Volta Flood and Drought Management

ADAPTATION FUND

Mid-term evaluation report

VFDM project: Integrating Flood and Drought Management and Early warning for the Climate Change Adaptation in the Volta Basin

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Final Report

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WORLD METEOROLOGICAL ORGANIZATION

Project Executed by:

WORLD METEOROLOGICAL ORGANIZATION

AUTORITE DU BASSIN DE LA VOLTA — BURKINA FASO, MALI, BENIN, COTE D'IVOIRE, TOGO, GHANA — VBA — VOLTA BASIN AUTHORITY

Global Water Partnership West Africa

Abbreviation	Meaning
AF	Adaptation Fund
AFB	Adaptation Fund Board
BF	Burkina Faso
CGRE/CEDEAO	Centre of Water Resources Coordination, Economic Community of West African State
CN-CIEPA	Coalition Nationale Campagne Internationale pour l'Eau Potable et l'Assainissement
E2E	End to End
ECOWAS	Economic Community of West African States (ECOWAS)
EE	Project Executive Entity
GWP-WA	Global Water Partnership West Africa
IE	Project Implementing Entity
KPI	Key Performance Indicators
LC1	Local consultant Ms. Benagabou
LC1	Local consultant Mr. Dossou-Togbe
MTE	Mid Term Evaluation
PC	Principal Consultant Mr. P. Reggiani
PAC	Project Technical Advisory Committee
SHMI	Swedish Meteorological and Hydrological Institute
STEM	Science, Technology, Engineering and Mathematics
UN	United Nations
UNCCD	United Nations Convention to Combat Desertification
UNEG	United Nations Evaluation Group
VFDM	Volta Flood and Drought Management Project
UN SDG	UN Sustainable Development Goal
VCER	vulnerabilities, capacities, exposures and risks
VBA	Volta Basin Authority
WAEMU	West African Economic and Monetary Union
WASCAL	West African Science Service Center on Climate Change and Adapted Land Use
WBG	World Bank Group
WMO	World Meteorological Organization

Contents

1. Executive Summary

1.1. VFDM project Background

The Volta Basin is one of the most vulnerable regions in West Africa due to its high exposure and low adaptive capacity to water-related hazards. The region, which is home to more than 25 million people, has been affected by climate change events, such as flood and drought, generating social, economic and environmental losses to almost two million people over the last 20 years. Key affected stakeholders are mainly people working in the agricultural sector, as around 68% of the population in the basin has a livelihood based on substance farming.

The VFDM project has the ambition to provide the first large-scale and transboundary implementation of integrated flood and drought management by supporting the National Meteorological and Hydrological Services and other competent authorities of the six riparian countries (Benin, Burkina Faso, Côte d'Ivoire, Ghana, Mali, Togo) with robust solutions aimed at disaster risk reduction and mitigating climate impacts. The interventions also include capacity development for nature-based solutions and gender-sensitive participatory approaches. An E2E-EWS for floods and drought management should be implemented aimed at reaching national civil protection services and other private and public stakeholders that are potentially vulnerable to flood and drought-related hazards.

1.2. Project objectives and structure

The main three project objectives, which are all aimed at assisting the riparian countries towards becoming resilient in the face of impacts to climate change, are supposed to provide support in the following three key areas:

- *Objective 1*: Develop capacity and established frameworks at the local, national and regional levels to ensure risk informed decision-making.
- *Objective 2*: Develop concrete adaptation and environmentally friendly actions (i.e. nature-based solutions) using an integrated approach.
- *Objective 3*: Strengthen policy and institutional capacity for integrated flood and drought management at the local, national and trans-boundary levels.

These objectives should be delivered through three main project components: 1) *risk prevention*, 2) *concrete adaptation* and 3) *stakeholder engagement & governance*.

In Component 1 actual and future areas of vulnerability, capacities for flood and drought management, information on risk exposure are identified with the aim to develop local, national and regional flood and drought risk maps. Capacity building sessions at the national level and the local community level transfer the potential climate scenarios and risk maps to stakeholders and address possible impacts of climate change in selected target zones.

Component 2 provides the basis for integrated flood and drought management in the region by means of data collection and early warning systems installed in the basin. The development and implementation of the E2E Early Warning System (EWS) for floods and drought at the scale of the Volta Basin is the key output of VFDM. Capacity development ensures adequate acquaintance with the new products, services and tools. Self-help modules on nature-based solutions and gender-sensitive participatory approaches are under development at local and national scales.

Component 3 explores the benefits of the project's implementation in order to revise or develop new policies, plans and guidelines on disaster risk reduction and climate change adaptation.

Adaptation measures and strategies that align with environmental and social policies and gender principles are discussed locally to increase flood and drought resilience. The participation and engagement of local stakeholders facilitate the adoption of the strategies for disaster risk reduction and climate change adaptation with the aim of ensuring long-term sustainability.

1.3. VFDM Mid Term Evaluation

In line with AFB Policy, AFB-funded projects are monitored and evaluated regularly by the implementing agency. The Mid-Term Evaluation (MTE) of the VFDM project should determine the state of progress toward the achievement of outcomes and aims to identify course correction and mitigate imminent risks. MTE focus is on the effectiveness, efficiency, sustainability and timeliness of project implementation, project management team performance and to highlight issues requiring decisions and actions to align with the overall goal of the VFDM project (needs and priorities are considered and worked upon) as well as the Adaptation Fund. MTE evaluation findings are incorporated as recommendations for enhanced implementation during the 2nd half of the project's term.

1.3.1. MTE Methodology

The principles of design and execution of the MTE, the MTE approach, data collection methods, and limitations to the MTE, are based on project progress analysis through the following 4 criteria:

- Project relevance and design
- Effectiveness analysis
- Budgetary efficiency
- Sustainability

The methodology applied in the present MTE is based on two types of evaluation**:** *i)* quantitative evaluation and *ii)* qualitative/subjective evaluation. The MTE follows the vertically layered structure of the project by addressing actors at the regional, the national and the community level. This is performed through field visits, discussion with relevant stakeholders and/or remote interviews across all levels.

1.4. MTE findings

1.4.1. Project relevance

- The VFDM project is highly relevant for the Volta basin region. The area is also particularly susceptible to effects of climate change, mostly flood and drought and related environmental degradation.
- There is a lack of an operational E2E EWS for flood and drought warning.
- The basin is characterized by lack of coordination at local, national and regional levels.

1.4.2. Project structure

The project design follows a horizontal structure across three main project components, which are thematically interconnected and sequential in time. Vertically, the project is structured as three layers, across which communication is organized top-down, from the executive level (EE) at the regional level through national focus points to national agencies (meteorological services, hydrological services, water resources services, agencies in charge of environmental protection and civil protection) and, with the support of NGOS, to local communities in vulnerable rural and urban pilot sites scattered across the basin.

1.4.3. Effectiveness

Here we report the findings on the extent to which the project objectives were achieved, or are expected to be achieved, by considering their relative importance at the regional, national and local levels and considering the mandates of key players involved in the management of floods and drought. The VFDM project consists of three major components:

Component 1
The first component of the project addresses the capacity building activities at the regional, national and local (peripheral) level through risk identification and risk awareness raising and through the participatory development of different strategies to mitigate social, economic and environmental risks.

At project commencement about 60 rural and urban pilot sites were identified with the support of national agencies across the six Volta basin countries. With the support of specific workshops and targeted information campaigns, the selected communities were sensibilized for the type of natural hazards they are exposed to and made aware on how special knowledge, actions and skills can contribute to the mitigation of climate-related risks

Component 2
The second project component focusses on the development of an E2E Early Warning System platform VoltAlarm myDEWETRA based on rainfall-runoff and hydraulic modelling. The system includes capability of accessing global available observation products and contains static data such as terrain maps.

The design of the project does not explicitly foresee a basin-wide modelling system to be operated at the regional level and up to present relies on each country continuing to manage its own, mostly very basic, modelling capabilities. The development of the platform was still at an early stage, with no working data streams or decisions taken by the project technical advisory committee (PTAC) on hydrological model selection and integration. Also, the forecast dissemination and warning chain in the context of the E2E EWS has not yet been defined at all. Lack of progress on taking important system design decisions has delayed the actual implementation of VoltAlarm. The progress state of Component 2 was still low at the time of MTE.

Component 3
The third component of the project addresses the governance component of flood and drought management across the basin, especially the translation of the flood and drought management practices into policymaking and action plan at the transboundary and national levels. The Regional Workshop, which took place between 4th and 6th Mai 2022 in Cotonou constituted the first action of the implementation of Component 3. However, Component 3 is still at a too early stage (as these will be implemented based on the experience and lesson learned from the activities implemented under component 1 and 2 of development to be evaluated by the MTE.

Gender balance
An important outcome, against which the project success should be evaluated in all three components, is the gender balance in the VFDM project executive bodies and across project activities. The executive entities seem to understand that VFDM gender balance at the actual project execution state is suboptimal.

The situation is entirely different at the level of the local communities and the outreach work performed by NGOs. Especially in the social science fields, the gender balance is positive. The workshops and capacity building activities in the communities are frequented by roughly 1/3 female and 2/3 male participants.

Albeit all responsible entities have ensured that efforts are being made to increase female participation, it is doubtful that a fully balanced situation will be reached until the end of project. This is mainly due to the STEM nature of the VFDM project which requires academic background and work experience in flood and drought management, which is rare among women of the Volta basin countries and so their participation rate remains low in the national meteorological, hydrological, water resources and disaster management services.

1.4.4. Efficiency

Project budget spending
Project efficiency has been difficult to examine due to lack of transparency in project accounting. However, the SARS-COV2 pandemic delayed project progress and the reaching of milestones. As a result, the spending is lagging begin schedule. At the time of the PTAC meeting on the 6th of May 2022, out of a total project budget of 7,122,000 $US made available from the Adaptation Fund, only 2,797,357 $USD (39% of budget) were spent with another 790,000 $US (11% of budget) tied up for obligations. An amount of 3,534,643 $US (49% of budget) resulted still not spent.

