**Methods**

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**Project title**: Building REsearch Capacity for sustainable water and food security In drylands of sub-saharan Africa’ (BRECcIA)

**Dataset**:A qualitative study of lived experience and life courses following dam release flooding in Northern Ghanaian communities.

**Objectives**

This study aims to

* Understand the scope of dam release flooding impacts reported by affected downstream communities.
* Assess impacts of dam release flooding on the lived experience and life course of affected communities.
* Identify adaptive behaviours to flooding impact and gender related issues among affected dam release flooding downstream communities.
* Understand response to flood sensitisation and flood effects.

Study site.

Fieldwork took place in the Talensi District with a total population of 87,021 in 2021 of which 88.2 per cent were rural in Upper East Region and Savelugu Municipality a population of 122,888 in 2021, of which 37.1% were rural in Northern Region of Ghana (Ghana Statistical Service, 2021). Both areas experience a unimodal rainfall regime annually mostly from late April – mid-October with annual precipitation of 1000-1200mm on average while the dry season commences late October –March annually. The white volta serves as the water source for most of the communities in these districts. These communities also suffer most during dam release related flooding. Communities along the White Volta in the Northern part of Ghana experience perennial flooding as a result of the spillage of excess water from the Bagre Dam in neighbouring Burkina Faso. The Bagre dam is operated by a Burkinabe power company, Société Nationale Burkinabe d’Electricité (SONABEL) and has two turbines with a total installed capacity of 16MW. It meets 10% of the country's energy supplies. The dam flows into the White Volta and enters Ghana from the village of Sapielga in the Upper East Region, about 60 kilometres from the dam (Manu, 2019).

**Study design**:

This study is the qualitative part of the whole project which employed a sequential exploratory approach through a mixed-methods study design (Creswell & Clark, 2017). The study employed a phenomenological approach to understanding from the perspectives of dam release flood victims, the occurrence, severity, adaptation and its implications on life course as well as livelihoods (Mapp, 2008).

**Sample size and participant selection.**

Four communities were selected from Savelugu Municipal and Talensi districts using preliminary analysis of satellite imagery, corroborated by Red Cross reports documenting the agency’s emergency response to flooding in the Upper East region (International Federation of Red Cross and Red Crescent Societies, 2019) . For these districts, satellite imagery from the Sentinel-1, Sentinel-2, and Landsat-8 sensors was acquired for known periods of Bagre Dam spillage (usually August-September) from 2015 to 2019. This imagery was classified to map the historical distribution of flooding following dam release using a differencing image technique (Singha, et al, 2020). Study sites were identified using a composite inundation map layer created from the map layers of flooded areas for different years. This composite flood map was overlaid onto digital map layers of populated places based on the WorldPop population dataset (Sorichetta, et al, 2015) and water and sanitation points (e.g., boreholes and pit latrines) (Yu, et al, 2019) to identify eight communities affected by flooding. These communities were confirmed by the National Disaster Management Organisation’s (NADMO) district office to be the communities most affected by dam release flooding.

Prior interactions (stakeholder meetings, site visits to flooded communities, and community mapping) took place with the communities, enhancing familiarisation with the flooding situation. A maximum variation sampling technique was employed in selecting respondents for the Focus Group Discussions (FGDs). Inhabitants of the eight flood-affected communities were recruited in person by referral from the local NADMO officer and the assembly members (a local elected representative), who were the point of contact. All respondents were 18 years and above old, had lived in the area for at least ten years, and had first-hand knowledge of floods in these localities. Participants were either district assembly members or chiefs, community opinion/influential leaders, or household heads. Only invited participants were present, and no one refused to take part. For the (KIIs), a purposive homogenous sampling strategy was used in selecting participants because of their community representatives (community representatives and chiefs or Traditional authority figures) and professionals with relevant roles in flood-related institutions (the health sector, local government or other organisations with a disaster relief remit) were purposefully selected to provide a range of perspectives (see Table 1). None of these selected participants declined participation.

**Table 1.Focus Group Discussion (FGD) and Key Informant Interview (KII) participants in Savelugu and Talensi Districts, Ghana**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **District** | **Activity** | **Male** | **Female** | **Total** |
| Savelugu | FGD | 9 | 8 | 17 |
| KII | 3 | 2 | 5 |
| Talensi | FGD | 8 | 8 | 16 |
| KII | 5 | 0 | 5 |
| **Total** |  | **25** | **18** | **43** |

**Data collection**

Data collection took place for two weeks, 14th – 27th September 2020, during the flooding period culminating in the Bagre dam release. All interviews and discussions were audio-recorded following a written informed consent of all participants. Both FDGs and KIIs were assisted by MA and FTG (Ghanaian male & female researchers, respectively, located outside the White Volta catchment). MA has a master's degree in environmental geography, training in qualitative research methodologies, and six years of qualitative interviewing experience. FTG is a PhD researcher with a psychology and social science implementation background. She is a qualitative researcher with over seven years of experience.

