

Farmers Perceptions of Climate Change: A Case Study in the Abura-Aseibu-Kwamankese district, Central Region, Ghana

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1 Introduction

As the effects of climate change are increasingly felt every year, research is revealing which factors make a country and populations most vulnerable. Because of the agricultural basis of its economy, and because of the nature of this industry, Ghana unhappily finds much of its population at risk.

Although among sub-Saharan countries, Ghana is among the most developed with a government aiming to become a middle-income country (i.e. with a per capita income of USD 1,000 a year) by 2015 as part of its Growth and Poverty Reduction Strategy (GPRS II) it continues to rely heavily on agriculture. According to IFADs 2006 Country Strategic Opportunities Paper, agriculture contributes over 40% of GDP and pro-

vides the main source of livelihood for about 60% of the labor force. Most of the sector is characterized by smallholder farmers with some 2 740 000 subsistence-oriented farms, averaging 1.2 ha in size and accounting for 80% of agricultural production [2].

The area in which this study takes place is Abura-Aseibu-Kwamankese, located in the Central Region on the periphery of Cape Coast. In many ways it is typical of these trends: the farm size is estimated by the Ministry of Food and Agriculture (MOFA) to be between 3 and 10 acres; like the majority of farmers, the area relies exclusively on rain, with no irrigation systems in place, and is in many ways still traditional, with developments like row planting still not fully widespread.

Simultaneously, climate changes burden is being felt in this nation. The government

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of Ghana is the site of piloting REDD+ schemes, making it one of the first African countries to formally engage in carbon dioxide reduction schemes (The Forestry Commission of Ghana). However, this is just a beginning, and adaptation strategies are still not being yet implemented.

Small-holder farmers are most vulnerable to climate change, since their margin of security is narrower (Morton). Their reliance on rain makes them more dependent on the very climate that is shifting. With less access to education and limited infrastructure in communication, there are limited ways for farmers to understand the nature of the changes.

This paper aims to establish the current understandings and perceptions that farmers hold regarding the changes they perceive. Climate changes recent and irregular nature means that detecting changes to those unaware of the phenomenon takes time, and can result in confusing and differing interpretations. One aim is to establish whether there is any consensus on what the changes are, and general interpretation on its implications. This would provide insight into the urgency with which the changes are felt in this specific region and what areas are most vulnerable. It also reveals the extent to which current government services are successful in reaching these rural communities. Finally, this paper aims to establish whether the farmers are consciously addressing the perceived threat from climate change.

2 Method

The main source of information from this paper came from interviews conducted with a variety of farmers in the Abura-Aseibu-Kwamankese region. They were sometimes interviewed in a group, sometimes alone, but in total approximately 30 farmers were interviewed in 20 sessions. About half of the farmers were contacted through the areas agricultural extension agents, part of the Ministry of Food and Agriculture. Four were located at least a mile away from the nearest paved road in the communities of Brebia, Old Ebu, Asomdwue and Pra-Ewusi. In this area, most farmers fall between the ages of 40 and 49, 3,460 out of 11,530. Most farmers interviewed were within this range, although attempts were made to specifically interview older farmers, or those who had retired.

The agricultural extension agents, as the crucial link between the government and the local farmers, were also interviewed. There are 9 extension agents covering only 7,288 of the 11,530 farmers of the area. We interviewed the three agents who cover the various communities surrounding the towns of Abakrampa, Asebu and Pra-ewusi.

Also interviewed were the teachers and students of Asuansi Farm Institute, a training school for farming. While the school once taught classes to adult farmers, and has the capacity to house up to 100 students, there are currently only 10 students enrolled, and 4 teachers.

3 Findings

The interviews conducted yielded the following information. Certain observations were more consistent than others, but because of the nature of the study, no quantitative inferences can be drawn from this information, mostly because of the variation in the interviews and because the sampling of the farmers was not random. However, the farmers themselves tell a story that we can infer is common to many, even if it is only representative in its confusion.

3.1 Existence

The first question for the study is whether the farmers had heard of any of the formal terms for climate change. I relied heavily on either the farmers' fluency in English, or the extension agents as translators; in any case, only one farmer of the area had heard of the term. The follow-up question was if the farmers had perceived any difference in the patterns, and when the change had taken place. Overall, this was the most consistent answer, with nearly every farmer answering yes. Nearly every farmer pinned the change to approximately 5 years ago; only 3 farmers, all of them older, saw the changes in a longer-term range, between 5 and 10 years. Only one local farmer did not acknowledge the changes, as well as two recent migrants from the Ivory Coast. The ability for migrants to adapt to changes they do not yet recognize are going on might be interesting to further study.

