



MISSION TO STRENGTHEN POLITICAL, INSTITUTIONAL AND ORGANIZATIONAL CAPACITIES FOR INTEGRATED MANAGEMENT OF FLOOD AND DROUGHT RISKS IN THE VOLTA BASIN

REPORT ON BEST PRACTICES AND OPPORTUNITIES FOR IMPROVING INTEGRATED FLOOD AND DROUGHT RISK MANAGEMENT AND CLIMATE CHANGE ADAPTATION MEASURES AT THE PILOT SITE(S)

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Acronyms

Abbreviation	Connotation	
AF	Adaptation Fund	
CC	Climate Change	
CCA	Climate Change Adaptation	
CSO	Civil Society Organizations	
СШР	Country Water Partnership	
DA	District Assembly	
DRR	Disaster Risk Reduction	
EPP	Emergency Preparedness Plan	
EWS	Early Warning System	
FBOs	Vegetable Farmers groups	
FGD	Focus Group Discussion	
GMet	Ghana Meteorological Agency	
IMFDR	Integrated Management of Flood and Drought Risks	
GWP-WA	Global Water Partnership in West Africa	
JHS	Junior High School	
M&E	Monitoring and Evaluation	
МР	Member of Parliament	
NADMO	National Disaster Management Organization	
NCCE	National Commission for Civic Education	
NGO	Non-Governmental Organization	
PWD	Persons with Disability	
SEPO	Success, Potential, Failures and Obstacles	
TV	Television	
VB	Volta Basin	
VBA	Volta Basin Authority	
VFDM	Volta Flood and Drought Management	
WMO	World Meteorological Organization	

1. Context and Rationale

In response to the problems of flooding and drought in the Volta Basin (VB), the World Meteorological Organization (WMO), the Volta Basin Authority (VBA), the Global Water Partnership in West Africa (GWP-WA) and the 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 mid-2024. The VFDM project, financed by the Adaptation Fund (AF), prioritizes capacity building of hydrometeorological service providers in the six countries bordering the VB; as well as the development of a flood and drought early warning system (EWS) for the basin, considering civil protection services and other actors concerned.

As part of the VFDM project activities, a VoltAlarm flood and drought forecasting and warning platform has been developed and information bulletins are produced by the VBA and the national structures in charge of hydrology, meteorology, civil protection, and agriculture. A regional strategy for integrated flood and drought risk management was developed together with VB stakeholders.

In line with a series of activities to close the project, 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.

1.1 Objectives and deliverables/products expected from the mission

The mission synthesises the findings received from field surveys and focus group discussions conducted in three selected areas of the Ghana portion of the Volta basin in April 2024. The main objectives of the mission are to aid;

- improving policies, strategies, plans and instruments as well as decision support for longterm integrated management of flood and drought risks to strengthen resilience to climate change (CC) at local, national and transboundary in the basin;
- building the capacity of actors and decision-makers on policies, strategies, plans and instruments for long-term integrated management of flood and drought risks at local, national, and transboundary levels; and

• the development of a collaborative process to ensure that policies, strategies, plans and instruments for long-term integrated flood and drought risk management are accepted by local organizations and communities and adapted to the local context.

These are to be achieved by

- documenting the experiences of local communities on the long-term flood and drought management strategies,
- collecting feedback for improving early warning and integrated management of flood and drought risk strategies, and
- documenting the best practices from the perspective of stakeholders and opportunities for improving integrated flood and drought risk management and climate change measures in the Volta Basin. These are presented in this report.

2. Methodological approach

2.1 Study design

The study applied the mixed methods approach involving both qualitative and quantitative analysis from focus group discussions and field surveys, respectively. This strategy was to ensure a comprehensive analysis by gathering in-depth qualitative insights and survey-based quantitative data. The utilization of both methods facilitated increased reliability.

2.1.1 Study area

The transboundary Volta Basin covers several communities from the entire northern to the southeast of Ghana. The survey was conducted across three (3) sites in Ghana. The first site, covered communities in the Lower Volta Basin, including Central, South and North Tongu districts, Asuogyaman district, Ada East and Shai-Osu Doku districts. The second site is the section below the Bagre dam in Ghana and covered communities in the Bawku West District, whilst, for the Upper East site, communities in the Talensi, Bongo, Binduri and Nabdam districts, as well as Bawku Municipal were surveyed.



Figure 1: Transboundary Map of the Volta River

2.2 Sampling Strategies

The stratified random sampling method was used to select a representative sample of communities within the identified project sites based on their geographical location or historical vulnerability to floods and drought risks.

