Volta Flood and Drought Management

ADAPTATION FUND

Project: "Integrating flood and drought management and early warning for climate change adaptation in the Volta Basin"

(VFDM Project)

LOCAL WORKSHOP ON TOOLS, STRATEGIES AND OTHER ARRANGEMENTS FOR THE INTEGRATED MANAGEMENT OF FLOOD AND DROUGHT RISK TO STRENGTHENING RESILIENCE IN THE VOLTA BASIN

22 and 23 April 2024, Johnass Hotel, Zebilla in the Bawku West District, Bagre Dam Downstream Area, Ghana

Deliverable 3C: Workshop Report

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WORLD METEOROLOGICAL ORGANIZATION

AUTORITE DU BASSIN DE LA VOLTA — VBA — VOLTA BASIN AUTHORITY

Global Water Partnership West Africa

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Volta Flood and Drought Management

Contents

List of Figures

List of Tables

Acronyms and abbreviations

AAP	Annual Action Plan
ADDRO	Anglican Diocesan Development and Relief Organization
AF	Adaptation Fund
AU	African Union
BEWDA	Belim Wusa Development Agency
CCA	Climate Change Adaptation
CODI	Community Organization Development Institute
CRI	Crop Research Institute
CRS	Catholic Relief Service
CSIR	Council for Scientific and Industrial Research
CSOs	Civil Society Organizations
DA	District Assembly
DCE	District Chief Executive
DDMC	District Disaster Management Committee
DDOA	District Department of Agriculture
DMTDP	District Medium Term Development Plan
DRM	Disaster Risk Management
DRR	Disaster Risk Reduction
DVG	District Volunteer Groups
EOC	Emergency Operation Center
EPA	Environmental Protection Agency
EPP	Emergency Preparedness Plan
EWS	Early Warning System
FAO	Food and Agricultural Organization
FBOs	Farmer Based Organizations
FONAR	Forum for Natural Regeneration
FORIG	Forest Research Institute of Ghana
GES	Ghana Education Service
GHS	Ghana Health Service

GIZ	German Development Corporation
GMet	Ghana Meteorological Agency
GNFS	Ghana National Fire Service
GWP-WA	Global Water Partnership in West Africa
HYDRO	Ghana Hydrological Authority
IMFDR	Integrated Management of Flood and Drought Risks
ISD	Information Service Department
IUCN	International Union for Conservation of Nature
KNUST	Kwame Nkrumah University of Science and Technology
LUSPA	Land Use and Spatial Planning Authority
MDAs	Ministries Departments and Agencies
MMDAs	Metropolitan Municipal and District Assemblies
MOFA	Ministry of Food and Agriculture
NADMO	National Disaster Management Organization
NCCE	National Commission on Civic Education
PWDs	People With Disabilities
SARI	Savannah Agriculture Research Institute
UDS	University for Development Studies
UNHCR	United Nations High Commissioner for Refugees
UNICEF	United Nations Children's Fund
USAID	United States Agency for international Development
VBA	Volta Basin Authority
VFDM	Volta Flood and Drought Management
VRA	Volta River Authority
VSLA	Village Savings and Loans Association
WMO	World Meteorological Organization
WRC	Water Resources Commission
WRI	Water Research Institute
WVBO	White Volta Basin Office

1. Introduction

A consortium of the World Meteorological Organization (WMO), Volta Basin Authority (VBA) and the Global Water Partnership in West Africa (GWP-WA), together with relevant national structures of the VBA Member States are implementing the Volta Flood and Drought Management (VFDM) project entitled “Integrating flood and drought management and early warning for climate change adaptation in the Volta Basin" from June 2019 to June 2024. The VFDM project, financed by the Adaptation Fund (AF), prioritizes the strengthening of the capacities of hydrometeorological service providers and disaster management organizations of the member states. In line with a series of activities to close the project implementation process, a National Consultant and investigators were recruited to conduct the “Mission to strengthen the political, institutional and organizational capacities for integrated management of flood and drought risks in the Volta basin” in Ghana.

This mission aims to (i) document experiences of local communities about the long-term flood and drought management strategies in the national portion of the VB; (ii) collect feedback from stakeholders for improvements on documented experiences of communities related to EWS including the VoltAlarm EWS, strategies for integrated management of flood and drought risks (IMFDR), disaster risk reduction (DRR) and climate change adaptation (CCA) arrangements, and; (iii) document best practices and opportunities for improving integrated flood and drought risk management and CCA measures in the VB.

To this end, the consulting team carried out field engagements in selected communities of the Bawku West District downstream of the Bagre Dam. The engagement was informed by literature and documentary reviews on floods and droughts, considering national policies, strategies, and plans and the Volta Basin. This workshop introduces stakeholders to the mission deliverables, using tools and strategies on DRR and CCA arrangements for in-depth assessment.

2. Social management of the workshop

The workshop was marked by the opening ceremony that included welcome statements by the Ghana Country Water Partnership and the Water Resources Commission. The keynote address was delivered by the District Chief Executive for Bawku West District.

2.1. Opening ceremony

The opening ceremony of the workshop was chaired by Dr. Joachim A. ABUNGBA, Principal Basin Officer at the Black Volta Basin Secretariat, Wa who represented Dr. Bob ALFA, the Ag. Executive

Secretary of the Water Resources Commission (WRC). In his welcome speech, Dr. Joachim ABUNGBA appreciated participants for the turnout to the workshop. He underscored the importance of the VFDM project, recognizing the devastating impact of floods and drought on the living conditions of communities. He called on participants to bring to bear their experiences of floods and drought on the outcomes of the project and by extension the workshop.

Mr. Maxwell BOATENG-GYIMAH made a statement on behalf of CWP-Ghana/GWP-WA and project partners in general. He expressed his gratitude to participants for the taking part in the field survey. He noted that it was an essential part of the stakeholder engagement process and provided an opportunity to deepen our collective understanding of the issues related to floods and drought as they pertain to communities of Bawku West District.

Dr. Joachim A. ABUNGBA

Hon. Daniel A. ANANIA

Mr. Maxwell BOATENG-GYIMAH

Figure 1 Photo of speakers at the opening session of the local workshop at Zebilla, Bagre Dam Downstream Area

The Bawku West District Chief Executive, Hon. Daniel A. ANANIA delivered the keynote address. He was delighted to be present at the workshop, noting with keen interest from the day he received the invitation notice to open the session. He observed the impacts of floods and drought that plague the populations of Bawku West district, particularly those in the Sapelliga community enclave. Although information flow regarding spillage of the Bagre Dam has improved, he recounted attending to the effects of the excess water on the livelihoods of the populations, particularly those in the Sapelliga community and its environs. He noted the importance of incorporating the lessons learned from past disasters, using approaches for adaptation while embracing steps to mitigate the impacts through collaboration and coordination to ensure the safety of communities. He then declared the two-day workshop on «Tools, Strategies and Other Arrangements for the Integrated Management of Floods and

Drought Risk to Strengthen Resilience in the Volta Basin» duly opened and charged participants to actively contribute towards a successful workshop.

2.2. Presidium of the workshop

The workshop was chaired by Dr. Joachim ABUNGBA and the rapporteurs were Messrs. Iddrisu ATUBIGA and Abdul-Fatawu ALHASSAN.

