

Perception of climate change and adaptation strategies in the drylands of West Africa : A review

Florence DE LONGUEVILLE^{1,2}, Pierre OZER¹, Sara VIGIL²

¹ Department of Environmental Sciences and Management, University of Liege, Belgium

² CEDEM, University of Liege, Belgium

Introduction

The perception of climate change has become an exiting new field of research explored in recent years. This is a response from the international scientific community to the conclusions of the 4th report of the Intergovernmental Panel on Climate Change which had underlined serious deficiencies in this field, particularly in West Africa where population is largely dependent of rain-fed agriculture. Yet, a global survey of the literature since 2000 shows that most references on this topic were published over the last five years.

Objective

This study aims to explore the literature devoted to the perception of climate change and to adaptation strategies in arid and semi-arid area of West Africa in order to identify key trends

Method

A systematic literature review (request by keywords) was carried out using the *Scopus* and *Google Scholar* databases since 2000. A distinction was made between studies in arid zone (300-500 mm) and in semi-arid zone (500-900 mm).

Results

Tab.1: Perception of change in rainfall in arid and semi-arid zones of West Africa (% of interviewed people - if the total is not 100%, the rest is 'without opinion')

		Semi-arid zone			Arid zone		
		↘	Stable	↗	↘	Stable	↗
Total annual rainfall	Akponikpè et al. (2010)	61	4	21	91	2	2
	Nielsen and Reenberg (2010)				62	6	32
	Mertz et al. (2009)	82	5	13			
	Mertz et al. (2012)	82	10	8	83	4	13
	Diessner (2012)				90	6	3
Length of the rainy season	Akponikpè et al. (2010)	61	6	14	91	2	4
	Nielsen and Reenberg (2010)				60	6	26
	Mertz et al. (2012)	84	10	6	82	6	12
Dry spells during the rainy season	Akponikpè et al. (2010)	13	4	68	6	6	85
	Nielsen and Reenberg (2010)				14	0	74
	Mertz et al. (2009)	23	0	45			
	Mertz et al. (2012)	10	6	84	20	6	74
Start of the rainy season		Later	Stable	Earlier	Later	Stable	Earlier
	Akponikpè et al. (2010)	67	9	15	85	4	6
End of the rainy season		Earlier	Stable	Later	Earlier	Stable	Later
	Akponikpè et al. (2010)	48	13	24	70	7	11

Tab.2: Significant changes in rainfall felt by population in arid and semi-arid zones of West Africa according to results from focus group or interviews (the 1st change is the most important)

		1 st change	2 nd change	3 rd change
Arid zone	Ouédraogo et al. (2010)	Decrease in rainfall	Changes in the onset and offset of seasons	Dry spells
	Dieye and Rye (2012)	Decrease in rainfall	Irregular rainfall	Change in the onset and offset of seasons
	Tschakert (2007)	Lack of rain	Irregular rainfall	Periodic droughts
	West et al. (2008)	Long-term decline in rainfall	Increase in rainfall variability	
Semi-arid zone	Ouédraogo et al. (2010)	Decrease in rainfall	Changes in the onset and offset of seasons	Irregular rainfall
	Tambo and Abdoulaye (2013)	Decrease in rainfall and changes in the timing of rains	Changes in the timing of rains	Decrease in rainfall

Globally, two methods are used in the studies of the perception of climate change by population: interviews (Tab.1) and focus groups (Tab.2) .

The most important change felt by population is a decrease in total annual rainfall but population also raised a decrease in the length of the rainy season (later starting date and earlier end date), an increase in dry spells during the rainy season and in periodic droughts and irregular rainfall (Tab.1 and Tab.2).

These perceptions have the same trends in the two climatic zones but are somewhat more pronounced in the arid zone than in the semi-arid zone.

In recent years, these climatic zones are experiencing a clear rainfall recovery as illustrated by the case of the southern part of Mauritania (Fig.1), but the farmers interviewed did not express this view.