Time and human resources allocation
On the project three full-time staff are employed at the EE with WMO, VBA and GWP-WA are also providing in kind contributions by making some of their staff time available for the implementation of the VFDM project and ensuring synergies and linkages with other parallel activities and partners.

1.4.5. Sustainability

Support of observing systems
One point of concern for the MTE team with respect to VFDM project sustainability is the perception by national project partner agencies that donors should provide the financial means to continue operating observing equipment that has been installed with VFDM project resources, beyond the project lifetime. However, it is the responsibility of national services to maintain and support the equipment through the national budget allocated to national hydro-meteorological services. Failing to provide such support will seriously impair project sustainability. The project team is continuously involving the national agencies in the implementation of the activities so that long term sustainability of project results is ensured.

Data exchange
Another important aspect concerning sustainability is stable data exchange among basin countries and a regional coordinating entity. The lack of such exchange hampers the implementation and long-term operational sustainability of the basin-wide forecasting system VoltAlarm, to be developed in Component 2. Data sharing agreements signed by the national agencies and regional entities are a prerequisite to ensure long-term sustainability of the E2E EWS.

Data storage and archiving
Effective integrated water resources management in a transboundary basin, including transboundary flood and drought management, requires an efficient and centralized data base system for surface water observation records (see also UN sustainable development goal on transboundary basins UN SDG 6.5.2). The project is progressing well in establishing such centralized database.

Communication and Outreach
The project presents itself through a project website. The website is well organized and provides easy access to project documents. Also, project events and project-relevant publications are made accessible through the project web site. Among project participants the exchange is ensured trough project meetings and workshops, that take place at regular intervals across the different riparian countries.

1.4.6. Challenges and lessons learned

- Within the VFDM project there exist significant challenges in the interaction among national agencies across countries. The communication is often inefficient and information exchange with the EE slowed by national interests.
- Problems in communication among agencies at the national level have led to national project workshops taking place with some national agencies not having been informed in due time by the national focus point.
- There is a strong divide between financial and human resources allocated to the meteorological services and those reserved for hydrological services.
- Integration with other ongoing regional projects like the World Bank funded HYDROMET project in Burkina Faso, the multi-country financed CREWS West Africa initiative or FANFAR could be strengthened.
- A considerable gender imbalance exists at all levels, also if progress to improve this situation has been achieved. The imbalance is especially noticeable at the national agencies and at the regional coordination level, less so at the community level.
- Besides the pandemic, which contributed to project delays, project progress in reaching set objectives is slow, but significantly effective in terms of building capacities of the agencies and communities.
- Some of the critical decisions are not being taken jointly by the project technical advisory committee as each country wants to take independent decisions based on their needs and experience.
- There is an overall lack of conscience and preparedness at the regional EE level and at national hydrometeorological agencies that ownership of observing equipment sponsored by the project is transferred to the respective national agencies and therefore needs to be maintained and become integrating part of the national networks.

1.4.7. Recommendations

- The project lags with respect to the planned schedule mainly due to differential support in the implementation of project activities in the six countries and also due to the pandemic and civil security issues in BF, Mali and northern Benin. A budget-neutral extension of the project duration, as requested by the EE VBA and GWP-WA is inevitable and is strongly recommended.
- In the interest of a timely development of the E2E-EWS in Component 2 of the project, the MTE team recommends leaning onto the existing regional FANFAR system, that is already integrated in an open-source modelling system for West Africa and visualized under the VoltAlarm EWS.
- The cooperation among national agencies within each country and between riparian countries needs to be reinforced and the flow of information improved.
- Gender equality is improving, but is still unbalanced in technical positions at national agencies. This is due to lack of STEM-trained women. Young women across the riparian countries should be encouraged to be trained in STEM areas.
- National hydrological and meteorological services need to allocate budgets for maintenance and operation of monitoring networks.
- Better involve national meteorological services in the choice of measurement equipment.
- New planning of reallocation of financial resources and work load in the remaining half of the project is needed.
- Strengthen the cooperation with regional agencies and programmes in the development of the regional flood and drought management plan and the VoltAlarm system development.

2. Project description and background

2.1. Context

The Volta Basin is one of the most vulnerable regions in West Africa due to its high exposure and low adaptive capacity to water-related hazards. The region, which is home to more than 25 million people, has been affected by climate change events, such as flood and drought, generating social, economic and environmental losses to almost two million people over the last 20 years. Key affected stakeholders are mainly people working in the agricultural sector, as around 68% of the population in the basin has a livelihood based on substance farming (source: IUCN https://portals.iucn.org).

The Volta Basin project *Integrating Flood and Drought Management and Early Warning for Climate Change Adaptation in the Volta Basin* (VFDM) has the ambition to provide the first large scale and transboundary implementation of integrated flood and drought management by supporting the National Meteorological and Hydrological Services (NMHS) and other competent authorities of the six riparian countries (Benin, Burkina Faso, Côte d'Ivoire, Ghana, Mali and Togo) with robust solutions aimed at disaster risk reduction and mitigating climate impacts, including the capacity development for nature-based solutions and gender-sensitive participatory approaches. An End-to-End Early Warning System (E2E-EWS) should be implemented, which is aimed at reaching national civil protection services and other private and public stakeholders that are potentially vulnerable to flood and drought-related hazards.

The present document is the final report for the Mid-term Evaluation (MTE) of the Volta Flood and Drought (VFDM) management project. The VFDM project has an operational lifetime of 4 years (2019-2023). According to the original schedule, the MTE should have taken place already in 2021 but has been postponed due to general difficulties related to the global SARS-CoV-2 pandemic. The MTE is therefore performed with about one year of delay, starting mid of March 2022.

In summary, the goal of the VFDM project is to strengthen target national and regional agencies and communities' resilience and adaptation capacity to the impact of climate change events, notably floods and drought, in the riparian countries of the Volta basin by means of an integrated participatory approach.

The project is aligned with the Adaptation Fund Boards objective to ''reduce vulnerability and increase adaptive capacity of communities in responding to the impacts of climate change at the local, national and regional levels." The project also falls under the agenda of implementing the UN sustainable development goal by providing direct contributions to Sustainable Development Goal (SDG) 5, 6, 11 and 13.

2.2. Project objectives

The main three project objectives, which are all aimed at assisting the riparian countries towards becoming resilient in the face of impacts to climate change, are supposed to provide support in the following three key areas:

> *Objective 1*: Develop capacity and established frameworks at the local, national and regional levels to ensure risk informed decision-making.
>
> *Objective 2*: Develop concrete adaptation and environmentally friendly actions (i.e. nature-based solutions) using an integrated approach.

Objective 3: Strengthen policy and institutional capacity for integrated flood and drought management at the local, national and trans-boundary levels.

These objectives should be delivered through **three main project components** described below: 1) *risk prevention*, 2) *concrete adaptation* and 3) *stakeholder engagement & governance*.

In Component 1 actual and future areas of vulnerability, capacities for flood and drought management, information on risk exposure are identified with the aim to develop local, national and regional **flood and drought risk maps**. Capacity building sessions at the national level and the local community level transfer the potential climate scenarios and risk maps to stakeholders and address possible impacts of climate change in selected target zones. Stakeholder recommendations are integrated into especially developed climate change adaptation approaches and disaster risk strategies. Indicators and tools will be made available to stakeholders to **raise awareness** on the role of the ecosystem and its anthropogenic and climate-related vulnerabilities. These instruments support stakeholders in wetland preservation and biodiversity hotspots.

Component 2 provides the basis for **integrated flood and drought management** in the region by means of data collection and early warning systems installed in the basin. The development and implementation of the E2E Early Warning System (EWS) for floods and drought at the scale of the Volta Basin is the key output of VFDM. An open-source forecasting platform (myDEWETRA) is used to connect the meteorological, hydrological, climatological, vulnerability databases and other validated outputs, such as hydrological modelling systems, decision support and early warnings, from related projects and initiatives at the local, national and regional levels.

For improved information sharing, the EWS covers the complete risk reduction chain – from vulnerability and risk mapping to forecasting, warning dissemination and decision support. The operational use of the new E2E-EWS should be supported by selected pilot sites in vulnerable areas and characterized by diverse socio-environmental conditions.

Parallel capacity development ensures adequate acquaintance with the new products, services and tools. Self-help modules on nature-based solutions and gender-sensitive participatory approaches are under development at local and national scales.

Component 3 explores the benefits of the project's implementation in order to **revise or develop new policies, plans and guidelines** on disaster risk reduction and climate change adaptation. Adaptation measures and strategies that align with environmental and social policies and gender principles are discussed locally to increase flood and drought resilience. Participation and engagement of local stakeholders facilitate the adoption of suitable strategies for disaster risk reduction and climate change adaptation with the aim of ensuring long-term sustainability.

2.3. Project executive agencies and funding

The **implementing entity** (IE) of the VFDM project is the World Meteorological Organization (WMO). The project **executing entities** (EE) include the Volta Basin Authority (VBA), the Global Water Partnership West Africa (GWP-WAF) and the World Meteorological Organization (WMO). The participating countries include Benin, Burkina Faso, Côte d'Ivoire, Ghana, Mali, and Togo, with Ghana being the only anglophone country. The project is funded by the Adaptation Fund Board (AFB).

2.4. Project Technical Advisory Committee

A significant responsibility in the execution of the project lies with the **Project Technical Advisory Committee** (PTAC). The main task of the PTAC is to provide strategic guidance and support to the project coordinator and project team to ensure that the activities meet the project's objectives. The responsibilities and duties of the PTAC members are:

- Review the project outcomes and identify the strong/weak points with respect to the objectives of the projects and the applications of the results (open-source, sustainable and tailored products and services with institutional strengthening);
- Comment on the teams' skills and the relevance of their proposals and actions;
- Link the project stakeholder's efforts to other initiatives to build synergies, optimize resources and assure coherence;
- Promote the exposure of VFDM project activities at the national and regional level.

