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Irit Eguavoen

Blessing and destruction.

Climate change and trajectories of blame in Northern Ghana.

Bénédiction et destruction.

Le changement climatique et les trajectoires de blâme dans le Nord du Ghana.



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Author's address

Dr. Irit Eguavoen
Center for Development Research (ZEF), University of Bonn,
Walter-Flex-Str. 3
53113 Bonn, Germany
E-mail: eguavoen@uni-bonn.de
www.zef.de



www.wascal.org

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Abstract

This anthropological study provides an analysis of environmental observations by farmers and their perceptions of change, as well as models of blame in Northern Ghana, a poor agricultural region of high vulnerability to climate change. Qualitative data were collected through a standardized questionnaire which was directed to twenty-five individuals to collect data on community consensus on how to explain this change. Responses were transcribed to allow content analysis. Natural data sets confirmed most local observations but older age and affectedness of the respondents were crucial in determining the views of the respondents. Farmers observed more changes than younger people who were not yet decision-makers on their family farms. Climate change was generally given a lower priority by the respondents compared with other manifestations of change that have occurred over the past decades, such as infrastructural development, human-spiritual relations and changes in social relations within the community. When referring to these changes, the respondents often made reference to the blessing of the land and the destruction of the land. The destruction of the land was always understood in a metaphorical way as the result of eroding social relationships and stagnation, as well as norm-breaking and lack of unity within the community.

Keywords: Climate change, perception, local priorities, West Africa

Résumé

Cette étude anthropologique fournit une analyse d'observations environnementales d'agriculteurs du nord du Ghana, une région agricole appauvrie avec une grande vulnérabilité au changement climatique, de leurs perceptions du changement, ainsi que des modèles de blâme qu'ils utilisent. Les données qualitatives ont été collectées par le biais d'un questionnaire standardisé distribué à vingt-cinq personnes pour recueillir des informations sur le «consensus communautaire» avec lequel ils expliqueraient ce changement. Les réponses ont été transcrites pour permettre l'analyse des données. Un ensemble de données naturelles ont confirmé les observations sur place, mais l'âge avancé et l'émotion des personnes interviewées étaient cruciales dans la détermination des points de vue des répondants. Les agriculteurs ont été plus marqués par les changements que les jeunes qui n'étaient pas encore en mesure de prendre des décisions sur leurs exploitations familiales. L'impression qui se dégage des réponses est que le changement climatique a été généralement vu comme une priorité mineure par les répondants par rapport aux autres manifestations de changement qui ont eu lieu au cours des dernières décennies, tels que le développement des infrastructures, les relations spirituelles humaines et les changements dans les relations sociales au sein de la communauté. Lorsqu'on aborde ces changements, les répondants ont souvent tendance à faire référence à la bénédiction de la terre, mais aussi à sa destruction. Cette dernière a toujours été comprise d'une façon métaphorique comme étant le résultat de l'érosion des relations sociales et de la stagnation, mais aussi comme une «briseuse» de normes et un manque d'unité au sein de la communauté.

Mots-clés: changement climatique, la perception, les priorités locales, Afrique de l'Ouest

Blessing and destruction. Climate change and trajectories of blame in Northern Ghana.¹

1 INTRODUCTION

While undertaking the final preparations for field research in the district capital in Northern Ghana, a middle-aged farmer approached me curiously to enquire about what work I had come to do. When I replied: “climate change”, he smiled enthusiastically at me, saying: “this is really good work”. It was somehow hopeless to convince him about the ‘uselessness of research work’ due to the low political uptake of scholarly advice. In his eyes, my mission was good and involved really important work. To my surprise, the driver also took the same line when listening to my somehow doubtful comment that according to development indices, the Upper East region would face a number of problems larger than climate change. Certainly, I was puzzled by the chat I had while driving to the village where I intended to hold interviews with farmers and young people on their views on climate change. Maybe I was overloaded with abundant ethnography on local weather discourses in which talks about *‘cultural and moral change are often associated with narratives of changing climate and vice versa [and that] weather can be called or diverted by human actions, and atmospheric conditions [which] have frequently been explained with reference to a religious context’* (Strauss and Orlove 2003: 3-4). In addition, I had racked my brain over the empirical challenge of conducting research on perceptions of climate change (Eguavoen and zur Heide 2012).

People all over the world seem to talk about the weather through observations and talks, and ways in which we respond to the weather bear cultural-specific connotations. *‘Culture frames the way people perceive, understand, experience, and respond to key elements of the worlds which they live in. [...] This framing is particularly relevant to the study of climate change [...] Individual and collective adaptations are shaped by common ideas about what is believable, desirable, feasible, and acceptable. [...] Anthropology’s potential contributions to climate research are the description and analysis of these mediating layers of cultural meanings and social practice’* (Roncoli et al. 2009: 87). Such study can be aided by drawing a conceptual distinction between ‘description’, i.e., what people observe and think, and ‘comprehension’, i.e., what people feel and how they make sense out of observations (Strauss and Orlove 2003: 6), or by a more detailed approach involving an analytical distinction between perception, knowledge valuation and response (Roncoli et al. 2009; see Figure 1)

¹ The paper was presented at the panel 07 “The politics of climate change in Africa: Negotiating responsibilities, cosmologies and adaptation” of the VAD conference in Cologne, 01 June 2012.

Figure 1 Four axioms in anthropological climate research

Description	Comprehension		
What people observe and think	How people make sense out of observations		
Perception	Knowledge	Valuation	Response
How people perceive through their cultural lenses	How people comprehend what they see based on mental models and social locations	How they give value to what they know in terms of shared meanings	How they respond on the basis of these meanings and values

(Source: based on Strauss and Orlove 2003: 6 and Roncoli et al. 2009: 88)

Perception studies in climate change research usually put more emphasis on descriptions of weather events and the question of whether farmers' observations meet rainfall data sets and other measurable variables. They usually try to determine whether the observations are correct (West et al. 2008, Kemausuor et al. 2011, Rademacher-Schulz and Mahama 2012) or try to sustain the claim that indigenous knowledge should be considered a source of wisdom. In contrast, investigating local comprehension of weather observations has revealed perceptions, local knowledge, valuation of events and models that explain causal relationships between natural and social variables (Meze-Hausken 2004, Slegers 2008, Tschakert and Sagoe 2009). Crate and Nuttal (2009: 394) summarized the, thus far, missing acknowledgement of anthropology in climate studies: *'Scientists talk about climate [...] presumably anthropologists [...] tend to only talk about the weather'* This is because anthropologists follow a people-centred approach, and their interview partners tend to talk about the weather rather than about climate.

