ASSAR

ADAPTATION AT SCALE IN SEMI-ARID REGIONS

2014–2018

PUTTING **PEOPLE** AT THE CENTRE TO ENABLE EFFECTIVE **CLIMATE ADAPTATION** IN SEMI-ARID REGIONS

INSIGHTS FROM GHANA

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VULNERABILITY AND ADAPTATION TO CLIMATE CHANGE IN SEMI-ARID GHANA

ASSAR'S FOCUS IN GHANA

West Africa's semi-arid regions are home to an incredibly rich history of cultures that have thrived despite highly demanding environmental conditions. Today, people living in these dryland areas face a suite of complex challenges. These are related to increasingly erratic rainfall, rising temperatures, droughts, poor soil fertility and floods, combined with high population growth, gender inequalities, ineffective decentralisation of governance, and reliance on climate-dependent livelihoods.

From 2014-2018, ASSAR's Ghana team worked in the Lawra and Nandom districts of Ghana's Upper West region to better understand how these interlinked challenges are impacting people's capacity to adapt. Our team comprised researchers and technical officers from the University of Ghana's Institute for Environment and Sanitation Studies (IESS) along with master's and PhD students from IESS and other university programs. We worked with partners and stakeholders from national to household levels to understand differentiated vulnerabilities, identify barriers to adaptation, and explore what needs to happen to support more effective, sustained and widespread adaptation.

Key insights

- Intersecting climatic and non-climatic challenges manifest in varied ways for different groups and individuals. Therefore, researchers, policy makers and practitioners should view these combined stressors holistically and use this more complete understanding when making decisions that will impact livelihoods and adaptation options of different social groups.

- Measures can be taken now to ameliorate non-climatic challenges and bolster adaptive capacities. These include developing market support services, expansion of veterinary services, enforcement of regulations on bush burning, and better grading and packaging of produce.

- Policy makers, government ministries and practitioners should tailor water management to the needs of different social groups, prioritise provision of accurate and timely rainfall information, and strengthen technical capacities for maintaining water infrastructure. Further, to increase uptake among farmers, measures need to be taken to integrate traditional irrigation approaches that are culturally accepted with more modern mechanised approaches and financing.

- Migration is often seen, in an overly simplistic manner, as a favourable adaptation response to combined stressors, but this is not necessarily the case. Migration is not always an available or desirable option. A focus should be placed on supporting sustainable adaptation options for those for whom migration is not a viable option.

- Traditional patriarchal norms have favoured males and promoted structural inequalities among females in terms of decision making, access to and control over land for agricultural activities, and the ability to engage in more productive livelihoods. Recognising gendered dimensions of land tenure, and improving access and ownership rights for women and marginalised groups, is central to identifying successful adaptation strategies for the future.

ABOUT THE RESEARCH

Research priorities

Our team sought to better understand what the current situation is with regard to how people are adapting to climatic and non-climatic changes occurring in the Upper West region, especially in relation to food security and in the context of trends toward agricultural intensification in Ghana and beyond. We set out to understand how the current situation developed and what may be needed to better ensure successful adaptation to potential future changes. Exploring how combined stressors affect different social groups in different ways, and how adaptation options are shaped by cultural traditions, social norms, and associated power relations was also key. Through this work we were able to identify certain barriers and enablers of adaptation, particularly as these link to water, migration, land tenure, farm production and marketing, and livelihoods.

ASSAR investigated differing vulnerabilities and response options among and within different groups of people in Ghana's Upper West and what these mean for adaptation. We also investigated barriers and enablers to adaptation relating to:

- Water resource management at local and district levels
- Migration
- Gendered access to and control over agricultural land
- Production and marketing of farm produce
- Agricultural and off-farm livelihoods

