

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

National technical workshop to enrich the findings and recommendations of the national consultation mission for the assessment of capacities and needs for the flood and drought forecasting and warning system in the Volta Basin Coconut Grove Hotel, Accra, Ghana 27 - 28 January 2021



# Final report of the workshop

**Developed by** Joachim Ayiiwe Abungba, Black Volta Basin, Water Resources Commission **Assisted by** Eric Muala, Water Resources Commission

Accra, January 2021



ACRONYMS AND ABBREVIATIONS2
INTRODUCTION
I. OPENING CEREMONY
1.1 Opening Speeches
1.2 Keynote Address5
1.3 Self-Introductions and Meeting Presidium5
II. PRESENTATIONS, WORKS, EXCHANGES
2.1. Presentation of the objectives and expected results of the workshop5
2.2. Presentation of the workshop program6
2.3. Brief overview of the VFDM project6
2.4. Session 1 – Setting the Scene7
2.5. Interactive Session 1- EWS Assessment8
2.6. Interactive session 2 - Recommendations on EWS9
2.7. Session 3 - Comparison between the base analysis carried out by CIMA and the results of the previous interactive sessions
2.8. Session 4 - MyDewetra and VoltAlarm presentation11
2.9. Interactive session 4 - Live demonstration of the myDewetra platform and survey by agency on VoltAlarm Error! Bookmark not defined.
2.10. Establishment of the working group at national level15
2.11. Presentation of additional activities to be carried out in 2020-2021
III. WORKSHOP RECOMMENDATIONS
IV. CLOSING CEREMONY
CONCLUSION
ANNEXES (I-VIII):

 $\square$ 



#### **ACRONYMS AND ABBREVIATIONS**

BPA	Bui Power Authority
BVB	Black Volta Basin
CERSGIS	Center for Remote Sensing and Geographic Information System
CILSS	Interstate Committee for Drought Control in the Sahel
CIMA	CIMA Research Foundation
CWP	Country Water Partnership
EPA	Environmental Protection Agency
GMet	Ghana Meteorological Agency
GWP – WA	Global Water Partnership- West Africa
HSD	Hydrological Services Department
IUCN	International Union for the Conservation of Nature
MSWR	Ministry of Sanitation and Water Resources
NADMO	National Disaster Management Organization
NDPC	National Development Planning Commission
NFS	National Focal Structure
UNDP	United Nations Development Program
VBA	Volta Basin Authority
VFDM	Volta Floods and Drought management project
VRA	Volta River Authority
WASCAL	West Africa Science Service on Climate Change and Adapted Land Use
WB	World Bank
WMO	World Meteorological Organization
WRC	Water Resources Commission
WRI	Water Research Institute
WVB	White Volta Basin





# INTRODUCTION

As part of the implementation of the project entitled "Integrating flood and drought management and early warning for adaptation to climate change in the Volta Basin (VFDM)", a workshop to present the conclusions and recommendations of the national consultation mission for the assessment of capacities and needs for the flood and drought forecasting and early warning system in the Volta Basin was held on January 27<sup>th</sup>-28<sup>th</sup>, 2021 at the Coconut Grove Regency Hotel, Ghana, Accra. The workshop was co-chaired by Mr Ben Ampomah (Executive Secretary of the Water Resources Commission) and Dr. Michael Tanu (Acting General Director of Ghana Meteorological Agency).

The list of participants present at the meeting is attached in Annex VI, while representatives and experts from the World Meteorological Organization (WMO), CIMA Research Foundation, IUCN and CERFE participated virtually in the workshop due to the COVID-19 pandemic restrictions.

## I. OPENING CEREMONY

The opening ceremony, which had media personnel from different media houses in attendance, was commenced by four speeches from namely:

- Dr. Rafatou Fofana, Acting Director of the Volta Observatory, Volta Basin Authority.
- Mr. Ben Yaw Ampomah, Executive Secretary, Water Resources Commission, Ghana.
- Dr. Hwirin Kim, Head of Hydrology and Water Resources Division, World Meteorological Organization (WMO) Secretariat.
- Dr. Bernard Edward Gomez, Representative for North, Central and Western Africa, WMO.

## **1.1** Opening Speeches

Dr. Fofana, spoke on behalf of the Executive Director of the Volta Basin Authority. She noted that the workshop sought to provide a platform for all stakeholders to achieve a common understanding of the gaps, limitations and opportunities of each country's existing early warning systems, while identifying feasible actions to be implemented as part of the VFDM project.

She mentioned that the need for this project was drawn from the Intergovernmental Panel on Climate Change (IPCC) special research report published in 2012. The report made a recommendation for the strengthening of national institutions forecasting on drought and floods, risk mapping and early warning systems as means to reduce impacts of disaster on human lives and properties.







To this end, the VBA through the VFDM project is working to assist the six riparian countries of the Volta Basin to implement coordinated and joint measures to improve their existing regional, national and local level management plans and to draw on lessons learned from previous and current projects on disaster risk reduction and climate change adaptation. This work is being done in partnership with the WMO, the GWP-WA and with funding from the Adaptation Fund.

The project intends to develop disaster risk reduction and climate change adaptation solutions including capacity development for "Green" solutions and gender-sensitive participatory approaches. It, therefore, will help national institutions design early warning systems taking into account civil security services and other private entities and public stakeholders. Also, the project will select one community in Ghana to implement project deliverable suitability for possible integration of EWS into local, regional and national plans.

Dr. Fofana called on all stakeholders to provide the needed assistance based on their institutional strength to ensure the materialization of the project deliverables.

Dr. Hwirm Kim, Head of Hydrology and Water Resources Division, World Meteorological Organization (WMO) Secretariat, extended WMO's gratitude to Volta Basin Authority and Global Water Partnership-West Africa for supporting this Workshop and participants who joined the workshop in the challenging situation of the COVID-19 pandemic. She acknowledged the VFDM project will provide benefit to the Ghana Agencies and the partners involved will support them in the establishment of the open-source EWS. She requested the National partners to own the system, operate and maintain it after the project. This is why the project is engaging the National stakeholders from the beginning. So, it is important to identify together the National needs, gaps, and capacities that are meant to improve. There is no single perfect flood and drought management system but the active participation of the participants in this workshop will surely make possible to protect more and more people's life and properties.

Dr. Gomez, the WMO representative for North, Central and Western Africa, indicated that the project was in tandem with WMO's core business of saving lives from water and climate extremes. He entreated participants to make inputs with the backdrop of leaving no one behind, achieving gender inclusion, and proposing solutions that contribute to swift evidence-based solutions.

This project, therefore, will help the 6 riparian countries and will have a gender sensitive participatory approach. He thanked the Adaptation Fund, WMO, and GWP-WA for their supports in making this technical workshop possible to deliberate in developing flood and drought early warning systems in the Volta Basin countries and to learn best practices on existing regional, national and local level management plans on disaster risk reduction and climate change adaptation. Within Ghana, the project will empower GMet, NADMO, HSD, and other relevant agencies and help them having a common understanding of the limitation and





opportunities of each institution's early warning systems, identify feasible actions to be implemented while providing innovative solutions including green solutions.