A representative sample size of 600 individuals was calculated to be spread equally across the three selected sites. Each site's share of the sample was then distributed using equal weights across the districts. The sample size for each identified district was then allowed to be increased to ten (10) participants to account for non-response and other challenges that could reduce the desired sample size.

The focus group discussions also involved purposive sampling of key actors in each district. This included both regional and local government departments, traditional authorities, the private sector, civil society, and gender groups in each district. Each group consisted of a minimum of 8 to a maximum of 10 discussants. Marikena and Setiawannie (2022) note that to foster increased engagement among participants, promoting active involvement and diverse perspectives, the ideal number for focus group discussions should range between six and ten participants, with an average of eight.

2.3 Primary Data Collection

2.3.1 Field Survey Data Collection

The field interviews began on the 5th of April and ended on the 10th of April, 2024, and enabled the engagement with 668 persons. To ensure a smooth data collection exercise vis a vis commutation in the communities, the district and assembly person(s) of each community were consulted ahead of time to facilitate community entry and awareness creation of the exercise in the various communities.

2.3.2 Focus Group Discussions

The focus group discussions involved identifying key actors in each study district relevant to floods and drought management. Each district was grouped for discussions. A facilitator moderated each session by allowing each participant to freely express their opinions on floods and drought management practices in the communities, relative to the Volta Basin. Each group discussion session lasted for an average of one hour and thirty minutes for effective deliberations. Details of the data collection methods used i.e. the field survey and the focus group discussion are presented in Appendix 2.



Figure 2 Images from some Focus Group Discussions with stakeholders

2.4 Data Analysis

The study employed mixed quantitative and qualitative data analysis methods. The quantitative data was analysed using SPSS, STATA and Microsoft Excel statistical software to generate

descriptive statistics and inferential analysis to assess the survey data. Qualitative data analysis was conducted using thematic analysis to extract key themes and insights. The qualitative data was thus transcribed, coded by themes and patterns related to the study questions and analysed using qualitative Atlas TI and GPT-4 data software. The qualitative method provided context to the quantitative finding

The qualitative analysis also applied the SEPO matrix (Success, Potential, Failures and Obstacles), which is a prospective evaluation tool that allows you to take advantage of lived experiences to improve performance and future interventions. It was used in a participatory manner to take into account the opinions of stakeholders in the evaluation experience and the results are presented in Appendix 1.

2.5. Socio Demographics

2.5.1 Demographics from the Field Survey

In total, the study randomly interviewed 386 males and 282 females, making up 58% and 42% respectively, with an average age of 44 years. The minimum and maximum ages ranged from 20 to 89 years old. A large proportion (48%) of the respondents had no formal education. The remaining respondents had attained different levels of education including 35% with primary/JHS education, 9% with secondary school education, 6% with post-secondary Nursing, teacher training or university/polytechnic education and the remaining 2% with technical/ vocational training.



The youngest respondents interviewed were 18 years old, while the oldest respondent was a 91year-old male. This showed that the survey was inclusive of genders in the communities surveyed. Most of the respondents interviewed answered that were natives of the community surveyed with 10% noting they had migrated into the survey communities for various reasons including employment, marriage, and trade, and reported that, they had stayed in the communities for 35 years, averagely.

Focusing on respondents' livelihoods, a significant majority (75%) identified as farmers, while the remaining 25% were mostly engaged in the private sector in occupations such as retail trading, food vending, and motorcycle transportation, or were either civil/public servants or unemployed. Only 25% reported having secondary employment. Generally, a lack of alternative income sources leads to communities being highly vulnerable to flood risks. Thus, the predominance of farming as the primary livelihood for a significant majority of respondents, coupled with the limited presence of secondary employment further exacerbates the vulnerability to their livelihoods when floods occur and affect farms, roads, and residential or occupational housing.

2.5.2 Composition of Focus Group Discussions

The focus group discussions in each district included officers from the government and public sector, NGO and Civil Societies, vulnerable groups, traditional authorities, and the media. In total, 105 respondents were grouped across 12 groups in each district. Table 1 shows the class or institutions of actors and stakeholders involved in the focus group discussions.