Case study sites

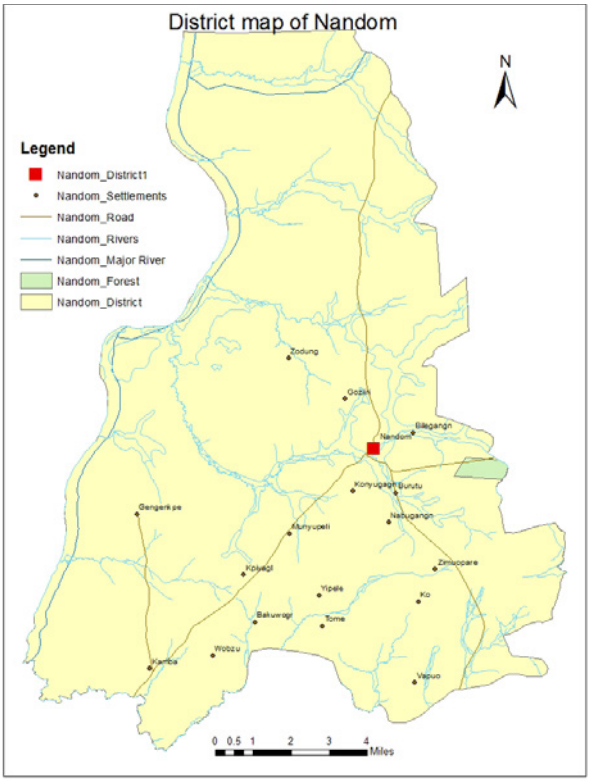
We focused on the Wa portion of the dry sub-humid band that extends from the Upper West region of northern Ghana through southern Mali, referred to as the Wa-Bobo-Sikasso transect. The region experiences high exposure to dry spells, and has medium-high to high drought risk and strong multi-decadal fluctuations in climate. Our team worked in two districts, Lawra and Nandom, in the Upper West region. Smallholder farming is the dominant livelihood in the area with over 80% of all households in the districts engaging in agriculture. Most farms grow crops including yam, cereals, maize, sorghum, millet, and guinea corn. Women often practice groundnut farming and processing along with shea butter processing and soap making. Livestock such as goats, cattle, sheep, pigs, and poultry are kept on a small scale. Other activities include smock weaving and pito brewing.

Approach

We began our work with the Regional Diagnostic Study (RDS) that investigated current dimensions of risks, vulnerabilities, and adaptation responses across different groups of people in the study sites and through cross-referencing at the national level. For this study, two sets of national and local level workshops were held. The first set of workshops engaged stakeholders at the local and national level to obtain their perspectives on barriers and enablers of climate change adaptation in semi-arid Ghana. The second set of workshops was to disseminate results and get feedback from the stakeholders on the findings at both levels. During this phase, we found diverse, and sometimes conflicting, interests in terms of policies, strategies, and investment priorities. Further, overly complex management systems where people have conflicting interests, different skills and capacities across institutions and individuals, differing monitoring and evaluation systems, and differences in terminology, were also found to be barriers for prioritising and achieving adaptation goals. With regard to enablers we found that policy measures that support greater availability and sharing of climate and agricultural data, increased use of established data quality control protocols, and use of more comparable language with appropriate and consistent definitions and terminology would support greater adaptation.

This information helped to shape the way in which we contextualised and approached the research questions in the first round of studies conducted by master's and PhD researchers from the University of Ghana (UG), and through research done by the core research team (comprising UG faculty members and master's graduates who served as technical officers). We explored our target issues primarily through: 1) focus group discussions, surveys, and key informant interviews, 2) targeted sampling and mapping of the biophysical attributes of local ecosystems, 3) investigation into ecosystem-based livelihoods and natural resource management, and 4) careful analysis of adaptation-related policies and regulations across scales. Throughout, we maintained a special focus on gendered dimensions of vulnerability and adaptation options in Upper West.

Our research further encompassed work on life histories in Lawra and Nandom, mental modelling approaches, and participatory stakeholder engagement processes. In turn, the evidence gained from this initial research then served to inform our Transformative Scenario Planning (TSP) phase of the project. For this, we held two workshops in Wa, a city in Upper West, in 2016 where we used TSP to build stories about what plausibly might happen to agriculture and food security in the Upper West Region until the year 2035.



Insights gathered during the TSP process then informed the second phase of our regional research program that centered on migration options, vulnerability of different social groups, institutional capacities, food security, ecosystem services and management, governance, livestock management, and adaptation strategies. Throughout all stages of the research, special attention was given to recognising how gender and other intersecting categories of social difference shape the vulnerabilities, capacities, and responses of different people. Over the course of the project our team's Research-into-Use (RiU) dimension progressed to building on information from the research and the TSP and using this knowledge for more targeted capacity building activities with stakeholders.