# 1.2 Keynote Address

Mr. Ben Ampomah, the Executive Secretary of WRC and Acting Chair of the Ghana Country Water Partnership, duly opened the workshop in a speech read on behalf of the Ministry of Sanitation and Water Resources. He stated that flood and drought disasters are the major contributors to loss of lives, damage of properties and livelihood in Northern Ghana and across Africa. He called on stakeholders to assist replicating and scale-up existing disaster risk reduction systems.

He quoted that "while the forces of nature are impossible to master, it is possible to master ways to reduce the impacts of natural disasters." He used this to buttress the urgent need to adopt coping strategies to advert possible climate change related disasters.

He highlighted some transboundary flood forecasting programs implemented by the Government of Ghana and Togo in the Volta Basin to address EWS, including the flood early warning systems developed for the White Volta and Oti basins in 2016 and 2017, respectively. Also, a drought early warning system was developed and tested for the country in 2018. To this end, the country conducted base-line data and gap analyses to ascertain climate vulnerability assessment for drought management in dry season and planning for the agriculture sector at the national and transboundary levels. Further assistance was needed to invest in building capacities in adaptation and resilience for national and local level decision-makers and community members.

## 1.3 Self-Introductions and Meeting Presidium

After the opening ceremony, there was personal introduction by participants after which the meeting presidium was established as follows:

Chairman:	Mr Ben Ampomah, Executive Secretary, WRC;
Vice-Chairman:	Dr Michael Tanu (Ag. Director General of GMet)
Rapporteurs:	Mr Joachim Ayiiwe Abungba and Mr Eric Muala (WRC)

# **II. PRESENTATIONS, WORKS, EXCHANGES**

The workshop proceeded with presentations and discussions, group works, and feedback plenary sessions.

# 2.1. Presentation of the objectives and expected results of the workshop









Dr. Fofana presented the objectives and expected results of the national technical workshop in Ghana, the methodology for carrying out the work, and the duration of each planned sequence. The methodology and expected results were (i) exchanges and contributions for the enrichment and finalization of the results of the analysis of national capacities and needs in terms of flood forecasting and warning and drought in the Volta basin; (ii) presentation of the guiding principles and approaches for the implementation of project activities (early warning system for floods and drought events, preparation of risk maps) with partners to ensure their regular participation, contribution and mutual support to coordination; (iii) identification of additional institutional arrangements at the national level to support the implementation of project activities; and (iv) production of a technical report of the workshop highlighting recommendations and a draft action plan to develop risk maps and the early warning system in the Volta basin.

# 2.2. Presentation of the workshop program

The chairman, Mr. Ben Ampomah, presented the draft workshop program for amendment by the participants. The draft program was adopted by acclamation.

# 2.3. Brief overview of the VFDM project

Dr Rafatou Fofana of the VBA and Mr Ramesh Tripathi (WMO) presented the VFDM project. The presentation shared and explained the overall goal, the specific objectives, the components and the expected results of the project. It was showed the level of execution of the activities, the achievements, the difficulties and the prospects.

Operationally, the project aims to strengthen the capacities of the six (6) VBA member states in flood and drought management and early warning with a view to reducing disaster risks related to hydro-climatic phenomena. This capacity building will make it possible to set up a cross-border early warning system. This system will be supported by collection and exploitation of existing data on disaster risks, vulnerability, the adaptation capacities of actors and by actors with strengthened capacities and operational skills in terms of EWS. Several training sessions on topics relating to the mandates of actors will be provided.

The project is financed by the Adaptation Fund to the tune of USD 7,920,000 or approximately CFAF 4 billion. It is being implemented by a consortium of partners (WMO, VBA, GWP-WA) under the leadership of WMO.

Execution of the project during the last 12 months had recorded results (various thematic studies, workshops, virtual meetings, preparation of operational documents, reports, etc.) which constitute the bases of the intervention of the project. In the implementation of these activities, difficulties due to the delay in carrying out the activities, the unavailability of actors, human insecurity in certain areas, and especially the COVID-19 pandemic were encountered. Project implementation will continue during the year 2021 based on a budgeted work plan.



Some of the key highlighted project elements and activities (on-going or planned for future) are mentioned below:

- Overall content of National Consultation Report
- Methodology used for baseline analysis
- Effective end-to end 'people centred' early warning system approach
- Risk prevention approaches
- Governance to strengthen resilience and build capacity of stakeholders and policy makers
- Concrete adaptation and stakeholder engagement in the project.

After the presentations, the discussions (questions and answers, comments, contributions) that took place made it possible to retain the following: a participant noted that the methodology did not consider representation of District or Local government authorities or local government services. Dr Tripathi responded that, the report is still at a draft stage, hence all local level issues could be captured during the feedback sessions.

#### 2.4. Session 1 – Setting the Scene

This presentation was made by Dr Marco Massabò of the CIMA Research Foundation. It focused on the Early Warning System (EWS) and the National Consultation Report. Thus, the key elements of the EWS, the content of the national consultation report and the methodology used for the basic analysis of the EWS were presented. The four (4) elements of EWS are (i) improving knowledge of disaster risks, which includes five sub-components namely identification of main hazards, identification of exposure, vulnerability and capacities, identifying roles and responsibilities, consolidating risk information and incorporating risk information into EWS; (ii) monitoring and forecasting, which comprises four main sub-components, namely surveillance systems, forecasts, warnings and institutional mechanisms; (iii) dissemination and communication of warnings, which consists of planning the organization and the decision-making process, setting up communication systems and equipment and giving alerts based on impacts; and finally (iv) preparation and the response, that is implemented through three sub-components including the design of disaster response plans, carrying out public awareness and education campaigns and carrying out tests on public sensitivity.

The second part of the presentation was on the national consultation report including the methodology for its preparation, the broad outlines of its content, and the terms of reference which supported its preparation.

Four stages marked the preparation of the report: the documentary phase, the national consultation, the analysis of the EWS, and the examination of the reports by the national actors. The national consultation is to assess the capacities and needs of national structures in flood and drought forecasting and warning in order to develop integrated, adapted,



sustainable and basin-wide solutions for building resilience to climate change at local, national and regional levels in the Volta basin.

The consultation was based primarily on documentary analysis and meetings with identified structures. Discussions focused on (i) the institutional framework, infrastructure, tools and capacities related to hydrological and meteorological forecasting and warning; (ii) areas at risk of flooding and drought in the country/basin, socio-economic impacts, available hydrometeorological services; (iii) the data available that could facilitate the preparation of risk maps in the Volta basin; (iv) programs, projects related to forecasts and related alerts for developing synergies/complementarities with VFDM project; and (v) the contributions of national structures in the design and implementation of a basin-wide EWS.

## 2.5. Interactive Session 1- EWS Assessment

The first interactive session followed on from the session on the national consultation methodology and report. It focused on the introduction to the four (4) key elements of the EWS and their macro-components as presented in the diagram below.