Perhaps it is worth noting here that climate change, while mentioned in class, is not a for-

mal unit in the curriculum at Asuansi Farm Institute, although I was told it would be addressed in the second semester, and at least 2 of the 10 students did not know about it. A school teacher in the small village of Akwidaa in the Western Region did inform me that it was part of their public school curriculum, where they still teach agriculture, although I could not look further into how widespread this is.

3.2 Tangible Perception

The clearest indicator for farmers that the weather has been changing has been in the shifting of the rainy season. The first thing most farmers noted when asked about a change in the weather is that the months in which rainy season starts have changed. All farmers agreed that the major rains were starting later than remembered. About 6 estimated they now began in April, and the predominant rest stated they now began in early May. The farmers expected minor rains between January and March, and several farmers complained that these had not been forthcoming, or smaller than expected.

Other perceptions were less consistent. When asked to describe if there had been any changes other than the timing, a few farmers volunteered descriptions of rain intensity and continuity. However, these reports were often the most blatantly contradictory. While some perceived the rain as falling with greater intensity, others saw the opposite. Similarly, the amount varied—some said it was raining more than before, others, less. Finally, the length of days in which it rained straight was seen

as important by several farmers, but again, some would say it rains more days in a row now, while others say that it rains less frequently. For example, one farmer said that it used to rain 3-4 days without stopping, now, 2,3 days, sometimes 1, then stop for a week. The most consistent set of answers is that it rains less continuously, as that farmer said, but when it does fall, the rain is hard; in the words of another farmer now, when it delays, it comes torrential, too heavy; it floods. However, because it rains less frequently, there is overall less rain.

These perceptions align with what research has already proven. According to the National Climate Adaptation Strategy of Ghana, rainfall patterns have been shifting. Among the most problematic changes in the transitional and coastal savannah habitats is the early termination of rainfall which is likely to convert the current bi-modal regime to a uni-modal one[1]. The paper adds that total rainfall has also been dropping, and will continue to do so, by up to 20.5% by 2080 [1].

At least 5 farmers recall increased damage because of the rains, either through flooding or harsh winds. Farmers recall a year in which storms destroyed several houses.

In addition to the alteration in rains, many farmers also complained that the intensity of the sun had also risen. One farmer complained that it was so bad 3-4 years ago the leaves of some peoples cocoa got burned. Professor Felix Asante said that this is actually the most identifiable effect of climate change in the central region, but it is harder for farmers to recognize. In the statistics he has been exploring, he saw this as a more pronounced

trend than that of even the rains. Again, the National Climate Adaptation Strategy of Ghana backs this up, stating that the average annual temperature has increased 1C in the last 30 years [1].

Mr. Eric Nyamteah, a teacher at Asuansi Farm Institute of environmental management, aquaculture and arable farming, accredits these inconsistencies to an absence of record-keeping, which affects how the weather is remembered. For example, he said, since the interviews were conducted well into rainy season and because the minor season had been good compared to previous years, farmers were less likely to identify a drop in rainfall. This year has not been good, compared to what it used to be, the records indicate, but farmers only realize this at the end of the season. This sentiment was echoed by a professional farmer in Asebu, who emphasized his record-keeping as essential to his success as a farmer.

Another major factor in misremembering, Mr. Nyamteah continued, was the witnessing of flooding, which suggests to farmers that there is increased rainfall. However Mr. Nyamteah attributes the flooding to the higher rates of deforestation in the area since a government concession to large tracts of the forest to timber. That concession was 5 years ago, the time at which most farmers pinned the beginning of the climate changes. However, much of the deforestation happened prior to that, within 10 and 5 years ago, according to several of the older farmers. Before, it could rain 5,000 mm per annum without flooding, he remembers, whereas now, 2,000 mm of rain will cause disruptive flood-

ing, rendering roads unmotorable and flooding low-lying areas.

As for predictions on whether the current disruptions will continue, most of the time the question was answered with a only God knows. Those who had attributed the changes to deforestation were more likely to answer that the current changes would continue.

3.3 Effects

If the perceptions on the weather were varied, their effects on the different crops as a result of these changes were even more so. However, there were certain patterns in regards to some crops.

Maize: Many interviews cited maizes particular vulnerability because of the necessary precision in timing the planting. Maize needs rain to begin germination, and farmers were more aware of this crops reliance on the first rains than any other. A few farmers recalled having lost part of their work in previous years because of failure to predict when the rains would fall, although this was not a widespread phenomenon. Farmers would cite this as a possibility, but few had actually experienced it. Much the chagrin of Prof. Nyamteh and to the amusement of his students, an attempt of his to plant maize for himself this year failed because of wrong timing. Moreover, too much rain once the maize has been harvested can result in higher post-season losses, since the maize will not dry properly and can rot. One farmer, part of a new maize cooperative, however, said that

the less continuous rainfall with sun in between favored his maize yields.

