.1 below. Refer to the Climate and Farming Calendar (Tool 6) and the seasons identified there. Participants can decide which season to start with. Often the current season is a good starting point for dialogue.	'Have you noticed any major changes or fluctuations in weather [rainfall or temperature] during your lifetime?' Write down the number of participants who reply 'yes' and the number who reply 'no'.	Remember that perceptions cannot be wrong. Everyone, including those who say climate hasn't changed, should still be invited to participate in the exercise.
2	Mark the seasons (with months) down the left-hand column of the table. Work through each indicator in turn: rainfall, temperature, wind etc. Discuss with the group and write the answers in the table.	**'What** changes do you perceive in each of the different seasons in your lifetimes?' 'For example, have there been periods with more or less rainfall [quantity] in Spring?' 'Was that rainfall more or less intense?' 'Are there more or less rain-free days?' 'Any other changes?' **'When** [approximately what year] did each change start/finish? In each box, note how many participants describe more/less/no change, and other relevant details. **'How** is it changing [discuss cycles or other regular patterns or trends, variability between years etc]?'	There can be more than one answer noted in each box in the table. If participants give lots of relevant details and descriptions keep a separate note for later use.

3	After the exercise is completed, ask the group to look at the table they have made.	Again ask how many of the participants have noticed any major changes or fluctuations in weather (rainfall or temperature) during their lifetime. Note whether the number answering 'yes' has changed since the beginning of the discussion.	This last question helps to show whether participants were influenced by the group discussion. Sometimes participants think that they 'should' think the weather/climate is changing when they actually do not. Alternatively, they might explain that the discussion has made them more aware of changes that they had not noticed before.

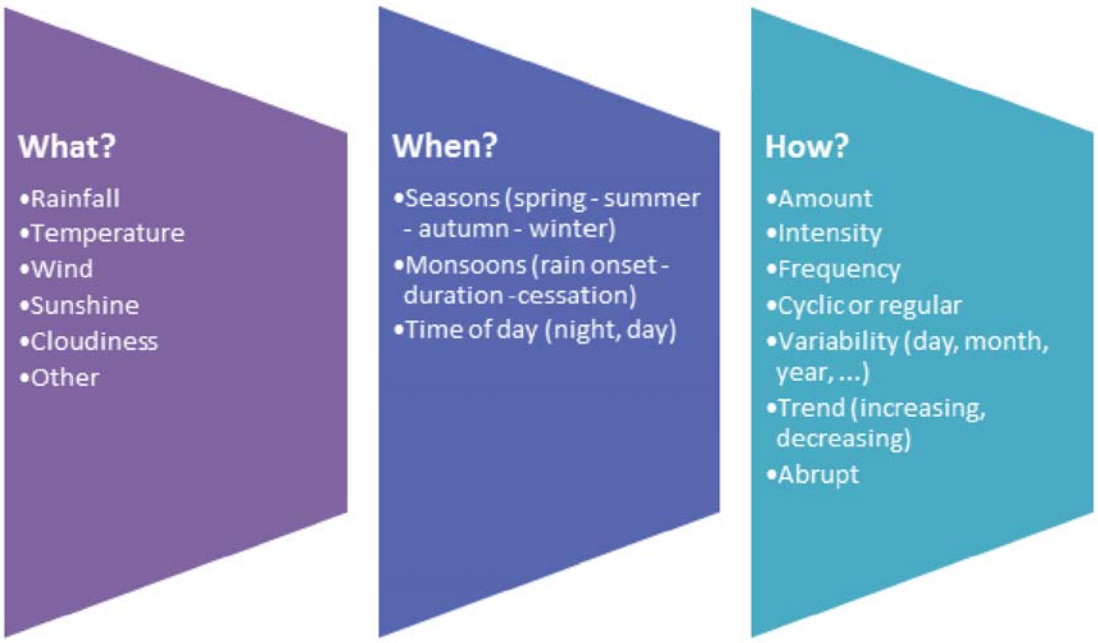


Figure 14.1: Checklist for perceptions of change

Note: 1) what aspects of the climatic patterns are changing? 2) when are they changing? 3) how are they changing?

Notes

For most farmers, the weather (especially the timing of rainfall and temperature) determines their activities. In order to analyse changes in climate patterns it is important to know what type of weather farmers expect at any given time. We will refer to this as 'normal' weather. Having established this standard, we can then explore how normal weather has changed or varied over a particular period of time.