Participants were divided into four thematic groups to assess each component of EWS in Ghana, as follows: Group A: knowledge of disaster risk; Group B: monitoring and forecasting; Group C: dissemination and communication of warnings; Group D: preparedness and response.

The group exercise consisted of completing the online questionnaire :



https://docs.google.com/forms/d/e/1FAIpQLSfdCsGfieYxRR3-YLKZeVz5M47yntGSWtQ96BqRsF7DR7X-A/viewform?usp=sf\_link

The results of the group work (see Annex I - Results of the group work on EWS Assessment - interactive session 1) were presented and discussed through proposals, suggestions and recommendations.

Some of the queries or points raised by the participants during the group presentations are presented below:

1) What a is Impact-based forecasting?

Forecasting of a severe event and its potential consequences, specifically the forecast translates meteorological and hydrological hazards into potential impacts per sector and for different locations. Impact-based forecasts can lead to actionable warnings and the development of responses to mitigate those impacts. It is important to have Vulnerabilities, Exposure and capacities information at national and local level together with hydro-meteo data for a proper impact-based forecasting.

2) Sharing of warning information through a joint bulletin and establishment of an Emergency Operation Centre (EoC) is required.

EoC is a multi-agency coordination centre with mandate to coordinate the response to different hazards. Strong link should be made by EoC and institutions in charge with monitoring and forecasting. A standardize warning bulletin can support the operation of EoC and all other actors involved in end-to-end early warning.

## 2.6. Interactive session 2 - Recommendations on EWS

This session was the continuation of interactive session 1. The four groups were invited to present their opinions on the prioritization and the organization of recommendations related to the same themes dealt with earlier by the four (4) groups.

At the end, each group presented the results they had reached. Questions, contributions and answers were the highlights of the discussions that followed the various presentations. The results of the groups are presented in the tables in Annex II (Results of the recommendations groups - interactive session 2).

Some key recommendations are summarized in session III, however it is worth to underline two important points raised by the participants

1. All preparedness plans should be mainstreamed into national development planning processes;







This is a very important aspect that will be supported by the project which aim to develop risk maps for floods and drought that will ultimately inform risk management plans

2. IT is central for all the components process of the project, The VoltAlarm platform should integrate other existing platforms/modules and should be user friendly

VoltaAlarm is a key component for the project and it is a flexible tool that can be easily connected with other existing system in place

# 2.7. Session 3 - Comparison between the base analysis carried out by CIMA and the results of the previous interactive sessions

Session 3 focused on a comparative analysis between the results of the previous interactive sessions and the basic analysis of the 4 components of the EWS in Ghana presented in the report of the national consultations by CIMA.

During interactive sessions 1 and 2, the consultants gathered comments and suggestions related to the EWS analysis and related recommendations, which were contained in the report presented during the workshop. The first exercise (interactive session 1) consisted of performing a quick analysis of EWS, assigning a score to the same components and subcomponents used by the consultants. The objective was to obtain an analysis carried out by the main stakeholders and to compare the results with the evaluation produced by the consultants, and possibly to amend it on the basis of the explanations provided by the participants (see the results as graphs in Annex III - comparative assessment of elements of the EWS).

In general, there were not so many differences between the results obtained by CIMA Research Foundation and the workshop groups. Components A and B were very close, while the comments related to components C and D will be considered to make some minor adjustments to the baseline analysis included in the national consultation report.

Here below a graphical summary of the results of this comparative session for each group, presenting not only the graphs but also the most important aspects sorted out during discussion on recommendations.



# 2.8. Session 4 - MyDewetra and VoltAlarm presentation

Session 4 was on the presentation of the MyDewetra system which is the technological basis of the VoltAlarm platform, which is proposed within the project as a central tool of the EWS for floods and drought in the Volta basin. The presentation referred to (i) the importance of technological and IT tools in support of EWS; (ii) the example of the myDewetra platform for information integration; (iii) the proposal of a tool for the dissemination of alerts in the Volta basin.

MyDewetra is a multi-risk platform for building forecasting and risk scenarios in real time, which allows preventive measures to be taken and the impacts of foreseen events to be reduced. It is a set of technological tools and procedures to support national early warning systems. It aims to:

- Improve the monitoring and forecasting capacities of hydrometeorological variables with new technological tools;
- Use computer technologies aimed at reducing the time for actions that do not require expertise (e.g. less time wasted in data collection, more time for data analysis and decision making);



- Promote data sharing and communication between authorities responsible for disaster management (myDewetra as a "round table").

The myDewetra platform has been developed since 2009 by the CIMA Foundation for the Department of Civil Protection of Italy and it's currently the official operating system in Italy, Albania, Croatia, Serbia, Lebanon, Barbados and Bolivia. The system works on the basis of global data but above all on the basis of data provided by the national agencies, which are local and more precise data.

The diagrams below show the workflow of the operational tool proposed for the drafting of monitoring and warnings bulletins and the dissemination of alerts either at national level or at regional level in the Volta basin.







Currently, the platform is being designed and developed and it is important that actors at national level make the necessary data available for its operation.

It has the advantage of integrating the relevant information covering the four (04) pillars of an EWS, namely, knowledge of risks, the monitoring and alert service, dissemination and communication and preparedness and response capacity.

Explanations were provided on its flexibility to allow data integration and especially by several data and information providers with the possibility of issuing multi-risk surveillance bulletins for the Volta basin.

A participant raised a question on the sustainability of the VOLTALARM system to which Ramesh Tripathi informed that the National NHMSs and other authorities should continue to provide data and information to the system and at the transboundary level, VBA will ensure the system is running for use. VBA has also agreed to request maintenance cost from the future projects related to the VOLTALARM system.

Another question was raised on the openness and freely availability of the VOLTALARM EWS. Marco Massabo informed that the myDewetra platform is freely available for use and it can easily integrate the various existing information including also outputs of the Meteorological and Hydrological models for visualization.





The following recommendations were made after the discussions on the presentation:

- Project should support to maintain existing monitoring stations for data collection.
- Platform should integrate other existing platforms and models
- The platform should as much as possible be free and open source to enable free usage
- The platform should be user-friendly
- The platform should allow for the integration of national data sets

A participant suggested that for models to continue to be relevant, they will need continuous validation. Therefore, in case of a local model, the National institution or entity responsible for it should continue with data update for the model validation process. This is very key for the model development process.

However, Anna Mapelli emphasized that, the providers of the models are expected to do validation and calibration, while the national forecasters could realize some validation at the country/local levels, in order to then analyse the model outputs based on their experience and generate warnings.

# **2.9.** Interactive session 4 - Live demonstration of the myDewetra platform and survey by agency on VoltAlarm

Anna Mapelli took participants through a live demonstration of the Dewetra platform to illustrate the possible functionalities in support of the EWS for floods and drought in the Volta Basin. The demonstration was followed by a presentation of a survey for assessing the area of interest and use of VoltAlarm to be completed by each agency involved, in order to help the development of an effective EWS. This survey (available online at the link: <a href="https://www.floodmanagement.info/floodmanagement/survey">https://www.floodmanagement.info/floodmanagement/survey</a>) was filled in by members or representatives of national structures and agencies strongly involved in the implementation of the project and in Volta EWS.