Roots/Tubers: Cassava was generally regarded as a more resilient crop, capable of surviving late rains, and a possible back-up plan in case the maize crop failed. Too much rain at harvesting season affects cassava in the form of problems with storage although there are various ways to process cassava, these are often very labor intensive. A professor at the University of Cape Coast alluded to research being conducted both in the university and as part of the IFAD/MOFA Root and Tuber Marketing and Improvement Program into the possibility that the local varieties of cassava fare better in storage. The womens co-operative at Old Ebu, as well as a few other farmers in the area were aware of these developments. Although cassava seems to be more resistant, a farmer complained that cocoyam, on the other hand, goes underground rather than germinating in times of drought. This means that farmers cant see where they planted it.

Vegetables: The farmers who farmed vegetables emphasized their reliance on water at the right time. They need rain for the beginning stages of growth, but too much rain later can destroy the flowers that will become the vegetable. This resulted in loss in yields.

Trees: Most farmers in the area have some number of both palm and citrus. Most farmers agreed that the trees were not giving them trouble because of the climate change, and

that in fact these offered a more resistant and consistent crop in light of these changes. However, they are plagued by other problems. Citrus in particular is plagued by a fruit fly that causes the oranges to drop too early no links were consciously drawn between the weather and these flies, or any pests. Mr. Nyamteh also attributes this to lack of record-keeping, and says that citrus yields are in fact affected by the climate. On a visit to a commercial citrus farmer, an extension agent commented that yields were far below what they should be a tree could yield 1500 oranges, and at the time, they were only yielding 300-400. However, this was predominantly because of the flies, both he and the farmers said, not because of the climate. Since oranges are relatively new to the area, it is hard to compare to previous yields.

Other effects included the aforementioned flooding, as well as increased erosion. One of the most consistent responses was bringing up flooding within the past 5 years. Several of the older farmers were more likely to link this to deforestation one added that because there are no more trees to soften the wind, the wind can destroy more houses. All of this was reiterated by a teacher at Asuansi Farm Institute, who added that lack of urban planning was exacerbating the problem. The rise in population meant more people were living alongside rivers, and poor drainage systems choked with trash he added this was not just an urban problem, but a dynamic of the growing rural towns.

3.4 Adapting

The main adapting mechanism that was consciously acknowledged as a direct result of the changes in climate was the shifting of planting. Most farmers said that while in the past (when their fathers used to farm, for example), they would begin planting in March, they now begin in either April or, most frequently, as late as May. In fact, this was the only conscious form of adapting to the changes, yet it was acknowledged by every farmer. There were two main ways to change their planting techniques. One was to wait until the rains actually started, or as a farmer put it, I meet the rain. Several farmers noted that waiting for the rains, coupled with a shorter rainy season, resulted in a rushed season which affected yields. The other option some farmers followed was guiding themselves from previous years, but this, too, was vulnerable to the possibility that the rains wouldnt come, and their work would be lost, or very affected, as was the case with Mr. Nyamteh.

A womens cooperative in Old Ebu, which is experimenting with several varieties of cassava and planting techniques, said that they had found that planting the cassava stalks upright helped prevent rotting in the early stages.

The ability to predict future seasons would be an important tool for knowing when and what to plant, but remains elusive. Government weather reports, both daily and for future seasons, reach most farmers. The presence of television in village households is becoming increasingly widespread in this area,

and every farmer recalled hearing these reports either after the news, or on the radio, at least in the communities discussed. However, there were very mixed reviews on the importance of these reports. About a third of the farmers said the reports were right more than half the time. A greater proportion of the farmers did not trust the reports, and several of them complained of having followed a government prediction only to have the rains fail or fall unexpectedly. Overall, although most farmers listened to the reports, only 2 said they found them useful. It was also suggested by an Asuansi teacher that the reports do not target those who need them most; they are delivered in a way to farmers that is either hard to understand, or that is not translated into how the information should be applied practically.

Various professors, among them Prof. Ofori and Prof. Felix Asante, both of KUNST, as well as Mr. Ebenezia Azasu, of the regional offices of MOFA in Cape Coast, cited the lack of sufficient weather stations as a factor in the unreliability of the predictions. According to Mr. Nyamteah, there are 3 - 4 weather stations per district, although this was unconfirmed. Recent IMF structural adjustment policies have aimed to cut back on waste, and the meteorological stations have been radically cut back under this initiative.

A few farmers indicated unique ways of predicting the weathers. Most memorably, the womens cassava cooperative in Old Ebu said that little green worms and other small bugs know rains will come. However, none of these techniques were repeated by other farmers, and as the professional farmer in

Asebu said, traditional knowledge is being lost with every generation. Other farmers lamented that so much knowledge from before is irrelevant now.