This study contributes to this second approach by acknowledging *'the inevitable gap between anthropological and the others' projects of sense making. For these projects are never the same thing, even if some anthropologists, by writing about 'local models', 'emic perspectives', and the like, have pretended they are'* (Sanders 2008:198). A participatory method has been used for the documentation of mental models of climate change (Tschakert and Sagoe 2009). However, this study used interviews as the main source of information. During talks, ideally both parties exchange their interests, views and information. In contrast, field studies are usually interest driven, and the relationship between the researcher and the respondent is hegemonic. Understanding the interests of local people the researcher needs to be a good listener. It is a methodological challenge to give farmers the opportunity to talk about their concerns rather than to make them answer questions that reflect the agenda of the researcher only, especially if the results are intended to be somehow quantifiable.² To come closer to the ideal of understanding local concerns, this study has made use of a quantitative and a qualitative mixed-method approach, including the use of a standardized questionnaire for consensus analysis (Schneegg and Lang 2008, Borgatti 1999), combined with audio-records, their transcription and translation and free listing to document the talks with the farmers (see appendix). This paper gives considerable space to quotations from these talks to enable the reader to follow the respondents' way of reasoning and talking. The summaries of the interviews, however, are the result of interpretation by the researcher.

The study took place in early April 2012, the hottest time of the year, before the onset of the annual rainy season. The analysis of the talks was facilitated by the researcher's familiarity with the place and people based on ethnographic research in the same village during several research visits since 2004. The study illustrates causal relationships between natural and social phenomena as they were explained by the farmers and young people. While reporting on observations of their natural

²This paper is based on twenty-five interviews and additional informal conversations. The data set will be extended in the course of the WASCAL project with data sets from Ghana, Benin, Burkina Faso and Togo and then statistically analyzed.

environment, almost all the respondents extended the topic of conversation to other kinds of change that they had seen within the past years or decades, thereby inviting an exploration of the emic concept of change as the first step of the investigation.

The research site is located in a rural/peri-urban setting in the Upper East region of Ghana, where the population speaks Nankani and mainly practices agro-pastoralism, in addition to a number of non-farm activities, such as petty trade and handicrafts. The region is densely populated and is one of the poorest regions in Ghana. Its natural conditions are characterized by intense land use for agriculture and savannah vegetation with single standing trees and shrubs. It has a semi-arid climate, which is projected to undergo transformation as a result of global environmental change. The main climate projections predict an increase in temperature, a higher variability of rainfall and a higher frequency of extreme events, such as droughts and floods, as well as a prolonged dry season, delayed onset of the rainy season and, finally, dry spells during the rainy season (see page 9).

The anthropologist Aaron Denham has worked among Nankani-speaking people on the phenomenon of spirit children, a research subject that belongs to the domain of health, reproduction and family relations. In one of his recent publications, he analyzed how risk is perceived and how blame is attributed, as well as 'how blame influences future perceptions of risk' (Denham 2012: 175). Although dealing with a domain other than agricultural and natural conditions, he offers some useful terminology for the analysis of climate talks: trajectories of blame, cultural (he calls them traditional) and scientific models of blame, as well as unofficial and official risk. Blame is an important human strategy to deal with risk. Comprehensions of observations that negatively affect rural livelihoods often entail a notion of blame: the identification of an undesired activity and the ascription of responsibility to an individual or a group of actors. Blaming is a common pattern within human societies that enables people to make sense of risk and respond to it in practical manner (Douglas and Wildavsky 1982). Blame may follow different trajectories and models and is, thus, not only site- but also culture-specific. Therefore, the study of risk perception, as well as studies of trajectories and models of blame, can serve as an alternative entry point for studies investigating the perception of climate change.

If cultural models of blame exist, they can be found in different domains of the same society. While unofficial risk within a society may show typical cultural patterns, official risk may differ from domain to domain. Denham identified several unofficial risks among Nankani-speaking people, such as '*jealousy, witchcraft, benevolent and malevolent sorcery, hidden forces or intentions, ancestral demands, spirits, destiny and a range of behavioral taboos*' (Denham 2012: 177). He states that these unofficial risks seem less relevant in the work of public agencies, despite their relevance or '*greater concern to the community*' (Ibid. 2003: 177). Official risks with regard to climate change are, for example, the destruction of shelter through floods, food insecurity or an increased vulnerability for specific diseases.

2 DO WE TALK ABOUT CLIMATE CHANGE OR SOMETHING ELSE?

Much of the climate change adaptation literature assumes that the populations under study are aware of the risk posed by climate change and that they are able to react to observable outcomes of this change. As a critical analysis by scholars pointed out, empirical evidence is problematic due to the uncertainty of climate projections and the low local perceptibility of global change, as well as the impossibility of isolating climate as a crucial variable for action (Nielsen and Reenberg 2010, Eguavoen and zur Heide 2012). There is evidence of farmers being rather good, although not perfect, observers of their natural and social environment. Not all farmers are equally good observers because the possibility of observing long-term environmental change usually increases with age and the individual's affectedness. There is also evidence that people transform their observations into models, which are informed by their knowledge, experience and world view. These models do not necessarily reflect natural science patterns of explanations, although they may, of course, make reference to them. However, the models—typical patterns of explaining causal relationships—may guide conversation and negotiation about responsibilities for change in the form of laying the blame on people and unwanted processes.

The majority of respondents in rural Ghana had never heard of 'climate change' before the interview with the older respondents, in particular, having had low or no access to formal education or to public media. If a radio was accessible in the house in the compound, the older respondents did not understand many of the English programs: *'Yes, I have heard of weather change in the media. I have heard of the word "climate change" but I don't know how to explain it and its meaning. I have never been to school. That is the reason why I cannot explain'* said an old man. One woman of his age just laughed when asked: Have you heard about climate change in the media? *'Do I always understand what they say in the radio? No!'* Some public speeches in the local language that I attended during my stay made reference to climate change but used the English term 'climate change' without further explanation. However, all the farmers were familiar with the local expression of 'changes in the weather' (*sana teeri*³), which was easily understood and used by the respondents during our talks.

Myself and a local assistant pre-tested and adjusted the standardized English interview questionnaire several times to facilitate an adequate translation into the local language. A starting point was the concept of change (*tiŋteeri*, literally 'land has changed'), which is similar to the English word insofar as it bears a non-linear and neutral connotation in the sense that things become different over time. As its English equivalent, it can be specified further as environmental, social, economic and institutional changes, although the connotations then demand an explanation of the context in Nankani society in Northern Ghana.

When we asked farmers about 'changes in the weather', the respondents referred to precipitation, temperature, humidity, thunder, dust and wind, thus, covering all of the study's variables. However, weather does not equal climate. Overall, the responses predominately focused on short-term observations, such as the current state of the weather in comparison to the previous days before the interview or other times of the same day. The people talked about the heat or about winds blowing from one direction, with thunder indicating the imminent arrival of the first rains from the opposite direction. These first rains were associated with fears about a lack of fodder due to wet hay and livestock diseases caused by early-maturing grass species. These weather predictions were proven correct when these unwelcome first rains set in a few days later.