Institution of Stakeholders in the Focus Group Discussions
Public/Government Sector
• NADMO
Department of Agriculture
Ghana Health Service
Water Resource Commission
District Assembly
Forestry Commission
Fire Service
Ghana Meteorological Agency
NGOs/Civil Society Organizations (CSOs)
Vulnerable Groups
• Women
Youth groups
Persons with Disability (PWDs)
• Aged
Traditional Authorities

٠	Chiefs
•	Queen mothers
•	Assembly persons (unit committee members)
•	FBOs (Vegetable farmers groups)
Media	

3. Mapping of Identified Floods and Drought Practices

Understanding the experiences and perspectives of older adults in flood-risk areas is essential for developing effective disaster risk reduction (DRR) strategies that cater to the diverse needs and capacities of at-risk populations (Walkling and Haworth, 2020).

The survey respondents were largely natives and with an average age of 44 years had appreciable experience of the flood and drought situations in their communities. The settlers/migrants had also lived for an average of 35 years in their communities, making them well-versed in the survey areas. Nearly all respondents (97%) noted that they had experienced floods in their communities, with 44% reporting that flooding had affected their farms, a quarter stated that floods affected their households, and the remaining quarter 25% indicated that the floods affected roads and road networks.

In addition, the results showed that the main materials for housing structures in the communities surveyed were largely constructed with mud (78%), 18% were mainly made of cement blocks and the remaining 4% were made of bricks. Mud houses lack resilience against floods because of the material's vulnerability to water and structural fragility. This is because, as a building material, mud has a high absorption rate, which means it easily soaks up water during floods (Ayereka and Jaman, 2023; Ahadzie, Mensah and Simpeh, 2022).

The assessment of flood impacts in the surveyed communities highlighted extensive challenges, including

- the destruction of crops,
- damage to property and infrastructure, and
- displacement of households.

These issues severely threatened agricultural livelihoods, food security, and overall stability. Health impacts from disease outbreaks and limited access to healthcare, along with economic hardships due to loss of property and income, further strained community resources. Mobility and access to essential services were also significantly hindered during floods.

Similarly, the impacts of droughts were severe, with crop failure being the most critical issue, leading to heightened food insecurity. Livestock losses, water scarcity, and economic hardships due to increased food prices and loss of income were prevalent. Health issues, including mosquito-borne diseases and poor air quality, compound community vulnerability.

3.1 Flood-related practices

The survey further queried respondents on how long the most memorable flood day(s) lasted. According to the results, the most memorable flooding events ranged from a minimum of one day to a maximum of 120 days with an average of 30 days. Respondents also referenced the spillage of the Bagre dam and the recent spilling of the Akosombo dam as the major contributors to recurrent flooding in the Volta basin in Ghana.

The study assessed how individuals have adapted to flood events by estimating the capacities of individuals and communities to respond appropriately to early warnings. The results show that, in almost equal proportions, communities are faced with the options of either migrating, trying to improve on-farm irrigation, depending on alternative water sources, or reinforcing infrastructure. Less than 10% of the total respondents noted that they were part of social groups, which mainly provided food, clothing and shelter to them during flood events. The larger majority noted that some institutions mostly comprising NADMO or District Assembly, Volta River Authority, and MP or Central Government were most likely to provide flood/drought adaptation aid during floods/drought events. In addition, the majority of the respondents noted that local authorities have not involved the community actively in the planning and decision-making processes for floods and drought management. Also, 95% of the respondents did not know about the Flood and Drought Risk Management EWS VoltAlarm (VFDM) strategy. Further revealing that the knowledge of flood and drought risks is mainly from lived experiences.

Respondents expressed their perspectives on the mode of EWS communication by relevant local authorities. The results identified the District Assembly/NADMO as the most active actor in communicating early warning information. Next were the assembly members and unit committee members. Authorities such as the Volta River Authority were perceived to communicate the least. This shows the perceived influence or power of the local government in reaching the masses because the local government is the main channel through which all other regional, national and international authorities and agencies reach out to the communities and local population. The

results also, showed that the District Assembly/NADMO largely used the mass media (radio and TV) in communicating early warnings, while the assembly members more generally used face-to-face communication and community information centres, to get closer to the local population.

3.2 Drought-related practices

The study explained droughts as long periods of no rainfall. The results showed that as one moves towards the north of Ghana the risks of drought increase. This was evident when more respondents in the Lower Volta basin (comprising communities in the southern to middle belt of Ghana¹) noted that they had not experienced droughts compared to those who had. Averagely, respondents indicated that the most memorable drought event lasted for 7 months in the Lower Volta Basin, 16 months in the Upper East Region area, and 19 months in the area below the Bagre dam.