For example, changes in **rainfall** can be discussed in term of accumulated amount, frequency of showers, intensity of showers and duration of each spell of rain. The duration can be described in units of a day, a week, a month, a crop season, or some other period identified by the farmers. Clarify whether floods have been caused by rainfall or stream flow.

Changes in **temperature** are typically described by defining minimum and maximum temperatures that fall within or outside the range of 'normal'. When discussing changes and variations, it is useful to note the duration and/or frequency of different temperatures. It can be helpful to refer to the types of clothing worn, and perhaps the type of bedcovers or blankets used at night.

For **wind patterns**, farmers often describe the direction in which the wind is blowing and the wind speeds associated with different seasons. Wind speeds may also change owing to broader weather changes, as well as because of local land-use and hydrological changes.

There are two ways to gather this information.

1) **Individual interviews.** This approach allows the facilitator to quantify how many participants perceive a particular change. However, this process is time consuming and, because participants' memories are not discussed in a group, many nuances and details may be missed. If using this approach, discuss contradictory individual perceptions during subsequent group discussions.

2) **Focus-group discussions.** This approach encourages the sharing of both individual and collective memories. Individual perceptions and opinions should not be 'negotiated away' in order to try and reach a single 'true' answer. Instead, record this variability by noting and quantifying how many participants (dis)agree. This approach can produce more nuanced results.

With either approach, the information generated through Tool 7 can be compared with meteorological data. Encourage the participants to share as many details as possible. Individual perceptions and definitions of the onset of rainfall, for example, can provide a very useful complement to standard climate statistical analyses.

When preparing the table, refer to the Calendar of Climate and Farming (Tool 6) and make sure that the order of seasons corresponds with the list.

Avoid using the terms 'good' and 'bad' years because these terms for farmers usually refers to agricultural outputs and are not therefore indicators of exposure. Try to refer to specific time periods (years or decades) when discussing variability. Try to confirm whether the group members have perceived a constant, increasing or decreasing trend, yearly variability, or other cycles or types of change.

Avoid leading questions that might influence the content of the discussion. There are no right or wrong perceptions. Focus on recording the perceptions just as the participants present them.

References

Simelton E, Quinn CH, Antwei PA, Batisani N, Dyer J, Fraser EDG, Mkwambisi D, Rosell S, Sallu S, Stringer LC. 2011. African farmers' perceptions of rainfall. Working Paper No. 73. Leeds, UK: Centre for Climate Change Economics, University of Leeds.

Simelton E, Quinn CH, Batisani N, Dougill A, Dyer J, Fraser EDG, Mkwambisi D, Sallu S, Stringer L. 2013. Is rainfall really changing? Farmers' perceptions, meteorological data, and policy implications. Climate and Development. doi:10.1080/17565529.2012.751893

Table 14.1: Example of how notes can be made ofperceptions of changes in rainfall and temperature (and wind and sunshine, if applicable).See Simelton et al., 2011 for further examples.

	Rainfall				Temperature			
Season	**Rain amount**	**Rain intensity**	**Dry Days**	**Other (Wind)**	**Night temperature**	**Day temperature**	**Sun**	**Other**
Winter: Dec, Jan, Feb				Windier, less foggy after cut forest 1989 (¼)		Gradual increase (½) since mid-80s (¼), since mid-90s (¼)		
Spring: Mar, Apr			Fewer since mid-90s (½)				Stronger, 'burns' maize leaves (1)	Apr temp is like May in the 60s
Summer: May, June, July, Aug	10-year cycles (top 1987, 1997, 2006) (½)	Increase since 80s (½)	Fewer since 80s (½)	Stormier since end 80s (¼)	Gradual increase since 80s (1)	Gradual increase since 80s (½)		
Autumn: Sep, Oct, Nov		Occasional intensive rain storms in Sep, never happened before 1990s (¾)		Stormy season used to end in Sep, since 1990s storms continue into late Sep two out of three years				Sep temp is like Aug in the 60s

Note: This table shows a solar calendar, though the group may choose to use a lunar calendar. The seasons should correspond with those listed in Tool 6.
Legend: (¼) = 25% agree, (½) = 50% agree, (¾) = 75% agree, (1) = all agree.