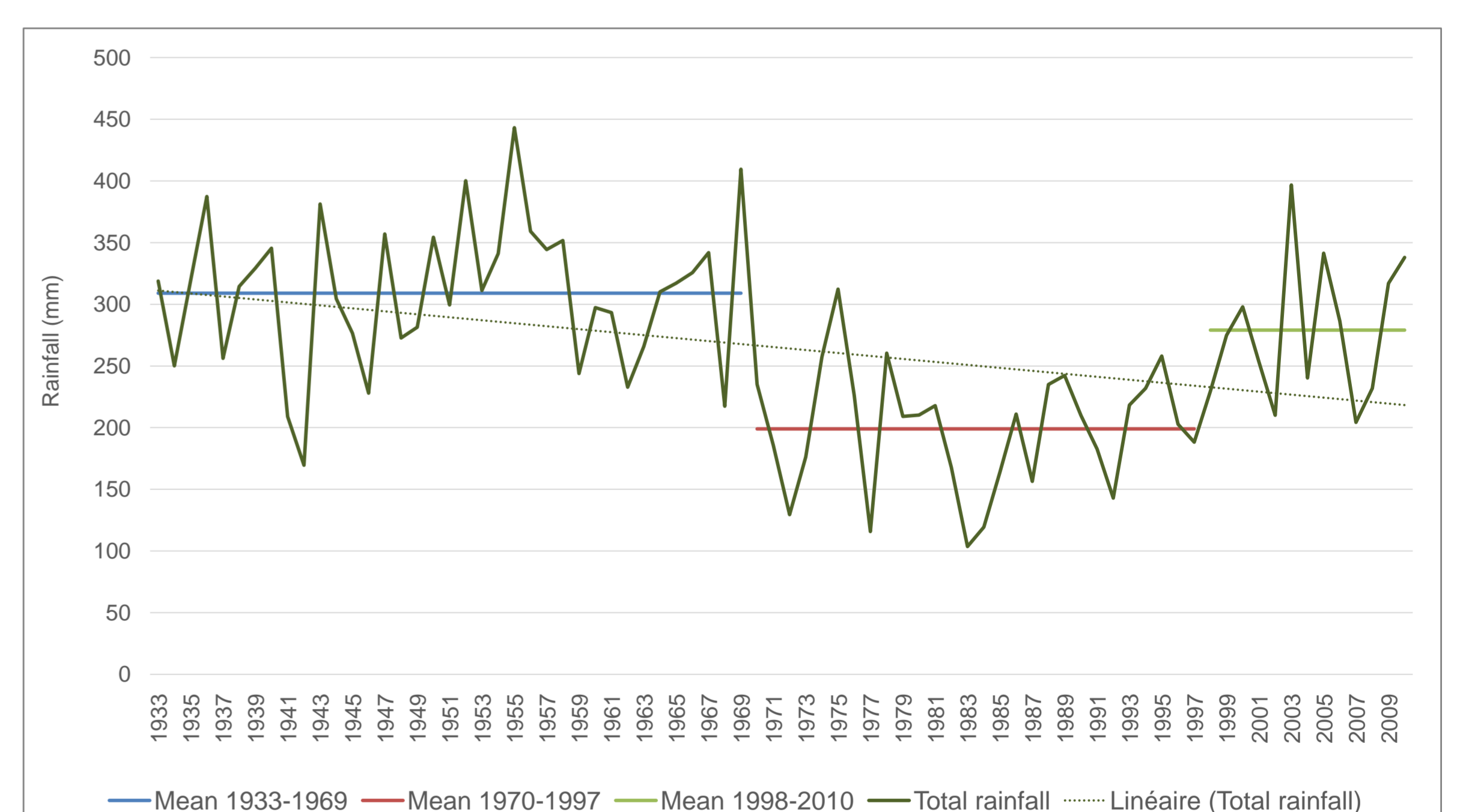


Fig.1: Evolution of total annual rainfall (average on 9 stations) in the southern part of Mauritania over the period 1933-2010 with the linear trend and the break points

The strategies implemented by farming communities to adapt to climate change vary largely depending on the study areas and are highly dependent on cultural factors. If most farmers believe that the management of soil fertility (through fertilizer) could help to counteract the impacts of climate change, most of them (66-99%) do not adopt any measure due to their unavailability and the high cost. Moreover, it appears that 78 to 100 % of farmers do not use irrigation and do not implement soil and water conservation practices because these are labor intensive and their cost is unaffordable for rural population. Yet, most of the time, the only adaptation observed is to postpone seeding dates. The diversification of activities and migration are also part of adaptation strategies to cope with climate change.

Conclusions

The effects of climate change are strongly felt by population, regardless of their geographical position and climatic zone. A majority suffers of a decrease in the annual rainfall but other constraints have been raised by the interviewed people dependent of rain-fed agriculture. A lot of farmers adopt no strategy in response to these changes and it seems that the strategies adopted by the others are often not efficient.