2.3. Workshop participants

There were twenty-six (26) participants at the workshop, drawn from the district allied agencies and communities including the following:

- District Assemblies (Chief Executive, Coordinating Director, and Development Planning Officer);
- Districts Departments of Agriculture (crop and livestock);
- National Disaster Management Organization (NADMO) in the District;
- Forest Services Division in the Bawku Forest District at Bawku Municipality;
- Field Investigators who supported the administration of the survey instruments in selected communities;
- Communities, represented by Assemblymen, women, and the youth.

The organizers were WRC, Ghana Country Water Partnership (CWP-Ghana), and the National Consulting Team members and facilitators.

See the attendance list in Appendix 1.

Figure 2 : Group photo of participants at the Local Workshop in Zebilla, Bagre Dam Downstream Area

2.4. Adoption of the workshop agenda

The chairman for the workshop took participants through the proposed agenda, which was adopted by all present. The adopted agenda was structured into sessions as presented below:

- Session 0: Welcome and introductory remarks including keynote address;
- Session 1: Overview of the risk profile, EWS – VoltAlarm, the regional strategy for the IMFDR as well as arrangements of DRR and CCA of the Volta basin;
- Session 2: Comment and make suggestions to emerging issues from community engagements within the context of flood and drought risk profile, the EWS – VoltAlarm, the regional strategy for IMFDR as well as other DRR and CCA arrangements of the Volta Basin;
- Session 3: Actions to strengthen implementation of the regional strategy for IMFDR, deployment of EWS - VoltAlarm and other long-term DRR and CCA arrangements at the community level;
- Session 4: Best practices and opportunities for improving the IMFDR as well as CCA measures in the national part of the Volta basin in Ghana;
- Session 5: Ways to disseminate best practices identified and responsibilities of stakeholders across scales documented.

Mr. Maxwell BOATENG-GYIMAH spoke on the logistical arrangements for the workshop.

2.5. Communication languages

Communication at the workshop was in English with intermittent translation into the local dialect Kusaal language.

3. Progress of work and summary of discussions

The progress of activities for the successful conduct of the workshop is presented in this section.

3.1. Reminder of objectives and results

Participants were reminded of the workshop objectives through a presentation by Mr. Maxwell BOATENG-GYIMAH. He stated that there were three project sites in Ghana with two (2) located in the Upper East Region of the White Volta Basin and the other, in the downstream area of Akosombo and Kpong dams in the Lower Volta Basin.

The expectation from the meeting is that participants' knowledge of drought and flood is built, comments and suggestions for improvement are received based on community experience and the process of disseminating flood and drought information to all stakeholders is identified and improved.

3.2. Methodological approach

The methodological approach involved preparation, implementation, and reporting.

The preparatory stage concerned the mobilization of participants and logistical arrangements for the workshop. The implementation stage included the development of materials for sessional presentation, discussion, and group works for plenary feedback. The local workshop was facilitated by the National Consulting team in collaboration with the Country Water Partnership-Ghana and the Water Resources Commission (Coordinator of the National Focal Structure (NFS) of VBA in Ghana). The facilitation techniques used at the workshop included brainstorming, experience sharing, presentations of group works, and discussion at plenary and allowed for active participation.

3.3. Implementation of workshop sessions

Session 1: Overview of the risk profile, the VoltAlarm EWS, the regional strategy for the reduction and the IMFDR as well as other DRR and CCA arrangements of the Volta Basin

This session was marked by a series of presentations including:

- the flood risk profile of the Volta Basin;
- Early warning systems particularly the VoltAlarm and their benefits for both floods and drought impact mitigation.

- the Regional Strategy for Integrated Management of Floods and Drought in the Volta Basin; and
- other DRR and CCA arrangements in the Volta Basin

- ***Flood Risk Profile of the Volta Basin***

In his presentation, Dr. Joachim ABUNGBA explained the risk profile of multi-hazards in the Volta Basin, particularly floods and drought. He noted the impacts on the affected persons including lives and property and highlighted the other infrastructure such as roads, and water schemes. It also noted further that about 50% of destruction caused in the Volta Basin was attributable to the Ghanaian portion, an indication of the vulnerability of populations to floods and drought hazards. Some flood risk maps for the Volta Basin were presented, showing areas that are likely to be impacted.

With the projected increase in temperature and corresponding rainfall by 2050 and 2080, the occurrence of floods and drought is likely to increase for which preventive measures such as early warning are key to mitigate the impacts.

Participants easily associated with the degree of impact as they experienced it quite often in their jurisdiction.

- ***The Early Warning System – VoltAlarm***

Dr. Joachim ABUNGBA gave a presentation on the VOLTALARM, a system developed as part of the VFDM project for impact-based forecasting for the Volta Basin. According to him, the system assesses the risk of the hazard and potential impacts, looking at the degree of exposure, vulnerability and capacity to cope with the hazard. He presented the relevance of an early warning system (EWS) including;

- preparedness actions;
- deployment of emergency response in good time;
- improvement in control operations; and the
- minimization of losses and property damage.

As a result, bulletins of flood and drought are produced, using colour codes to indicate the level of severity of the impact. This information informs the decision-making of individuals and the community.

A comment/question:

- Was the VoltAlarm in operation?

  Answer: No. As of the workshop date, VoltAlarm was not known to participants except the GMet, NADMO, and WRC staff who are piloting the VoltAlarm for demonstration and possible uptake by all.

- ***Regional Strategy on Integrated Management of Flood and Drought Risks***

Mr. BOATENG-GYIMAH presented the key areas of the Regional Strategy on Integrated Management of Flood and Drought Risks (IMFDR) in the Volta Basin. He observed the vision statement of the strategy, the objective, and the four (4) strategic focus areas. With each strategic focus area are tasks and associated key action points defined for implementation. The document is to help understand floods and drought at the basin scale, strengthen governance and institutions for integrated management of drought and flood risks in the basin, and develop flood and drought risk reduction measures and integration at the basin scale in a transboundary manner.

Some comments/questions are as follows:

- How can we get the regional strategy to help national planning?

  Answer: The regional strategy will be validated by the countries of the Volta Basin in due course and allow for full exploitation.
- Which local knowledge can be integrated into the regional strategy document?

  Answer: The strategy outlines broad frames of focus and allows for the incorporation of indigenous knowledge during the implementation of interventions at the local scale.

- ***DRR, CCA and Other Arrangements of Floods and Drought in the Volta Basin***

Mr. BOATENG-GYIMAH gave an overview of the documentary and literature review of policy, strategy, and plans related to floods and drought in the Volta Basin. He noted that Ghana was party to various international frameworks including the SDGs, Sendai Framework, Paris Climate Agreement, and the AU Agenda 2063. In Ghana, several documents on flood and drought related-disasters were reviewed while taking note of the gaps identified as follows:

- inadequate funding;
- ineffective collaboration and coordination,
- outdated policy frameworks; and the
- increasing challenges in flood and drought management.

He added that stakeholder capacity and funding, incentives and subsidies, regulatory framework, and research and development support were key components in the implementation of existing frameworks in Ghana and the Volta Basin.