Also, although the proportion of respondents who had experienced droughts was significantly higher in the northern parts of Ghana, respondents who had experienced droughts were relatively more in the area below the Bagre Dam (85%) than in the Upper East Region Area (79%). According to Abugri (2020) and Lente et. al., (2023), farmers in the northern parts of Ghana perceive a rising risk of drought over the past few decades, aligning with scientific observations of climate change effects on rainfall variability and agriculture. Furthermore, the large reliance of the respondents in the surveyed areas and farmers in Ghana generally on rainfall and water bodies for irrigation implies that increasing drought risks directly translates to livelihood risk (Klutse et. al., 2021).

4. Best Practices

The study used information from the focus group discussions to assess the best practices for improving the IMFDR and CCA measures in the national part of the Volta basin in Ghana. The best ways of disseminating the best practices and the responsibilities of actors from the local level to the transboundary level were also identified and documented.

4.1 Best Flood Management Practices

¹ Asare-Nuamah, P., & Botchway, E. (2019). Understanding climate variability and change: analysis of temperature and rainfall across agroecological zones in Ghana. *Heliyon*, *5*(10).

Results from the synthesis of group responses show that the groups stressed the significance of the best practices at different stages of managing floods. These include the following:

- Preventive measures against flooding include conducting afforestation and dredging water bodies, enforcement of buffer restrictions from riverbanks and flood-prone areas, and adhering to physical housing plan guidelines.
- Development and implementation of early warning systems, combined with proper information flow and education on flood risks, were deemed essential for preparedness.
- During response efforts, relocating affected persons to safe havens, forming rescue teams at the community level, and ensuring the timely distribution of relief items and logistics were identified as crucial.
- For the post-disaster period, the rehabilitation of critical infrastructure, provision of healthcare, and conducting needs assessments were highlighted as key practices for effective flood recovery.
- For improving IMFDR and CCA measures specific to floods in the Volta Basin, afforestation along river banks and the enforcement of physical housing plan guidelines are critical. The establishment of adequate drainage systems and the formation of emergency planning committees by NADMO and District Assemblies are also considered vital.
- For preparedness, the importance of early warning systems, evacuation plans, and community participation in disaster risk planning was highlighted.
- During flood response, the focus was on the relocation of vulnerable persons to safe havens, the formation of rescue teams at the community level, and ensuring that logistical and relief support reaches affected persons.
- Rehabilitation measures include the fumigation of water bodies, provision of temporary shelters, healthcare, and alternative livelihood training, alongside land reclamation using climate-smart agriculture technologies.

4.2 Best Drought Management Practices

The best drought management practices that the participants emphasized were:

- proper land use planning and the protection and preservation of wetlands to mitigate the impact of droughts.

- the necessity of resource mobilization from varied sources to support drought management initiatives and the implementation of early warning systems to provide adequate, timely, and reliable data.
- promoting dry season farming through the demarcation of lands, provision of production resources, mechanized boreholes, and the construction of dams.
- effective coordination among all relevant stakeholders to ensure a unified and efficient response to drought conditions.

The measures for improving IMFDR and CCA specific to droughts were:

- sensitization and education to stop illegal sand winning and promote proper waste management.
- tree planting, especially along water-sheds and communities, and the enforcement of bylaws to prevent deforestation and illegal activities.
- development of ponds and reservoirs, ploughing across contours to prevent erosion, and the enforcement of buffer restrictions from river banks
- encouraging the use of early maturing crop varieties and early harvesting were also highlighted as critical adaptation strategies for managing drought impacts.

5. **Opportunities for Improving Management Measures**

The focus group discussions identified opportunities to improve drought and flood management. These involve:

- building trust with communities to ensure their responsiveness to Early Warning Systems (EWS). Thus, it is essential to involve them in the planning and implementation process, making it participatory and inclusive,
- providing reliable, timely, and effective information, such as updates from the Bagre Dam, is crucial. Establishing a feedback mechanism allows for community input while using effective communication methods like drama and cinema to make information more relatable,
- leveraging influential community leaders, incorporating Indigenous knowledge, and offering sustainable incentives for adherence to EWS can further build trust, and
- enforcing community byelaws and values, equipping volunteers, and fostering effective collaboration among stakeholders are also key strategies.

5.1 **Opportunities for Flood Management**

A majority of the respondents (69%) noted that the most common flood management measures taught to them by local authorities were pre-flood strategies. This often included

- promoting early planting to avoid flood impacts,
- encouraging afforestation to reduce soil erosion, and
- running extensive educational campaigns on the risks of farming and building near riverbanks.