³*Sana*, n. temps, saison; *tee*, v. changer, échanger, imperf. *teeri* (Kropp Dakubu 2009 : 165, 169).

Looking for an alternative way of encouraging discussion about climate changes, myself and my assistant discussed ‘changes in the weather in the long term’, something that required a lengthy explanation and made them finally end up with ‘environmental change’, which could not be translated literally but would be best described as ‘changes in the surroundings’ in local terms (*korom korom teeri*, literally olden days have changed).⁴ These surroundings include diverse natural variables, such as the plants and animals, people, the landscape and the weather. They also include the spiritual world, which is closely linked to natural objects and weather events. Thus, asking about observations relating to their surroundings automatically made the people think about the connection between natural and spiritual phenomena, as well as the role human behaviour plays in mitigating between these two. This was very obvious in the interviews with the older respondents, irrespective of whether they belonged to a traditional religion or church. Asking about how ‘olden days have changed’ opened the door to discussions about all kinds of change, including social and institutional, as well as economic.

Observations on environmental change were assumed to be influenced by the age and the affectedness of the respondent, as well as by their access to information through public media and formal education. Three age groups were distinguished based on three age categories (youth: 15–35 yrs., adult: 36–55 yrs, older adult: more than 55 yrs),⁵ and the responses were evaluated according to these clusters. Although locally distinguishable into different facets, was usually perceived and explained in a holistic way, showing individual views but also cultural patterns. Moreover, the quality of change was usually valued by using the bipolar categorization ‘blessing’ versus ‘destruction’ of the land, as explained in the following paragraph four.

The empirical literature indicates that communication about climate change is not always easy, as conceptual frameworks between the researcher and the respondents may differ significantly. The priorities of the people in the conversations do not necessarily reflect the dramatic narrative of climate change, especially if there is no distinct local concept, term or understanding of the global process. Therefore, scholars need to reflect critically on what they have been discussing during ‘climate change interviews’, as well as whether it is correct to place so much emphasis on a concept that is perhaps of little relevance to their respondents. Do researchers twist local people’s tongues by interpreting their conversations in terms of the global climate change paradigm?

⁴*Koromme* = früher, lange her, in alten Zeiten (Rapp 1964: 187).

⁵The local age categorization mainly considers biological age and physical appearance. *Bilia* are infants. *Bia/koma* are children until ca. 15–16 years old. To serve the analysis, the largest category of adults was divided into adults and older adults. *Koma* are youth (ca. 15–35 years old) who ‘have strength’ (*taari panga*) and who can work hardest. Elder people are considered adults (*bunkeka*). Adults and young people with the function of household heads are equated in this study with farmers as only adults involved in farming were interviewed. Adulthood is not defined via marriage or parenthood status, although there is a change in terminology, with girls becoming women (*pugela-poka*) and boys becoming men (*budibela-boora/ buda*) after marriage. The term *ke’ema* (elder) reflects a political authority, not an age category, meaning that under some circumstances a person categorized as a youth can be an elder. To serve the analysis, the large category of adults was divided into adults and older adults. These are analytical categories.

3 DESCRIPTION OF CHANGING NATURAL CONDITIONS

Free listing and some statements in the consensus analysis questionnaire aimed at the documentation of observations that farmers and young people had made with regard to natural conditions. Given the small number of respondents, their deviation from a consensus in their qualitative statements was remarkable. The following four selected answers by older farmers (partly active, partly retired) illustrate that the perception of change depended on the individual's judgment, as well as on the cultural understanding of change. Change does not indicate a direction and is a process rather than an outcome:

'There is a change. Even if there is no change, there is change.'

'Yes. I have seen the change in the farming season because the farming season has been moved forward and we no longer have rain the way we used to have it.'

'Why can't I see that things have changed? Things have really changed. If it were to be in the olden days that they perform all the ceremonies, by April rain will set.'

'I have not seen any change. There is still rain. We are still sowing. The change is within the individual. Anytime it rains. It is still the same water. I have not seen any changes.'

These four quotations represent the diversity in the descriptions and the comprehension. The first statement underlines the process character of change. Change always happens, although conditions may seem stable. The observations reported in the second quotation are usually quoted in climate change perception studies in the region, usually as a result of standardized questionnaires and multiple-choice responses. The third quotation brings in an additional dimension by linking social behaviour and weather events. Finally, the old lady, the eldest respondent, quoted in the fourth example states that she has not observed any relevant change in the weather and that perceptions and change are separate issues. People change more than the weather.

The oldest cluster among the respondents could make reference to the olden days based on their individual experiences and perceptions. They still knew the village as a location of vast bush land with dispersed houses made from clay and straw in the compound, little infrastructure and a smaller population. The old men and women had witnessed how farm land had come to dominate the bush land over the past decades and how access to natural resources had changed over time. Thus, their observations were very much to the point, including outbreaks of disease, the prevalence of pests or the establishment of water points. They were able to compare past and present situations and to enumerate more observations than the younger generations (see Figures 2 and 3) during free listing and in their extensive responses to the questionnaire.

Figure 2 Observations of changes in the natural environment by older respondents

Observations	Old people (55 yrs and older)	Confirmation by data sets/climate projections
Rainfall	Sometimes very destructive rains in olden days	no data
	Enough rain in olden days; nowadays, there is less rain	opposite trend
	More erratic rainfall nowadays	confirmed
	Fresh air for a few days after the rain in the olden days	no data
Rainy season	Farm season has moved forward	confirmed
	Rainy season is shorter than in olden days	confirmed
Temperature	Hotter weather nowadays	confirmed
Wind	More/stronger wind nowadays	no data
Floods	Floods are not more frequent but more severe/destructive	different observation
Agro-pastoral livelihood	Drought did not kill crops in olden days	no data
	Other crop varieties were grown in olden days	confirmed
	Low availability of wild fodder nowadays	confirmed
Other observations	Water places were farther away in olden days	confirmed
	There was vast bush land in olden days	confirmed
	Shea nut flowers later and fruits later	no data
	Many people died from measles in olden days	no data

(Source: Free listing, April 2012, Jung and Kunstmann [2007], van der Giesen et al. [2010]; responses are listed without consideration of their rank and frequency)

Older adults stated that drought, flood and pests have always posed a threat. There was no consensus on whether the long-term change in the weather has aggravated the risk of destruction caused by these threats because they linked effects of their farming practices to the occurrence of rain, heat and wind. With regard to floods, droughts and crop disease, they stated that some farm practices have not been helpful but rather contributed to the higher risk of yield losses. The line between natural conditions and anthropogenic effects in many responses was totally blurred. Although the questions were clearly directed towards weather and climate, respondents constantly made reference to consequences of human activity. For example, a farmer spoke about the devastating floods caused by the opening of the Bui dam in Burkina Faso that he had heard of on the radio. The following quotation by a female farmer recounts the benefit of historical floods and the negative impact of drought on crops, as well as the change in agricultural practices that has made crops less resilient to pests:

Flood has been in existence since long. Flood even used to give us manure in olden days because it will work a land somewhere and put it here. But flood were not as destructive as nowadays. [...] We used to have drought long time ago. Anytime, there is drought, our plants were always in survival until the rain comes again. But now the drought always kills all our crops. The drought in olden days was helping the farmers to farm very fast. But now, it is more than helping. Because it is more than two months. [...] Crop diseases are in existence since long but not as destructive as compared to nowadays. Our way of farming has also invited more disease for our crops. In the olden days, they used to put

the seeds into the holes but now they make lines that always leave the seed defenceless. [The holes were diagonal not horizontal and reaching deeper layers of the soil. With lines, only the upper layer of the soil is touched.]