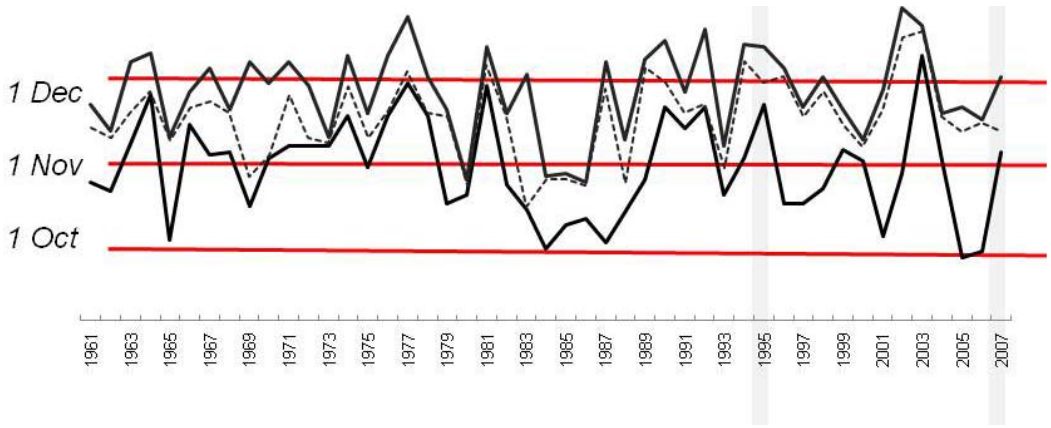


Figure 14.2: Example of how information from farmers in Malawi can be combined with rainfall data. The black lines illustrate the first three occasions with at least 10 mm rainfall (meteorological observations) as a rough estimate of when the soils are moist enough to start planting. Here, about 40 mm of rain is needed to wet soils to 30 cm depth (farmers' measure). The graph shows that farmers have to be ready to plant between October and January, and that the interannual variability in the third 10-mm rain, i.e. the onset of rainfall is increasing.
From: Simelton et al. 2013.

CHAPTER 15

Tool 8 Table of strategies for coping and adaptation

Purpose Documentation of the strategies that farmers use to reduce their vulnerability to extreme events.
The tool helps identify strategies for limiting impacts before, during and after an extreme event, as well as highlighting possibilities for reducing future vulnerability.

Output A table presenting coping and adaptation strategies for dealing with extreme weather events.

Prerequisites The list of exposures from Tool 5 is used for the column headings of the table. If coping strategies and adaptation were discussed at an earlier stage, it will be useful to refer to the Village History and Hazard Timeline (Tool 3).

Materials List of exposures (from Tool 5); flipchart paper; pens; sticky notes.

Duration 20–30 minutes.

	Steps	Suggested commentary	Remarks
1	On a sheet of flipchart paper, use the list of exposures (Tool 5) to form the column headings of a new table. Divide the sheet horizontally into four parts: 'before', 'during', 'after' and 'reducing future impacts' (see example below).	'Looking at this list of hazards and extreme weather events again, let's say you anticipate a cold spell.' 'What do you to reduce its impact on crops, trees or animals before the cold spell?' 'What crops/trees/animals are usually at risk?' 'In what ways?''	Questions like these lead to open-ended discussions. You should record interesting points in your notebook or on a separate sheet of paper. Notes can be used for later analysis.
2	The facilitator asks, 'What do you [or people in the village] do to reduce the impact of each of these exposures? -before (proactive)? -during (reactive)? -immediately after (reactive/coping)? -to reduce future impacts (proactive/adaptation)?	'Is there some way you can know that there is a risk of drought **before** it happens?' 'How do you know?' 'Do you have access to an early warning system? Weather forecast? Signs in nature (local knowledge)? Information from the radio or community groups?' 'If you expect a drought, what do you do **before** it happens to reduce the loss or damage of crops, trees or animals?' 'Do you change your management system, crop variety, planting schedule?' 'Do you irrigate?' **During**: 'If you are in the middle of a cold spell/drought, what do you do to reduce damage to specific crops, trees and animals?' 'Do neighbours help each other?' Do you get support from agricultural advisors?	Answers may be written on sticky notes that can be moved around the flipchart.

	'After a cold spell, what do you do to reduce the effects of the damage on crops, trees, animals for a) the present harvest [coping]; and b) future harvests [adaptation]?' 'Do you consider diversifying with new types of crops, trees and animals?' 'Are there any government relief programs to help compensate your losses or to help you prepare for future exposures?' 'Where do you find support to help you **reduce future impacts** on your livelihood?' 'Where can you go for useful information and/or funding?'