Session 2: Comment and suggestions on emerging issues from community engagements considering the experiences of communities to the flood and drought risk profile, EWS-VoltAlarm, the regional strategy for IMFDR as well as DRR and CCA arrangements in the Volta basin

Mr. BOATENG-GYIMAH presented the findings of the field engagement at the community level showing the demographics of the two hundred and seventeen (217) respondents drawn from seven communities located downstream of the Bagre Dam in the Bawku West District of Ghana. They were males (56%) and females (44%).

The findings bothered on the following thematic areas:

- livelihoods and related strategies –
  - agriculture sector (93%), civil or public service (2%), the private sector (2%), and the unemployed (3%);
  - other income-generating activities of respondents – Yes (27%) and No (73%);
  - mode of transport to and from communities of which motorbike (57%); canoe (4%); vehicles (1%); walking (3%); tricycle - motor-king (35%);
  - house-made material – mud (93%); cement (7%);
- personal experiences with floods and drought;
  - floods - Yes (96%) and No (4%)
    - with attending impacts on housing, farms and occupational lands, and road infrastructure;
  - drought – Yes (84%) and No (16%)
    - with attending impacts of crop failure, and high cost of food by the end of the cropping period
- knowledge of CCA and communication of early warning

The presentation afforded participants knowledge of the collective responses about their respective jurisdictions while taking note of the associated gaps.

Although the workshop involved only the Bawku West district, two (2) groups were formed to enhance discussions and consensus building.

A set of questions was responded to during the group work and summarized in Table 1. The individual results of the groups' work are presented in Appendix 3.

Table 1 Knowledge of existing Early Warning Systems on Floods and Drought, and associated plans and services in the Bagre Dam downstream area

Zebilla - Bawku West District, Bagre Dam Downstream Area
Are you aware of any regional, national, and local planning for integrated flood and drought risk management strategies including EWS VoltAlarm and other guidance documents on DRR and CCA? If yes, list them.
Yes • Disaster risk reduction action plan • White Volta Basin IWRM Plan
What are some of the mechanisms with EWS in your districts (alert management, alert channels, response)?
• Radio announcements (the media) • Community engagements • Mobile communication • Radio stations • Mobile SMS • Friends • Family members • NADMO
How functional and effective are the EWS/alerts?
• EW Messages on rain onset and end dates are effective. • It is effective but limited to information sharing due to lack of resources
What are some of the weaknesses/difficulties with EWS/alerts in your district?
• Some EWS are not suitable. Dates given for information dissemination is not always followed. Information will either be given late or early. • Weakness – Some EWS do not give adequate solution/information for adaptative measures. • Difficulties – Medium of communication of some EWS are not suitable for the target groups • Inadequate information dissemination due to lack of funds
What are the other types of interventions for flood and drought management in your district in the reduction and management of flood and drought risks?

• <u>Pre-disaster measures</u>
  ○ Choosing appropriate farming methods
  ○ Early information delivery
  ○ Provision of shelter
  ○ Evacuation plans
• <u>Post-disaster measures</u>
  ○ Moving to safer havens
  ○ Validation of destroyed buildings
  ○ Validation of farm lands destroyed
  ○ Plans for livelihood
  ○ Provision of life jackets

Which local authorities coordinate these other flood and drought management interventions and what are their responsibilities? (E.g. The State, Community practices, NGOs, Associations, Foundations)?
• NADMO/District Assembly • NGOs • Local Authorities – Opinion leaders, Youth groups, • Religious bodies (Churches, Mosques, etc. • Women groups.
What are some of the weaknesses/difficulties with the other flood and drought management interventions in your district?
• Weakness – They will only minimize the effects of the floods • Difficulties – Inadequate resources (financial) • Difficulties in mobilizing relief resources • Ineffective coordination of relief support
What are some of the strengths and opportunities with the other flood and drought management interventions in your district?

• Strength
  ○ Not capital intensive such that the management intervention only involves a change of human behaviour and in some cases change in the dates and times of an activity. (in the case of early planting)
• Opportunities
  ○ Department of Agriculture is available to give extension services.
  ○ NADMO is also available to give technical advice.
  ○ It improves clear and easy movements on the river. This is due to the aquatic weeds being cleared on the river.
  ○ There are new species of fish in the area.

Session 3: Actions to strengthen implementation of the regional strategy for IMFDR, deployment of EWS - VoltAlarm and other long-term DRR and CCA arrangements at the community level in the national part of the Volta basin in Ghana

Following the first group work on the gaps identified in their responses on EWS/alert, participants went into another group work to propose actions to strengthen the implementation of the regional strategy on IMFDR.

A set of guiding questions concerning actions/strategies for IMFDR and responses are provided in **Erreur ! Source du renvoi introuvable.**.

Table 2 Suggested actions to strengthen implementation of the regional strategy for IMFDR, deployment of EWS - VoltAlarm and other long-term DRR and CCA arrangements at the community level in the national part of the Volta basin in Ghana

Zebilla – Bawku West District, Downstream of Bagre Dam
What are some suggestions for better EWS Implementation?
• Continuous community engagement on EWS • Organize community durbars • Early dissemination of information well ahead of schedule • Undertake radio advertisement/ jingle
What are some suggestions for improving the implementation of other flood and drought management interventions?
• Continuous sensitization and engagements
How can EWS be sustained in your district?
• Collaboration with development partners • Resourcing of NADMO/District Assemblies • To be included in school curricula • There should be workshops/ trainings
How can the other flood and drought management interventions be sustained in your district?
• Continuous Sensitization • Resourcing of District Department of Agriculture • It should be guided by a policy framework and heads charged with the mandate to lead • It should be documented and as well included in school programs • There should periodic workshops/ training programs.

Session 4: Best practices and opportunities for improving the IMFDR as well as CCA measures in the national part of the Volta basin in Ghana

Amid the challenges associated with the implementation of DRR and CCA-related interventions, there are equally lessons learned that culminated in best practices while exploring opportunities for improving on the gains made. Through a plenary session, Mr. BOATENG-GYIMAH led participants to identify best practices and opportunities in the context of the four (4) priority areas of the Sendai framework notably; (i) disaster prevention and mitigation; (ii) disaster preparedness; (iii) disaster response; and (iv) disaster rehabilitation and recovery.