2.5. Project Deliverables and Expected Outputs

Deliverables by the project, comprising IE and EE, consist of:

- Coordinated project activities within and across the various project components;
- Develop annual work plans and budget preparation.
- Assuring that the project is consistent with its design or endorsement from the donors.
- Reporting on risks and emerging issues for the project and proposition of respective mitigating measures.
- Providing joint monitoring and evaluation reports on the project's activities and outputs.

3. Midterm Evaluation (MTE)

3.1. Mid Term Evaluation Scope of the MTE

In line with AFB Policy, AFB-funded projects are monitored and evaluated regularly. The Mid-Term Evaluation (MTE) of the VFDM project determines the state of progress toward the achievement of outcomes and aims to identify course correction and mitigate imminent risks. MTE focus is on the effectiveness, efficiency, and timeliness of program implementation; and to highlight issues requiring decisions and actions; it presents initial lessons learned about program design, implementation and management. MTE evaluation findings are incorporated as "lessons learned" and recommendations for enhanced implementation during the final half of the program's term. Through MTE exercises accountability for objective achievement is promoted by assessing results, effectiveness, processes, and performance of the partners involved in the AFB-supported activities to date and by making recommendations on improving the delivery and quality of expected outcomes if required. The results need to be monitored and evaluated for their contribution to UN sustainable development goals and the basic principles of the AFB.

3.2. MTE Methodology

The principles of design and execution of the MTE, MTE approach, data collection methods, and limitations to the MTE are based on project progress analysis based on the following 4 criteria:

- *Project design and relevance*
  Examine the extent to which the objectives of a project intervention are consistent with beneficiaries' requirements, country needs, global priorities and partners' and donors' policies. The relevance of the project design to achieve this goal, i.e. the extent to which the planned activities were suited to local and national development policies and organizational priorities, including exchange over time.

- *Effectiveness analysis*
  The extent to which the project objectives were achieved, or are expected to be achieved, by considering their relative importance at the regional, national and local levels and considering the mandate of key agencies or institutes involved in the management of floods and drought.

- *Budgetary efficiency analysis*
  This analysis measures and assessed how financial resources/inputs (funds, expertise, time, human resources etc.) are converted into project results and outcomes.

- *Sustainability*
  This last category looks into the potential of the continuation of benefits from the project intervention as well as the probability of continued long-term benefit emerging from it. In the case of the VFDM project, it is important to look at how sustainability has been addressed in the early stages of programming and project design.

The report concludes with lessons learned and recommendations, hereby focussing on the sustainability and the risks (probability and magnitude of risks related to the continuation of both, funding and activities, as well as technical, social, political, and environmental aspects).

The methodology applied in the present MTE is based on two types of evaluation**:** *i)* quantitative evaluation and *ii)* qualitative/subjective evaluation. The MTE follows the vertically layered structure of the project by addressing actors at the regional, the national and the community level. This is performed through field visits and/or remote interviews across all levels.

The preparation of the MTE report was constrained by several factors that affected the timely collection and analysis of data, including:

- Delays experienced in accessing essential project reports and data needed to inform MTE findings.
- Gaps in monitoring and reporting that effectively document the implementation experience at defined intervals.
- Inconsistencies in project reporting in areas of planning, technical reporting, financial reporting, and monitoring and evaluation that made it difficult to track the project technically and financially.
- Delays in the availability through remote interviews of key project personnel and other partner agency representatives for consultations.
- The SARS-COV2 pandemic, which affected staff availability and commencement of the MTE. The SARS-COV2 containment measures also impacted MTE implementation where an in-field mission was not possible due to air travel or border crossing restrictions.
- Political instabilities (coup d'état in Burkina Faso and Mali) and security issues which prevented access to pilot sites in proximity of national border regions.
- Delays in the delivery and installation of monitoring equipment, that is required for the implementation of the project component 2.

Note: The evaluation analyses the project mid-term achievements of mainly the first two project components in terms of the above criteria. The third component, which focuses on policy development, is not at a sufficient advanced stage at MTE to be ready for full evaluation.

3.2.1. Quantitative evaluation

The quantitative evaluation against the four criteria above is performed after an in-depth study of the already published project reports and materials by benchmarking the project visible and measurable achievements against a set of quantitative (numerical) indicators, that have been introduced as metrics for monitoring and assessing project progress.

The indicators are grouped for each of the three project objectives and include measurable quantities such as number of consultations performed, number of desk studies carried out, number of meetings conducted.

These numerical quantities are supposed to be filled into the project indicator table (available at https://www.floodmanagement.info/volta-basin/monitoring-and-evaluation/) by the VFDM implementing partners and are verified during the MTE.

3.2.2. Qualitative evaluation

The qualitative evaluation against the four categories of project progress has the scope to get a broader impression on the implementation of the project, is perceived benefits for the various actors, potential bottlenecks, dissatisfaction and to gather information on aspects, where there is still need for improvement. This assessment is considered more subjective, because it is not quantifiable in terms of measurable indicators. This quantitative information is mostly gathered by means of interviews with the stakeholders at all levels of project implementation. A set of questionnaires, that is dispatched at the various levels and filled in by the MTE consultants during field visits at the stakeholder institutions at regional, national and rural communities' level. The use of a consistent set of questionnaires ensures homogeneity in the interviews and allows better inter-comparison of the answers provided by the involved counterparts.

3.3. MTE task team

The MTE was carried out by principal consultant (PC) Paolo Reggiani. The contract between the PC and WMO has been signed on the 9th of March 2022. To prepare the MTE, the Principal Consultant (PC), Paolo Reggiani, started to familiarize himself with the project material accessible at the VFDM project site.

Simultaneously, the PC initiated the hiring process of two national consultants. These were identified and interviewed by the PC during the proposal phase and successively contracts finalized.

3.3.1. Local Consultant 1

A first subcontract has been signed with local consultant (LC1) Ms. Ida Benagabou, who performed MTE-related field work in Burkina Faso (BF). Ms Benagabou, a Burkina Faso resident and citizen, native French speaker, attended face-to faced meetings with the regional executing agencies, the Volta Basin Authority (VBA) and Global Water Partnership West Africa (GWP)-WA. Both agencies have their headquarters in Ouagadougou (BF).

Due to the consistently instable security situation in BF and Mali, especially in the rural communities, and the long quarantine period imposed for travellers to BF, it has been agreed with WMO project office that the PC will not travel to these two countries. Instead, the local consultant conducted a filed visit to the Badara Community, Houet province, Bama department, and attended meetings in the VBA/GWP-WA headquarters in BF. Ms Benagabou also attended virtual interviews with national agencies in the remaining francophone countries.

3.3.2. Local Consultant 2

A second subcontract has been issued to local consultant Mr Albert Dossou-Togbe (LC2), who is proficient in French and English. Mr Dossou-Togbe, a Benin citizen and resident, was hired to perform interviews with local communities in Ghana and Benin. In two separate trips he visited the Kunkua community in the Bongo district, Bolga, Ghana, and the Tabota community in Tanguieta, Benin.

Mr Dossou-Togbe also attended face-to-face meetings at national agencies in these countries and took part in virtual meetings with national agencies in Mali, Togo and Cote d´Ivoire. Mr. Dossou-Togbe also took part in the Project Regional Workshop meeting held at the Hotel Royal Benin in Cotonou (Benin) during 4th to 5th May, 2022, and joined the meeting with regional partners held on the 6th of May in the same Venue following the Regional Workshop.

3.4. MTE execution schedule

The MTE was executed following a schedule that was elaborated by the consultants in agreement with the EE. The plan contains an overview and timeline of all activities involved in the MTE.

The MTE consist of desk appraisal studies of project documentations as well as local visits, in which project actors at the regional, national and local level are interviewed. Several meetings were held virtually as conditions did not allow for physical presence.

Where physical presence was possible, the interviews were held in the form of local workshops led by the consultants, who visited the organisations, agencies or local communities and led the interviews directly. Mixed forms of interviews, in which some counterparts were present, and others joined virtually, were also organized.

As requested by the TOR, rural pilot sites were visited in at least three countries (Ghana, Benin, Burkina Faso). The rural communities in Mali could not be visited because of impending security concerns. Meetings with national agency representatives of all six countries have taken place. In summary, meetings with five groups of people took place during the MTE:

Group 1: VBA and GWP-WA (virtual and phys. presence of LC1 & LC2)
Group 2: National Agencies of all 6 riparian countries (virtual and/or phys. presence of PC, LC1 and LC2)
Group 3: Local communities in Ghana, Benin and Burkina Faso (phys. presence LC1 & LC2).
Group 4: Project technical advisory committee (phys. presence of PC and LC2).
Group 5: Project external technical partners (CIMA Research foundation, UNOSAT, IUCN and CERFE/K&I), (virtual lead, PC)

The counterparts met and interviewed under Group 2 and Group 3 in each country are summarized in the table below:

Country	NMHSs,	Disaster management/Civil protection	Others (Agriculture, geographic, water resources etc.)	Community
Benin	☒	☒	☒	☒
Burkina Faso	☒	☒	☐	☒
Cote d'Ivoire	☒	☒	☒	☐
Ghana	☒	☒	☒	☒
Mali	☒	☒	☐	☐
Togo	☒	☒	☒	☐

4. MTE Findings

4.1. Introduction

The VFDM project involves a 400.000 km^2 transboundary river basin area that is distributed over six riverine countries, with disparate percentages of area portions covered by the single countries. While 42% of the basin lie within Ghana and 43% in Burkina Faso, the remaining 15% are shared by Togo Benin and Ivory Coast[1].