Notes

At the start of the exercise, decide with the group whether you will a) go vertically through all the 'before', 'during', 'after' and 'reducing future impacts' stages for each exposure on the list; or b) go horizontally through all the exposures focusing on each consecutive stage. See what works for your particular group.

The facilitator should transfer the information produced during the flipchart exercise, along with any extra notes, into a digital table for analysis and future use (see Figure 15.1 and Table 15.1 below).

Reference

Daze A, Ambrose K, Ehrhart C. 2009. Climate vulnerability and capacity analysis. Handbook. Geneva: Care International.

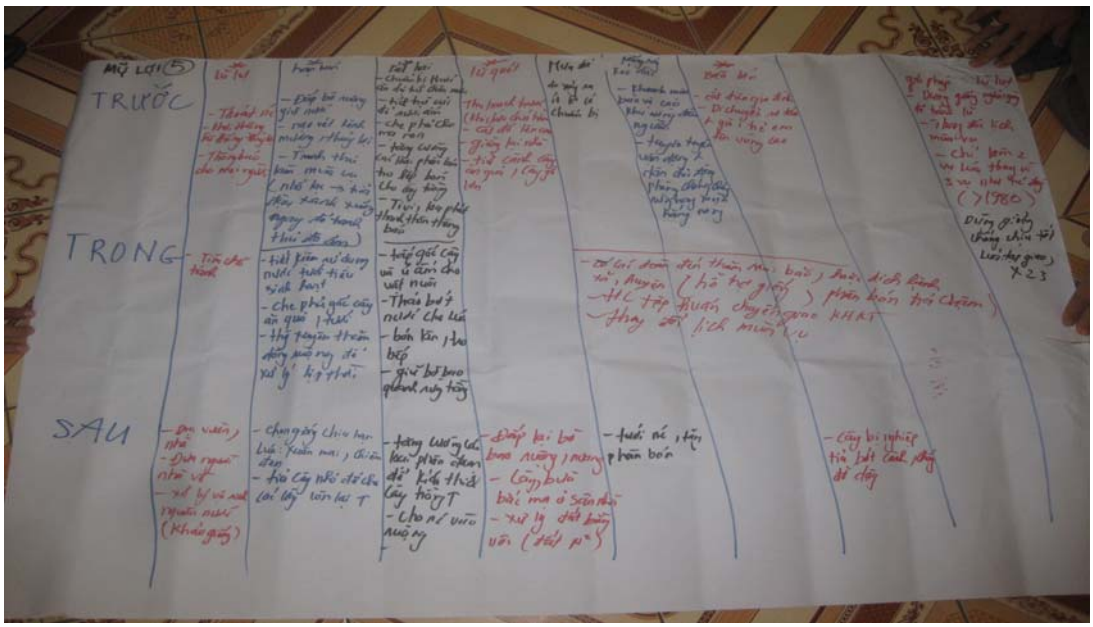


Figure 15.1: Example of flipchart table showing coping and adaptation strategies before/during/after/future planning for various extreme weather events

Table 15.1: Refined table showing some coping and adaptation strategies before/during/after/future planning for various extreme weather events. The tables show key words and details are kept in a notebook.

	Drought	Hot spell	Cold spell	Early onset of rainy season	Delayed onset of rainy season	Flooding (from rain)	Flooding (from river, lake)	Heavy rain fall	Hail
Before	*Prepare water storage*	*Follow weather forecast*	*Plastic mulching*	*Listen to weather forecast*	*Plastic mulching*	*Clear irrigation channels*	*Clear rivers from branches*	*Clear water pipes*	*Can't predict so do nothing*
During	*Irrigate*	*Irrigate in the morning*	*Plastic mulching*	*Plant earlier*	*Plant sweet potato instead of peanut*	*Channel water away from field*	*Follow weather forecast*	*Store water for irrigation*	
After	*Replant*	Add fertiliser and pesticide	Spray pesticides			Add fertiliser and pesticide	Add fertiliser	Add fertiliser	Replace damaged plants
Reduce future impacts	*Plant later*	Plant shade trees in tea plantations	Grow grass to feed animals	Adjust farming calendar	Adjust farming calendar	Plant grass strips to prevent soil erosion	Plant grass that absorb water along river	Plant grass strips to prevent soil erosion	