Table 3 Best practices and opportunities for improving Integrated Management of Floods and Drought in the Volta Basin

Priority Area	Best practices/ experiences
	Undertaking afforestation (along the water-sheds, communities)

Disaster Prevention and Mitigation	Dredging water bodies
	Stop burning of farm crop residues, bush burning
	Ploughing across the contour (prevent erosion)
	Providing timely and reliable information, education and sensitization
	Enforcing buffer restrictions from river banks and flood-prone areas (building or farming away from these areas
	Encouraging the use of early maturing crop varieties and early harvesting
	Creation of ponds and reservoirs
	Prevent deforestation
	Adequate drainage system
	Adhering physical (housing) plans guidelines
Disaster Preparedness	Planting trees along the river banks
	Encouraging the use of early maturing crop varieties and early harvesting
	Providing timely and reliable information, education and sensitization
	Adhering to EWS
	Adhering physical (housing) plans guidelines
	Adequate drainage system
	NADMO and District Assembly should form emergency planning committees to develop flood and drought management strategies
	Ensuring community participation in district disaster risk planning
Disaster Response	Relocating affected (vulnerable) persons to safe havens
	Forming rescue teams at the community level
	Ensuring that logistical and relief support reach affected persons (support are sometimes extended to land-owners rather than the land users)
	Rechanneling flood to less flooded areas or water bodies
	Provide counseling services to affected persons
	Ensure appropriate distribution of relief and logistics
	Availability of health personnel, medical and health services
Disaster Rehabilitation and Recovery	Conducting needs assessment
	Provision of safe drinking water
	Provision of accommodation and temporary shelter for affected persons
	Fumigation of water bodies and affected areas
	Provision of healthcare and health facilities
	Provide counseling services to affected persons

	Provision of food and relief items
	Re-afforestation
	Rehabilitate educational facilities
	Provision of alternative livelihood skills and training
	Land reclamation (by application CSA technologies, example composting)
	Reconstruction/rehabilitation of roads
	Linking farmers to support with farm input credit (NGO, or suppliers)
	Demonstrating or encouraging the use of early maturing crop varieties and early harvesting
	Resourcing the District Department of Agriculture with early maturing seeds for distribution to victims of floods and drought
	Resourcing the relevant institution with needed logistics

Session 5: Ways to disseminate best practices identified and responsibilities of stakeholders across scales

Mr. BOATENG-GYIMAH, in a plenary session, led participants to identify actions to improve the dissemination of best practices of early warning in the communities, as well as assigning roles to the associated agencies.

Table 4 Ways of improving dissemination of best practices and stakeholder responsibilities in the Volta Basin in Ghana

Ways of disseminating best practices	
• Organize community durbars to disseminate early warning information • Mounting and making use of community information centres • Opinion leaders (religious and traditional leaders) should be involved in the dissemination process as they are more trusted • Identifying and involving community groups and their leaders in information dissemination (youth groups, queen mothers, women groups (VSLA), etc. • Disseminating early warning information through the heads of basic, primary and secondary schools • Disseminating early warning information through social centres and gatherings (bars, pubs, funerals etc. • Disseminating early warning information through markets • Disseminating early warning information through radio stations and social media	
Institution	**Perceived Role in Flood and Drought Management**
Public/Government Sector	
NADMO	Coordinates disaster response and management; provides relief and rehabilitation services.
Department of Agriculture	Implements agricultural policies and practices to mitigate impacts on farming; promotes drought-resistant crops.
Ghana Health Service	Ensures public health during and after disasters; provides medical assistance and disease control.
Water Resource Commission	Manages and regulates water resources; ensures sustainable water supply.
District Assembly	Local governance and infrastructure development; facilitates community-based disaster risk reduction.

Security agencies (police, army, fire)	Provide security and emergency response services; assist in evacuations and rescue operations.
Forestry Commission	Manages forest resources; implements reforestation programs to prevent soil erosion and flooding.
Ghana Meteorological Agency	Provides weather forecasts and climate information; issues early warnings for floods and droughts.
Ghana Hydrological Authority	Oversees the development and maintenance of hydrological infrastructure; monitors and manages flood risks.
Research/Academia	
Savannah Agriculture Research Institute	Conducts agricultural research to develop drought-resistant crop varieties and farming techniques.
Crop Research Institute (CRI)	Engages in crop research and development; provides solutions to improve food security during droughts.
Forest Research Institute of Ghana (FORIG)	Researches forest and agroforestry systems; develops strategies to use forests in mitigating flood and drought impacts.
Forestry Commission Training School	Provides training on sustainable forestry practices and environmental conservation.
Development Partners	
Water Aid Ghana	Supports water, sanitation, and hygiene (WASH) projects to ensure clean water access during crises.
World Vision	Implements community development programs focused on disaster resilience and recovery.
Global Communities	Provides support for sustainable community development and resilience building.
Tree Aid	Works on reforestation and tree planting projects to combat soil erosion and improve water retention.
UNICEF	Focuses on child protection and welfare; provides emergency relief and support for affected children.
Centre for International Forestry Research	Conducts research on sustainable forestry and land management practices to mitigate flood and drought impacts.
ADDRO Ghana	Provides community-based health and agricultural services to enhance resilience.
Action Aid	Advocates for vulnerable communities; implements disaster risk reduction and resilience-building initiatives.
USAID	Offers financial and technical support for disaster management and resilience programs.
NGOs/Civil Society Organizations (CSOs)	
Rice Ghana	Promotes sustainable agricultural practices and resilience among rice farmers.
Belim Wusa Development Agency (BEWDA)	Engages in community development and disaster preparedness activities.
Innovation for Poverty Action (IPA)	Conducts research and advocacy to improve disaster resilience and reduce poverty.
Haven of Love	Provides humanitarian aid and support for vulnerable populations during crises.
CODI	Implements community development and disaster risk reduction projects.
Link Community Development	Focuses on educational and community resilience projects.

Vulnerable Groups	
Women	Actively participate in community decision-making and resilience-building activities.
Children	Require protection and support during disasters; focus on education continuity.
People With Disabilities (PWDs)	Need specific accommodations and support for effective disaster response and recovery.
Aged	Require targeted support and assistance during disasters due to increased vulnerability.
Fulani groups and refugees	Need tailored support and inclusion in disaster preparedness and response plans.
Private Sector	
Various private sector entities	Donate relief items to the communities during climate related disasters; Invest in infrastructure, technology, and services to support disaster management and resilience efforts.
Traditional Authorities	
Chiefs	Lead local governance and community mobilization for disaster preparedness and response.
Queen mothers	Represent women in community decision-making; advocate for women's roles in resilience-building.
Tindanas (land owners)	Manage land resources and support sustainable land use practices.
Elders	Assist local in governance and community mobilization for disaster preparedness and response.
Other Relevant Groups	
Assembly persons (unit committee members)	Facilitate local governance and community coordination during disasters.
Religious leaders	Assist local in governance and community mobilization for disaster preparedness and response.
Opinion leaders	Influence community behavior and support disaster risk reduction initiatives.
Community Watch dog committee	Monitor and report on community safety and security issues; support disaster response efforts.
Fire volunteers	Assist in firefighting and emergency response activities.
Disaster volunteer groups	Participate in disaster preparedness and response activities; support community resilience.
Farmer Based Organizations (FBOs, vegetable farmers groups)	Promote sustainable agricultural practices and resilience among farmers.
Youth groups	Engage in community mobilization and support disaster risk reduction activities.
Media	
Radio stations (ZEBS FM, Dastech, Max Empire)	Disseminate information, early warnings, and educational programs on disaster preparedness and response.
Information Centres	Provide local information and updates on disaster-related issues and response measures.

4.0 Closing of Workshop

In his closing remarks, Mr. BOATENG-GYIMAH acknowledged with gratitude the contributions from participants during the 2-day workshop. He noted that the information largely complemented the survey results and minimized the gaps observed thereof. This step, he observed, was useful for the next steps of the documentation process, contributing to the overall outcome of the study.