In contrast, a man spoke about change in practices that have reduced the risk of crop loss to pests, as well as about the lower priority that farming has for a number of people in the community who succeed in generating income by non-farm activities as a result of livelihood diversification:

'No [bad harvest is not mainly due to climate change]. Bad harvest is coming from our own laziness. Because what we are supposed to be doing in order to get enough yield is not always done. [Q: Are all people lazy or only some people?] Some people are lazy, not everybody. And it is coming from our business [market activities] that we are doing every day. Some people like to do business and no farm work. [...] Crop disease has been in existence since long. In the time of our forefathers, if you harvest, you don't put the crops immediately in the store. You leave them outside for your family members to come and see before you store. And so many food crops have been spoiled by things – termites, yaare, gunga, kotanko [red ants]. [Q: So when storing it immediately, it is better? It is better now?] Yes. If you harvest and all your crops have been chopped [eaten] like this. What will you do? Only to weep. One of the crop diseases is also called torongansi and they are very destructive. If this torongansi gets into your farm, they always eat all green leaves. And when all the green leaves are taken away, the plant is no more resistant to rain water and wind. Crop diseases are there since long, not only today.'

Young people, in contrast, did not give lengthy answers during the consensus analysis interview but responded simply yes or no. However, they free listed a number of observations. Some of these observations are unlikely to be based on their personal experience but rather seem to stem from local narratives and public media, especially when they made use of English climate change buzz words, such as 'onset' or 'distinction', which could be categorized along with other vocabulary as 'school children's issues [...] Given that these terms are technically not indigenous, their construction and formulation are primarily not from the indigenous world view' (Amenga-Etega 2011: 25).

Figure 3 Observations of changes in the natural environment by youngest respondents

Observations	Youth (15–35)	Confirmation by data sets/climate projections
Rainfall	Reduction of rainfall	opposite trend
Rainy season	Onset of the rainy season has shifted	confirmed
Temperature	Hotter weather	confirmed
Wind	More wind nowadays	no data
Floods	More frequent floods	confirmed
Agro-pastoral livelihood	Livestock does not grow well	no data
	More animal diseases	no data
	Reduction of crop yield	no data
	More destructive crop diseases nowadays	?

(Source: Free listing, April 2012, Jung and Kunstmann 2007, van der Giesen et al. 2010; responses are listed without consideration of their rank and frequency)

This is not to say that young people cannot perceive change themselves and make up their own pattern of explanation. In informal conversations, a man in his mid-thirties but from another region reported on ponds that had disappeared in his neighbourhood and on a beloved wild vegetable that used to grow around Easter but that he had not seen for many years now. A student in his late twenties at the senior secondary high school explained how he thinks the higher birth rate of girls in comparison to boys is related to climate change, change of food habits and general conditions, including heat. However, all this evidence is anecdotal. Generally, the youth have better access to external information due to English language skills, formal education and higher spatial mobility (many students migrate for secondary education and live in dormitories with students from all parts of Northern Ghana). If their economic status allows, they make extensive use of mobile phones and the Internet (via mobile phones). Thus, as their sources of knowledge are more diverse, it may be more difficult to trace common patterns of thought or models within this age category. In addition, the issue of affectedness comes into play here, as many young people still contribute labour to their farms of their kin group but are not yet the decision makers on the selection of crops or the timing of agricultural activities. They are the group contributing labour but not yet having authority and responsibility. Moreover, they tend to generate cash income from non-farm activities (business, sale of labour, sourcing supporters) rather than directly from farming as they cannot sell their family's farm produce.

How do these observations relate to measurements of climate variables and projections in Northern Ghana? Do they emphasize the same variables and trends? This study does not intend to repeat the good and detailed comparison between observations and natural science data that was provided by Eickhof (2010) for the nearby Bongo district. That study investigated the perception of climate change in a more detailed manner but collected no data on local comprehension of causality and responsibility. The focus of this paper is on these factors and, therefore, a more general comparison is sufficient to place the observations in the context of climate change (see figures 2 and 3).

The rainy season in the Upper East region of Ghana currently begins during the period April to May and finishes at the end of September or the beginning of October: *'The onset of the rainy season seldom occurs abruptly and is often preceded by short isolated showers with intermittent dry spells of various lengths, which are often misinterpreted as the start of the rainy season. Precipitation, in monthly totals, gradually increases during the rainy season before falling sharply towards September and October, and rainfall events are highly erratic and variable over space. Average annual rainfall in*

the north ranges from 700–1,000 mm, with peak rainfall occurring in August. [...] Wind speed is low, varying between 0.4 m/s and 0.3 m/s' (Eickhof 2010: 16).

Apart from these general descriptions, it is difficult to find precise numbers on trends that exactly cover the Upper East region. Climate studies employ diverse spatial scales, as well as various periods, for measurements and model projections. However, the hotter temperature that was observed by the respondents could be based on individual observations as the increasing trend of the temperature was confirmed by measurements. Compared to the 1990s, an average increase up to 1.5 degree Celsius until 2030 was projected for the Volta River basin. In addition, the shift in the onset of the rainy season, with the season beginning earlier, has been validated by rainfall data sets from the region, and it is projected to move farther to a later time in the year. The average onset of the rainy season in 2030 to 2039 might be in June or even later. The suggestion that rains are more erratic nowadays seems to also be based on experience. Rainfall variability will increase in the future (Jung and Kunstmann 2007). However, the observation that total rainfall was more in the past is not confirmed by the measured data sets. Since the drought period during the 1970s and 1980s, total rainfall amounts per year have actually increased (Dietz et al. 2004), and no significant reduction of rainfall in the coming decades is projected by the climate models. What can be claimed for the future are prolonged dry spells and more frequent occurrences of floods (Tschakert et al. 2010). There are a number of observations that cannot be validated or falsified (yet) on the basis of data sets, such as the reports of wind that is stronger or more frequent today than in the olden days or that the crops had survived the droughts before but not any longer.