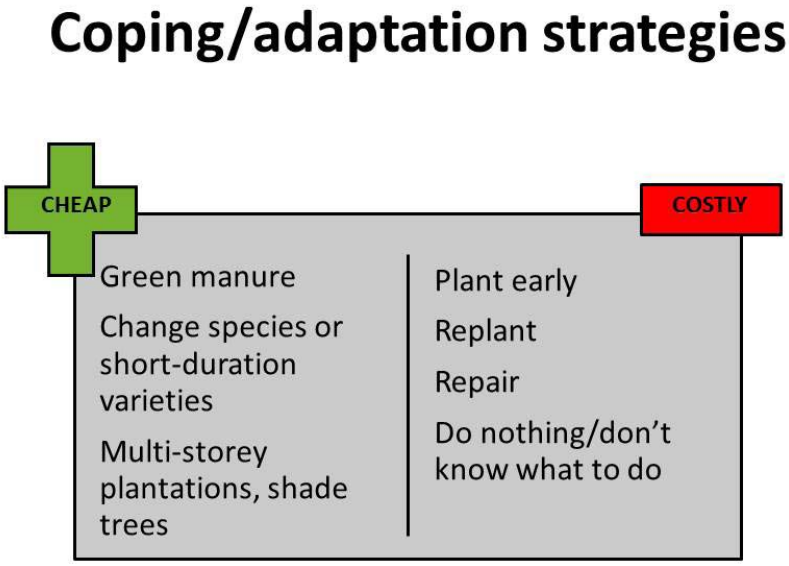


Figure 15.2: Example of selected coping and adaptation strategies summarised into strategies that do not infer production losses and can be readily be implemented at low cost, and costly strategies that infer economic losses.

CHAPTER 16

Tool 9 List of losses: vulnerability and support mechanisms

Purpose To clarify farmers' perceptions of weather and climate in relation to their choices of farming system.
The discussions provide information about which systems are most vulnerable or sensitive to impacts. This information also helps with formulating the household survey.

Output A list showing the extent and frequency of losses caused by exposure to extreme weather events. It also lists the various support mechanisms that are available, used, and/or requested.

Prerequisites It is useful to complete beforehand the Tree & Crop Suitability Ranking (Tool 10) and Coping and Adaptation Strategies (Tool 8).

Materials A0 flipchart paper; pens; sticky notes.

Duration 30 minutes.

	Steps	Suggested commentary	Remarks
1	Discuss the participants' vulnerability in terms of the extent of their actual losses. Ask each participant in turn.	'What is the most valuable thing you have lost because of any of these hazards (refer to the list of exposures (from Tool 5)?' 'Was it a person, your home, belongings, livestock, crop yield, soil, or something else?' 'How many times have you suffered a loss because of this hazard?' Also ask detailed questions about economic losses at each stage of production (input, growth, harvest, post-harvest, marketing).	Encourage people to talk: facilitator takes notes and asks the participants to write their own responses on sticky notes. These can then be clustered on flipchart paper.
2	Discuss what support mechanisms are locally available.	'What support do you have access to if there is an extreme weather event or other exposure?' 'What type of support is offered (money, food, relief program, loan or something else)?' 'Who provides the support (government, NGOs, neighbours, relatives, someone else)?' 'Is the support continuous or just available for emergency situations?'	Ask what support is available for the communities and for individuals respectively.
3	Ask the participants to suggest how support could be improved in ways that would really help them.	'What could be better about the support available to you?' 'What kind of support would you prefer?'	

Notes

It is particularly important to make careful notes in cases where it is perceived that support mechanisms are not available, not reaching the relevant groups, or not meeting the specific needs of farmers facing vulnerabilities or losses.

References

Daze A, Ambrose K, Ehrhart C. 2009. Climate vulnerability and capacity analysis. Handbook. Geneva: Care International.

Regmi BR, Morcrette A, Paudyal A, Bastakoti R, Pradhan S. 2010. Participatory tools and techniques for assessing climate change impacts and exploring adaptation options. Kathmandu: Livelihoods and Forestry Programme Nepal.