In his concluding statement, Dr. Joachim ABUNGBA, on behalf of WRC, CWP-Ghana/GWP-WA and VFDM Project partners, expressed appreciation to the authorities of Bawku West District Assembly for the warm welcome and support for the programme. He informed participants that the information provided was relevant to the Regional Strategy on Integrated Management of Floods and Drought Risks in the Volta Basin and to guide future interventions on floods and drought in the White Volta Basin. He was hopeful that the Volta Basin Authority, together with the riparian countries would work at mobilizing resources for the implementation of floods and drought-related interventions to enhance community resilience to floods and drought.. He wished participants safe travel to their respective destinations.

Appendices

Volta Flood and Drought Management

Appendix 1: List of workshop participants

No.	Surname & Name	Contact	Designation	Institution / Community
1	AYENDAGO Atibilla Musah	ayendagomusah@gmail.com / 0243329601	Member	Galaka
2	AYEMBILLA Inusah	0244483840	Member	Sapelliga
3	APANGA A. John	0241649063	Member	Kobore
4	ATUBIGA A. Iddrisu	0246484757	Field Investigator / Assistant Planning Officer	Bawku West District
5	AVOKA Robert	0249040743	Member	Googo-Sakpare
6	APAM Theresa	0549960602	Member	Googo-Sakpare
7	LABILLA Agogo James	0246279825	Assemblyman	Sapelliga
8	AGUMAH Daniella	0533142531	Member	Yarigu
9	ANABILLA Moses	0248540730	Member	Yarigu
10	ALAAFIA Osman	0243533387	Field Investigator	Bawku West District
11	AZURE A. Memuna	0247147282	Member	Sapelliga
12	ABUGRI A. Sadik	0247483642	Assemblyman	Yarigu
13	AKOLOGO A. N. Issaka	0240947496	Field Investigator	Binduri
14	AWINI Alice	024207023	Member	Kobore
15	ALOU Wenaser Paul	0248402661	Assemblyman	Kobore
16	DANZI Booremah Patricia	0246147646	Agric. Officer	Department of Agriculture
17	AZURE Nderago Amos	0242265732	Ag. Director	NADMO, Bawku West
18	AKURUGU Williams	0249397343	Assemblyman	Googo-Sakpare
19	YENLI Reuben K.	0249780479	District Planning Officer	Bawku West District
20	ALHASSAN Abdul-Fatawu	0242925113	Forest Range Manager	Forest Services Division, Bawku
21	AKUMANUE Diana	0248115037	Director	Department of Agriculture
22	ALHASSAN Zakari A. Gomina	0245281633	Member	Tanmodu
23	ALHASSAN Ahmed	0243911995	District Coordinating Director	Bawku West District
24	ANANIA A. Daniel	0540217644	District Chief Executive	Bawku West District
25	ABUNGBA A. Joachim	0246737819	Basin Head	WRC-Black Volta Basin
26	BOATENG-GYIMAH Maxwell	0558584069	Executive Secretary	CWP-Ghana

Appendix 2: Workshop Agenda and Concept Note

A.2.1 Workshop Agenda

Time	Activity	Methodology	Facilitator
Day 1			
08:30 – 09:00	**Registration of participants**		▪ CWP/WRC-WVBS
09:00 – 10:00	**Session 0: Welcome and introduction**		
	Opening ceremony ▪ Remarks from partners ▪ Keynote Speech		▪ WRC ▪ DCE – Bawku West
	▪ Introduction of participants	Participant self introduction	▪ Participants ▪ CWP ▪ National Consultant
	▪ The workshop objectives ▪ The workshop agenda and adoption	Communication and exchanges	
	▪ The logistical aspects of the workshop		
	▪ Setting up the workshop presidium		
10:00 –10:15	**COFFEE BREAK**		
Session 1: Overview of the risk profile, the VoltAlarm EWS, the regional strategy for the reduction and the IMFDR as well as other DRR and CCA arrangements of the Volta Basin			
10:15 – 11:30	**Session 1.1**: The Volta Basin risk profile	Communication Q&A	▪ National consultant ▪ WRC ▪ National consultant ▪ Participants
	Session 1.2: The VoltAlarm EWS in the Volta Basin	Communication Q&A	
	Session 1.3: The Regional strategy for the reduction and the IMFDR in the Volta basin	Communication Q&A	
	Session 1.4: Other DRR and CCA arrangements in the Volta Basin	Communication Q&A	
Session 2: Comment and suggestions for improvement, based on the experiences of communities, to the flood and drought risk profile, EWS – VoltAlarm, the regional strategy for IMFDR as well DRR and CCA arrangements in the Volta basin			
11:30 – 13:00	▪ First findings from the study	Communication and discussion	▪ National consultant
	▪ Instructions for the Group work 1	Group work 1	▪ Participants
13:00 – 14:00	**LUNCH BREAK**		
14:00 – 15:30	▪ Group work 1 (continuation) ▪ Reporting back of the results of group work 1	Communication and discussion Group work 1	▪ National consultant ▪ Participants
Session 3: Actions to strengthen implementation of the regional strategy for IMFDR, deployment of EWS - VoltAlarm and other long-term DRR and CCA arrangements at community level in the national part of the Volta basin in Ghana			
15:30 – 17:00	▪ First findings from the study	Communication and discussion	▪ National consultant ▪ Participants

Time	Activity	Methodology	Facilitator
	▪ Instructions for the Group work 2 ▪ Group work 2 ▪ Reporting back of the results of group work 2	Group work 2	
17:00	**Coffee break and Closing of the 1st day**	Plenary	▪ National consultant ▪ Participants
Day 2			
Session 4: Best practices and opportunities for improving the IMFDR as well as CCA measures in the national part of the Volta basin in Ghana			
08:30 – 10:30	▪ First findings from the study ▪ Instructions for the Group work 3 ▪ Instructions for the Group work 3	Communication and discussion Group work 3	▪ National consultant ▪ Participants
10:30 – 10:45	**COFFEE BREAK**		
10:45 – 11:45	▪ Group work 3 (continuation) ▪ Reporting back of the results of group work 3	Group work 3	▪ Participants
Session 5: Ways of dissemination of the best practices and responsibilities of actors from the local level to the transboundary scale identified and documented			
11:45 – 13:30	▪ First findings from the study ▪ Instructions for the Group work 4 ▪ Group work 4 ▪ Reporting back of the results of group work 4	Communication and discussion Group work 4	▪ National consultant ▪ Participants
13:30 – 14:00	▪ **Wrap up of the workshop recommendations** ▪ **Closing ceremony**	Closing Remarks/ Speech	▪ National consultant ▪ WRC ▪ RCD - UERCC
14:00	**LUNCH BREAK – DEPARTURE**		

Volta Flood and Drought Management

A.2.2 Concept Note

ADAPTATION FUND

Project: "Integrating flood and drought management and early warning for climate change adaptation in the Volta Basin"

(VFDM Project)

LOCAL WORKSHOP ON TOOLS, STRATEGIES AND OTHER ARRANGEMENTS FOR THE INTEGRATED MANAGEMENT OF FLOOD AND DROUGHT RISK TO STRENGTHENING RESILIENCE IN THE VOLTA BASIN

22nd to 23rd April 2024, Zebilla
Bawku West District - Upper East Region, Ghana

Concept Note

Implementation Partners **April 2024**

WORLD METEOROLOGICAL ORGANIZATION

Global Water Partnership West Africa

Introduction

A consortium of the World Meteorological Organization (WMO), Volta Basin Authority (VBA) and the Global Water Partnership in West Africa (GWP-WA), together with relevant national structures of the VBA Member States are implementing the Volta Flood and Drought Management (VFDM) project entitled "Integrating flood and drought management and early warning for climate change adaptation in the Volta Basin" from June 2019 to June 2024. The VFDM project, financed by the Adaptation Fund (AF), prioritizes the strengthening of the capacities of hydrometeorological service providers and disaster management organizations of the member states.