When translating the audio recordings and speaking with the research assistant, it became quite clear that not all natural science concepts are easily understood and translatable into the local language, as Nankani does not differ between a drought and a dry spell (*warre*), for example. During the process of the transcriptions, I had to define what constitutes a flood and what constitutes run-off. For example, somebody reported how he saw that a horse was carried away by a flood and afterwards made reference to a bridge. Therefore, the report was about strong run-off from the river, not directly about the effects of flooding though these phenomena may be linked, of course. This raises the aforementioned concern about what scholars really talk about in their 'climate change interviews'.

4 RELEVANCE AND LOCAL PRIORITIES

Old people are cited in the climate change literature as being the most knowledgeable age group to report on climate change, simply because they have had more time for observation. However, the very obvious fact that they have also witnessed enormous transformation around them in terms of technology, political and economic conditions, as well as demography, is often neglected. In addition, in rural Africa, old people's living conditions are affected by these changes, which are experienced every day. Some of these changes are quite dramatic because they determine well-being with regard to work load, health, food security and survival, much more so than future climate change will probably ever affect their children's and grand children's generation. Thus, the conversations constantly tended to shift from weather to other observations, which reflect the importance that the respondents ascribed to them:

It is not only the weather I can talk about when talking about change. I can also talk about diseases. I can also talk about the Whites who have helped. Measles have been killing so many people like this. As for the disease, they are no more as they used to be. [...] No, change in the weather is not a problem of my generation because the weather is

changing with so many things. For example: in the years back, war used to be the pride or when you conquer a nation. That used to be pride. But now, we are now talking of peace. And peace is what we want. So anybody can eat at any place at all or can do whatever he wants to do.

When the old man talked first about measles, he made a reference to improved health services that accompanied other infrastructural improvements mentioned by the respondents, such as water supply, roads, cement houses, bridges, vehicles for transport, machinery for constructing dams, etc., all of which could be summarized as 'development'. In the local parlance, people say *tijmaalego* (literally 'blessing of the land') when translating the English term. *Tijmaalego* implies that things get better, that there is some progress. The anthropologist Rose Amenga-Etego noted that '*malgo is a reflection on improvement, betterment, advancement, repair and maintenance [...] within this conceptual understanding, the Nankani say malgo is a never-ending process [...] For them the future is uncertain and each step presents new needs for malgo*' (Amenga-Etego 2011: 27).⁶

For the youth and adults who feel less connected to traditional ceremonies and ways of doing things, *tijmaalego* in the sense of 'development' describes a lifestyle that is characterized by the use of technical facilities, motorized vehicles, formal education-based knowledge, notions of modernity, timeliness and, finally, superiority over the so-called traditional way of doing things. The latter connotation is not directly spelled out in conversations but can be observed in everyday interactions and negotiations among formally educated, partly Christian sections of the population towards their not formally educated, mostly traditionalist counterparts.

The divide in views and lifestyles is, of course, the largest in the middle-age category (the current group of people aged between mid-thirties to mid-fifties) due to the history of school enrolment in Northern Ghana and local attitudes towards schooling. However, the divide is by no means absolute because there are many individuals who embrace ways of doing things that include elements of both sides without seeming contradictory in every-day life. There is no point in wondering about university graduates being the proudest war dancers during traditional funerals or the unbroken popularity and re-election of an outspoken young, educated, polygamous traditionalist into the district assembly. There is no contradiction between a person telling you one day about how to identify the thief by inviting thunder to strike the culprit (which was reported to be quite efficient but must be based on a group consensus) and the next day telling how he has taken someone to the High Court for the illegitimate sale of his family land. A study on local religion underlined: '*According to the Nankani, prayers do not fight each other. [...] those involved refer to this concept instead of the Christian notion of the "jealous" God, desiring all attention and dedication [...] "Mixing" (garngo) here refers to a religious atmosphere in which adherents combine freely indulge in the different religious traditions and practices in the area*' (Amenga-Etego 2011: 67).

Returning to the old man's statement about war leads to a second category of changes described during the interviews. Not knowing the cultural context of Northern Ghana, one would probably assume that this category of change refers to regional or national political conditions, which is, in the author's view, not so much the case. Violent conflicts between settlements and ethnic groups have been reported for the past years but, generally, the region is peaceful. The inhabitants of the village, in particular, have not participated in the fights between two neighbouring villages over the name of a hospital in the past, and they used all occasions to declare that they would not allow other villages to pull them into violent conflict. Thus, the man rather speaks of good relations, trust and unity among neighbours, a condition of not fearing being bewitched or pulled into unwanted affairs by others. Neighbours here can be understood as parts of the kin group, other village sections and other villages, as well as other ethnic groups, or as Amenga-Etego calls it in relation to *maalego*: 'various constituents of *malgo* were given. This included *bure* (family), *nuyeene* (unity/peace) [...] and *nungire*

⁶ The article uses spelling as suggested by Kropp-Dakobu (2009). '*Maalego*' and '*malgo*' are the same.

(liking/ solidarity)' (Ibid. 2011:28). The underlying idea that a community (defined according to the specific context) can succeed in something or have strength if it acts as a unit is quite crucial. This is the message of the old man: peace is what we want, peace is what we have. However, as he later noted and as other respondents pointed out during the talks: unity in action is what we are missing.

5 COMPREHENSION AND MODELS OF BLAME

Nankani traditionalist belief is much more complex than the basic idea that the weather can be influenced by human activity. Nevertheless, the interviewees thought of the weather as God's response to rituals that are performed by authorities in the Nankani community on behalf of their kin group. The weather is conceptualized as God's and the ancestor's punishment for norm-breaking behaviour and, of course, it is also imagined as the outcome of mainly local resource management practices and global processes. The questionnaire asked about causes of climate change, such as cutting trees and smoke from bush burning, as well as smoke from cars and factories, and other manifestations, such as the frequency of floods and droughts and the occurrence of plant diseases and bad harvests. It also investigated which countries were affected (Ghana/far-away countries) and whether the process could be reversed. Finally, it asked whether people in Northern Ghana could contribute to the fight against climate change.

Challenges in translating global concepts into local languages have already been mentioned above. As climate change was obviously not a local concept, we explained it in local terms and used 'change in the weather' in the follow-up questions to investigate whether people saw causal relations between their management practices and the change in the weather/climate. Most of the people blamed local motorized vehicles, deforestation and burning the land. However, they also made it very clear that these practices are unavoidable in their view as they secure and support their poor livelihood. From their standpoint, there is no alternative. Other respondents emphasized bad behaviour and lack of morals as causal factors:

'Yes, they [cars and motorbikes] increase the temperature. But we have nothing to do because the positive impact is more than the negative impact of the vehicle. The smoke is really coming from the fuel that is always used by the machine. So, it is having an effect. But we can't do otherwise. This smoke usually travels and goes as high as to the sky.'

