

**BRAVE:** Building understanding of climate variability into planning of groundwater supplies from low storage aquifers in Africa.

## Work Package Progress Report:

### WP1: Understanding Past, Current and Future Vulnerability

**WP Leads:** Co-I Osbahr, CARE Ghana/Christian Aid Sahel

**WP 1.1** - Large-scale mapping of groundwater supply vulnerability to climate variability (preparatory collation of national scale GW information e.g. supply, vulnerability to climate variability, situation for Volta River Basin, to help situate context for site selection)

**WP 1.2** - Baseline Assessments of Communities' Susceptibilities and Coping Capacities to the Impacts of Climate Variability (particularly water for agriculture)

**WP 1.3** - Generation of Vulnerability Indices and Livelihood Impact metrics

- Selection of 8 baseline sites based on review of locations with groundwater potential within the Volta River Basin, comparative rainfall (drier to wetter), accessible via NGO partners (Christian Aid Sahel – Reseau MARP in Burkina and CARE Ghana):
  - **Ghana:** Akara and Tariganga in Garu-Tempene, Upper East Region, Jawani and Saamini in East Mamprusi, Northern Region
  - **Burkina Faso:** Zhilivele and Poa in Dassa, Sanguie, Tomo and Kado in Kyon, Sanguie
- Development of fieldwork protocol in partnership with NGOs. Fieldwork in 2016 across the communities. This included 8 focus groups to map resource, networks and institutions and detailed seasonal planning calendars, and 288 household interviews. Technical analysis included descriptive statistics and correlation, and qualitative coding through SPSS. The approach developed data on: locally perceived livelihood vulnerability to the impacts of climate change and variability, and interactions with exacerbating socioeconomic factors, with a particular focus on risks to water for agriculture; local priorities and existing livelihood coping strategies of rural households to manage water for agriculture; perceived effectiveness of groundwater supply and use in the communities, particularly for agricultural irrigation; and the existing local governance arrangements for groundwater distribution and access.
- Development of a paper on local governance for agricultural livelihoods – managing climate change impacts in West Africa (to be presented at Climate Change conference in Cambridge April 2017, Resilience Conference Stockholm 2017)
- Exploring feasibility of using vulnerability indices to track changes to livelihoods and food security (TAMD) - track 1: using an integrated groundwater tool to change behaviour through awareness, value and use; track 2: resilience building (to show enhanced adaptive capacity for vulnerable groups)

Work Package 1 Review  
Year 1 - Key Actions from the past year



**Finalization of indicators for tracking 2017 and 2018 change to be coordinated with NGO partners and communicated through a practice paper and tools for WP5. Value of integration with other approached taken by BRACED, PICSA or Carr 2014).**

- The findings show the value of a 'Livelihoods as Intimate Government approach' to help understand complex questions of vulnerability and resilience, to enhance understanding of decision making and the link between theory, application and practice.
- There is limited access to groundwater planning tools for communities. The data has provides insight into existing information available and the format of delivery which will be helpful to the development of communication approaches within WP4 and WP5

**Selected Results:**

**What is the perceived livelihood vulnerability to the impacts of climate change and variability, with a particular focus on risks to water for agriculture?**

- Increasingly erratic rainfall is perceived as main driver of agricultural water insecurity and associated with groundwater availability in the communities.
- Perceptions of shorter rainy seasons with seasonal drying of wells influencing local perceptions about the contribution of groundwater to irrigate crops (e.g. the intensification of gardening activities in good rainfall year - 37% households in Burkina increasing their frequency of watering in good rainfall year against 16% in Ghana).
- Initiatives to explore dry season farming very limited in some locations due to perceived drought risks. Communities may have similar exposure but not same experiences of vulnerability but as these are shaped by different roles and responsibilities, history, identity and the discourses of livelihood, there are different preferences in the types of information valued.
- For example, women perceived June as the most risky rain time, men perceived July. Those with dry season gardens perceived a problem from January and women perceived this most, due to the extra burden to source water.

**Who has access to what and when? *What variables shape effective water use for agriculture?***

- Groundwater sources: unprotected wells in Burkina Faso (90% of households); boreholes in Ghana (52%)
- For irrigation: private deep wells in Burkina used for livestock and agricultural commercialisation (e.g. tomatoes, onions) (94%) vs private shallow wells in Ghana for crops for local consumption (58%). Seasonality plays a key role in timing of use.
- In Burkina, more households own livestock and groundwater key to year round water access (94% own livestock in Tomo and 97% for the other communities.
- In Ghana, the use of water for irrigation correlated to household demography and wealth (e.g. in Jawani and Samini fewer own their house compared to Tariganga and Akara; larger households with more children in Jawani and Samini). This could be expected since maintaining shallow wells and irrigation requires labour inputs and is privately managed.



Garden Well in Tomo/ Burkina