The survey was structured as follows: (i) the various activities of the institutions that VoltAlarm could support and the data that each institution would like to see included in Dewetra; (ii) the profiles for the use of the platform desired by the agencies, the various data that each institution could provide for a proper implementation of the system and its data sharing policies; and (iii) the characteristics of the warnings issued through the VoltAlarm platform. The structure of the survey, as well as the responses of the various institutions are presented and analysed in detail in the Annexes (Annex IV - Survey on the VoltAlarm platform; Annex V - Results of the structures' responses to the survey on the VoltAlarm (Session interactive 4)). In general, each actor involved in the early warning system, in accordance with its mandate and needs, would like to have a technological tool to be able to exchange and analyse data, as well as to develop or receive warning bulletins. Almost all of the data







typologies suggested in the survey are considered very useful by the majority of structures, most of which would like to have access to the platform and could provide certain information to be integrated, while respecting their own data sharing policies (existing within some entities). Regarding warning bulletins, the majority of structures will be interested in issuing or receiving national bulletins as well as a general bulletin at basin level published by a supranational institution and bulletins issued by riparian countries. On the other hand, there are different opinions regarding the alert zones, period of validity and frequency of issuance of bulletins.

## 2.10. Establishment of the working group at national level

This session, which was led by Ramesh Tripathi, focused on the establishment of the working group to facilitate the organization of Project activities. The nomination of the national working group was to be included in the workshop report. All the key institutions represented were tasked to nominate specific persons to be included in the group. The WRC as the National Focal Institution of the VBA was tasked to write letters to the institutions concerned to nominate their representatives.

The working group formed by members (minimum 5 people) of different agencies related to the implementation of project activities (meteorology, hydrology, disaster management, etc.) is to provide support in the implementation of project activities. The working group will be the first point of contact in each country. Its responsibilities are among others:

- coordinate the implementation of national and local activities;
- provide assistance in identifying participants to be involved in trainings or workshops;
- organize national workshops or trainings, including logistical aspects;
- provide support to consultants to collect data and information or meet with national agency staff;
- ensure synergies and complementarities with other completed, ongoing or future projects.

## 2.11. Presentation of additional activities to be carried out in 2020-2021

This presentation covered the other activities of the project and the level of implementation. It described all the activities implementation status during the years 2020 and 2021, in particular those already carried out and those to be executed. The activities presented are:

 mapping of vulnerabilities and exposure to floods and drought and related adaptation capacities at community level in sixty (60) sites in the Volta basin. This mapping was carried out in fifteen (15) sites identified in the Volta basin portion in Ghana; The study results of the 15 sites is currently being analysed and will be presented to the National stakeholders during the next workshops. One of the most vulnerable and less capacities



community from the 15 sites will be identified and then community-based activities for floods and drought will be implemented.

- collection and analysis of data and information on ecosystem and environmental indicators in the Volta Basin to be integrated into the early warning system (EWS) to effectively strengthen resilience and responses to climate change and disaster risks; The regional workshop to present the results of the study will happen in the second quarter of 2021.
- Activities related to the development of floods and drought risk maps are currently under finalization. The concept note (with methodology and implementation plan) and Terms of reference will be shared to identify National staffs who would contribute in the development of the vulnerability and exposure maps.
- establishment of the Project Technical Advisory Committee (PTAC), the process of designation of members by States and other institutions is completed. A total of 21 Members are part of the PTAC from the six countries (one from each of the Meteorological services, one from each VBA focal point institute, one from each Civil protection/Disaster management entity and three are from the regional organization (CILSS, ECOWAS and WASCAL);
- collection of data and information available in the countries for the establishment of the cross-border platform integrating flood and drought forecasting and warning (VoltAlarm) within the framework of the project;
- capacity development of national agencies on the end-to-end early warning system for floods forecasting and drought prediction; The concept note will be shared soon and also requested the participants to fill the survey to better understand their needs and availability of existing training materials.
- establishment of centralized national databases (MCH), based on the availability and needs of infrastructure and capacity development.

# **III. WORKSHOP RECOMMENDATIONS**

At the end of the workshop, the following recommendations were made:

- 1. All preparedness plans should be mainstreamed into national development planning processes;
- 2. The VoltAlarm platform should integrate other existing platforms/modules and should be user friendly;
- 3. The National working group should be constituted, and the membership will be communicated later based on the key institutions represented;





- WRC should write to all institutions concerned to nominate officers for the working group;
- 5. Participants should take note of the training program outlined and avail themselves when the time is due;
- 6. Ghana should work towards having specific module or set of modules to be used under the training program;
- 7. Ensure continuous update of the modules as to remain relevant for use;
- 8. IT is central to all the component process of the project;
- 9. Place emphasize on the importance of impact based forecasting in the Voltalarm system;
- 10. The private sector should be brought on board for project sustainability;
- 11. Sectoral coordination with regards to Early warning should be improved;
- 12. Citizen must be taught or informed on how to use IT gadgets in information gathering.
- 13. Communities within the Districts must be engaged in the stakeholder process.

# **IV. CLOSING CEREMONY**

It was marked with four (4) statements:

- **1. Ramesh Tripathi (WMO):** Thanked all who participated in the workshop. He was very satisfied with the successful organization of the workshop and urged all participants to stay in touch and prepared since there was going to be more of such workshops.
- 2. **Marco Massabo (CIMA):** He thanked everybody for their presence and active participation and requested that the workshop recommendations be shared.
- **3.** Rafatou Fofana (VBA): She extended her appreciation to all national stakeholders and the consultants at WMO for the efforts in making the workshop a reality. She concluded that she was particularly happy that all stakeholders were now at the same level with regards to the project activities.
- 4. Ben Ampomah (WRC): He also thanked all project partners especially those who joined virtually, to VBA and GWP-WA especially Dr Rafatou Fofana and Mr Sidi Coulibaly who assisted in facilitating the workshop. He expressed optimism that all participants were going back with new ideas and benefits from the project. He formally closed the workshop.





# CONCLUSION

Ramesh Tripathi highlighted the need to appoint institutions to serve as National Focal Points (NFP) for the project implementation. Participants appointed WRC to lead the NFP. WRC was also tasked to identify four other institutions and officially write to invite them. Also, participants were entreated to avail themselves for the upcoming capacity development training scheduled in June 2021.

Mr Ben Ampomah, the Chairman expressed his appreciation to all participants for the participation and for making the workshop a success.



# ANNEXES

P





#### Annex I: Results of group work on EWS Assessment (interactive session 1)

The participants split into four (04) thematic groups to assess each component of the EWS in Ghana, each answering 3 questions. Here the responses of the groups.