They also prepare for emergencies by designating safe havens for evacuations and maintaining communication strategies to keep the public informed about flood conditions.

Moreover, the study assessed the capacities of the local flood and disaster risk reduction management in their communities. The results show that generally, the challenges in managing both early warning systems and post-climate events in the Volta Basin include:

- financial constraints hindering infrastructure development,
- inadequate information dissemination and community education,
- low community engagement,
- infrastructure deficiencies,
- natural factors like dam spillage and topography, climate change effects, poor agricultural practices, and delayed response times.

These issues collectively impede effective disaster management efforts and exacerbate the impact on affected communities.

Also, the majority of respondents (71%) answered that information about flood management strategies to communities is not easily accessible. Further, the majority (88%) noted that local authorities and early warning systems do not prioritize the needs of gender and the vulnerable in society.

The study also summarises a synthesis of identified opportunities for flood management from the focus group discussions. Key among the identified points include:

- Collaboration with institutions:
 - Collaborate with the District Assembly and other institutions for flood reduction and management.

- Leverage resources and expertise from state institutions like NADMO, NCCE, DA, NGOs (World Vision, Red Cross), and others.
- Early Warning Systems and Monitoring:
 - Periodic review of EWS by VRA-Emergency Preparedness Plan (EPP).
 - Monitor weather and climate patterns and reports.
 - The district relies on the EPP as a source of its EWS. Monitoring and evaluation of this system serve as feedback for assembly members and community disaster volunteer groups.
- Preparedness and Response:
 - Identification of safe haven areas.
 - Frequent visits and monitoring of flood-prone areas.
 - Organize District Disaster Management Committee.
 - Availability of technocrats and the ability to collaborate resources from other agencies.
 - A disaster preparedness plan includes setting aside disaster response funds.
- Community Engagement and Infrastructure:
 - Existence of public buildings in highlands.
 - Availability of community volunteers.
 - Community scorecards and engagements.
 - Interface meetings.
 - Inspection of safe havens.
- Strategic Planning:
 - Hazard mapping by NADMO to identify disaster-prone areas and develop response strategies.
 - National guidelines for the preparation of M&E metrics to aid long-term flood management.

5.2 **Opportunities for Drought Management**

The respondents alluded to the fact that local authorities exemplified strengths, which served as successful factors in the current early warning system and post-drought events. Sharing information accurately coupled with timely dissemination plays a crucial role, in ensuring communities are well-informed and prepared. Additionally, adequate sensitization efforts, including education programs and awareness campaigns, enhance community readiness and response.

Further, local authorities have embarked on afforestation initiatives, which contribute to ecosystem restoration and help mitigate the impact of droughts. Particularly, the District Assembly Department of Agriculture also educates farmers on effective agricultural practices, such as planting early maturing crops and avoiding farming near water bodies, to reduce vulnerability to extreme weather events.

Lastly, the summarised synthesis from the focus group discussions of identified opportunities for drought management includes;

- Collaboration with Institutions:
 - Collaborate with the District Assembly and other institutions for drought reduction and management.
 - Utilize resources and expertise from state institutions like Agric, NADMO, NCCE,
 DA, NGOs (World Vision, Red Cross), and others.
- Early Warning Systems and Monitoring:
 - Monitor weather and climate patterns and reports.
 - The district relies on the emergency preparedness plan as a source of its EWS.
 Monitoring and evaluation of this system serve as feedback for assembly members and community disaster volunteer groups.
- Preparedness and Response:
 - Frequent visits and monitoring of farms for drought occurrences.
 - Organize District Disaster Management Committee.
 - Availability of technocrats and the ability to collaborate resources from other agencies.
 - A disaster preparedness plan includes setting aside disaster response funds.
- Community Engagement and Infrastructure:
 - Availability of community volunteers.
 - Community scorecards and engagements.
 - Interface meetings.
- Strategic Planning:

- Hazard mapping by NADMO to identify disaster-prone areas and develop response strategies.
- National guidelines for the preparation of M&E metrics to aid long-term drought management.

6. Conclusions

The study's comprehensive examination of flood and drought management in the Volta Basin reveals critical insights that underscore the urgent need for a multifaceted approach to disaster risk reduction and climate change adaptation.