FINDINGS AND RECOMMENDATIONS

INTERSECTING CLIMATIC AND NON-CLIMATIC CHALLENGES SHAPE PEOPLE'S LIVELIHOOD OPTIONS AND DECISIONS

In Lawra and Nandom districts, climate change and perceptions of climate change are influencing decisions about agricultural and ecosystem-based livelihoods. However, this is not the only nor most influential factor in some cases. Policy makers and practitioners working to support adaptation need to seek a holistic view of the challenges and needs of different groups in order to strengthen overall abilities to cope with combined stressors.

Climate change is only one of many integrated challenges farmers must navigate on a daily basis. For livestock farmers, age, access to veterinary and extension services, decreased rainfall and increased temperatures, and membership of farmer organisations all play a role in shaping their decisions on whether to adopt certain management strategies for their animals. For production and marketing of smallholder produce, climate change is not perceived as a major challenge. Instead, postharvest losses, low prices for farm produce, poor packaging, poor grading, and absence of market infrastructure are more pressing concerns. These issues could translate to negative impacts on adaptation though, as incomes and food crops are affected. Similarly, groundnut farmers, who are largely women, are facing combined climatic (erratic rainfall and higher than normal temperatures) and non-climatic (poor soils and unequal access to land) challenges. Adoption of different responses to these depends on factors including age, gender and land tenureship.

Ecosystem-based livelihoods are providing important alternatives or support to conventional farming activities, but these are also facing combined climatic and non-climatic challenges that could impact their future viability. For example, in Lawra there are at least 76 non-timber forest product (NTFP) species that contribute significantly to local livelihoods and act as safety nets for residents in times of dwindling outputs from farming. These species and their sustainable use are facing several major threats including climatic changes (higher temperatures and irregular rainfall), animal and plant invasions, access restrictions, and the absence of specific laws on NTFP management, harvesting and processing. Harvest and use of medicinal plants is also being impacted by intersecting climatic and non-climatic challenges, especially in the form of bush burning, drought and high temperatures, and degrading harvesting practices.

Recommendations

- Policy makers, traditional authorities, and others seeking to design or implement targeted adaptation measures need to take a holistic view of combined climatic and non-climatic stressors that impact the vulnerability and adaptive capacity of different social groups and individuals. This will involve deeper engagement and communication with target communities and room for flexible feedback and adjustment of policies.

- Certain measures can be taken now to ameliorate non-climatic challenges that would bolster the health, financial security, and safety nets for communities in Upper West. These measures include developing market support services, expansion of veterinary services, enforcement of regulations on bush burning, and better grading and packaging of produce. These measures could bolster overall adaptive capacities for dealing with climate change impacts.

STRENGTHENED MANAGEMENT OF SCARCE WATER RESOURCES IS CRITICAL FOR REDUCING CONFLICT AND ENABLING ADAPTATION

Rising temperatures, unpredictable rainfall, and increased pressures from growing populations are shaping a complex landscape around water resources, especially groundwater and water from the Black Volta River which forms the border between Ghana and Burkina Faso. Supporting greater technical capacities and more integrated management of these resources will be essential for lessening negative impacts of climate change in the future and for reducing conflicts among users.

Droughts, floods, and increasingly variable rainfall are impacting the quantity and quality of water sources in Upper West. Nitrate levels are elevated across many water sources due to the proximity of farming activities, and microbial levels from the Black Volta exceed the guidelines for domestic use. These issues can be harmful to human health and can impact negatively on adaptive capacities. Likewise, seasonal drying of rivers and streams, and of some boreholes during more extreme conditions, is contributing to increased conflict between water users at boreholes, as well as between livestock and irrigation farmers along rivers. For example, recent decreases in the water level of the Black Volta have resulted in a struggle between dry season farmers and semi-nomadic Fulani herdsmen. Factors such as age, ethnicity, and gender can greatly shape how and to what degree these challenges impact different people. For example, it is women and girls who are primarily in charge of fetching water for households, while young men are often in charge of moving livestock.

Concerning governance and management, decisions are spread across different decision makers at multiple scales. For example, regulations designed at the district level are enforced by local level Water and Sanitation Committees (WATSAN). Then, there are traditional authorities who pass and enforce bylaws. These multiple layers of governance all aim for increased protection of water in the region. However, there are disconnects between community-level capacities and district-level management goals, and between traditional and formal government strategies. Lack of sufficient funding and technical expertise to maintain water harvesting infrastructure is perceived as contributing to a greater risk of increasing conflicts around water in the future.