#### Group A: Knowledge of disaster risk

statements)

Email address	franzalex@csir-water.com		
Group letter	A		
Identification of key haza	rds and related threats		
1. Are key flood and drought hazards and related threat identified?	2		
Strength Analysis: Identif	fication of key hazards and related threats		
Motivate your answer explaining why this component is a strength of the national EWS (max. three statements)	Hazard maps exist at the national level but at a low spatial resolution when considering it at the district level (admin level 2); not very useful for planning at the district level. There is historical meteorological data for the whole country with a non-uniform spatial distribution of weather stations; higher concentration in the southern part of the country than in the north.		
Assessment of Exposure	, Vulnerabilities and Capacities		
2. Are exposure, vulnerabilities, 1 capacities and risks assessed?			
Gaps Analysis: Assessm	ent of Exposure, Vulnerabilities and Capacities		
Motivate your answerby listing possiblecauses and limitations(max. three statements)			
Roles and Responsibilitie	es		
3. Are roles and responsibilities of stakeholders identified?	2		
Strength Analysis: Roles and Responsabilities			
Motivate your answer explaining why this component is a strength of the national EWS (max three			

there good dissemination of key findings.



Participants suggested also some important aspects for having a consolidated risk information:

- i. Strengthen collaboration between key stakeholders
- ii. Improve communication and sharing of information
- iii. Improve capacity building for key institutional gaps identified
- iv. Have a centralized platform for communication and dissemination

Regarding the incorporation of risk information to EWS:

- i. it was noted that forecasting in Ghana was not impact based as it does not go a step further to provide EWS forecast effects on possible areas and the anticipated hazards to cover (consequences). E.g.: with a continuous rainfall of 30 mm in two days, how is the effect interpreted to an ordinary farmer.
- ii. Participants also suggested mainstreaming EWS strategies into national, and district sector plans and strategies.
- iii. Also participants proposed the establishment of an emergency fund to support line budget allocation during emergencies.
- iv. Participants proposed to have citizen science approach for the static risk information.





# Group B: Monitoring and forecasting

Email address	maclumor@yahoo.com		
Group letter	В		
Flood and drought monite	oring systems		
1. Is the monitoring network for flood and drought hazards established?	1		
Gaps Analysis: Flood and	d drought monitoring systems		
Motivate your answer by listing possible causes and limitations (max. three statements)	<ol> <li>FEWS-Volta (White and Oti) and CREW has been developed.</li> <li>Hydromet stations have been established but near real-time data is inadequate.</li> <li>No network linkage was however done between the servers of GMet and HSD.</li> </ol>		
Forecasting and Warning	l de la construcción de la constru		
2. Are flood and drought forecasts and warnings in place?	1		
Gaps Analysis: Forecasti	ng and Warning		
Motivate your answer by listing possible causes and limitations (max. three statements)	<ol> <li>Yes, there are various forecasting (mostly flooding) being done by the various institutions.</li> <li>Warning centers, except GMet, are not operational 24/7.</li> <li>Forecasting is generally not impact based.</li> </ol>		
Institutional Mechanisms	i		
3. Are institutional mechanisms established?	1		
Gaps Analysis: Institutional Mechanisms			
Motivate your answer by listing possible causes and limitations (max. three statements)	<ul> <li>swer established and spelt out.</li> <li>2. Inadequate coordination in Institutional arrangements and Operation Centers.</li> <li>3. Data sharing is generally informal.</li> </ul>		





#### Gaps in Ghana's EWS.

- i. It was noted that FEWS on the Volta and Oti and CREW had been developed.
- ii. Also, hydro-meteorological stations have been established across the country. However, these systems lack adequate and robust infrastructure to convey realtime data, while others need renovations.
- iii. It was agreed by all participants that some institutions in Ghana has forecasting and warning model. However, the reporting of these data among the institutions is not impact-based.
- iv. Also, although institutional mandates and responsibilities are clearly established and outlined, inadequate coordination within institutional arrangements exist.
   Majority of the coordination among the institutions is done informally.
- v. An appeal was made to intensify dialogue with the various local assemblies in the delivery of the project implementation to ensure early buy-in and ownership of District Assembly (DA) staff for easy mainstreaming of EWS policies in their respective plans. Also, capacities of DA staff need to be trained to appreciate EWS.



#### **Group C: Communication and dissemination of warnings**

Email address	barnes.iy@yahoo.com		
Group letter	с		
Organization and decisio	n making processes		
1. Are operational procedures and government policies in place to ensure effective dissemination of warnings?	1		
Gaps Analysis: Organizat	tion and decision making processes		
Motivate your answer by listing possible causes and limitations (max. three statements)	1. Lack of harmonization of early warning communication systems to target groups		
Communication systems	and equipment		
2. Is the warning communication effective?	1		
Gaps Analysis: Commun	ication systems and equipment		
Motivate your answer by listing possible causes and limitations (max. three statements)	<ol> <li>No backup systems</li> <li>Private sector not involve</li> <li>Mode of dissemination is not appropriate to the target group</li> </ol>		
Impact based early warning			
3. Is the Flood and Drought Early Warning "impact based"?	1		
Gaps Analysis: Impact based early warning			
Motivate your answer by listing possible causes and limitations (max. three statements)	1. No automated systems are in place.		

Participants suggested the following:

- i. Capacity training needs to target media personnel to understand and better report on EWS and drought and flood occurrences.
- ii. The private sector needs to be encouraged to partner in the development of EWS.

It was identified that inadequate automated systems relating to FEW communication systems exist in the country.





#### **Group D: Preparation and response**

Email address	kkinney@thedevin.org		
Group letter	D		
Disaster response plans			
1. Are there disaster response plans in place?	1		
Gaps Analysis: Disaster	response plans		
Motivate your answer by listing possible causes and limitations (max. three statements)	Low prioritization at the policy level and limited understanding to make it a policy		
Public awareness and ed	ucation campaigns		
2. Are public awareness and education campaigns effective?	1		
Gaps Analysis: Public aw	vareness and education campaigns		
Motivate your answer by listing possible causes and limitations (max. three statements)	Not well structured, not consistent, poor coordination of efforts among institutions		
Test on public awareness	5		
3. Are the lessons learned from previous catastrophic events well integrated into the preparedness and response plans?	2		
Strength Analysis: Test on public awareness			
Motivate your answer explaining why this component is a strength of the national EWS (max. three statements)	it touches on the end users who most vulnerable, important because it strengthens the feed back mechanism, provides context for the whole design, ensures preparedness to minimize the damage		

Participants raised the concern to integrate public awareness and education in developing preparedness and early response mechanisms for EWS. The reason being, it was estimated that much information is yet to be gathered from target groups of EWS information to ascertain if information received by target groups are appropriate and effective. These systems can be achieved by developing robust feedback mechanism integrated into the EWS preparedness and response process.