A relevant aspect is the two administrative language setting found among the riparian countries, with Ghana as only anglophone nation having a very different administrative structure from the remaining five francophone members. The six countries also have very different GDP per capita[2] (857$ in Burkina Faso, 1291$ in Benin, 2205$ in Ghana, 862$ in Mali, 2276$ in Ivory Coast and in 893$ in Togo. This national wealth distribution is to some extent reflected in the water resources management infrastructure and administration across the six countries and respective basin portions.

The findings of the MTE are structured following the four evaluation criteria listed in Section 3.2. With some exception for anglophone Ghana, the MTE findings across the six countries, that all share a comparable socio-cultural setting, are quite similar and can be brought to a common denominator through the MTE.

4.2. Project relevance and design

4.2.1. Project relevance

The VFDM project it highly relevant for the Volta basin. The basin area is inhabited by about 19 million people that are strongly reliant on agriculture as well as irrigation and drinking water for their livelihoods. The area is also particularly susceptible to effects of climate change, mostly flood and drought and related environmental degradation.

Moreover, there is a lack of an operational basin-wide E2E EWS for flood and drought warning in the Volta basin. The basin is also characterized by lack of coordination at local, national and regional levels. However, there is considerable skill base at the national agencies to operate such a system.

International, regional and national strategic orientation

The VFDM project, through its objectives, is well aligned with the international, regional and national strategic orientations that govern the interventions of countries and technical and financial partners in the field of flood and drought management.

At the international level, these include the 2030 Agenda for Sustainable Development, through SDG 13, the Sendai Framework for Action and the UNCCD Strategic Framework, among others, which address understanding of flood risks, governance, investment and disaster preparedness.

At the regional level, strategic documents including policies, strategies and action programmes are developed and validated by WAEMU and ECOWAS.

At the national level, national drought plans have been developed for the six countries covered by the project in the framework of the United Nations Convention to Combat Desertification (UNCCD) as well as policies dedicated to disaster risk management.

[1] IUCN https://portals.iucn.org

[2] Source: World Bank

Level	Strategic orientation
International	• 2030 Agenda for Sustainable Development - SDGs 13 and 15 : • Sendai Framework for Action on Disaster Risk Reduction 2015-2030 • UNCCD (United Nations Convention to Combat Desertification) Strategic Framework 2018-2030 • The Paris Agreements • Ramsar Convention
Regional	**Policies available at UEMOA and ECOWAS level targeting natural disasters including drought, floods** • ECOWAS Vision 2020 • ECOWAS Environmental Policy 2008, • West Africa Water Resources Policy 2008 and its implementation plan 2012 • African Union Programme of Action for Disaster Risk Reduction (2015-2030) • Regional Flood Risk Management Strategy and Action Plan 2020-2025 • Volta Basin Strategic Action Programme 2014-2024 • Great Green Wall (GGW) initiative for the Sahara and Sahel launched in 2007 by the African Union
National	**Drought management policies** • National Drought Plan Benin 2019-2024 • National Drought Plan Togo 2018-2021 • National Drought Plan Mali 2021-2025 • National Drought Plan Burkina Faso • National drought plan Ivory Coast 2021-2025 • Ghana national drought plan
	Disaster risk management policies • Ivory Coast: National Action Plan for Capacity Building in Disaster Risk Reduction (2016-2020) • Mali: National Strategy for Disaster Risk Management. • Togo: National Civil Protection Policy since 2017 that takes into account disaster risk management and a disaster risk reduction strategy with a programmatic framework of actions (2009-2013, 2013-2017, 2021-2025) • Burkina Faso: National Action Plan for Capacity Building for Risk Reduction and Emergency Response Preparedness (CADRI Plan) • Benin: National policy for integrated disaster prevention and management, and a national drought plan 2019-2024

Table 1: Alignment of the VFDM project with national, regional and international strategic orientations

4.2.2. Relevance for the region

Physical environment

The Volta Basin is characterized by 4 climatic zones (Sahelian, Sudano-Sahelian and Guinean zones) which are subject to climatic extreme phenomena: floods, drought and strong winds, depending on region. For example, the months of September 2009 and 2010 were marked by the worst floods, particularly in the Withe Volta sub-basin, following extended flooding and an emergency spill from the Bagré dam.

Local level, and in particular the community level

The populations living in these areas are economically vulnerable, and such climatic extremes exacerbate their vulnerability. They become victims of floods, winds hazard, heat waves and droughts, which destroy crops, affect the productivity of livestock and fisheries, as well as social and commercial activities. Inadequate coverage of basic socio-economic infrastructure combined with the low capacity of the population to respond to extreme weather events amplifies the negative impacts on the community. In terms of impact, as a result of the 2009 and 2010 floods, 17 people lost their lives, 3,234 houses in 55 communities collapsed, 23,588 farmers

had their farmland destroyed, 25,112 people were displaced in the central Gonja district in northern Ghana.

Institutional level

At the institutional level, the meteorological and hydrological services of the riparian countries lack the resources to cover the entire territory, with major needs for technical capacity building (insufficient hydrometeorological station coverage) and qualified human resources. Similarly, national efforts to harmonize disaster management policies are still in their infancy, with insufficient synergy across the region. Moreover, since 2021 violent extremism is on the rise in the region. This development has affected various economic sectors, particularly in Mali, Burkina Faso and north-western Benin and Togo. In this context it is important to provide a response to the difficulties encountered within the basin. This is among the objectives of the VFDM project through its three components. The first component focuses on the identification of climatic risks and informed decision-making in the face of them through capacity building at local (installation of local flood and drought management committees), national and regional levels and, in particular, the installation of automatic hydrometeorological stations. The second component builds capacity at all levels for adaptation through integrated actions. The third component addresses policy and institutional capacities for integrated disaster management at local, national and transboundary levels (training of technical staff of hydrological and meteorological services of member countries, development of a regional climate disaster response plan).

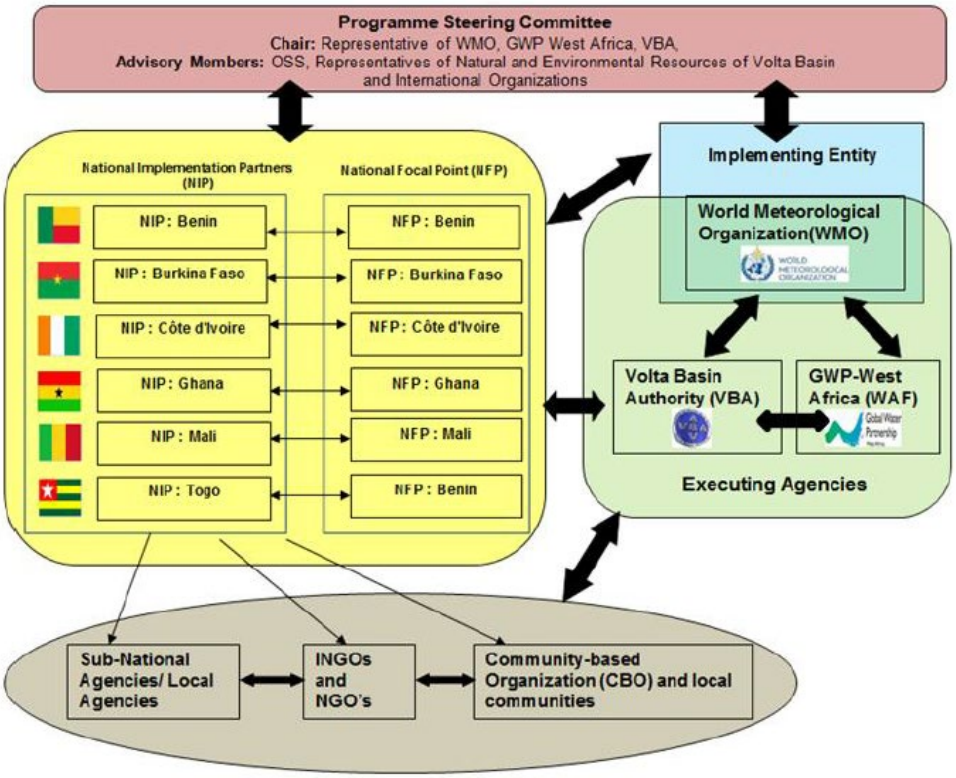


Figure 1: Schematic of the interaction of various players in the VFDM Project

4.2.3. Project design

The project design follows a horizontal structure across three main project components, that are thematically interconnected and sequential in time, as depicted in Figure 1.

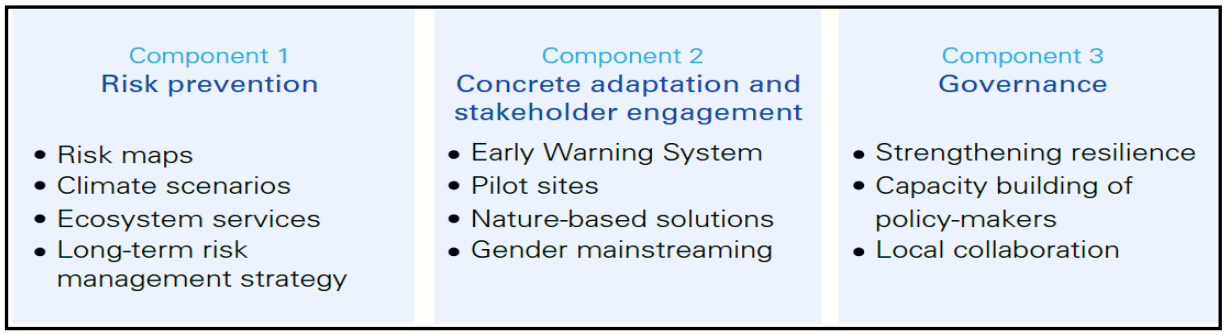


Figure 2: Schematic of the three project components

Vertically, the project is structured as layers, across which communication is organized top-down, from the steering committee (red box) and executive level (EE) (green box) through national focus points to national agencies (meteorological services, hydrological services, agencies in charge of environmental protection and civil protection, yellow box) and, with the support of NGOs to local communities in vulnerable rural and urban pilot sites scattered across the basin (grey box). The project work with local communities has been to some extent delegated to NGOs by the executive entities VBA and GWP-WA. The NGOs were effectively hired at the respective national levels.

