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# INDIGENOUS KNOWLEDGE AND CLIMATE ADAPTATION POLICY IN NORTHERN GHANA

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## SUMMARY


- The onset of climate change poses a direct challenge to small-scale agricultural production and food security in Ghana. Though this type of farming can be responsive to climatic variations, adaptation policies that promote high-resource solutions are not relevant to smallholder farmers.
- Climate change is already constraining agricultural productivity in Northern Ghana, but local farmers have successfully developed adaptation measures that reduce their vulnerability to climatic shocks
- National climate adaptation policies — in Ghana and across Africa — could better incorporate sources of indigenous knowledge to ensure programs are cost-effective, participatory and sustainable.


## BACKGROUND

With the increasing intensity of drought/rainfall variability and floods observed throughout Sub-Saharan Africa in recent years, it is predicted that these effects of climate change will continue to have a negative impact on small-scale agriculture across the continent (Easterling et al, 2007). Much empirical evidence, however, suggests that adapting to climatic effects are not entirely beyond farmers' control (Nyong and Osman, 2007; Moretimore and Adams, 2001). These sources see farmers in the agriculture sector as innovators with a sophisticated body of 'indigenous knowledge' comprised of practices gained through experience and transmitted through members of a community (Agrawal, 2003; Berkes, 1999).

There is, in fact, a vast amount of literature that documents how smallholder farmers use knowledge systems to adapt to climatic trends in Africa (Watts, 1983; Richard, 1986; Guthiga and Newsham, 2011). To take a few examples,

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a study of the Mende farming systems in Sierra Leone demonstrates how farmers use sophisticated agronomic practices to mediate poor rainfall (Richard, 1986), while in northern Nigeria, farmers use multiple cropping and varietal experimentation to mitigate against uncertain precipitation and high rates of evaporation (Watts, 1983). The Nganyi community of western Kenya, furthermore, uses traditional methods of weather forecasting — the behaviour of ants, bird songs and timing of tree flowering — to decide when to prepare lands and sow seeds (Guthiga and Newsham, 2011).

The portrait of smallholder farmers presented in these examples is one of resourcefulness and resiliency, in contrast to the image of unsophisticated peasantry that prevails in other literature that suggests Africa is approaching an agrarian crisis (Collier, 2008).

Despite recognition of its importance by the Intergovernmental Panel on Climate Change (Parry et al, 2007) and other international forums, governments throughout Africa continue to undervalue the role of indigenous knowledge in national climate change adaptation policies. Instead, policy makers are turning to international financial institutions (IFIs) and donors to transform farming by introducing large-scale industrial agriculture practices as the key to adaptation (World Bank, 2008). Paradoxically, this method of production relies on hybrid seeds, synthetic fertilizers and machinery run with large carbon inputs, further jeopardizing the climatic stability on which all types of agriculture rely (Robertson, Paul and Harwood, 2000).

Using Northern Ghana as an example, this backgrounder focuses on the value of including indigenous knowledge in national climate policies. First, a brief overview of agriculture in the region is presented, with particular attention paid to how small-scale farmers use indigenous knowledge to adapt to climatic extremes. Second, the challenge of integrating these practices into policy is examined. Although much of the empirical evidence is derived from Ghana, the discussion is relevant across the continent and beyond.

## SMALL-SCALE AGRICULTURE IN NORTHERN GHANA

Northern Ghana consists of three administrative regions: Upper East, Upper West and Northern Region. Together, they comprise the poorest region of

the country, with poverty rates ranging from 69 to 88 percent across the region (Shepherd et al, 2005).

In contrast to the more urbanized south, the majority of people in Northern Ghana reside in rural areas and depend on agricultural activities for their livelihoods. The farming system is based on rain-fed cultivation of crops such as maize, rice, sorghum, millet, groundnut and vegetables (Dietz et al, 2004; Shepherd et al, 2005). Crop production for sustenance is often combined with animal husbandry on small farms and maintained through labour-intensive agricultural methods (Naylor, 1999).

There is one rainy season, starting in April/May and ending in September/October, followed by a dry season that lasts for the remainder of the year. In the last 40 years drought has become a common occurrence, and annual rainfall levels are increasingly variable (Dietz et al, 2004; Van De Geest, 2004). In view of these fluctuations in precipitation patterns and corresponding changes in food availability, farmers in Northern Ghana have developed intricate strategies to adapt.

Despite its increasing variability, for example, farmers in Northern Ghana are still able to accurately determine the beginning of the wet season and when to prepare their fields for planting (Ofori-Sarpong, 2001). The flowering of the shea nut tree, migratory patterns of birds and position of the constellation *Pleiades* all help farmers determine when the rainy season is due (Benneh, 1970). Once the rains do come, farmers use the growth of certain grasses to determine soil moisture content and suitability for particular crops.

Small-scale farmers also choose different intercropping strategies based on variations of soil moisture and the onset, character and duration of rainfall. Typical combinations include cowpea, cowpea-sorghum and millet-groundnut in years with poor rainfall, and maize-beans, maize-groundnut and maize-millet combinations during years with moderate rainfall (Ofori-Sarpong, 2001). In parts of Northern Ghana where prolonged drought has deteriorated the soil, the use of moisture improvement techniques such as 'zai' planting methods are common (Ngigi, 2009). This technique consists of farmers digging pits in formerly barren land, into which water otherwise could not penetrate, and filling the holes with compost. During rainfall, runoff water seeps into the holes and is soaked up by the compost,

storing moisture and creating a beneficial environment for plant growth. The compost also attracts termites that dig galleries at the bottom of the holes, allowing further runoff water infiltration and creating deep moisture pockets favourable for plant growth.

Finally, findings from recent fieldwork suggest that farmers in Northern Ghana still prefer to plant traditional crop varieties — as opposed to hybrid or synthetic ones — because they are better suited to local conditions. In a recent survey, 85 percent of households still use local varieties of maize because they are perceived to taste better, require no fertilizer inputs and are more easily accessed and stored.[1]

## INTEGRATING INDIGENOUS KNOWLEDGE INTO CLIMATE ADAPTATION POLICY

The effectiveness of traditional knowledge systems in Northern Ghana suggest that the first-hand experience of farming communities should be essential to governments and donors in the formulation of agriculture related adaptation policies in drought-sensitive regions of Africa. Many policy makers, however, remain skeptical of the credibility of indigenous knowledge, considering it an inadequate basis for sustainable harvesting.[2]

Others development emphasize that, while indigenous knowledge is locally specific and embedded in traditional norms, scalability and shared learning is difficult as practices and beliefs are endemic to the group in which they are held. Much attention has therefore been given to high-technology, high-cost and genetically modified agriculture, although smallholder farmers' adoption of these techniques remains minimal in places such as Northern Ghana. In-depth household interviews and direct observation show that agricultural intensification using traditional methods is relatively inexpensive for smallholder farmers, hence the slow adoption of a more scientific approach.

This tension between knowledge systems suggests the need for climate adaptation policy to discover a better balance between the traditional and modern, both of which have their own limitations. With science and technology leading in current policy prescriptions, there is an opportunity to

1 Author's ongoing research in the Upper-West region of Ghana.

2 Focus group discussion from author's ongoing research in the Upper-West Region, Ghana.

further study and integrate indigenous adaptation measures into national climate policies.

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