'It is true that we are not supposed to be felling trees anyhow because they provide shade. But what can we do? We cut the trees mainly for of our house building. Trees bring rain. Yes, they bring rain. Felling a tree is like evicting someone from my house because where the trees are, are our homes.'

'We say we want rain but we are not ready for the farming because we did not clear our lands [collect rubbish and residues and burn them, prepare the soil]. If we were to clear our lands, God would have had mercy on us. [...] See, we have not cleared our land and we want rain. If I was God, the rain would come in September [laughter].'

'The floods are not caused by natural things only, also spiritual. Sometimes the flood is like a curse to us for our sins, for what we have been doing. Sometimes there are not natural causes. Women sleep anyhow with men. Men are sleeping anyhow with women.'

'We are not more obeying. The rules and regulations to guide us in our behaviour, the advice we don't take them. There is no help for the elder. Youth behave like this because they don't take advice. I was respecting my husband, my son, and even my younger people but modern Ghana doesn't do this.'

'We used not to sell land. We used to give it free of charge for someone to build or to farm. But nowadays, we sell land which is a serious crime. That is why we get no more food from the land.'

'Yes, it is true [that cutting trees affects the weather in a bad way]. But some of the trees when they are in your land don't encourage high yield. We therefore cut them away. If a new tree, for instance, is in your land that does not help you because it is not having manure and the water is also bitter [the rain water dropping from the tree]. Under this tree [points at a Neem tree], crops don't grow well [due to this]. But if Acacia is there, you can leave it because it provides manure and the animals come to eat the leaves and provide their faeces which is manure. You can even cut a bad tree [a seat of spirits] and it can have serious effect on you – even to the point of dyeing. So it is not proper that we cut trees anyhow. Clearing the land and burning the rubbish is harmful but if we also sow without clearing the land, crop disease like termites will chop of [eat] the roots of the plant. We need to seriously look again at our traditional rules and regulations and do what will help us. [...] We think that our tradition is now full of dirty things [deggero] but that is not the issue. We need to go back to our tradition [maalema]. Because we have left our tradition, we now give birth to spirit children. This really affects the women.'

The quotations show how people justify their management practices not just against the charge of degradation, but also against the breaching of local rules and culture. Culturally, it is not desirable to cut trees. It might even be dangerous as it may annoy some spirits and bring harm to the individual (such as sickness or madness), the family (birth of spirit children who bring misfortune, sickness and death) and the community (receiving less rain during the farming season or unwanted rain storms during the harvest season). Tradition is not preventing better resource management: pragmatism and experience drive people to (selectively) cut trees or burn farm land.

As in many other places in Northern Ghana, custodians of land, the *tindaama* of a village section, perform rituals to ensure the fertility of the land and sufficient rainfall on behalf of their local communities. The elders may also approach the ancestors to beg God for rain. Moreover, the custodian of rain, the *saadaana*, is in charge of the well-being of the entire population with some special duties that only he can fulfil (such as perform rituals for people hit by lightning). While the *tindaama* were quite prominent, it seemed that many youths and adults did not know about the *saadaana* title any longer, the *saadaana's* function and who was currently in office. As both title holders rely mainly on requests from the community, they are proactive only if people approach them directly.

'It is not one person who comes to ask for the rains but it is the whole community who comes together to our father [the saadaana] to ask for rain when it is not raining. The work of our father was to go and seek some Gods before he comes back to sacrifice the

*God saa [rain] and it will give rains. The people will always come together and discuss with him and he goes out to consult the soothsayers and know why it is not raining. But the [present] community leaders are no more united. They do not mind about the poor rains for there is now money, whether it rains or not, they will get food to eat. So, they do not have time for the God again. He [the saadaana] cannot also go out alone to know what is happening that is why he is also sitting’.*⁷

In the case of the *saadaana*, these requests now occur less and less frequently. At the same time, being less active contributes to the waning of the public presence of the *saadaana* office, and this, in turn, leads to fewer approaches because fewer people are aware of his duties and abilities. The number of office holders seems to have fallen over the past decades to one office holder within the community (before, the *saadaama* seemed to have acted for each village section). The *tendaama* were more prominent because they were frequently involved in land transfers within the village. Some old people referred to the *tendaama* when discussing the changes in the weather and also hinted at the fact that there was not enough attention paid to ceremonies that ensure sufficient rainfall:

‘There are a whole lot of changes on the sky and on the land. In the olden days, there used to be drought and anytime there is drought, we always gather at the tindaana house and sing and dance there for the rain to come. [...] Drought has been in existence since long. And crops were dieing off unless you would consult the tindaana. But now, there is a lot of food even if there is drought. People do not consult the tindaana because they are not hungry. But now as we sit, they [the other people] don’t know who is the tindaana’.

‘In the olden days, anytime there was drought, we used to go to the tindaana yire for consultation. But now the tindaama are drunkards, they do no more proper consultation. [...] Nowadays, the heavy wind that is always blowing is our shrine [tingaane] who is looking for water. Simply because we don’t do the right sacrifices. But if they were to be doing proper sacrifice, there wouldn’t have been wind blowing all over. The shrines are helpmates of God. So God always sends them to come and help us. And if we fail to do the right thing, they will also leave us. Development like building, road construction is good but our social life is bad. We need to go back to our ceremonies. So that the weather will also change in a good way for us, especially rain.’

The first remarkable statement one can draw from these quotations is the low demand for ritual weather manipulation because people purchase food from the market in lean seasons rather than relying on their farm produce. Thus, the priority is to generate money to bridge the annual lean season rather than investing more in farming, which seems less promising. Although the literature frequently states a regular period of hunger in Northern Ghana, some of the respondents explicitly stated that people are not hungry and, therefore, show less commitment to traditions. This may be attributable to various factors. Their families may have found successful ways to overcome the lean season. The food aid system may work effectively. The general belief in the power of weather manipulation is not shared by all community members, etc.

Knowledge fragmentation and normative pluralism have led to the abandonment of some rituals and traditions, at least by some segments of the community. The causal model contends that the abandonment of tradition results directly in the absence of blessing because the underlying source of

⁷Mr. A. Asinsagbo (village *saadaana*) and Mr. A. Akonwake (his older brother), 2005.

tiɲmaalego is local religion, tradition and culture: *'It has been noted that in the past, things were good, if not, better because people paid attention to malma and, in return, their efforts were blessed'* (Amenga-Etega 2011: 28). This model has been documented in the ethnographic literature of West Africa and East Africa (Roncoli et al. 2002, Sanders 2008). Among Mossi in Burkina Faso, for example, *the 'state of degradation of the land is causally connected to processes of social erosion: loss of knowledge and morals'* (Luning 2007: 87).

This deviation from tradition is often spelled out as destruction, in Nankani *tiɲsa'ango*⁸, a state of stagnation in which no progress can be reached. It is the opposite of *tiɲmaalego*, which stands for dynamism and betterment. The negative valuation 'destruction of the land' with connotations of pollution and the breaking apart refers to social issues only, not to land degradation. Change in the weather may be an outcome or a manifestation of the state of social destruction. Thus, while there are Nankani terms to translate the English terms 'development' and 'destruction of the land', they bear a different meaning to that of the English words.