The first-hand experiences shared by community members and the findings from focus group discussions and field surveys paint a vivid picture of the challenges and opportunities in managing natural disasters. Memorable flood events lasting up to 120 days, often exacerbated by dam spillages, have inflicted severe and widespread impacts on agriculture, property, health, and overall economic stability. Similarly, droughts, particularly prevalent in northern regions, have led to prolonged agricultural and livestock losses, exacerbating food insecurity and economic stress. However, amidst these challenges, best practices, opportunities, and dissemination pathways for effective flood and drought management abound (see Table 2).

The synthesis of group responses highlights best practices for flood and drought management, emphasizing preventive measures such as afforestation and dredging of water bodies. The importance of early warning systems, proper information flow, and education on flood risks cannot be overstated, while effective coordination among stakeholders is crucial for a unified response. Post-disaster recovery efforts must prioritize rehabilitation of critical infrastructure, provision of healthcare, and needs assessments. Similarly, for drought management, proper land use planning, resource mobilization, and promotion of dry season farming are essential strategies. Coordination among stakeholders ensures a unified and efficient response to drought conditions, while early warning systems provide crucial data for timely action.

From the perspectives of respondents and communities in the Volta Basin, opportunities for future strategies are evident. Ample arable land presents opportunities for initiatives like reshaping and dredging to optimize land utilization while prioritizing tree planting not only combats erosion but also fosters environmental sustainability. Community engagement emerges as a promising avenue,

with real commitment from residents, for improving collaboration with government institutions and community leaders. Active collaboration with NGOs and other actors augments flood management efforts, while infrastructure development, including dam construction and water management systems, is crucial in mitigating flood risks. Enhancing early warning systems bolsters disaster preparedness, ensuring swift and effective responses to natural disasters. Furthermore, leveraging opportunities such as harvesting excess water for irrigation underscores the potential for comprehensive flood and drought management in the Volta Basin.

Table 2 Dimensions Best Practices Opportunities and Dissemination Actions for IMFDR and CCA in the Ghanaian Part of the Volta Basin

Dimensions	Best practices	Opportunities	Dissemination actions
Understanding Disaster Risk	 Hazard identification and assessment Exposure and vulnerability assessment Risk profiling 	 Pre-planning Resettlement Construction with climate change considerations Improved public health 	 Community Engagement Education and Training Use of indigenous knowledge
Strengthening governance	 Standardizing method through which information flows from the national level to the local level Legislative framework Monitoring and evaluation 	 Empowerment of the local people Community involvement in decision making Strengthening and enhancing collaboration of various stakeholders 	 Integrate the local governance into our decentralization policy Sessional planning involving different interest groups
Investing in Disaster Risk Reduction for Resilience	 Community Contribution Funding (Government, Development partners, Charities) Research Grants 	 Private /public partnership (PPP) Technology and innovation infrastructural development (flood resilient structures) Investment into sustainable livelihood and proper land use 	 Engage in communal planning Encourage communal labour Use of indigenous knowledge in early warning
Improved preparedness and reconstruction / Strengthening Readiness	 Mitigation measures to control hazards Early warning system Emergency planning 	 Empowerment of the local community in decision making Strengthening and enhancing collaboration of various stakeholders 	 Integrate the local governance into our decentralization policy Sessional planning involving different interest groups Review and update existing policies

In conclusion, the study highlights the necessity for proactive and comprehensive flood and drought management strategies in the Volta Basin. By prioritizing sustainable land use, robust infrastructure development, and community engagement, stakeholders can build resilience against the increasing frequency and intensity of these natural disasters. Collaboration between local authorities, NGOs, and community members is paramount in crafting and implementing effective disaster management strategies. Despite existing challenges, the study underscores the critical role of accurate information sharing, early warning mechanisms, and community-driven initiatives in enhancing resilience against floods and droughts.

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APPENDICES

Appendix 1: SEPO Matrix (Success, Potential, Failures and Obstacles)

• Limited knowledge of communities regarding flood and drought management practices.

- Poverty hinders the ability to adapt to flood and drought conditions.
- Inadequate Information Sharing: Delays and inadequacies in sharing vital information about flood and drought conditions.
- Apathy and lack of cooperation among some community members with warning and education efforts.
- Environmental Degradation and Improper Practices:

- Cutting down of trees due to poverty, which exacerbates environmental degradation and flood risks and improper farming practices, such as farming on buffers, contribute to flood vulnerability.
- Lack of financial resources
- Inadequate infrastructure
- Natural water drainage patterns
- Environmental Challenges and Natural Events
- Information and Education Management:
- Community Engagement and Compliance
- Seedlings and Supervision of tree planting and management

Appendix 2. Data Collection Tools

1. Individual/Community Interview Guide

Brief introduction

- Presentation of the mission and its importance for the development of communities/communities/the nation

Site identification

- Administrative location, geographic coordinates, investigator, etc.