Attendees for the FGD were flood-prone residents the facilitator had never met before. A participant information document containing the study goal and objectives was read to FGD and KII participants in a language they understood. One of the researchers took field notes during all conversations, while the other led the interaction. The FGD and KII tool were not piloted, and interviews were not repeated.

**FGDs**: Participants were invited to discussion sessions at a convenient location (Municipal Assembly conference hall), separating male from female participants to allow more open contributions on community and individual viewpoints and gender-sensitive issues (Smyth and Hai, 2012). A table of pseudonyms was created for each participant to record their comments. The mode of communication was in the local dialect (Dagbani and Frafra) and was translated by a professional translator whose gender matched that of the group concerned. Discussion groups comprised nine and eight participants (see Table 1), enabling each participant to contribute (Rodiguez et al, 2011). Topics discussed focused on the impacts of flooding on a community’s livelihood, life course, social, health, and economics, as well as short and long-term impacts (*see guide*). A discussion session (face-to-face) lasted for about an hour and a half. On the fourth FGD, the topic had achieved saturation. In addition to seeking informed consent, permission was sought from participants for the discussions to be audio-recorded. Field notes were also taken to document any gestures and observations that may not have been captured in the audio recording.

**KIIs:** Participants were interviewed in their offices and homes in English. A face-to-face 45-minute interview with semi-structured and open-ended questions focused on flooding’s impact on flood-related institution sectors and observations over time and challenges in delivering service to affected populations.

**Qualitative Data Management, processing, quality control, and anonymization**

**Data management*:***The data from the BRECcIA project is jointly owned by the University of Ghana, School of Public Health (UG-SPH), and the project’s grant holders (University of Southampton). Trained research assistants transcribed all audio recordings, adhering to ethical standards by maintaining confidentiality. The data was organized, cleaned, and stored on OneDrive, an online data management platform, with access restricted to key project staff. Analysis of the main study outcomes was conducted by the Project Qualitative Analysts, Principal Investigator (PI), and Co-PIs. Once anonymized, the dataset was archived and made available for future analysis to protect participants’ identities.

**Quality control:**

* **Training**: Field research assistants were thoroughly trained in the study protocol, including collecting qualitative data using a role play and interpreting questions. Professional translators were also trained to understand the study tools and protocol and adhering to ethical guidelines.
* **Supervision:** The PI from UG-SPH supervised data collection in the field, ensuring it was conducted ethically and efficiently.

**Trustworthiness:** To ensure credibility, applicability, consistency, and neutrality, research assistants spent prolonged time with respondents to gather accurate responses. Follow-up contact was made to verify initial answers, and transcripts were proofread to ensure verbatim accuracy. Data triangulation, combining interview transcriptions with field notes, was also used to enhance the completeness and reliability of the data.

**Anonymisation:**The archived qualitative dataset (transcripts) has been anonymized by replacing the names of respondents and locations with pseudonyms. Additionally, the transcripts were carefully reviewed to identify any potentially revealing information, which was subsequently redacted to ensure confidentiality.

**Ethical considerations**

* ***Ethical approval***

This study was approved by the Ethics Committee of the Faculty of Environmental and Life Sciences, University of Southampton, U.K. (Ref No: 54506, Approval date: 9th February 2020) and the Noguchi Memorial Institute for Medical Research, University of Ghana, (NMIMR-IRB CPN 062/19-20, Approval date: 4th March 2020)

* ***Informed consent***

All study participants provided written informed consent before participating. They were informed about the study's aims, objectives, data collection process, plans for data sharing, potential risks and benefits, and their rights as participants. The consent documents were written in simple English, but Professional translator also explained them in local languages (Dagbani and Frafra) for better understanding, addressing any questions participants had. Those who agreed to participate signed or provided a thumbprint on the consent form before taking part in the study.

* ***Confidentiality and Anonymity***

All participants were assured that their information would be treated confidentially, with findings reported anonymously. The dataset was encrypted and securely stored in the BRECcIA OneDrive storage system, protecting it from unauthorized access, accidental loss, or destruction. Data analysis and presentation were conducted using pseudonyms to ensure participants' anonymity and confidentiality were fully preserved.

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