In line with a series of activities to close the project implementation process, a National Consultant and investigators were recruited to conduct the "***Mission to strengthen the political, institutional and organizational capacities for integrated management of flood and drought risks in the Volta basin***" in Ghana.

This mission aims to:

Document experiences of local communities about the long-term flood and drought management strategies in the national portion of the VB;

Collect feedback from stakeholders for improvements on documented experiences of communities related to EWS including the VoltAlarm EWS, strategies for integrated management of flood and drought risks (IMFDR), disaster risk reduction (DRR) and climate change adaptation (CCA) arrangements, and;

Document best practices and opportunities for improving integrated flood and drought risk management and CCA measures in the VB.

To this end, the consulting team has carried out field engagements in selected communities in Bawku West District. The engagement was informed by literature and documentary review on floods and droughts, considering policies, strategies, and plans in Ghana and the Volta Basin. This workshop introduces stakeholders to the mission deliverables, using tools and strategies on DRR and CCA arrangements for in-depth assessment.

Objectives and expected results of the workshop

Workshop objectives

The objective of this workshop is to strengthen CC resilience through improved engagement and participation of stakeholders including communities and relevant technical services in the adoption and implementation of policies, strategies, plans and tools for long-term IMFDR decision support in the Volta basin.

The specific objectives of the workshop are as follows:

- discuss with participants the flood and drought risk profile, EWS – VoltAlarm, regional strategy for the reduction and IMFDR as well as other DRR and CCA arrangements in the Volta Basin;
- examine responses from communities' engagement within the context of flood and drought risk profile, the EWS – VoltAlarm, the regional strategy for IMFDR as well as other DRR and CCA arrangements of the Volta Basin;
- propose actions to strengthen the implementation of the regional strategy for reduction and IMFDR, the deployment of EWS - VoltAlarm and other long-term DRR and CCA arrangements in Ghana;
- deepen and complement best practices and opportunities for improving IMFDR as well as CCA measures in Ghana;
- discuss ways to disseminate best practices identified and documented with a focus on the roles and responsibilities of stakeholders from the community level to the transboundary scale for the overall improvement of IMFDR and CCA measures in Ghana as well as the Volta basin.

Expected results of the workshop

At the end of the local workshop, the following results are expected:

- Participants' knowledge of flood and drought risk profile, EWS – VoltAlarm, regional strategy for reduction and IMFDR as well as DRR and CCA arrangements in the Volta Basin are enhanced;
- Comments and suggestions for improvement, based on the experiences of communities, to the flood and drought risk profile, EWS – VoltAlarm, the regional strategy for IMFDR as well DRR and CCA arrangements in the basin are highlighted;
- Actions to strengthen the implementation of the regional strategy for IMFDR, the deployment of EWS - VoltAlarm and other long-term DRR and CCA arrangements in the national part of the Volta basin in Ghana are proposed;
- Best practices and opportunities for improving IMFDR and CCA measures in the national part of the Volta basin in Ghana are highlighted and validated;

Ways to disseminate best practices, for the improvement of IMFDR and CCA measures in the national part of the Volta basin in Ghana, identified and documented while highlighting the roles and responsibilities of stakeholders across scale are proposed.

Workshop Methodology

The methodological approach involves preparation, implementation and reporting.
The preparatory stage concerns the mobilization of participants and arrangements of logistics for the workshop.
The implementation stage involves the development of materials for sessional communication, discussion and defining group work themes for plenary feedback.
The reporting stage looks at the synthesis and analysis of all the products from the workshop on the one hand, and preparation of the workshop report, on the other hand.

Workshop facilitation

The local workshop will be facilitated by the National Consultant in collaboration with the Country Water Partnership-Ghana and the Water Resources Commission (Coordinator of the National Focal Structure (NFS) of VBA in Ghana).
The workshop will employ an interactive approach using various facilitation techniques including brainstorming, experience sharing, presentations and discussion, group work and plenary feedback to ensure active participation.
The medium of communication at the workshop is English with simultaneous translation in a common local language.

Local workshop content

The sessions of the 2-day workshop are structured as below:

- Session 0: Welcome and introductory remarks including keynote address;
- Session 1: Overview of the risk profile, EWS – VoltAlarm, the regional strategy for the IMFDR as well as arrangements of DRR and CCA of the Volta basin;
- Session 2: Comment and make suggestions for improvement, based on the experiences of communities, to the flood and drought risk profile, EWS – VoltAlarm, the regional strategy for IMFDR as well DRR and CCA arrangements in the basin are deepened, highlighted and validated;

- Session 3: Actions to strengthen implementation of the regional strategy for IMFDR, deployment of EWS - VoltAlarm and other long-term DRR and CCA arrangements at the community level;
- Session 4: Best practices and opportunities for improving the IMFDR as well as CCA measures in the national part of the Volta basin in Ghana;
- Session 5: Ways to disseminate best practices identified and responsibilities of stakeholders across scales documented.

Workshop participants

Participants are drawn from communities downstream of Bagre Dam, particularly those in the Bawku West District, including decentralized administration and allied technical services such as the Department of Agriculture, Forestry and National Disaster Management Organisation (NADMO). The technical and financial partners will join the opening and closing sessions of the workshop.

Table 5 List of Institutions and Participation

Item No.	**Stakeholders**	**Bagre Downstream**
		# of Participants
A	**UPPER EAST REGIONAL LEVEL**	**4**
1	Ghana Hydrological Authority, Bolgatanga	1
2	Ghana Meteorological Agency, Bolgatanga	1
3	White Volta Basin Secretariat, Bolgatanga	1
4	Environmental Protection Agency, Bolgatanga	1
B	**UPPER WEST REGIONAL LEVEL**	**1**
5	Black Volta Basin Officer	1
C	**BAWKU WEST DISTRICT LEVEL**	**13**
6	District Chief Executive	1
7	District Coordinating Director	1
8	Development Planning Officer	1
9	Department of Agriculture (crops/livestock)	2
10	Forest Services Division	1
11	NADMO	1
12	Investigators	6
D	**CIVIL SOCIETY ORGANIZATIONS**	**2**
13	NGOs involved in DRM / CCA Projects	1
14	Women and youth organizations	1
E	**COMMUNITY LEVEL**	**15**

15	Community - 1 (3 Reps. - Assemblyman, Woman, Youth)	3
16	Community - 2 (3 Reps. - Assemblyman, Woman, Youth)	3
17	Community - 3 (3 Reps. - Assemblyman, Woman, Youth)	3
18	Community - 4 (3 Reps. - Assemblyman, Woman, Youth)	3
19	Community - 5 (3 Reps. - Assemblyman, Woman, Youth)	3
	ORGANISERS	**4**
	CWP - Executive Secretary	1
	CWP - Admin. Assistant	1
	Water Resources Commission - Accra	1
	Consultant(s)	1
	Total	

About thirty-five (35) participants are expected at the workshop.

