

Rain calendars: a tool for understanding changing rainfall patterns and effects on livelihoods

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CARE and the International Institute for Sustainable Development (IISD) collaborated to pilot the use of an innovative tool for participatory analysis of changing rainfall patterns. The rain calendar tool is designed to gather community perceptions of rainfall patterns, to determine the parameters for good, average, and bad years in terms of rainfall, and to provide a platform for discussing risk management strategies to adapt to changing rainfall patterns.

How to facilitate the tool

The tool essentially combines a historical timeline with a seasonal calendar.

- Participants are asked to plot rainfall and temperature conditions experienced over five or more years.
- They plot the timing, that is, the months or seasons (and where possible, the specific weeks) during which rain fell in their locality. They also plot the amount of rainfall received under the categories of little/below normal, average/normal, or heavy/above normal rainfall.

- In the same way, information on temperature level (normal, high, cold, very cold) and timing is plotted for each year.

- Participants also describe the nature, duration, distribution, and effects of rainfall and temperature conditions experienced on their livelihoods.

- Where meteorological weather records and other relevant reports are available at the local level, these are compared to the information provided by communities for validation.

Case study: examining the vulnerability of pastoralists to climate change in Ethiopia

CARE, IISD, and Save the Children UK used the tool on a pilot basis in a collaborative research project in May and June 2009. The project examined the vulnerability to climate change of pastoral communities in the Somali and Borana regions of Ethiopia. Approximately 24 focus groups disaggregated by gender and age were involved in developing rain calendars.

In Kalabaydh village (Shinile district,

Table 1: Rain calendar, Kalabaydh Village, Shinile District, Ethiopia, May and June 2009

MONTHS		Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sept	Oct	Nov	Dec
Rainy Seasons				Gu Season				Karan Season					
YEARS													
2009	R	X	X	X	X	**	X						
	T	↑	↑	↑↑	↑↑	↑↑							
2008	R	X	X	—	—	—	X	**	**	X	X	X	X
	T	↑	↑	↑↑	↑↑	↑↑	↑↑			↓	↓		
2007	R	X	X	**	**	**	X	**	**	**	X	X	X
	T			↑	↑	↑	↑	↑↑	↑↑	↑↑	↑	↑	↑
2006	R	X	X	—	—	X	X	—	—	—	X	X	X
	T	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑	↑
2005	R	X	X	—	—	—	X	—	—	—	X	X	X
	T												

Key:

** Light rain showers X no rain — normal rain == heavy rain
 ↑ normal temp. ↑↑ high temp. ↓ cold temp. ↓↓ very cold temp.

R = rain
 T = temperature

Somali zone), the rain calendar helped community groups to compare weather conditions (rainfall and temperature) in terms of quantity, quality, and distribution during the main seasons (*Gu* and *Karan*) across past years (Table 1). The calendars showed that, in 2009, daytime temperatures in the *Gu* season (March to May)

were the warmest experienced so far in the last five years. They also showed local variations in rainfall: some locations within the area receive comparatively higher rainfall than others in given seasons, and this results in a higher concentration of livestock in such areas and the potential for the rapid spread of livestock diseases. The

Notes on rainfall and temperature
Two days of rain showers in the third week of May.
High temperatures. Temperatures were warmer than in 2008.
In the <i>Gu</i> season, the rains were near normal and were better than in 2009. In the <i>Karan</i> season, light rain showers fell for 1 to 2 days. However, some pocket areas received <i>Karan</i> rains for more than 2 days. The 2008 rains were insufficient. Most livestock were not returned to the area due to insufficient pasture. In pocket areas that received more rain, the community was advised not to concentrate livestock there due to the spread of diseases.
In January and February, days were very warm and nights were cold. Temperatures increased in March and April and were very high in May and June. Temperatures began to decrease in September. October was the coolest month.
The rain was of little quantity. It was poorly distributed and fell in a few areas in both the <i>Gu</i> and <i>Karan</i> seasons.
Between March and June, temperatures increased though they were cooler than in 2009. From July to September, temperatures were very warm during the day and the nights were windy. From October to December, temperatures were moderate. There were huge livestock deaths in 2007 and 2006.
The rainfall was good in March and April. In August and September, the rains were normal. An unknown disease affected camels in August and September. Other livestock were also affected by a disease that led to miscarriages.
There was normal temperature all year.
There was very good rain in both the <i>Gu</i> and <i>Karan</i> seasons.
Temperatures were warmer than in the previous year (2004).

calendars also recorded other major events that affected the lives of communities across the rain calendar years for example, years when they experienced severe droughts as well as years when they had good rains, or huge losses of livestock due to diseases and drought.

The rain calendar was used to facilitate discussions and reflections on:

- Other factors that contribute to the problems communities experience, such as population growth and pressure on resources.
- Current coping strategies such as feeding

livestock on relief food, herd diversification, purchase of grain, and the sale of firewood and charcoal were also discussed. Communities reflected on the sustainability and effectiveness of their coping strategies, and articulated their needs in terms of the types of support they require to help them adapt to longer-term changes, and reduce the negative impacts of various coping strategies. For example, the Kalabaydh community noted that the government should provide physical and financial resources for the construction of water reservoirs, and tap the available ground water and distribute it in the area.

Strengths and limitations of rain calendars

The rain calendar is a simple, user-friendly participatory tool. It takes a relatively short time to apply it, and it doesn't require a high level of expertise to use.

The rain calendar provides useful information that can be used to compare weather conditions for specific sites across seasons and years. It helps document changes in the predictability of rainy and dry seasons, based on the onset and cessation. It also clarifies the consequences of the changes on livelihoods. However, it may not help in providing patterns of weather conditions.

Since the rain calendar is a tool that is useful at local level, it is important to accurately translate information into and from local languages when applying the tool in the field. It is also important for facilitators to be clear on the specific types and parameters of information to gather, and use a standard template (including symbols) for recording gathered information. This makes it easier to understand conditions experienced at a glance, and harmonise such information.

The rain calendar provides qualitative weather information for specific locations. It helps project practitioners and researchers to better understand how community members evaluate their weather conditions, and how changes in these conditions affect their livelihoods. From the pilot study, it was noted that communities' interpretation of good or bad seasons incorporates weather as well as other conditions such as:

- quantities of crop yields;
- pasture availability;
- livestock productivity;
- occurrence of abnormal livestock and human diseases and mortality;
- duration of migrations (which could be due to bad weather, political conflicts etc.); and
- access to markets.

For example, the group of older men in

Kalabaydh village noted that over the last 10 years, it has been getting warmer and drier in the area. Consequently, livestock numbers and quantities of milk produced have reduced over this time. The older women mentioned that they constructed semi-permanent houses in 2004 when there was plenty of rain and abundant, good quality grass. They also noted that 2007 was a bad year because it was very dry in both the *Gu* and *Karan* seasons, their family members had to migrate livestock to Oromiya, and they suffered loss of some livestock due to camel-rustling in Oromiya.

It is therefore important for the facilitators to guide discussions in a way that will bring out precise information on weather conditions separately from other conditions that affect communities. For example, based on the information provided by communities, facilitators should ask follow-up as well as guiding questions that would bring out additional and specific information sought for the purposes of developing the rain calendar.

The rain calendar relies on participants' collective memory. It was noted that the precision and accuracy of information provided diminishes after five years. Therefore, the rain calendar cannot be used to determine changes in trends of weather conditions for the specific locations in which it is applied.

The information obtained through the rain calendar can be augmented with larger-scale quantitative meteorological data for project planning and implementation.

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