#### Annex II: Results of the groups on recommendations (interactive session 2)

Each group classified the recommendations proposed by the CIMA Foundation (see list below for each group) in the report "Assessment of capacities and needs" according to the 3 macrocomponents of their specific EWS component, using white sticky notes. The new actions proposed by the working group (in red in the list) are displayed on the blue sticky notes. **Group A: Consolidate knowledge of disaster risk** 





#### Group B: Strengthen monitoring and forecasting





# Improve Monitoring and Forecasting: recommendations and actions



#### Group C: Improve the warning and its dissemination



Group D: Increase preparedness and response







# Increase Preparedness and Response: recommendations and actions







# List of actions

- 1. **Promote gender mainstreaming**: participations of vulnerable groups to risk mapping, to post-disaster evaluations, to specification of warnings and to warning dissemination; \*
- 2. Integrate disaster risk modules in the school and university curricula;
- 3. Educate people in recognizing the hydro-meteorological hazard signs;
- 4. Develop local and national preparedness plans in a scenario-based manner which are
- implemented/enforced through an allocated budget; \*
- 5. Actively engage the communities in the development of disaster preparedness and response plans; \*
- 6. Assess the community's ability to cope to disasters and respond to warnings;
- 7. Create an emergency fund based on forecasting of any floods events; \*

8. **Review periodically the** contingency **plans** according to risk information and integrate response actions to warnings for flood and drought; \*

9. Establish an IT system for improving knowledge of climate-disaster impacts on population, infrastructure and services; \*

10. Update and review public awareness strategies and programs regularly, according to changes in hazards and vulnerability

11. Testing of Plan



#### Annex III: Comparative assessment of elements of the EWS

The graphs show the results presented by the CIMA Foundation on the basis of 80 questions for each element of the EWS in the report "Assessment of capacities and needs". The country score is shown in blue in the report and compared to the scores (in yellow) proposed by each working group (based on 12 questions, 3 per group) during the interactive session of the workshop.









During the interactive session 4 the participants, following a practical demonstration of the functioning of the VoltAlarm platform (which will be implemented in the second year of the project), answered - by structure - to a survey on the platform itself.

The survey consisted of three sections, each responding to an objective of interest for the future implementation of the platform.

Section name	Corresponding objective
Data types on VoltAlarm	How do you want to use the platform? For example, do you only want to visualize the data or also provide it?
Users and Profiles	Do you have data to share? Are the legal and IT conditions established for the sharing of this data?
Warnings	How do you want the alert bulletin to be organized to be effective?

The survey is presented below.



25/02/21, 16:58

# Interactive Session - Day2: VoltAlarm EWS platform

As part of the Volta project, an End-to-End Early Warning System for both floods and drought will be developed with the aim of generating tailored hydrometeorological information services for the agencies, communities and the general public.

For the development of an effective web-based early warning system, this survey aims to investigate and discuss benefits and functionalities (types of information, forms of warning etc.) of the VoltAlarm service. Your views and suggestions will be essential to create a system that can support and easily integrate into national operating services, assimilating available models and data.

\*Required

1. Email address \*

2. National agency or institute which you belong: \*

3. 1. Think about the mandate and duties of your institution, how VoltAlarm could support you institution in your daily activities? \*

e.g., identification evacuation routes, hazards' forecast, issue of warnings (please specify the type of warning), issue (bulletins (please specify the type of bulletin), urban planning, etc.

2. Based on the duties and mandate of your agency in the EWS chain, what kind of data wouk you like to see in VoltAlarm?

https://docs.google.com/forms/d/1bZJILu4ZHojagL6RyKnEiax0gntt3R99XVz81jPggFc/printform

Pagina 1 di 9



25/02/21, 16:58

4. Observation data on rainfall \*

Mark only one oval.

- 0 not useful for my institution
- 📃 1- can be useful for my institution but not essential
- 2 very much useful for my institution
- 5. Observation data on drought (e.g. SPI, NDVI) \*

Mark only one oval.

- 0 not useful for my institution
- 1- can be useful for my institution but not essential
- 2 very much useful for my institution
- 6. Observation data on soil moisture \*

Mark only one oval.

- 0 not useful for my institution
- 1- can be useful for my institution but not essential
- 2 very much useful for my institution
- 7. Forecasts from meteorological models \*

Mark only one oval.

- 0 not useful for my institution
- 1- can be useful for my institution but not essential
- 2 very much useful for my institution

https://docs.google.com/forms/d/1bZJILu4ZHojagL6RyKnEiax0gntt3R99XVz81jPggFc/printform

Pagina 2 di 9



25/02/21, 16:58

8. Forecasts from hydrological models \*

Mark only one oval.

- 0 not useful for my institution
- \_\_\_\_ 1- can be useful for my institution but not essential
- 2 very much useful for my institution
- 9. Exposure data (e.g. geospatial location of infrastructures, services) \*

Mark only one oval.

- 0 not useful for my institution
- 1- can be useful for my institution but not essential
- 2 very much useful for my institution
- 10. Flood hazard maps corresponding to events of different magnitudes \*

Mark only one oval.

- 0 not useful for my institution
- 1- can be useful for my institution but not essential
- 2 very much useful for my institution
- 11. Drought hazard maps \*

Mark only one oval.

- 0 not useful for my institution
- 1- can be useful for my institution but not essential
- 2 very much useful for my institution

https://docs.google.com/forms/d/1bZJILu4ZHojagL6RyKnEiax0gntt3R99XVz81jPggFc/printform

Pagina 3 di 9



25/02/21, 16:58

12. Flood risk maps for the present and future climate conditions \*

Mark only one oval.

- 0 not useful for my institution
- 1- can be useful for my institution but not essential
- 2 very much useful for my institution
- 13. Drought risk maps for the present and future climate conditions \*

Mark only one oval.

- 0 not useful for my institution
- 1- can be useful for my institution but not essential
- 2 very much useful for my institution
- 14. Data on past disasters (affected population, damages, etc.) \*

Mark only one oval.

- 0 not useful for my institution
- 📃 1- can be useful for my institution but not essential
- 2 very much useful for my institution
- 15. 3. Are there any other categories of data or system functions not listed above or presente that you would like to have in VoltAlarm to support your institution's activities within the flood and drought early warning system? If yes, which ones? \*

https://docs.google.com/forms/d/1bZJILu4ZHojagL6RyKnEiax0gntt3R99XVz81jPggFc/printform

Pagina 4 di 9



25/02/21, 16:58

#### **Users and Profiles**

16. 5. Does your agency want to have direct access to the VoltAlarm platform? \*

Mark only one oval.

O Yes	Skip to question 17
No	Skip to question 21

#### VoltAlarm user types

17. 6. What kind of user role in the VoltAlarm platform would be most appropriate for your agency? (more than one answer can be selected) \*

Mark only one oval.

Viewer	Skip to question	21
Viewer and	d Data Provider	Skip to question 18

#### Data provider user type

18. 7. VoltAlarm aims to facilitate the exchange of information between different national and cross-border actors. Is there any restriction for your agency for sharing data with third parties? \*



Pagina 5 di 9



25/02/21, 16:58

19. 8. Which kind of data are you willing to share through the VoltAlarm? (more than one ansv can be selected) \*

Tick all that apply.

- Static information on hydro-meteorological conditions (climatology, watershed boundaries, data c past events, etc.)
- Dynamic information collected by real-time hydro-meteorological stations
- Dynamic information provided by forecasting models
- 20. If dynamic information has been selected: IT equipment for dynamic data storage and sharing might be needed. Does your agency have sufficient computational tools (equippe server room, stable internet connection) to ensure a continuous provision of real-time date to the VoltAlarm system? \*

Warnings

The hydro-meteorological data that will be available in the VoltAlarm system are useful to assess current and near-future flood and drought conditions. This information should be synthetized and disseminated through warning bulletins. Alert should be easy-to-read and consistent in time in order to trigger timely actions, using a colour-scale from green to red for instance. How these warnings should be in your opinion and how your agency should contribute?