Respondent identification

- First and last name, gender, age, level of education, household size, social status (head of land, community, religious, etc.), cultural affiliation, etc.

Access to resources and living conditions

- Access to land, environmental resources, etc.
- Socioeconomic occupations
- Services from water resource-related ecosystems
- Modes of housing, transport, GSM communication, etc.

Personal experiences of floods and drought (importance, impacts)

- Understanding floods and drought
- Frequency and scale of disasters (flood, drought, etc.)
- Impacts on livelihoods (social, economic, environmental)
- Share a personal experience of flooding or drought that you have had

Early warning system including community EWS: Participation/Involvement and perception/appreciation of communities

- Knowledge of the existence of EWS (s) (EWS VoltAlarm, Community EWS and other EWS)
- Access, channels and receipt of the alert
- Alert effectiveness

- Decision of the competent authorities
- Responses from communities/vulnerable groups
- Belonging to a social group
- Support or response from state, decentralized, or intermediation structures (NGO, charitable association, etc.)
- Taking gender into account (women, children, young people, disabled people and vulnerable people)
- Feedback, lessons learned/Evaluation and valorization/improvement of EWS
- Sustainability of EWS

Individual/personal and collective adaptation and resilience measures

Structural measures

- Infrastructure construction
- Displacement (emigration, exodus, refugee)
- Adaptation of lifestyle and activities
- Etc.

Institutional measures

- Development and management plans and tools
- Capacity Building
- Establishment of new bodies or partnerships
- Implementation of a new communication system
- Improved governance framework
- Etc.

Interventions of the State and its partners in the reduction and management of flood and drought risks (community perception and assessment)

- Types of intervention at each stage of DRR preparation, emergency/crisis, rehabilitation and reconstruction
- Constraints: weaknesses and threats
- Advantages: Strengths and Opportunities
- Suggestions for improvement

Experiences of Local authorities in flood and Drought Management

- Types of intervention – pre or post-disaster measures, contingency plans, preparation, alert, response, rehabilitation, frequency of interventions related to disasters

- Intervention mechanisms and effectiveness: coordination, IEC/communication for behaviour change
- Satisfaction with interventions, personal or community benefits
- Constraints: weaknesses and threats
- Advantages: Strengths and Opportunities
- Suggestions for improvement

Knowledge of/familiarity with long-term flood and drought management strategies (community perception and appreciation)

- Knowledge of regional, national and local planning (integrated flood and drought risk management strategies, EWS VoltAlarm and other guidance documents on DRR and CCA in the BV)
- Knowledge of implementation mechanisms
- Knowledge of monitoring-evaluation and feedback mechanisms
- Suggestions for improvement of these plans/strategies

Community participation and practices in reducing and managing flood and drought risks (community perception and appreciation)

- Community understanding of risks for better management
- Strengthening risk governance to better manage them
- Implementing investments in DRR for better resilience
- Strengthening pre- or post-disaster measures, contingency plans, preparation, alert, response, rehabilitation to risks to intervene effectively and sustainably in the recovery and rehabilitation and reconstruction phase
- Constraints: weaknesses and threats
- Advantages: Strengths and Opportunities
- Suggestions for improvement

Interventions of social intermediation structures (NGOs, associations, foundations, etc.) in the reduction and management of flood and drought risks (community perception and assessment)

- Types of intervention pre or post-disaster measures, contingency plans, preparation, alert, response, rehabilitation
- Perception/assessment of actors in interventions
- Constraints: weaknesses and threats
- Advantages: Strengths and Opportunities
- Suggestions for improvement

Best practices and successful experiences in disaster risk management (floods, drought)

- Practices/experiences (pre or post-disaster measures, preparation, alert, response, rehabilitation) in line with at least one of the 4 priorities of the Sendai Framework of Action for DRR
- Best practices will be identified based on the assessment of the evaluation grid of the practices inventoried (during data collection) for this purpose
- Propositions for dissemination actions

2. Focus Group Discussion Interview Guide

Brief introduction of background

• Presentation of the mission and its importance for the development of communities/the nation

Identification of the site (administrative location, geographic coordinates, investigator)

- Administrative location, geographic coordinates, investigator, etc.
- Nature, status and number of participants in the focus group