The national agencies are strongly involved at all stages of project implementation and execution through the following activities:

- At the start by developing the project activities concept note;
- Planning for the activity's implementation at all levels;
- Conducting workshops or training session;
- Identification of vulnerable communities;
- Recruitment of local and national consultants.

4.3. Effectiveness

Here we report the findings on the extent to which the project objectives were achieved, or are expected to be achieved, by considering their relative importance at the regional, national and local levels and the responsibility of key players involved.

4.3.1. Component 1

The first component of the project addresses the capacity building activities at the regional, national and local (peripheral) level through risk identification and risk awareness raising and through the participatory development of different strategies to mitigate those risks.

At project commencement about 60 rural and urban pilot sites were identified with the support of national agencies across the six Volta basin countries. The areas were identified based on the degree of vulnerability by various types of climate-related natural hazards, in particular flood and drought. A GIS-based risk zoning for the selected areas was successfully performed by national agency staff or by local contractors hired by the national agencies on the project. These maps are available for download on the project web site.

The selected pilot sites are characterized by man-induced environmental degradation (e.g. soil erosion due to a combination of increasing surface runoff and land-use practices, river bank erosion, desertification through drought), which has contributed to amplifying the climatic impacts. With the support of specific workshops and targeted information campaigns, the

selected communities were made aware of the type of natural hazards they are exposed to and of how special knowledge, actions and skills can contribute to the mitigation of climate-related risks. This community work can be considered as a very successful project outcome.

At the level of **communities**, the awareness campaigns were organized by local social-science NGOs, that have built up trust and communication with the local communities. These NGOs were most successful in transferring relevant knowledge. The participatory workshops organized in the communities included activities such as participatory flood risk mapping for risk awareness building and promotion of nature-based solutions, for example to combat soil erosion, or increase rain interception through nursing and planting of endemic species. Also, first aid training was organized for local disaster relief and self-help in the case of natural catastrophes.

At the level of **national agencies** in each country, various workshops were organized aimed at raising awareness and involving different actors into the project implementation and at knowledge exchange. Also, regional workshops have taken place, that were coordinated by the EE team GPW-AO and VBA to enforce coordination among national agencies across country borders at the basin level and exchange knowledge. 200 people were trained with the help of distance learning modules, among others due to travel restrictions during the SARS-COV2 pandemic. 64 Technicians were hired from the national agencies, academia and institutes of the six countries and trained for developing floods and drought risk maps for the Volta Basin countries.

Nevertheless, while the regional workshops have been very successful, in bringing actors together, some poor organization has been lamented concerning national agency workshops in the individual countries, as some agencies felt insufficiently involved. The reason highlighted by the responsible partner institutions was lack of budget available for activities to involve all the structures or participants from each agency.

The regional meetings were also frequented by other actors in the basin such as WASCAL (West African Science Service Centre on Climate Change and Adapted Land Use), AGRHYMET Regional Centre Niamey, and CGRE/CEDEAO (Centre of Water Resources Coordination/Economic Community of West African States) research organizations. Regional workshops had to be organized with simultaneous translation, to allow participants from both language groups to actively participate.

The level of completion of Component 1 is reported in Table 1 and Appendix E.

Outcome Output	Description	Completed (y/n) (scale 0-5)	Degree of statisfaction
Outcome 1.1: Improved knowledge of risks, climate change impacts and risk management capacities through knowledge sharing and participatory mechanisms			
Output 1.1.1	Inventory of information on vulnerabilities, capacities, exposure and risks (VCERs) for floods and drought in the Volta Basin is conducted	yes 5	high
Output 1.1.2	Database of VCERs, floods and drought related risk maps are developed	yes 5	high
Output 1.1.3	Capacity of stakeholders to use Floods and Drought risk maps is enhanced	yes 5	high
Output 1.1.4	Reports and communication documents on vulnerabilities, capacities, exposure and risks (VCERs) and Floods and Drought risk maps of the Volta Basin are available	yes 5	high
Outcome 1.2: Bridging the gap in adaptation measures to integrate future scenarios (economic, urban, climate, environment, etc.) into current practices and knowledge			

Output 1.2.1	Scenarios for socio-economic and environment development along with the climate change projections are collected	no 0	n/a
Output 1.2.2	Projected impacts on water resources, urban development, environment and agricultural areas are analysed on the basis of future scenarios	yes 5	medium
Output 1.2.3	Impact on environmental indicators is evaluated for current and future scenarios	yes 5	medium
Outcome 1.3: Risk management strategies in short, medium and long-term to be integrated into development plans (economic, social, environmental aspects)			
Output 1.3.1	Guidance documents for stakeholders are developed to raise awareness about the future scenarios	no 0	n/a
Output 1.3.2	Capacity of stakeholders to use future scenarios and to develop action plans is enhanced	no 0	n/a

Table 2: List of outcomes and outputs for component 1

4.3.2. Component 2

The second and core project component focusses on the development of an E2E earlywarning system platform based on the software myDEWETRA. The platform integrates rainfall-runoff and hydraulic models with hydro-meterological data, local as well as global. The platform is developed and configured by the external technical project partner CIMA. The resulting Volta E2E EWS, called VoltAlarm, exists at the point of writing this MTE report, as a GIS interface with only restricted functionality, and needs to be completed through the implementation of rainfall runoff models that are driven by meteorological forcing data from the respective basin components (see Figure 3).

The operational use of the new E2E EWS should be supported by selected pilot sites in vulnerable areas and characterized by diverse socio-environmental conditions. Parallel capacity development ensures adequate acquaintance with the new products, services and tools.

The hydrological and hydraulic models **necessitate ground observations** from the respective national observing networks, among which near-real-time precipitation measurements as well as discharge measurement for model calibration and forecast validation.

However, the hydrological observation network in the Volta Basin region is very sparse and many stations require considerable maintenance with respective operational costs that need to be sustained by the national hydrological services.

In all six riparian countries these data are collected and administered separately by the national meteorological and the hydrological services. Hydrological models have been acquired by different countries, with some (e.g. Ghana) operating quite advanced modelling systems, whereas others lagging far behind or having no modelling system at all in service.

The design of the project does not explicitly foresee a basin-wide modelling system to be operated at the regional level (i.e. at the regional bodies ABV or GWP-WA, or even externally in a cloud), and therefore primarily relies on each country continuing to manage its own, mostly very basic, modelling capabilities. At the stage of the MTE, it was not clear, to what extent Volta basin countries **are prepared to share their own hydro-meteorological data** with the future operator of the VoltAlarm system, for example VBA/GWP-WA or CIMA.