21. What would be in your opinion the role of your agency in the early warning system? \*

Mark only one oval.

)	0		1	+ la a		منتخم البيما
)	Complie	and	ISSUE	the	warning	DUIIETIN
	o o i i pilo		10040			Sanothi

- Provide information to the agency(ies) in charge of compiling the warning bulletin
- Receive the warning bulletin
- Other:

https://docs.google.com/forms/d/1bZJILu4ZHojagL6RyKnEiax0gntt3R99XVz81jPggFc/printform

Pagina 6 di 9



25/02/21, 16:58

22. How frequent would you like to receive/issue a warning? \*

Mark only one oval.

- Daily, even if no relevant events are observed or foreseen (green)
- With a fixed frequency, lower than daily (e.g. weekly, monthly)
- Only when relevant events are observed or foreseen (no standard daily routine)

)	Othor
	omer

23. If the bulletin to be issued entails a forecast, which time-horizon should the warning cove

Mark only one oval.

Next day
Next few days (2 to 3)
Next week
Ovariable period to be stated in the warning bulletin each time
Other:

24. Bulletin should be consistent in time, providing alert information on fixed boundaries (so called "alert-zones"). These areas should be defined according to operational response capacities. A "warned" zone should be able to take early actions and trigger civil defence response when activated. How would you define the alert zones? On the base of: \*

Mark only one oval.

) f	Hydrograp	hic sub	o-basis
-----	-----------	---------	---------

- Administrative level 1 (e.g. regions)
- Administrative level 2 (e.g. prefectures)
- A combination of sub-basins and administrative levels

Pagina 7 di 9



25/02/21, 16:58

25. Are you interested in receiving information regarding alerts issued in neighbours' countrie If yes in which form? \*

Mark only one oval.

Visualisation (not edition) of other countries warnings through the VoltAlarm platform

Receiving a general bulletin, issued by a supranational institution, covering the whole Volta watershed

Other:

This content is neither created nor endorsed by Google.

Google Forms

https://docs.google.com/forms/d/1bZJILu4ZHojagL6RyKnEiax0gntt3R99XVz81jPggFc/printform

Pagina 8 di 9





# Appendix V: Results of the structures' responses to the VoltAlarm survey (Interactive session 4)

The following 12 entities responded to the survey:

- Volta River Authority
- NADMO
- CSIR Water Research Institute
- Office of Head of Local Government service
- The Development Institute
- Ministry of Finance
- Environmental Protection Agency
- Water Resources Commission
- CERSGIS
- Ghana Country Water Partnership
- Ghana Meteorological Agency
- Hydrological Services Department

In the first section referred to data that the different structures would like to visualize in the platform, almost all of the suggested data typologies were considered very useful by the majority of the structures.



Concerning the section related to users and profiles, almost all structures (9 over 12) would like to have access to the platform and the majority of structures stated that they would like to be a user, either viewer and data provider. Half of the structures able to provide data also have policies and restrictions regarding data sharing, which obviously need to be taken into account for the implementation of the platform.



Entities also provided answers regarding data or information typologies that they would be able to provide to be integrated in the platform. A graphical summary of the results is presented below.



Finally, the section on warning bulletins consisted of 5 questions. The majority of structures will be interested in issuing and receiving bulletins, but there are also structures more interested in the dissemination. Regarding the alert zones, frequency of issuance and the period of validity of the bulletins, the structures have different opinions, hence the importance of promoting a dialogue with each structure and among the structures themselves to understand the needs of each one. Regarding bulletins of neighbouring countries, there is surely an interest in being able to know this type of information: more than half of the structures would like to receive a general bulletin published by a supranational



institution, while the other entities would rather be interested in viewing the information of bulletins issued by the other countries of the Volta basin.

A graphical summary of the responses for each question is shown below.

In general, each actor involved in the early warning system, in accordance with its mandate and needs, would like to have a technological tool to be able to exchange and analyse data, as well as to prepare or receive warning bulletins.















# Annex VI: List of participants

# LIST OF PARTICIPANTS

No.	NAME	INSTITUTION	JOB TITLE	PHONE NO.	EMAIL ADDRESS
1	Samuel Owusu Ansah	Gmet	Meteorologist	0242935927	Ansahsamuelowusu2014@gmail.com
2	Maureen Abla Ahiataka	Gmet	Meteorologist	0558392890	maureenahiataku@gmail.com
3	Stephen Asugre Jnr	CSIR-WRI	Technologist	0543551425	stepjnr@gmail.com
4	Franz Alex	CSIR-WRI	Technologist	0266769525	Franzalex@csir-water.com
5	George Owusu	CERSCUS	GIS Specialist	0243053574	georgesenyo@gmail.com
6	Isaac Barnes	Ghana Country Water Partnership	Rep. of Executive Secretary	0240381559	Barnes.iy@yahoo.com
7	Lilian Baeka	OHLGS	Director, MTS	0243343747	Lbaeka@hotmail.com
8	Ken Kinney	The Dev Inst	Executive Director	0208192239	kkinney@thedevin.org
9	Lumor Mawuli	W.R.C	Principal Basin Officer	0244533990	maclumor@yahoo.com
10	Brobbey Prince	NADMO	Geo-spatial & Big Data	0551519910	brnsprince@gmail.com
11	Ampomah Patience	NDPC	P.A	0261140558	patience.ampomah@ndpc.gov.gh
12	Sylvester Darko	ASD	SNR HYDRO	0244177110	slykwesi@yahoo.com
13	Suzzy Abaido	MSWR	WASH Project Officer	0244639021	sabaidoo@yahoo.com
14	Antwi Joseph	MOF	Chief Analyst	0242537894	josphantwi@gmail.com
15	Michael Tanu	Gmet	Director General	0549694200	Tanumicheal.gmail.com
16	Victor Addabor	NADMO	Head, Geospatial	0205370109	addabor@gmail.com
17	Christabel Hammond	HSD	Asst. Hydrologist	0246334641	hadei@rocketmail.com
18	Patricia Etornam Hlorbu	W.R.C	PR/Education	0244306364	Etornam422@gmail.com
19	Eric Muala	W.R.C	Snr. Monitoring Officer	0234502258	Ericmuala25@gmail.com
20	Lawrencia Ziwu	W.R.C	PRO	0245627642	laurrenex@gmail.com
21	Kudjawu Jewel	EPA	Ag. Director	0501301527	jkudjawu@gmail.com
22	Esi Biney	W.R.C	Principal Ecologist	0244224460	zbiney@yahoo.com
23	Ben Ampomah	W.R.C	Executive Secretary	0244874138	byampomah@yahoo.com
24	M. Wumbilla Salifu	B.P.A	Director Gen. Services	0245524634	ddir.gsd@buipower.com