6 PROJECTIONS AND LOCAL EXPECTATIONS

The study also investigated local projections of future weather, as well as local options to mitigate the change during the consensus analysis interviews. Although all the questions clearly made reference to weather or climate, the answers indicate that both cannot be thought of as single variables but only in the cultural context of change, in the sense of *tiɲmaalemo* and *tiɲsa'ango*. There was a strong tendency to claim that current conditions (weather, social conditions and infrastructural development) cannot be reversed. There was also a tendency to think that the difficult conditions will even worsen in future. Despite the future generations being expected to face more problems, they were also viewed as having opportunities to cope with them and knowing how to 'follow the weather'. The past was considered to be gone, with the olden days never returning, no matter what. The respondents spoke about the weather/climate, the old landscape, a more ordered social life and abandoned farming practices when referring to the past. This was reflected in all age groups but illustrated here with expressions from the older respondents, as outlined below:

'I am far from the change [because I am old]. Therefore you [to the researcher and her assistant, meaning young people]. How can I know? The change we have today will forever be.'

Yes, the next generation will get more changes than this time. And this is even our prayer. That they will see new things. For instance, we used to sleep under thatched building but now people are now building block [cement] houses to follow the weather. Now the building [pointing at the son's house] is resistant to many things [...] The changes [...] are moving with development. And once we want to be developed, then we can't go back to this stage again.

'You the young will experience more than us, especially in terms of problems. God will also want the young to experience more [laughter, Q: When will the old weather come back?] I am not having a watch. So how can I tell when? [laughter].'

⁸*Saango*, Zerstörung, Verderben, Umkommen (Rapp 1964: 212); *sa'am*, v. polluer, devenir ruiné, gér. *Sa'ango* (Kropp Dakubu 2009:165).

Yes, the grandchildren will see change more than us. We are even better. Years are coming if your child sees you sick, they will even beat you so you can die early. It will continue to be like that. It will never go back to the olden days. It is the youth who have changed things. But the world itself has not changed.

'One person cannot change it [climate change]. If one does something and another is doing something else. If all people come together with one mind, one can change something. Not one person alone.'

'We cannot stop it [climate change]. Because if you want to do it, somebody [else] may not like to do it. We continue to sacrifice. Our tradition will never go. We will always continue our funerals in the traditional way. The change is lying in our heads, so we can do whatever we want. Can we change back to the olden days? No. That is the big question. We have seen little and are about to go [to die]. You [the younger generation] will see more and tell us.'

Although children were referred to in the question as a reference term for the next twenty to forty years, some respondents returned to the topic again and spoke about inter-generational contracts and the young who change the world with their new habits, priorities, disobedience and technology. Their statements underline the fragmentation within the community and also express fears that the young may break the social contract between the generations that is in place to ensure that the old may rely and depend on their children when they become economically inactive and that they will also receive a decent funeral:

'The drums [big loudspeakers used to play music on festive occasions and funerals] we have been using, it is never part of our culture because drums are not made from here. So if I die and you are playing this music, you play it for yourself but not for me. The youth has destroyed the earth [koma la sa'an' tina la ne] because of the drums they always play chase away our forefathers.'

The complaints by the old people clearly shift the blame for unwanted change to the youth, with the youth freeing the old from blame for agricultural practices that may have led to degradation of the resource base. They generally agreed with the suggestion that bush burning and cutting trees cause changes in the weather. However, the youth and the older people did not place the blame on anybody for these practices.

7 SUMMARY: TRAJECTORIES OF BLAME BETWEEN BLESSING AND DESTRUCTION

In considering the description/perceptions and trajectories of blame, first of all, the weather was conceptualized by most respondents as the outcome of global pollution and local processes of resource management. It was evenly conceptualized as something that can be manipulated by human activities through norm-conform (or breaking) behaviour, as well as by the ritual mediation by authorities between the community on one side and God and ancestral spirits on the other side. Different trajectories of blame were reflected in the responses, which merged scientific and Nankani cultural models, often switching within one and the same statement.

Good weather is a sign that things in the community are good and orderly whereby bad weather indicates that something is going wrong. This finding is supported by the anthropological literature dealing with weather discourses (Strauss and Orlove 2003). Bad weather—and for the purpose of this study also climate change with negative effects on the community's livelihood—was perceived as a punishment by the community. As the punishment is directed to a group, the blame was put on groups or the society at large. Countries far away, Ghana or the local community were viewed as the origin of the curse where a solution needed to be sought. In the local talks, the youth were viewed as destroying the land. and the old people (also their age mates in far-away countries) were considered to be the ones who suffer most from the consequences because they are not well prepared to gain a living outside farming or, with increasing age, to survive without the support of their relatives.

Despite the constant merging of the scientific and the cultural model of blame, both models can be analytically distinguished as they show different features. The scientific model of blame was informed by formal education, science and media coverage, as well as by personal experience and observation. A central theme in the discussion was 'degradation', which refers to the deterioration of the natural resource base. This resource base can be damaged by chemical pollution, destructive activities and local management practices, such as burning the bush or cutting the trees. At the local level, people were blamed for refusing to do what was needed to ensure a good harvest. All the farmers underlined that soils require constant effort to keep them fertile through the application of manure, for example. However, it seemed that the work to collect and store the manure and later prepare it for application was done by older people. Young people, although aware of the importance of manure, did not seem to be interested in this work. Fields needed to be prepared before the onset of the rainy season by digging out the remaining residues of the former harvest, by clearing rubbish and by burning the land to reduce pests. Although several people communicated that it was the right time for this work (end of April), almost all the fields looked unprepared. The general consensus appeared to be that if a neighbour had not started, than why should they. Thus, there is some group dynamic that influenced decision making over farming activities. All households cultivated crops, but single household members had found a more promising source of income and preferred to dedicate their labour to these activities and to put less effort into farming. Of course, this priority is understandable from the individual's point of view. On a more general level, it contributes to a reduction in yields, as well as causing farming to be perceived as a less reliable base for a livelihood.