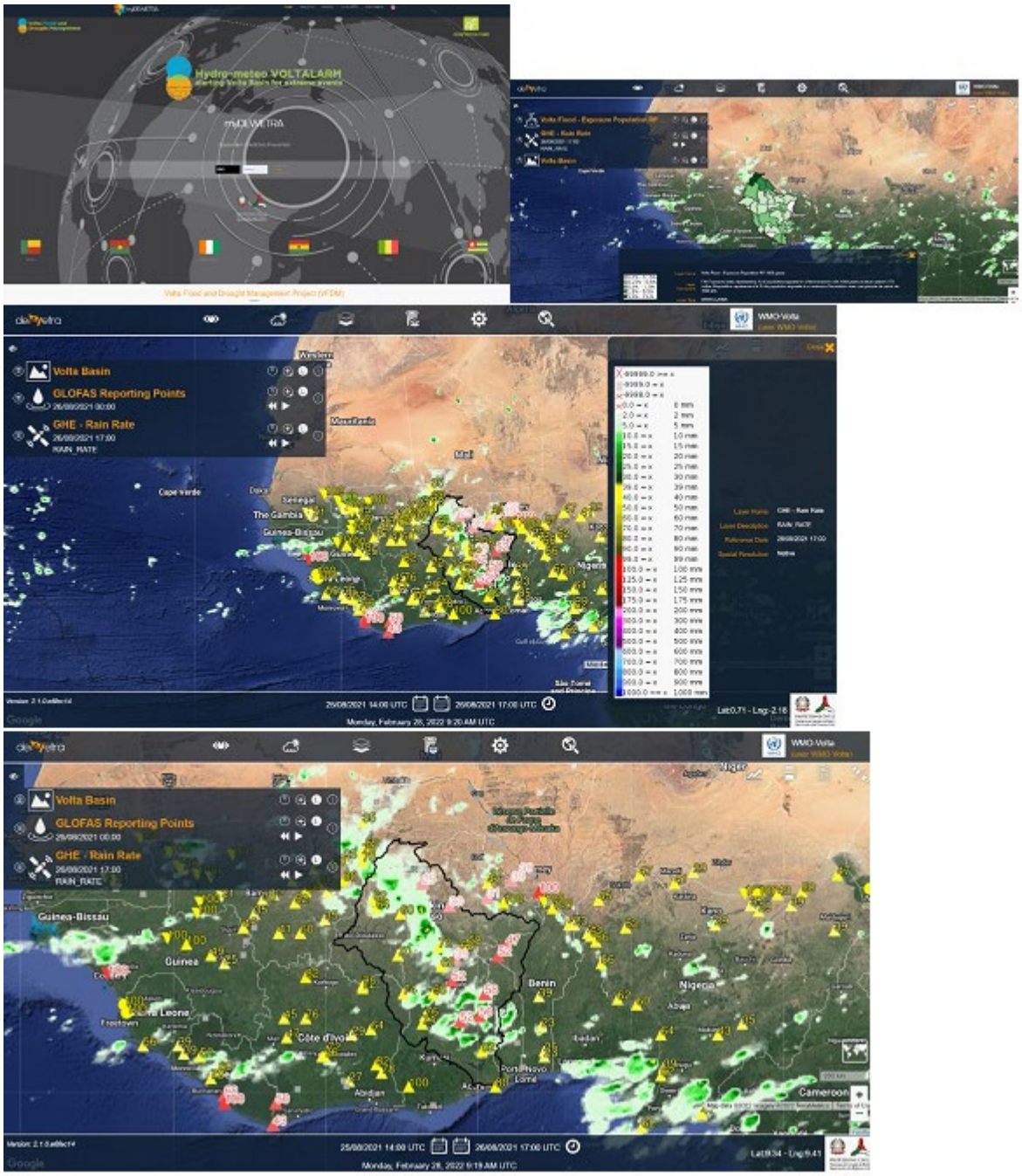
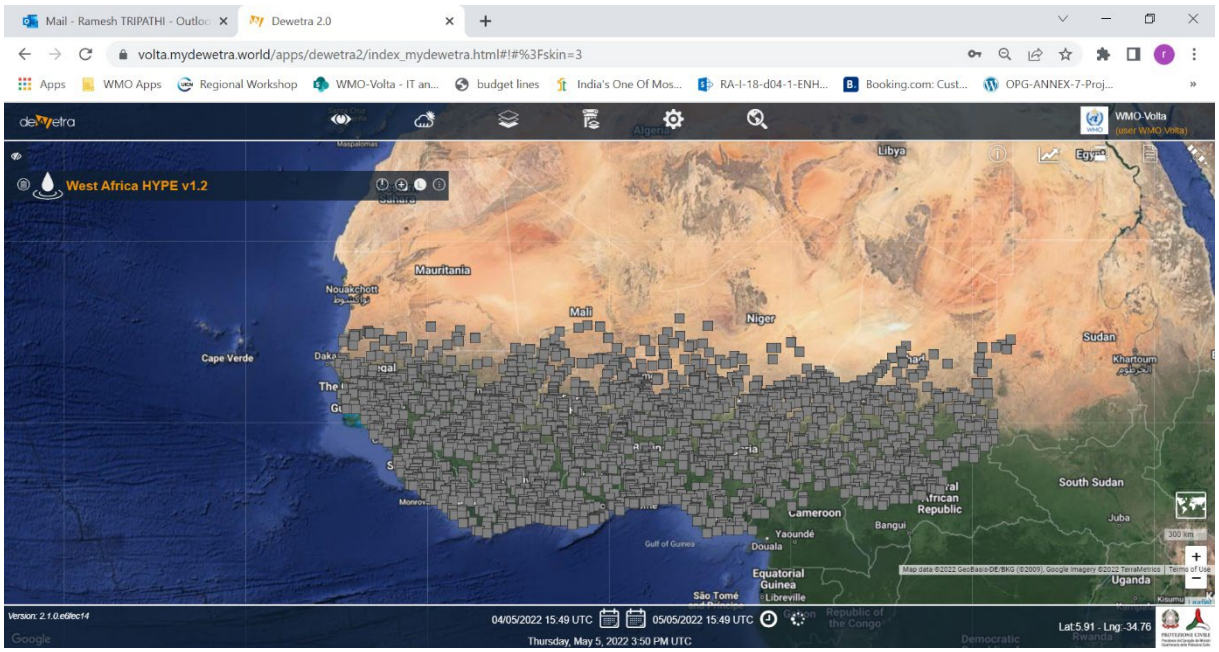


Figure 3: Screen shots showing the myDEWETRA prototype platform for the VoltAlarm E2E EWS system

Also, within the six basin countries there seems to be a strong divide between financial and human resources allocated to the meteorological services and those reserved for hydrological services. Whereas meteorological services are generally commercially very active and well-funded because their data are relevant for civil aviation, the hydrological service component remains weak, as surface water administration services are underfunded by their respective states due to water resources having low priority. This fact is the reason for a **general neglect of surface water monitoring networks**. This also includes maintenance and updating of flow rating curves that are needed to convert river water level readings into discharge values, among others for hydrological model calibration and validation and surface water quantity estimation.



- *Figure 4: FANFAR (SMHI and AGRYHMET) product output integration under VOLTALARM EWS*

The project management team of WMO, VBA and GWP-WA have made considerable efforts making existing regional-scale early warning systems available, for example the FANFAR system owned by AGRHYMET and the Swedish Hydro-meteorological Institute (SMHI) as well as national EWS in Ghana such as FEW-OTI and FEWS White Volta supported by HKV Consultants and the World Bank. In the discussion with the EEs, it was highlighted that these projects have been completed and now there were issues concerning pending yearly operational and maintenance cost. This causes the warning system becoming temporally non-operational and hence blanked out visualized in the VoltAlarm EWS user interface. Figure 4 shows a picture of the flow simulation outlet points of the FANFAR system, visualized through the myDEWETRA integration platform.

4.3.3. VoltAlarm E2E Early Warning System

VoltAlarm is a shared data and flood forecasting integration platform for E2E early warning, that needs to be driven with short- to medium-term weather forecasts and ground observations for hydrological and hydraulic model operation. The VoltAlarm system is based on the existing DEWETRA platform developed by external technical partner CIMA. The system allows integration and use of global hydro-meteorological products such as satellite precipitation (for reference see Figure 3). The use of global products enables countries to observe, analyse and provide warning services to the authorities and communities. However, there are several limitations in using global products related to inevitable data transmission delays and often inaccurate information. These issues are exacerbated in developing countries due to poor data transmission infrastructure.

In an E2E EWS system real-time computations of forecasted flows are compared against threshold levels at selected forecasting sites and in case of reaching critical threshold values, warnings are issued. Once warnings are issued, these need to be disseminated to the recipients and disaster relief forces such as civil protection need to be activated.

The VoltAlarm system should be implemented in Component 2 with the data transmission and inclusion of operational models from **national hydro-meteorological services** across the Volta River basin, as shown in Figure 3. If a **regional modelling and forecasting solution** is used instead of using multiple national models (e.g., the open-source HYPE model of the Swedish Hydrometeorological Institute, EU FANFAR project), a calibration, validation and operational updating/adjusting of the regional system with near real-time ground observations will be necessary for operational forecasting.

At the time of the MTE, the development of the platform was **still at an early stage**, with no working data streams and **no decisions taken on hydrological modelling** system selection and integration by the project technical advisory committee (PTAC). Also, the forecast dissemination and warning component in the context of the E2E EWS has not yet been defined at all. The state of completion of this component is therefore to be considered as low.

4.3.4. Local vs. cloud computing for VoltAlarm

At the time of the MTE, especially following up from the discussion during the project technical advisory committee (PTAC) meeting on the 6th of May, it was **not clear how the VoltAlarm system should be finally operated**. There are essentially two options: a) either the system is operated at the VBA headquarters, or b) the system is operated in a remote cloud on hired computing resources (e.g. CIMA computing facilities, Amazon cloud, etc.) and serviced by an operator (e.g. CIMA) with corresponding service costs. In both cases data need to be shared by the basin countries with the system operators (see Figure 3 and previous paragraph). During the meeting the VBA/GWP-WA executives explained that the VBA founding charter foresees data exchanges between member states and the central basin authority, but to date no visible operational data exchange is functioning.

The lack of progress on taking important system design decisions has delayed the actual implementation of VoltAlarm. The progress state of Component 2 was low at the stage of MTE.

The level of completion of Component 2 is reported in Table 2 and Appendix E.

Outcome Output	Description	Completed (y/n) (scale 0-5)	Degree of statisfaction
Outcome 2.1: Improved flood and drought forecasting instruments and Early Warning Systems (EWS) and coordination at the transboundary level to reduce disaster risks in vulnerable communities			
Output 2.1.1	Needs and existing resources of national and regional agencies staffs for web-based EWS are defined	yes 3	high
Output 2.1.2	The operational centre for the VoltAlarm Early Warning System is established in synergies with the NMHSs and the Volta Basin Authority	no 0	n/a
Output 2.1.3	The historical and real-time hydrological data from the gauging stations are collected and the procedure to link with the meteorological data is defined	no 1	low
Output 2.1.4	Thresholds for Floods and Drought risk levels are selected for the various parts of the Volta Basin and linked with environment thresholds	no 0	n/a
Output 2.1.5	The procedure for producing impact-based forecasts for the sub-basins and vulnerable areas on a daily basis is defined	no 0	n/a
Output 2.1.6	The web-based Early Warning dissemination interface for VoltAlarm is designed and developed	yes 3	high
Output 2.1.7	Knowledge and awareness about VoltAlarm are increased within the user groups	yes 1	medium
Outcome 2.2: Demonstration of the added value of the E2E EWS VoltAlarm through a series of pilot testing during monsoon and dry seasons			
Output 2.2.1	Pilot testing for a number of areas over the basin (Figure 8) during the monsoon and dry seasons are performed	yes 2	medium
Output 2.2.2	Feedback from the series of pilot testing is collected	no 0	n/a

Output 2.2.3	Development and implementation of community-based flood and drought management	no 0	n/a
Outcome 2.3: Strengthened awareness of vulnerable people on hydro-meteorological risks, prevention, preparedness, and response strategies through education programs using participative solutions			
Output 2.3.1	Knowledge and capacity development using the Flood Green Guide (FGG)	yes 5	medium
Output 2.3.2	Capacity development based on the Training Manual for mainstreaming gender in the E2E-EWS-F and flood management	yes 5	high

Table 3: List of outcomes and outputs for component 2

4.3.5. Component 3

The third component of the project addresses the institutional component of flood and drought management across the basin, especially the translation of the flood and drought management into policymaking at the national level. The Regional Workshop, which took place between 4th and 6th Mai 2022 in Cotonou constituted the first action of the implementation of Component 3. However, Component 3 is still at a too early stage of development to be evaluated by the MTE.