25	Joachim Abungba	W.R.C Black Volta	Basin Officer	0246737519	joachimayiiwe@yahoo.com
26	Aaron Aduna	W.R.C White Volta	Chief Basin officer	0242074137	aaronaduna@gmail.com
27	Philip Tetteh Padi	V.R.A	Snr. Water res. Engi	0243565393	Philip.padi@vra.com
28	Coulibaly Sidi	GWP.WA	Communication	+22670234104	Sidi.coulibaly@gwpwa.org
29	Fofana Rafatou	VBA	Ag. Observatory/ Hydrologist	+22670824583	rfofana@vba.int

# LIST OF MEDIA

No.	NAME	MEDIA HOUSE	PHONE NO.	EMAIL ADDRESS
1	Raissa Sambou	Ghanaian Times	0548997488	raissasambou1@gmail.com
2	Samuel O. Lartey	Ghanaian Times	0244955089	smlarley@gmail.com
3	Carlos Afamou	Ghana News Desk	0274413629	Afamou15@gmail.com
4	Nsor Paul	Amanie FM	0266616060	Nsorpaul54@gmail.com
5	Mensah Israel	Top News	0551468747	Israelmensah96@gmail.com
6	Fada Amakye	Otec FM	0241191515	amakyefada@gmail.com
7	Prince Acquah	Daily aGraphic	0262257426	Hakot35@gmail.com
8	Abdulai Haruna	G.N.A	0247471307	aharuna716@gmail.com
9	Benjamin A. Commey	G.N.A	0276437420	bcadamafio@gmail.com
10	Edna Salvo-Kotey	Daily Graphic	0545010540	efyarh@gmail.com
11	Mark Byron	UTV	0559223309	Mou3220.le@gmail.com
12	Eric Osei	UTV		
13	Mahama Muslim	UTV		
14	Ben Laryea	Daily Searchlight	0543458031	
15	Doreen Ayofo	GBC, Unique FM	0208218008	dreampofo@gmail.com
16	Samuel Appiah	Peace FM	0278767799	Samrice676@gmail.com
17	David Huttor	RFI/ATTV	0576626084	
18	Edward Alidjah	Daily TV	0244866829	Edwardalid48@gmail.com





Annex VII: Some photos



















# Annex VIII: Workshop agenda

# 'Final agenda'

	Day 1 – morning		
Time	Description	Responsible	
8:30 am - 9:00 am	Welcoming participants	WMO/VBA/GWP- WA	
	Opening ceremony	Ministers, VBA, Meteo	
	Presentation of the participants	VBA / GWP-WA	
9:00 a.m	Selection of the presidium	WMO / ABV / GWP- WA (to be identified with the project management team)	
10.15 a.m.	Presentation of the workshop objectives and expected results	Presidium	
	Presentation and adoption of the workshop agenda	Presidium	
	Media interviews		
	Photo	VBA / GWP-WA	
	Coffee break		
10:15 a.m 10:30 a.m.	Brief presentation of the VFDM project (progress of activities, difficulties and prospects)	WMO / VBA / GWP- WA	
	Session 1: Putting it into perspective		
	<ul> <li>Introduction to the key elements of the early warning system (knowledge of risks, monitoring and forecasting, communication and dissemination, preparation and response);</li> </ul>	WMO (CIMA) 15 min	
10:30 am -	<ul> <li>Presentation of the general structure of the national consultation report and the methodologies used for the basic analysis</li> </ul>		
12:30 pm	Interactive session 1: EWS assessment	CIMA (methodology)	
	Interactive discussion on chapters 2,3,4,5 and 6 through a group exercise.	VBA- GWP-WA / / Presidium (group	
	<ul> <li>Description of the group exercise on the assessment of the national EWS (main gaps, limitations and opportunities of each element of the early warning system)</li> </ul>	work) 45 mins	
	Performing the group exercise		







12:30 - 1:30 Lunch p.m. Day 1 – afternoon Presentation and reflection on group work Group rapporteurs 13:30 and presidium (45 Each group will present their work (10 minutes each group) 14:15 min) **Interactive session 2: SAP recommendations** CIMA (20 min) -Interactive discussion on recommendations and actions for each Presentations 2:15 p.m. component of EWS through a group exercise. 3:30 p.m. Description of the second group exercise Group work VBA-GWP-WA (45 min) ٠ Performing the group exercise Group rapporteurs Presentation of the results of the group work on the EWS 3.30 p.m. and presidium (45 recommendations in relation to the gaps 4.15 p.m. min) • Each group will present their work (10 minutes each group) 4:15 p.m. -Coffee break VBA / GWP-WA 4:45 p.m. General discussion on the national consultation report The discussion will be devoted to comments, observations • Presidium and feedback on chapters not yet covered in previous sessions Day 2 8:00 am -Brief summary of the results of the first day of the workshop Presidium 8:15 am Session 3: Presentation of the base analysis carried out by CIMA 8:15 am and comparison with the gaps identified during the previous day's CIMA 8:45 am session. Discussion on the recommendations obtained by the group work. 08:45 -Presidium Discussion 09:00 09h00-Session 4 : Presentation of myDewetra (general), the VOLTALARM CIMA / WMO / VBA 09h45 platform (Dewetra-Volta) and the VOLTALARM EWS bulletin / GWP-WA 09:45 -Discussion Presidium 10:15









10:15 a.m 10:45 a.m.	Coffee break	VBA / GWP-WA
10:45 a.m 12:00 p.m.	<ul> <li>Interactive session 4: VoltAlarm</li> <li>Dewetra Live Demonstration (CIMA)</li> <li>Completion of the survey on VoltAlarm by agency</li> </ul>	CIMA / WMO / VBA / GWP-WA
12h00 - 13h00	Appointment of members of the National Working Group (maximum 6 people) to provide support in the implementation of project activities	VBA/GWP-WA
13h00 - 14h00	Lunch	
2:00 p.m 3:00 p.m. 3:00 p.m 4:00 p.m.	<ul> <li>Summary of the implementation of additional activities to be carried out in 2020-2021: <ul> <li>Project activity 1.1.2.2 and 1.1.2.3: Establishment of centralized national databases (MCH), availability and needs of infrastructure and capacity development.</li> <li>Development of risk maps for the Volta Basin region</li> <li>Mapping of vulnerability to floods and drought and associated adaptation capacities at the community level (60 sites) in the six countries</li> <li>Activity of collecting and analysing data and information on ecosystem and environmental indicators in the Volta basin to be integrated into the early warning system (EWS) to effectively strengthen resilience and responses to climate change and climate change. disaster risk;</li> <li>Information on project Technical Advisory Committee of the VFDM project</li> <li>Collection of data and information available in countries for the establishment of the cross-border platform integrating flood and drought forecasting and warning (VOLTALARM)</li> </ul> </li> <li>Discussion</li> </ul>	WMO/VBA/GWP- WA Presidium
4:00 p.m 4:30 p.m.	Coffee break	









4:30 p.m 5:00 p.m.	Presentation of the workshop report and closing of the workshop	Presidium