Recommendations

- To reduce vulnerability of smallholder farmers in the Upper West region to increasing water scarcity and other interrelated challenges, policies and programmes should target smallholder farmers at the level of disaggregated social groups, instead of considering them as a homogeneous group.

- The Ministry of Food and Agriculture and other development organisations should focus on reducing vulnerability to drought and flooding through: 1) the provision of accurate and timely rainfall information, 2) strengthening of technical capacities for maintaining water infrastructure, and 3) more transparent communication and inclusion of different water user groups in the development and updating of regulations.

- Education of community members by government and non-governmental organisations on water quality issues and related health hazards should be prioritised where possible.

- Government institutions, including district assemblies and departments of agriculture, along with the Ghana Irrigation Development Authority (GIDA), should take measures to integrate traditional irrigation approaches that are socially and culturally accepted with more modern mechanised approaches, climate smart agriculture, and well-targeted financing in order to increase uptake among farmers.

MIGRATION IS NOT ALWAYS A FAVOURABLE ADAPTATION OPTION FOR ALL GROUPS

Migration continues to be one of the more popular responses to integrated climatic and non-climatic stressors in Upper West. But not everyone in Lawra and Nandom has the desire or the ability to move away from their homes and established social networks. Alternative adaptation options for those who choose not to, or cannot, migrate should be identified and supported, as should decision-making rights for marginalised groups.

Communities in Upper West can experience more than seven months of dry spells each year, affecting agriculture and food security for many households. During this period of dryness, vulnerable farmers have to make the difficult choice between migrating to southern Ghana as an adaptation option, staying and engaging in dry season farming with scarce water resources, relying on food and resources from other family members, or seeking limited off-farm employment. In parts of Upper West there is nearly an 80% migration rate among members of farming households.

Important, though, is that not all groups and individuals have equal access to migration. This ability is shaped by social factors. For instance, an individual's marital status influences their power over migration decisions. Married men, and single women and men, are freer to make such decisions than married women, who cite having children and deferring to their husbands as restrictions. Single women may permanently migrate. Married women, whose husbands live in these communities, often practice seasonal migration. These married women note that, although there are times that their husbands cannot afford their basic needs (such as cooking utensils, cloth, and other household items), they still prevent them from travelling to other parts of the country to earn income. They believe that their husbands prevent them from migrating because of the labor they provide on men's farms. Marriage restricts these women's mobility, even when such movements may enhance their and their family's adaptive capacities.

There is no homogenous view of the desirability of migration either. Age can play an influential role. For instance, young people tend to respond to stressors with migration, whereas older people rely instead on their local social safety nets. Some groups also have greater access to off-farm livelihood activities in their communities. For instance, women in Upper West are better able to secure local off-farm livelihoods that are not as vulnerable to climatic impacts, whereas men are often more solely dependent on farming activities that are highly vulnerable to climatic impacts. This means men are more likely to migrate south for farming opportunities.

Recommendations

- Migration decisions are based on diverse reasons, but underlying push factors are usually linked to food and financial security. Those who have access to off-farm activities are more likely to remain in place than those who have run out of response options to climatic risks and shocks. Governments and other institutions should focus on supporting sustainable adaptation options for those for whom migration is not a viable option.

- Creation of vocational training programmes should be prioritised by civil society, traditional authorities, and governments in the districts, when possible, to train young people in different livelihood activities that can sustain them during dry spells and droughts.

- Effort is needed to empower women to be part of household and community decision making activities. NGOs and institutions engaged in the district should ensure fair representation and participation of women in all meetings and decision making processes. Such efforts could build on progress made by the ASSAR Ghana team with strengthening capacities of women's groups in Lawra and Nandom.

STRENGTHENING LAND ACCESS RIGHTS AND LIVELIHOOD OPPORTUNITIES FOR WOMEN IS CRUCIAL FOR SUCCESSFUL ADAPTATION

Climate variability interacts with socio-economic, cultural, and political inequalities to shape vulnerability. Gender, in particular, largely influences access to land, a vital resource on which households depend. Understanding these gendered dimensions, and improving access and ownership rights for women and marginalised groups is central to identifying successful adaptation strategies.

Access to land is critical for adaptation in Lawra and Nandom, as it is intricately linked to livelihoods and food security. However, the ability of certain groups to access and use this resource is heavily influenced by social norms and traditions. For example, there are vast differences between male and female farmers with respect to owning farmland. Most female farmers have access to far less land than men do, and they must borrow or rent land instead of inheriting it as most men do.