The level of completion of Component 3 is reported in Table 3.

Outcome Output	**Description**	**Completed (y/n) (scale 0-5)**	**Degree of satisfaction**
Outcome 3.1 Decision support and policy development for strengthening resilience at the local, national and transboundary levels of the Volta Basin.			
Output 3.1.1	The transboundary governance plans, policies and guidelines about long term flood and drought management are evaluated	yes 3	medium
Output 3.1.2	Awareness of policy-makers from the six countries on the key long-term strategies for floods and drought management and environment impact is strengthened	no 1	low
Output 3.1.3	Experiences of local communities on key long-term strategies for floods and drought management are collected	no 0	n/a
Outcome 3.2 Strengthened capacities of actors and decision makers at national and transboundary level on long term risk management policies, plans and strategies			
Output 3.2.1	Strengthened implementation of the revised, or new, climate adaptation plans (NAPA, NAP, NDC), policies and guidelines (on data and information exchanges) on issues related to risk reduction and EWS	no 0	n/a
Output 3.2.2	Improved integration of national policies on long term risk reduction and climate adaptation into the transboundary Strategic Action Programme	no 0	n/a
Outcome 3.3 A collaborative process is developed to ensure those instruments and strategies are accepted by the local organization and communities and adapted to the local context			
Output 3.3.1	Collaboration with local communities and organizations in defining the procedures and measures to manage risks and to adapt to climate change	no 0	n/a
Output 3.3.1	Capacity of stakeholders to use future scenarios and to develop action plans is enhanced	no 0	n/a

Table 4: List of outcomes and outputs for component 3

4.3.6. Gender balance

An important outcome, against which the project success should be evaluated in all three components, is the gender balance in the VFDM project executive bodies and across project activities. The executive entities seem to understand that VFDM gender balance at the actual project execution state is suboptimal.

However, the imbalance is different across project layers. At the regional project working level (VBA and GWP-WA) women are underrepresented. The same can be said about the national agencies, hydro-meteorological services, civil protection, environment). The explanation provided by the representatives of the respective bodies are a lack of women with STEM-affine education that can be hired to fill vacant positions. The same can be said for the management

level. An example of female underrepresentation at the national agency and regional EE level is the list of participants at the regional workshop of and the Project Technical Partner meetings on 4-6 May, 2022, attached in Appendix C of this report.

The situation is entirely different at the level of the local communities and the outreach work performed by NGOs. Especially in the social science fields, the gender balance is positive. The workshops and capacity building activities in the communities are frequented by roughly 1/3 female and 2/3 male participants. At another positive note, the social science NGOs hired in the project to reach out to the communities are employing preponderantly women. It should also be noted that the local flood and drought management committees (CGCIS) in the 6 pilot sites of the project consider gender mainstreaming through the representation of all social strata, namely women, youth and the elderly.

Especially in Ghana the underrepresentation of women at all levels is particularly noticeable. This has also been observed by the external technical partners (Knowledge & Innovation) during their capacity building work in 55 communities (see interview minutes in Chapter 8).

Albeit all responsible entities have ensured that efforts are being made to increase female participation, it is doubtful that a fully balanced situation will be reached until the end of project. Overall, the MTE has shown that a significant effort has been made to effectively take gender into account in the implementation of the project. While the effects were more visible at the community level, they were much less visible at the level of national institutions due to the low number of female technicians in the field of hydrology and meteorology and in water-related professions in general.

4.3.7. Role of social NGO´s in the project

NGOs play an important link role between the regional/national level and the local community levels, especially in peripheral areas. Several NGOs were hired by the VBA/GWP-WA to perform social work and reach out to the communities. The collaboration between hired local NGOs and the national or peripheral bodies involved (mainly national hydrological and meteorological agencies, environmental protection and civil protection), requires some discussion in view of their role in the VFDM project.

At the time of redacting the MTE report, the NGOs involved in the VFDM project were in their second quarter of intervention, about 6 months into the project, with one or two months of working time effectively spent in the field, mainly getting in touch and establishing contact with the pilot sites and the various participants. The following observations are pertinent respect to the NGO involvement:

- The NGOs were recruited with the support of national agencies. The final choice was approved at the respective national level,
- After the choice of the local partners, the pilot experiments were launched at all selected sites. All agencies working in the field of rural development (environment, water, health, education, etc.) were invited to the launch workshops under the leadership of the local authorities (mayors, prefects, governors as the case may be);
- The project was presented, and the pilot experience explained to all parties involved;
- The activities on the pilot sites were carried out with the support of the peripheral technical services of the national agencies. Examples include the involvement of the Water and Forestry Department in Ivory Coast and the Environment Department in the Badara pilot site in Burkina Faso. At all levels, if the head of a peripheral service is on site, he or she is involved in the activities on site, his or her time permitting.
- The reception of the stations was prepared and occurred in presence of representatives of the different national agencies (meteorology, hydrology) in order to guarantee their

active presence. These bodies have signed for delivery through either a local representative of the agency or through representatives of the body at the national level;

- The local and administrative authorities, village chiefs and religious authorities were involved in local site activities. No activity has been carried out without informing the permanent bodies of the communities, whether it is setting up the flood and drought management committees, or the elaboration of the flood and drought management plans; Moreover, periodically ABV organises monitoring sessions with local partners and on several occasions the technical structures concerned are involved.

4.4. Efficiency

Efficiency analysis measures and assessed how financial resources/inputs (funds, expertise, time, human resources etc.) are converted into project results and outcomes.

4.4.1. Project budget spending

Project efficiency has been difficult to examine due to lack of transparency in project accounting. However, the SARS COV2 pandemic delayed project progress and the reaching of milestones. As a result, the spending is lagging begin schedule.
At the time of the PTAC meeting on the 6th of May 2022, out of a total project budget of 7,122,000 $US, only 2,797,357 $USD were spent with another 790,000 $US tied up for obligations. An amount of 3,534,643 $US resulted still not spent.

4.4.2. Budget-neutral extension request

The project executive entities, in agreement with project technical advisory committee put forward the request for a **budget-neutral extension of the project for 1 year**, to be able to make up for pandemic-related delays and being able to generate due project output.

4.4.3. Time and human resources allocation

On the project three full-time staff are employed at the executive entities: Mr Niampa Bukary (VBA), Mr. Maxime Teblekou (GWP-WA) and Mr. Ramesh Tripathi (WMO). VBA, GWP-WA and WMO are also providing **in kind contributions** by making some of their staff time (project officers, secretariat staff, ITC technicians, etc.) available for the implementation of the VFDM project and ensuring synergies and linkages with other parallel activities and partners (WASCAL, CGRE/CEDEAO, AGRHYMET).

4.5. Sustainability

The long-term sustainability of the project achievements will be strongly dependent on the timely and **sustained delivery** of meteorological, hydrological and climatological data and related products from the NMHSs of riparian countries to operate the VoltAlarm system. Several – as well as other agencies in charge of environmental protection – have already provided support letters to ensure the long-term transfer of information from the national databases to continue operations of the forthcoming transboundary Early Warning System coordination unit.

4.5.1. Support of observing systems

One point of concern for the MTE team with respect to VFDM project sustainability is the perception by national project partner agencies (i.e., national hydrological and meteorological services) and regional EE (VBA and GWP-WA) that donors should provide the financial means to continue operating observing equipment, which has been installed with VFDM project resources, beyond the project lifetime. Far road distances between the sites where equipment is operated and the agency headquarters in the capital cities has been put forward as a reason for high maintenance costs.

During the regional Workshop held between 4 to 6 May 2022 in Cotonou it was emphasized by the EE WMO that the VFDM project observing equipment should be integrated into the national observing network and that it is the responsibility of national services to **maintain and support**

the equipment through the national budget allocated to national hydro-meteorological services. Failing to provide such support will seriously impair project sustainability, including the operation of the E2E EWS system VoltAlarm, which relies on a continuous feed of observations from the hydro-metrological observing network to function. Remote stations need to be maintained by nearby local staff, that must be trained to execute maintenance to lower costs.

Note: The project team is continuously involving the national agencies in the implementation of the activities so that long term sustainability is consider and managed.

4.5.2. Data exchange

Another important aspect concerning sustainability is continuous data exchange among basin countries and a regional coordinating entity. This includes flood and drought forecasting, which requires near **real-time data flows** between riparian countries and a regional forecasting entity. While data and information exchange modalities protocols have been formally ratified in the founding charter of the VBA by member countries, in reality no active basin-wide data sharing of water level and discharge data with the VBA is occurring, as has been assessed by the MTE and discussed during the project technical advisory committee (PTAC) meeting on May 6th, 2022. The lack of such exchange hampers the implementation and long-term operational sustainability of the basin-wide forecasting system VoltAlarm, to be developed in Component 2.

4.5.3. Data storage and archiving

Effective integrated water resources management in a transboundary basin, including transboundary flood and drought management, requires an efficient and **centralized data base** system for surface water observation records and flow rating curves. These must be accessed for monitoring and reporting purposes, to be able to compare the state of the river basin between reporting periods (see also UN sustainable development goal on transboundary basins UN SDG 6.5.2). This information is also needed for research purposes, when comparing ongoing flood and drought events with similar events that have occurred in the past. During MTE no functioning data storage and archiving system at regional coordination level could be presented. The need for such a system was discussed at the PTAC meeting by the MTE principal consultant.