Dates and venue of the local workshop

The workshop will be held at Zebilla, the capital of Bawku West District in the Upper East Region of Ghana from 22nd to 23rd April, 2024.

Appendix 3 Results of Group Work

A.3.1 Group Work 1: Comments and suggestions for improvement on floods and drought based on experiences of communities

Zebilla - Bawku West District, Bagre Downstream Area	
Group 1	**Group 2**
Are you aware of any regional, national, and local planning for integrated flood and drought risk management strategies including EWS VoltAlarm and other guidance documents on DRR and CCA? If yes, list them.	
Yes • Disaster Risk Reduction Action Plan • Gambaga Sub-basin action plan under preparation • White Volta Basin Action Plan	Yes • White Volta Basin Action plan • Bawku West NADMO Action pan
What are some of the mechanisms with EWS in your districts (alert management, alert channels, response)?	
• Radio announcements (media) • Community engagements • Mobile communication	• Radio stations • Mobile SMS • Friends • Family members • NADMO
How functional and effective are the EWS/alerts?	
• EW messages on rain onset and end dates are effective	• It is effective but limited to information sharing due to lack of resources
What are some of the weaknesses/difficulties with EWS/alerts in your district?	
• Some EWS are not suitable. Dates given for information dissemination is not always followed. Information will either be given late or early. • Weakness – Some EWS do not give adequate solution/information to adaptative measures. • Difficulties – Medium of communication of some EWS are not suitable for the target group	• Information dissemination due to lack of funds
What are the other types of interventions for flood and drought management in your district in the reduction and management of flood and drought risks?	
<u>Pre-disaster measures</u> • Choosing appropriate farming methods <u>Post-disaster measures</u>	<u>Pre-disaster measures</u> • Early information delivery • People should be prevented from cultivating close to the river banks • Forest reserves must be protected

• Moving to safer havens	• Early cultivation should be encouraged <u>Post-disaster measures</u> • Enactment of by-laws by local authorities to enforce some of the intervention
Which local authorities coordinate these other flood and drought management interventions and what are their responsibilities? (E.g. The State, Community practices, NGOs, Associations, Foundations)?	
• NADMO/District Assembly • NGOs	• Water Resources Commission • NGO's • Global Water Partnership • Volta Basin Authority • District Assembly • Ministry of Food and Agriculture
What are some of the weaknesses/difficulties with the other flood and drought management interventions in your district?	
• Weakness – They will only minimize the effects of the floods • Difficulties – Inadequate resources (Money)	•
What are some of the strengths and opportunities with the other flood and drought management interventions in your district?	

• <u>Strength</u>
  ○ Not capital intensive such that the management intervention only involves change of human behavior and in some cases change in dates and time of an activity. (In the case of early planting)
• <u>Opportunities</u>
  ○ Department of Agriculture is available to give extension services.
  ○ NADMO is also available to give technical advice.	

A.3.2 Group Work 2: Actions to strengthen implementation of the regional strategy for IMFDR, deployment of EWS - VoltAlarm and other long-term DRR and CCA arrangements at the community level in the national part of the Volta basin in Ghana

Zebilla – Bawku West District, Downstream of Bagre Dam	
Group 1	**Group 2**
What are some suggestions for better EWS Implementation?	
• Continuous community engagement on EWS • Community durbars organized	• Community involvement and participation • Mounting of information centres in the various communities to help in the implementation process
What are some suggestions for improving the implementation of other flood and drought management interventions?	
• Continuous sensitization and engagements	• Community involvement and participation • Continuous sensitization and education • Enactment of by laws to enforce policies
How can EWS be sustained in your district?	
• Collaboration with development partners • Resourcing of NADMO/District Assemblies	• Continuous engagement of communities for feedbacks • Community involvement
How can the other flood and drought management interventions be sustained in your district?	
• Continuous Sensitization • Resourcing of Department of Agriculture	• Afforestation should be encouraged • Avoid bush fires • Creation of fire belts • Avoid farming along the river banks • Adhering to early warning systems

A.3.3 Group Work 3 – Plenary Session: Identify best practices concerning Early Warning Systems for Floods and Drought in the Bagre Dam Downstream Area

Priority Area	Best practice/ experiences
Disaster Prevention and Mitigation	Undertaking afforestation (along the water-sheds, communities,
	Dredging water bodies
	Stop burning of farm crop residues, bush burning
	Ploughing across the contour (prevent erosion
	Providing timely and reliable information, education and sensitization
	Enforcing buffer restrictions from river banks and flood-prone areas (building or farming away from these areas
	Encouraging the use of early maturing crop varieties and early harvesting
	Creation of ponds and reservoirs
	Prevent deforestation
	Adequate drainage system
	Adhering physical (housing) plans guidelines
Disaster Preparedness	Planting trees along the river banks
	Encouraging the use of early maturing crop varieties and early harvesting
	Providing timely and reliable information, education and sensitization
	Adhering to EWS
	Adhering physical (housing) plans guidelines
	Adequate drainage system
	NADMO and District Assembly should form emergency planning committees to develop flood and drought management strategies
	Ensuring community participation in district disaster risk planning
Disaster Response	Relocating affected person (vulnerable) to safe havens
	Forming rescue teams AT THE COMMUNITY LEVEL
	Ensuring that logistical and relief support reach affected persons (support are sometimes extended to land-owners rather than the land users
	Rechanneling flood to less flooded areas or water bodies
	Provide counseling services to affected persons
	Ensure appropriate distribution of relief and logistics

	Availability of health personnel, medical and health services
Disaster Rehabilitation and Recovery	Conducting needs assessment
	Provision of safe drinking water
	Provision of accommodation and temporary shelter for affected person
	Fumigation of water bodies and affected areas
	Provision of healthcare and health facilities
	Provide counseling services to affected persons
	Provision of food and relief items
	Re-afforestation
	Rehabilitate educational facilities
	Provision of alternative livelihood skills and training
	Land reclamation (by application CSA technologies, example composting
	Reconstruction/rehabilitation of roads
	Linking farmers to support with farm input credit (NGO, or suppliers,
	Demonstrating or encouraging the use of early maturing crop varieties and early harvesting
	Resourcing the agric department with early maturing seeds
	Resourcing the relevant institution with needed logistics

A.3.4 Group Work 4 – Plenary Session: Ways to disseminate best practices, for the improvement of IMFDR and CCA measures in the national part of the Volta basin in Ghana, identified and documented while highlighting the roles and responsibilities of stakeholders across scale are proposed

Ways of disseminating best practices
• Organise community durbars to disseminate early warning information • Mounting and making use of community information centres • Opinion leaders (religious and traditional leaders) should be involved in the dissemination process as they are more trusted • Identifying and involving community groups and their leaders in information dissemination (youth groups, queen mothers, women groups (VSLA), etc. • Disseminating early warning information through the heads of basic, primary and secondary schools