The government also relies on extension agents as messengers of current government recommendations, including when farmers should plant. Three of the extension agents of these communities were interviewed, and they proved to be very knowledgeable, as well as greatly appreciated by the communities in which they operate. These agents are the crucial link between government and university research, the meteorological predictions, government policy and the farmers themselves. They can be seen as the solution to the disconnected weather reports they interpret the weather predictions, or communicate the governments interpretation and recommendations, and translate it into practical advice to the farmers.

However, several professors pointed out that this branch of MOFA is understaffed, as well as underpaid and lack provisions for transportation to the remoter communities, like motorcycles. In Asomdwe, which is the most remote of the villages visited, the last extension agent had retired, and, a year later, there was still no replacement. Even when the extension agent was working, farmers who called him complained that he would not come to their remote farms. The understaffing is exacerbated by politics: a fleet of motorcycles was bought so the extension agents could get around, but with the change of government, these were never given out, and reputedly are sitting idle even now. Moreover, the government has cut this pro-

gram during this period in which they may be most important extension workers used to be recruited with material benefits (like motorcycles) and good wages; now, recent graduates are not drawn to this field, and rather are recruited into the independent cocoa services, which pays better.

4 Conclusion

The overall impression the interviews created was that although the changing climate was beginning to pose problems, it was not yet among the major obstacles farmers here faced. During a few interviews, farmers were asked to rank their major problems with their livelihood, and access to market and external inputs were considered more pressing than the timing of the rain.

This contrasted with a few informal interviews conducted in other parts of the country. In the countryside surrounding Bolgatanga in the North, a farming family described that the shifting of the seasons had reached the point where they were beginning to plant at the time in which they typically were harvesting already in the past. During their fathers time, they said, it would have been too wet for us to sit outside at this time, for there was water everywhere, there were rains throughout 7 months of the year, from April to October, while now, they only receive rains from June to mid-September. These changes had been seen since 7 years ago, they said. Unlike the south, the rainy season is not bi-modal, but occurs only once a year, which makes them more vulnerable to the

changes. Although the North presented the most urgent picture, farmers as far south as the area surrounding Kumasi were complaining of similarly radical shifts in season; two women farmers in Jachie, where the People and Land Ecosystems Commission worked in promoting agro-diversity, complained that they should be harvesting at the time, and yet they had just begun planting a few weeks ago.

Although this is somewhat beyond the scope of this paper, there were certain trends that suggest that the farmers retain the ability to adapt. Foremost among these was the prevalence of multi-cropping systems. Not a single farmer interviewed had devoted their land exclusively to one crop; it was rare to find farmers who did not grow at least 5 types of crops, and often more. In the remote village of Brebia, the average number of crops grown by those in the cooperative was 6. As a farmer put it, because land is limited, she cultivates anything she can get her hands on she had at least 7 crops on her farm.

Research generated by the People and Land Management Environmental Change suggests that maintaining high agro-diversity in farms may prove to be important in being able to adapt to changes (PLEC). Genetic variety was harder to assess, and the answers from informal interviews dont provide a very solid base. General trends observed were that farmers who were closer to paved roads were more likely to use hybrid varieties. One farmer who led a demonstration farm in Abakrampa estimated that over 60% of farmers in the area used hybrid varieties, buying new seed every year or every few years. This

was true of the Ofrinyame cooperative in Pra-Ewusi, which focused on maize, as well as other farmers around Abakrampa. However, in the remoter villages, farmers were more likely to recycle their corn from previous harvests, which they dried in elevated structures. For them, dry storage is particularly important, and they are more susceptible to the post-harvest losses due to rotting from too much rain.

For cassava, the very extensive IFAD and MOFA collaboration on the Root and Tuber Marketing and Improvement Program was helping explore the potential of many different varieties, both improved and local. This resulted in the womens cooperative to try to find local varieties of cassava that were being lost; hopefully they will not be lost once the project concludes. We saw at least two different kinds of cassavas on most farms; one preferred for garre (agric variety), one for making the local staple of fufu.

One final practice seen on a demonstration farm, but which may be more widespread, was that of using mixed-pollination for oil palms – local and hybrid were purposely planted next to each other.

The government response to the changes in the area is starting to kick off. The regional director of the Environmental Protection Agency, the EPA, alluded to a few educational outreach programs, mostly on radio, not many on television, and talks in schools and churches to inform people about climate change. Given the relatively good reach of radio in this region, this could be a useful tool.

The regional MOFA offices have begun to

cooperate with the EPA and the Ministry of Land and Natural Resources to educate farmers on the causes of climate change and possible adaptations, but already the initiative to do so has died out, according to Mr. Azasu, who works at the regional MOFA offices, and nothing formal remained in the MOFA office in terms of plans to continue.

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