Connections to agricultural land are not identical across social groups though. Married women have greater access through their husbands, and therefore more control over adaptation options. Comparatively, single women have less access and therefore less control over adaptation options. Indigenous women also have better access to land as compared to migrant women. Access to farmlands by married women, however, is by no means guaranteed as lands can easily be taken from them at any time by their husbands. This tenuous control over agricultural lands impacts the decisions different women can and do make regarding adaptation responses.

In part due to restricted access to farmland, women and young farmers are more likely to engage in off-farm livelihood activities. These tend to be impacted less by climate change and include the sale of local drinks, shea and groundnut processing, basket weaving, and petty trading for subsistence. While these additional livelihoods may increase women's agency (income is often used to support household food and other needs), they also increase work burdens and curtail leisure time. For some, increases in agency do not equal greater decision making power because of persisting patriarchal norms and power structures that continue to suppress the decision making abilities of women.

Recommendations

- Recognising the ways that gender and other social differences affect access and control over vital adaptation options for different groups is a central first step for successful adaptation planning. Policy makers and practitioners need to regularly engage with different social groups and their representatives in order to more thoroughly incorporate their perspectives and needs into adaptation policies and programming, with an explicit aim of more effectively addressing the needs of marginalised groups.

- In supporting women's agency and demand for recognition, interventions need to work with both women and men to challenge social norms and patriarchal traditions but also to invest in supportive structures (e.g., access to credit, markets, and improved transport networks).

- Women's access to land is vital for influencing adaptation strategies among agrarian societies. To improve this situation, the Ministry of Gender and Social Protection should sensitise communities on women's land rights, and the need for improved land access and tenure security among women and youth.

- Traditional authorities and civil society organisations should support dialogue and collaboration between men and women on gender equality, land access and rights, and adaptation.

WORKING WITH STAKEHOLDERS TO IMPROVE ADAPTATION AT MULTIPLE SCALES

Beginning with the RDS and exploratory trips of graduate student researchers, we built relationships with local and district level stakeholders that provided a strong foundation for each subsequent step of our project. Consistent engagement with stakeholders, and the inclusion of their voices and perspectives into our research and participatory processes, along with prioritisation of their needs in our capacity building activities, formed the core of our RiU strategy. These relationships first helped to facilitate more open student access to communities and key individuals with knowledge about different dimensions of the research. Later, as the team moved toward the TSP phase of the regional research programme, these relationships served as key connections for helping us bring the right people to the table for the scenario workshops which was key to their success.

Prioritisation of climate-smart water management during the TSP directly led the team to work with farmers on promotion of dry season farming through smart water management that enhances sustainable livelihoods for vulnerable communities through our Scenario Based Capacity Building (SBCB) award. The TSP also highlighted the need for more and better dissemination of research findings, weather and climate information, and adaptation strategies to stakeholders. Limited communication channels can make this challenging so the team created four Climate Advisory Resource Centres (CARCs) as part of their SBCB activities. The goal for these centres is to make farming advisories more meaningful and relevant to ordinary farmers and to support extension work. These observed gaps also led members of the team to develop a mobile application, Adaptation Hub, to promote communication and information sharing on climate and adaptation.

In 2018, the team used their work on smallholder irrigation with the SBCB award as a building block to partner with ASSAR colleagues at the University of East Anglia for developing a proposal for an action group of the Africa-EU Innovation Alliance for Water and Climate (AfriAlliance). Their proposal for the Planning for Drought (P4D) action group was among four out of 80 applications selected for this round of the project.

The activities of the P4D will be based on key ASSAR research findings on water management for vulnerable communities in Upper West and is focused on promoting dry season farming by enhancing the capacities of vulnerable farmers and local agriculture stakeholders (extension officers and input dealers/marketers). This will be achieved through participatory planning processes to enhance farmers' capacities in efficiently managing water resources, especially during drought and dry spells. The working group also aims to share experiences and knowledge gained with other stakeholders within and outside the Upper West region.

Our work in Lawra and Nandom also revealed that those involved with women's self help groups were a part of the local population whose vulnerability to combined climatic and non-climatic risks was greater than others in the region. This informed the team's priorities for our Grants for Local Adaptation Support work. The aim of this work was to enhance the adaptive capacities of women by introducing them to eco-inclusive businesses, advocacy skills, and business networking, and also to inform them of where and how they can access credit and register businesses.