Community experiences of floods and drought

- Importance of disasters
- Impacts on living conditions
- Examples of disasters that have left their mark

Early warning system including community EWS: Participation/Involvement and perception/appreciation of communities

- Knowledge of the existence of EWS (s) (EWS VoltAlarm, EWS Community and other EWS)
- Access, channels and receipt of the alert
- Alert effectiveness
- Decision of the competent authorities
- Responses from communities/vulnerable groups
- Belonging to a social group
- Support or response from state, decentralized, or intermediation structures (NGO, charitable association, etc.)
- Taking gender into account (women, children, young people, disabled people and vulnerable people)
- Feedback, lessons learned/Evaluation and valorization/improvement of EWS
- Sustainability of EWS

Community mutual aid system (existence of the social group, knowledge of state structure, decentralized, or intermediation, etc.)

- Infrastructure construction
- Humanitarian aid
- Lifestyle adaptation
- Advocacy with institutions
- Etc.

Interventions of the State and its partners in the reduction and management of flood and drought risks

- Types of intervention at each stage of DRR preparation, emergency/crisis, rehabilitation and reconstruction
- Constraints: weaknesses and threats
- Advantages: Strengths and Opportunities
- Suggestions for improvement

Experiences of Local authorities in flood and drought management

- Types of intervention pre or post-disaster measures, contingency plans, preparation, alert, response, rehabilitation, frequency of interventions related to disasters
- Intervention mechanisms and effectiveness: coordination, IEC/communication for behaviour change
- Appreciation of interventions, community benefits
- Constraints: weaknesses and threats
- Strengths and Opportunities
- Suggestions for improvement

Knowledge of/familiarity with long-term flood and drought management strategies

- Regional, national or local planning (integrated flood and drought risk management strategies, EWS VoltAlarm and other guidance documents on DRR and CCA in the BV)
- Monitoring-evaluation mechanisms
- Constraints: weaknesses and threats
- Strengths and Opportunities
- Suggestions for improvement of these plans/strategies

Community participation in the reduction and management of flood and drought risks (human, financial, in-kind investment)

- Understanding risks for better management
- Strengthening risk governance to better manage them

- Implementing investments in DRR for better resilience
- Strengthening risk preparedness to effectively and sustainably intervene in the recovery, rehabilitation and reconstruction phase
- Constraints: weaknesses and threats
- Strengths and Opportunities
- Suggestions for improvement

Interventions of social intermediation structures (NGOs, associations, foundations, etc.) in the reduction and management of flood and drought risks

- Types of intervention pre or post-disaster measures, contingency plans, preparation, alert, response, rehabilitation
- Satisfaction with interventions
- Constraints: weaknesses and threats
- Strengths and Opportunities
- Suggestions for improvement

Best practices and successful experiences in disaster risk management (floods, drought)

- Practices/experiences (pre or post-disaster measures, preparation, alert, response, rehabilitation) in line with at least one of the 4 priorities of the Sendai Framework of Action for DRR
- Best practices will be identified based on the assessment of the evaluation grid of the practices inventoried (during data collection) for this purpose
- Proposals for dissemination actions
- 3. Focus group discussion Best practice guide

Best practices and opportunities for improving the IMFDR as well as CCA measures in the national part of the Volta basin in Ghana – Practices/experiences (pre or post-disaster measures, preparation, alert, response, rehabilitation) in line with at least one of the 4 priorities of the Sendai Framework of Action for DRR

- (1) Disaster Prevention and Mitigation;
- (2) Disaster Preparedness;
- (3) Disaster Response; and
- (4) Disaster Rehabilitation and Recovery,

Best practices will be identified based on the assessment of the evaluation grid of the practices inventoried (during data collection) for this purpose

Ways of dissemination of the best practices and responsibilities of actors from the local level to the transboundary scale identified and documented Propositions for dissemination actions. Identify the relevant stakeholders under the following categories and their key roles and responsibilities in IMFDR in lower Volta

- I. Public/Government Sector (which includes regulatory bodies, policymakers and
- II. implementers from the Ministries, Departments and Agencies MDAs),
- III. Research/Academia,
- IV. Development Partners
- V. NGOs/Civil Society Organizations (CSOs)
- VI. Vulnerable Groups (Women/Youth/Disabled/Aged/Children
- VII. Private Sector
- VIII. Traditional Authorities (chiefs, queen mothers, elders
- IX. Other Relevant Groups
- X. Media.