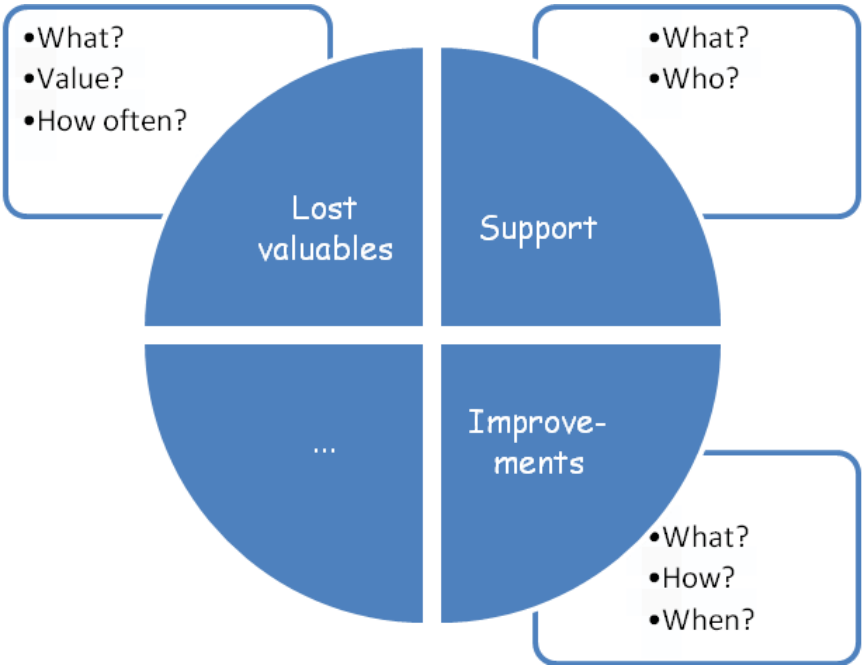


Figure 16.1: Suggested framework for questions about vulnerability and support
Note: Answers are written on sticky notes and clustered in the relevant area. The information can then be refined and transferred into digital form.

CHAPTER 17

Tool 10 Ranking suitable trees and crops

Purpose To create an inventory of locally appropriate farming systems so that farmers can choose to diversify with crops and products that are less vulnerable to extreme weather.

The Tree and Crop Suitability Ranking must be informed by both local and scientific knowledge. "Suitability" here refers to productivity (quantity and/or quality of yields) and the survival of the tree and crops under extreme weather events.".

The group discussion can also identify issues that need further research.

Output A table of all trees and crops grown in the village, ranked according to their suitability for withstanding various types of extreme weather.

Prerequisites The list of exposures (from Tool 5) is used for the column headings below. Refer to the problem tree (from Tool 2) to establish causes.

Materials A0 flipchart paper; pens.

Duration 60 minutes.

	Steps	Suggested commentary	Remarks
1	List all trees and crops currently planted in the village: Along the left-hand side of a new sheet of flipchart paper, list all existing names of trees, crops, and integrated systems of trees and crops (intercropped systems).	'What tree species do you have in the village, in the forest, fields, as intercropped agroforestry or home gardens?' 'What trees are most common?' List total numbers and area planted in the village; note how many farmers plant each species.	If the list gets very long, focus on the species that participants consider to be the most important for environmental, economic or socio-cultural reasons. Analyze the list and note the most vulnerable seasons and situations for each type of tree and crop.
2	Write the list of exposures from Tool 5 horizontally across the top of the sheet so that it forms titles for the columns. To form a table, the list of trees and crops made in step 1 form the headings for rows (running horizontally) and the exposures heading for columns (vertically) (see Table 17.1 below).		The facilitator places the table in the centre of the group or on a wall so that everyone can easily see it and move around it (see Table 17.1 below).

3	Rank the production suitability of the species from '1' for unsuitable to '5' for very suitable for withstanding each hazard (for more about ranking, see Notes below). Go through the table row by row to assess how each tree is affected by each exposure. In this way, the table becomes a relative ranking of how different trees are affected by a specific exposure.	Ask, and take separate notes of: 'How suitable (hardy) is this tree during a drought?' 'What is affected: taste of yield, quantity of yield, size of fruit or grains, number of flowers, growth, wood quality, pest attacks?' 'Are plants or animals sensitive at a certain age or stage of growth, rather than at a certain time of year?' 'Is it possible to prevent damage?' 'Can you adjust or minimise the impact or vulnerability by changing the time of planting or changing the crop?' The exercise produces a numeric ranking but the underlying explanations behind the ranking are more important: the ranking is only indicative. If the list of trees is extensive, it may be faster to base questions on the list of trees: which trees are not particularly affected by exposure X;	The suitability factor must be considered against the frequency of the hazard. Some hazards may not be relevant in the table because not all crops or trees are in high-risk zones. Once the table is complete, ask more detailed questions. If there is not enough space to write on the flipchart paper, just note key words and write down longer explanations separately.

Table 17.1: Matrix showing the production suitability of farming systems to extreme weather events

Note: Remember that the rankings (numbers) are only relative. The discussion is the most important and useful part of this exercise.

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