Another gap emerging from our stakeholder engagements was youth education and empowerment. In an effort to motivate action in this area, we supported Climate Change Innovation through Youth Innovation (CATYI). CATYI promoted dialogue and information exchange on climate and environmental issues through a school competition, and through building students' capacities in identification and communication of local environmental problems. The competition involved three schools and six teams and consisted of oral presentations on thematic areas identified as critical to agriculture and food security. The first and second prize winners paid a visit to the University of Ghana in Accra. The students used the opportunity to share their award-winning ideas with other students, toured the university campus, and visited coastal Accra to see differences in climatic challenges and livelihoods there.

At the national level, the ASSAR team was instrumental in the incorporation of the term 'Research-into-Use'- along with its underlying philosophy- into two national policy documents, namely *The Ghana National Science Technology and Innovation Policy* and *The New Directions Science Plan (2018 - 2028) of the Earth Systems Governance Programme*. In April 2016, we received an invitation to be part of the National Climate Change and Green Economy Learning Strategy Information Session to solicit views on the principles of Green Economy for integration into the National Climate Change and Green Economy Learning Strategy (CCGELS). As part of the Education Committee, we helped shape the document through contributions facilitated by research findings based on the RDS, and stakeholder engagement activities thus ensuring that critical concerns regarding climate education are taken on board, bearing in mind the variable climate and information gaps that exist across the country.

Overall, our targeted work on research for impact in Ghana has led to stronger links between previously unfamiliar stakeholders at the local and district levels, critical reflections about group and individual capacities to effect change with regard to strengthening adaptation, and the introduction of new ways of thinking and working into national policy spheres with a focus on using evidence-based research to boost positive impacts on adaptive capacities of vulnerable populations.

NEXT STEPS FOR RESEARCH, POLICY AND PRACTICE

For the people of Ghana's semi-arid areas, a future with global warming of 1.5°C and higher looks quite bleak, in the absence of adaptation, since local warming will be greater than the global average. Currently, semi-arid regions of Ghana experience about 6-7 months of dryness each year. By 2030-35 this could extend to 8-9 months. This would likely worsen existing vulnerabilities, including poverty and inequality, among different social groups. This would also mean extended hunger periods (the time between stock depletion and the next harvest) from current levels of 5-6 months to 7-9 months. Though this would have dire impacts across the population, the brunt of the burden of this lengthened food shortage would fall largely on women who are tasked with the daily responsibility of feeding their households. As described earlier, with women's already-precarious land tenure status, prolonged drought could lead to women losing more of their current arable farming lands to fully tenured land owners (primarily men). This in turn could increase women's dependence on non-farm resources, such as firewood and charcoal, that come from forests, which could further degrade forest ecosystems. The existing conflicts around water resources we have highlighted in our research would also almost certainly escalate with prolonged periods of drought. Lastly, all of these combined stressors would motivate more and more people to migrate, which would bring new vulnerabilities and challenges to them (e.g., marginalisation from host populations, no social safety nets, and vulnerability to crime) and those who are not able to move (e.g., increased labour burdens, decreased social safety nets, and increased climate-related impacts).

Enhancing and building the capacities of different social groups (e.g., women's groups, farmer groups, religious groups, and youth) to respond to different vulnerability needs in their communities will be critical. These groups represent important social safety nets and points for local resource mobilisation toward adaptation efforts. For researchers, policy makers, and practitioners this will mean incorporating measures of social difference beyond disaggregation only between men and women into seeking more nuanced and contextualised understandings of vulnerabilities and adaptation strategies of different groups. In this vein, policy makers and practitioners need to aim for working with both women and men to challenge the ability of particular social norms and patriarchal traditions to serve the best interests of vulnerable communities in the context of a changing climate. This is especially true of those norms and traditions that prevent women from owning land.

Identifying and empowering community champions for vulnerable communities can be a valuable asset for adaptation and poverty reduction efforts. Providing these champions with needed technical and leadership skills can help drive enthusiasm for practical action on the ground. Investments should be made by government and the private sector in delivering accurate and reliable weather, climate, and adaptation information to vulnerable communities in timely, culturally appropriate, and effective ways. Researchers and practitioners have a role to play in making this happen, as evidenced with our work with the Climate Advisory Resource Centres and the Adaptation Hub mobile app.

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