- Disseminating early warning information through social centres and gatherings (bars, pubs, funerals etc.
- Disseminating early warning information through markets
- Disseminating early warning information through radio stations and social media

Institution	Perceived Role in Flood and Drought Management
Public/Government Sector	
NADMO	Coordinates disaster response and management; provides relief and rehabilitation services.
Department of Agriculture	Implements agricultural policies and practices to mitigate impacts on farming; promotes drought-resistant crops.
Ghana Health Service	Ensures public health during and after disasters; provides medical assistance and disease control.
Water Resource Commission	Manages and regulates water resources; ensures sustainable water supply.
District Assembly	Local governance and infrastructure development; facilitates community-based disaster risk reduction.
Security agencies (police, army, fire)	Provide security and emergency response services; assist in evacuations and rescue operations.
Forestry Commission	Manages forest resources; implements reforestation programs to prevent soil erosion and flooding.
Ghana Meteorological Agency	Provides weather forecasts and climate information; issues early warnings for floods and droughts.
Ghana Hydrological Authority	Oversees the development and maintenance of hydrological infrastructure; monitors and manages flood risks.
Research/Academia	
Savannah Agriculture Research Institute	Conducts agricultural research to develop drought-resistant crop varieties and farming techniques.
Crop Research Institute (CRI)	Engages in crop research and development; provides solutions to improve food security during droughts.
Forest Research Institute of Ghana (FORIG)	Researches forest and agroforestry systems; develops strategies to use forests in mitigating flood and drought impacts.
Forestry Commission Training School	Provides training on sustainable forestry practices and environmental conservation.
Development Partners	
Water Aid Ghana	Supports water, sanitation, and hygiene (WASH) projects to ensure clean water access during crises.
World Vision	Implements community development programs focused on disaster resilience and recovery.
Global Communities	Provides support for sustainable community development and resilience building.
Tree Aid	Works on reforestation and tree planting projects to combat soil erosion and improve water retention.
UNICEF	Focuses on child protection and welfare; provides emergency relief and support for affected children.
Centre for International Forestry Research	Conducts research on sustainable forestry and land management practices to mitigate flood and drought impacts.

ADDRO Ghana	Provides community-based health and agricultural services to enhance resilience.
Action Aid	Advocates for vulnerable communities; implements disaster risk reduction and resilience-building initiatives.
USAID	Offers financial and technical support for disaster management and resilience programs.
NGOs/Civil Society Organizations (CSOs)	
Rice Ghana	Promotes sustainable agricultural practices and resilience among rice farmers.
Belim Wusa Development Agency (BEWDA)	Engages in community development and disaster preparedness activities.
Innovation for Poverty Action (IPA)	Conducts research and advocacy to improve disaster resilience and reduce poverty.
Haven of Love	Provides humanitarian aid and support for vulnerable populations during crises.
CODI	Implements community development and disaster risk reduction projects.
Link Community Development	Focuses on educational and community resilience projects.
Vulnerable Groups	
Women	Actively participate in community decision-making and resilience-building activities.
Children	Require protection and support during disasters; focus on education continuity.
People With Disabilities (PWDs)	Need specific accommodations and support for effective disaster response and recovery.
Aged	Require targeted support and assistance during disasters due to increased vulnerability.
Fulani groups and refugees	Need tailored support and inclusion in disaster preparedness and response plans.
Private Sector	
Various private sector entities	Donate relief items to the communities during climate related disasters; Invest in infrastructure, technology, and services to support disaster management and resilience efforts.
Traditional Authorities	
Chiefs	Lead local governance and community mobilization for disaster preparedness and response.
Queen mothers	Represent women in community decision-making; advocate for women's roles in resilience-building.
Tindanas (land owners)	Manage land resources and support sustainable land use practices.
Elders	Assist local in governance and community mobilization for disaster preparedness and response.
Other Relevant Groups	
Assembly persons (unit committee members)	Facilitate local governance and community coordination during disasters.
Religious leaders	Assist local in governance and community mobilization for disaster preparedness and response.

Opinion leaders	Influence community behavior and support disaster risk reduction initiatives.
Community Watch dog committee	Monitor and report on community safety and security issues; support disaster response efforts.
Fire volunteers	Assist in firefighting and emergency response activities.
Disaster volunteer groups	Participate in disaster preparedness and response activities; support community resilience.
FBOs (Vegetable farmers groups)	Promote sustainable agricultural practices and resilience among farmers.
Youth groups	Engage in community mobilization and support disaster risk reduction activities.
Media	
Radio stations (ZEBS FM, Dastech, Max Empire)	Disseminate information, early warnings, and educational programs on disaster preparedness and response.
Information Centres	Provide local information and updates on disaster-related issues and response measures.

Appendix 4: Photo Gallery

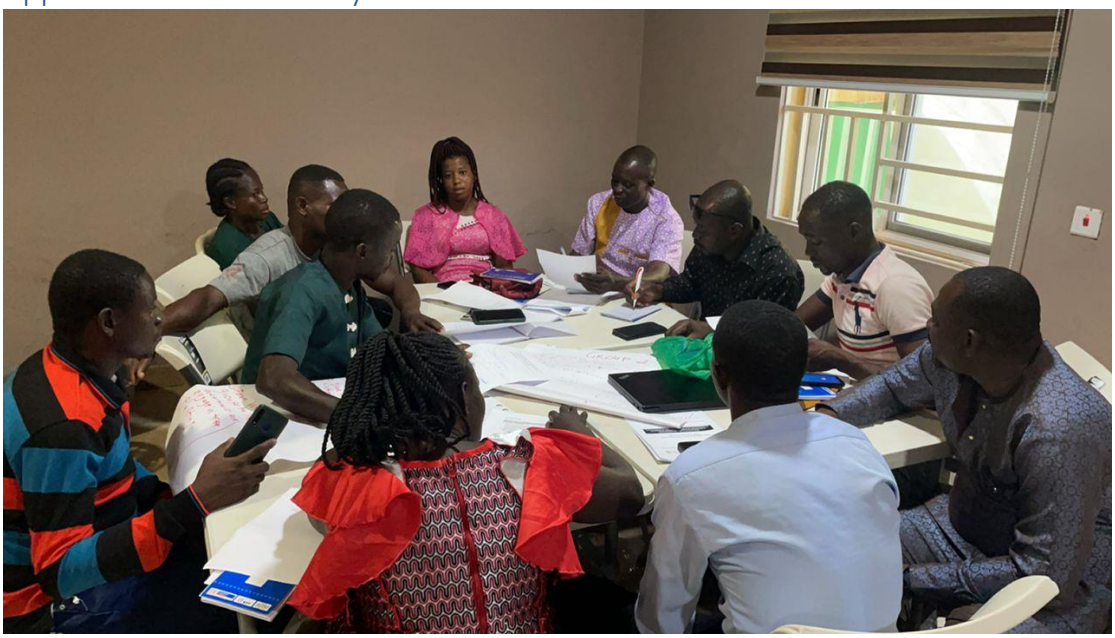

Figure 3 Group work during the local workshop at Zebilla, Bagre Dam downstream in Ghana

Figure 4 A second group work during the local workshop at Zebilla, Bagre Dam downstream in Ghana