The cultural model of blame was informed by cultural and religious knowledge and by customs and rules of the community, as well as by personal experience and observation. Another characteristic was the fear from unofficial risk and its visible manifestation as *tensa'ajo*/destruction. First, the cultural model shifted the blame to disrespect and disobedience towards other members of the community. There were two diverse aspirations and frames of reference in the community: fragmentation of knowledge and beliefs and self-interest that prevented united action. Although united action is also required in natural resource management (all the people would need to stop burning their farms to produce an effect, for example), it is especially required to approach local

authorities who are in charge of weather manipulation. Custodians of the land and custodians of rain need a request from the community to become active. The number of requests put forward may have decreased, but the *saadaana*'s and the elder's role in rain-making is still alive, as apparent in July/August 2011 when a severe drought struck one of the six village sections:

*'The community came to the saadaana and pleaded for rain. So I [the saadaana] consulted and went to the shrine and the rain came. I cannot call for rain when it is not there [to stir the onset of the rainy season] because we always use crops dying as a way of begging God. When we go to the shrine, we will then say: Our crops are dying. Our crops are dying. Have a pity on us. But as we have not done the sowing, what will we be saying?'*⁹

Blame was placed on the local authorities for not performing ceremonies or not performing them in the correct way. A second kind of blame was shifted to noise-making practices that scare spirits away. *'Although rain is not explicitly imagined to be a living thing, it possesses some characteristics which allow people to communicate with it [...] rain may hear noise [...] rain can be hurt, and [...] be driven away'* (Eguavoen 2008: 120).

The talks with farmers illustrate that most of the blame was placed on the village's members, with two trajectories of blame (the scientific and cultural model) apparent, although the cultural model clearly dominated the conversations. Farmers, especially older people, gave higher priorities to the unofficial risk and perceived the official risk of climate change of lesser importance. One reason might be that the official risk of climate change, spelled out in terms of drought and floods, for example, was contextualized historically and socially. Both droughts and floods and their associated risks to people and ways to cope with them are already part of the local experience. They were only perceived as gradually different from olden times, not more frequent but more disastrous (compare Tschakert et al. 2010). A second reason for the low priority placed on official risk might be that people do not see the effects of floods and droughts only as purely natural outcomes, but also as the results of management practice, e.g., houses in the compound destroyed by floods were re-established at the same locations again. Thus, there is human agency responsible, and if this agency changed, the floods and the droughts might become less harmful once again.

As shown above, the respondents not only observed a large number of changes, they also valued them to be positive or negative changes and linked them to the local concepts of 'blessing of the land' and 'destruction of the land'. Although other studies in West Africa have indicated that blame for natural degradation may also extend to external, as well as internal, transgressors, such as Fulani herders (Luning 2007), this study underlines the importance of internal moral discourses about the production of disorder and stagnation by local practices, attitudes and priorities. This is remarkable because the talks originally centred on climate change, which is caused externally.

The contribution of this study to the debate is neither about *"correct perceptions" and "differences between perceived and real environment"*, nor about *"perceptions [that] are unscientific, mainly because many subsistence farmers, who are by definition often poorly educated, resort to superstition to explain natural events because that is their only source of information"* (Kemausuor et al. 2011: 26, 27). From an anthropological perspective, this statement is problematic because *'[p]erceptions cannot simply be wrong as they are social constructs. They may have just a statistically low correlation with the underlying meteorological conditions'* (Meze-Hausken 2004: 27). Social constructions are also informed by cultural models, experience and knowledge. As this study has shown, a farmer's knowledge is not either scientific or cultural but highly merged, despite the fact that formal education rates of the respondents in Northern Ghana may be low. In the eyes of the individual, his or her perceived world is the real world, which guides decisions and actions. It is not

⁹Mr. A Asinsagbo, April 2012.

what scientists may consider real (equals measurable). The farmer may shift his/her world view when receiving new information or experiencing new things through, for example, anticipatory learning processes (Tschakert and Dietrich 2010), but then the individual's perception and knowledge change and redefine what is real.

Other studies on the perception of climate change in Ghana have also found that Ghanaians tend to blame themselves for degradation rather than blaming external causes, especially their use of logging, intensive land cultivation and bush fires (BBC 2010, Tschakert and Sagoe 2009). A study by the BBC World Trust's Research and Learning Group emphasized the need for education of the population, which is informed poorly about the process of global change. Many people are aware of a change in the weather, but they tend to explain their observations in relation to local environmental degradation. This phenomenon has been explained in relation to the prevalence of the degradation/desertification narrative (Tschakert et al. 2010, Eguavoen and Schraven Forthcoming). Moreover, many Ghanaians do not understand the scientific terminology that is used in media and governmental publications. Thus, in many cases, faulty actions have been undertaken, with projects concentrating on mitigation instead of adaptation (BBC 2010). Providing comprehensive information on global causes of climate change to the population, as well as information on opportunities and limitations of climate change adaptation projects, is also a responsibility of researchers conducting these kinds of studies. Poor rural farmers should be made aware of the actual causes of global climate change and not left believing that their natural resource management practices are responsible for causing climate change. In Ghana, Tschakert et al. (2010: 497) noted an absence of adequate communication tools for anticipatory learning about climate change, such as 'posters, drawings, board games, songs, theatrical skits, open days and special radio programs'.

This study also demonstrates that there are parallel and merged ways of talking about responsibility for climate change following different trajectories. There may be an impression that cultural models and local priorities do not fit a discussion of climate change or that they are not in accordance with 'Western' models and narrations. Farmers have legitimate concerns about changes that affect them, and if climate researchers wish to understand their responses to environmental challenges, farmers' perceptions, knowledge and valuations should be taken seriously. Listening to their concerns may contribute to a better understanding and may contribute to the identification of relevant social processes involved in the management of natural resources and adaptation to environmental change at the research sites.

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9 Appendix: Data sheet for consensus analysis & questions for free listing

	Statement/ Question as read out by researcher	YES.	NO.
1	Have you observed changes in the weather?		
2	The changes in the weather are caused by our everyday activities. Is it true?		
3	Cutting trees leads to higher temperature. Is it true?		
4	Smoke from bush burning leads to higher temperature. Is it true?		
5	Have you heard about climate change in the media?		¹⁰
6	Ghana is the most affected country. Is it true?		
7	Countries far away, such as America and Canada, are responsible for climate change. Is it true?		
8	Countries far away, such as America and Canada, also have problems with climate change. Is it true?		
9	Smoke from cars and factories lead to climate change. Is it true?		
10	Development in Ghana can have a negative impact for our climate. Is it true?		
11	People in Ghana can stop climate change. Is it true?		
12	More frequent floods are caused by climate change. Is it true?		
13	Drought has always been there. Is it true?		
14	Bad harvest is mainly because of climate change. Is it true?		
15	Climate change brings more crop disease. Is it true?		
16	Climate change is a problem of my generation. Is it true?		
17	Will your grand children see more changes in the weather than yourself?		
18	After some time, the weather will be like in olden days again. Is it true?		
19	People like you and me can help to stop climate change by better managing land and water. Is it true?		
20	Climate change cannot be stopped. Is it true?		

¹⁰ If response is NO, then please, explain: climate change means that the weather changes in the world over a long period. This concerns the temperature, rainfall but also leads to many other outcomes.

Free-listing

Please tell me what changes you have observed in your environment within the past years.

Have you observed (other) changes in plants? Have you observed (other) changes in animals? Have you observed (other) changes in farm crops?

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