The project is progressing well in establishing such centralized database through activities 1.1.2.1 and 1.1.2.2. in component 1. The host agency of centralized database in each country has been identified and procurement of database software and hardware is in progress. The reports available for activity 1.1.2.2 can be found here.

4.6. Communication and Outreach

Th project presents itself through a **project website** at https://www.floodmanagement.info. The website is well organized and provides easy access to project documents, including proposal, progress reports and deliverables with project progress indicator reporting in tabular form. Also, project events and project-relevant publications are made accessible through the project web site. Among project participants the exchange is ensured trough project meetings and workshops, that take place at regular intervals across the different riparian countries.

The VFDM communication plan for networking and outreach activities with all stakeholders is available on the project website under the following links:

- News and events: here
- Press room and media kits: here
- Social media channels: here

Besides increasing visibility of the VFDM project by the EEs in their organizational events, participation at various regional and international events such as the World Bank´s

Understanding Risk 2019 workshop, the Stockholm World Water 2021 event, the ECOWAS Hydromet Forum 2020 were project activities and outcomes promoted by the project team.

5. Challenges and lessons learned

The following challenges are identified by the MTE team, including lessons learned:

- Within the VFDM project there exist significant challenges in the interaction among national agencies across countries. The communication is often inefficient and information exchange with the executive entities VBA and GWP-WA slowed by national interests (e.g. the exchange of surface water information).

- Problems in communication among agencies at the national level within individual riparian countries have led to national project workshops taking place with some national agencies not being informed by the national focus point. For example, during the interview, which the PC undertook with representatives of national agencies in Togo, it emerged, that meetings have been organized through the national focus point, about which key people in other national agencies had not been timely informed. Similar situations arose in other countries.

- Integration with other ongoing regional projects like the ongoing HYDROMET project in Burkina Faso, which is sponsored by the World Bank, the internationally financed CREWS West Africa initiative or the European Union funded project FANFAR, could be significantly improved.

- A considerable gender imbalance exists at all levels, also if progress to improve this situation has been achieved. The imbalance is especially noticeable at the national agencies and at the regional coordination level, less so at the community level.

- Besides the SARS-COV2 pandemic, which has surely contributed to project delays, project progress in reaching set objectives is slow, especially as critical decisions are not being taken by the technical advisory committee. There is also a considerable risk of accumulation of further work delays during the remaining part of the project.

- There is an overall lack of understanding at the regional EE level and at national hydrometeorological agencies that observing equipment, which is sponsored by the project, needs to become integrating part of the national network and maintained through the budget of national hydrometeorological services.

- At present, equipment that has been installed by donors, follows different data exchange standards, leading to incompatibility of data interfaces with higher operational costs as a consequence (need for different proprietary data storage systems). In the interest of sustainability, for any chosen IT-based solutions, open-source software or software solutions with low-cost licensing should be used as to minimize operational and maintenance costs.

6. Recommendations

The following recommendations are made by the MTE team:

- The project lags with respect to the planned schedule. A **budget-neutral extension** of the project duration, as requested by the EE VBA and GWP-WA is inevitable and is strongly recommended.

- In the interest of a **timely development** of the E2E-EWS in Component 2 of the project, the MTE team recommends to lean onto an existing regional modelling system, for instance FANFAR that is already integrated in DEWETRA for West Africa and operated at AGRYMET. This modelling system is open-source, pre- operational, and can be calibrated for the Volta river basin with data supplied from the countries. FANFAR is a pilot system to produce operational short- and medium-term flood forecasts and alerts for West Africa. The FANFAR hydrological modeling system is based on the HYPE model of SMHI. The different input data streams consist of meteorological data for a historic initialization (analysis / hindcast) period and forecast period, satellite altimetry-based water levels, and in situ river flow observations. The core of the FANFAR system is a hydrological model, whose main function is to predict the effects of meteorological forcing (e.g. rainfall and temperature) on river flows and water level. If this solution is non-practicable, other existing regional modeling systems could be used instead.

- The **cooperation** among national agencies within each country and between riparian countries needs to be reinforced and the flow of information improved (e.g. planned workshops of agencies within single countries or in the region need to be announced timely and invitations send out to all actors). Similarly, at the country level, it is important to strengthen the collaboration between the national level and the community level (local NGOs and local communities) while ensuring better involvement of civil society (GWPAO national representations in the 6 countries, the Red Cross, etc.) as well as the services in charge of civil protection.

- **To inform and better involve** the national partners (meteorology and hydrology) in the choice of the hydrometeorological equipment (technical characteristics), which must be installed within the framework of the implementation of the project in order to maximize the degree of appropriation and the incorporation of this equipment in the existing national networks.

- **Ensure the transfer** of software rights that accompany the early warning system, which has been put in place, or at least choose a system that makes countries autonomous in the management of the early warning system after the project has been completed.

- The VFDM project will have a **greater impact at the community level**, while avoiding loss of interest in the project, by targeting communities through intervention of local NGOs and addressing problems related to agricultural activities, which are given priority by the community. Such problems include difficulties related to the loss in agricultural yields, access to agricultural input (seeds, water), cultivation techniques to counteract the effects of drought, agricultural finance and the fight against diseases that ravage livestock.

- **Gender equality** is improving, but is still unbalanced in technical positions at national agencies. This is due to lack of STEM-trained women. Young women across the riparian countries should be encouraged to be trained in STEM areas to increase the number of recruitable female professionals for open positions in national technical agencies.

- National hydrological and meteorological services need to allocate budgets for **maintenance and operation** of monitoring networks. Donated stations need to become part of the national network and maintained through national budgets. A working hydro-meteorological station network is the prerequisite for any sustainable E2E EWS for flood and drought.

7. Meeting minutes with executing partners VBA and GWP-WA

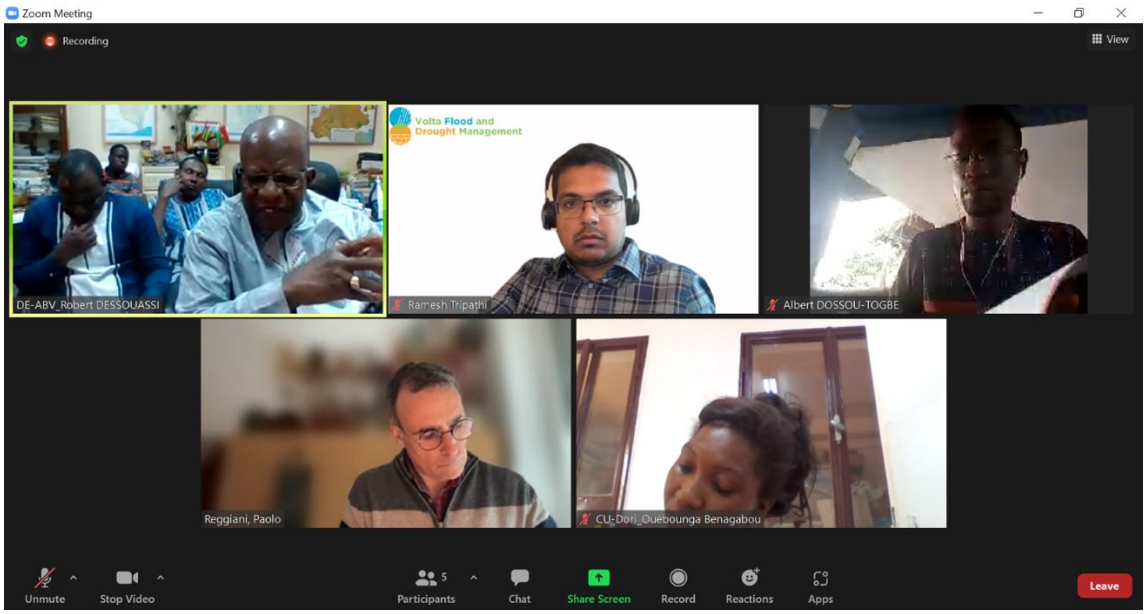


Figure 5 Screenshot of meeting with VBA/GWP-WA

The 1st meeting of the MTE with the project executive entities (EE), the regional partners Volta Basin Authority and Global Water Partners West Africa took place at the premises of VBA in Ouagadougou on the 7th of April 2022, 11:00-12:15 GMT.

The meeting was chaired by the PC (Mr. Paolo Reggiani), who connected remotely from Germany. National Consultant I (Ms. Benagabou) was present physically, whereas Consultant II (Mr. Albert Dossou-Togbe) joined remotely. The implementing entity WMO also joined the meeting through remote participation of Mr. Ramesh Tripathi.

VBA was represented by the executive Director, Mr. Robert Dessouassi, GWP-WA by Mr. Armand Houanye. The deputy director of VBA and the chief financial officer of VBA were also present.

After an initial round of introduction of the participants, Mr Houanye expressed his concerns about lack of knowledge on the methodology of the MTE, which he wanted to be explained by the PC. Mr. Dessouassi emphasized that VBA and GWP-WA constitute one team in the VFDM-WA project.

Mr. Reggiani acknowledged the work already done so far by the project participants, especially in the area of capacity building and knowledge transfer on climate-related hazards through local workshops in the communities. He also praised the achievement in risk mapping for remote rural areas exposed to flood hazards. Both, workshops and risk mapping are part of project Component 1 (“Develop capacity and established frameworks at the local, national and regional levels to ensure risk informed decision-making”). Finally, he remarked that the working conditions have been difficult due to the SARS-COV2 pandemic, which has inevitably led to delays and slowing of the work progress.

Next, Mr. Reggiani explained that the methodology, which will be applied in the project evaluation, cuts across the three-level structure of the project, by addressing the regional actors, national actors and actors at the community level of all Volta basin countries. The analysis of the achievement of project objectives requires field visits and /or remote interviews at these

three levels. The field visits would be carried out by the principal consultant and the two national consultants.

Mr. Houanye and Dessouassi expressed their concern about the fact that the scheduling of visits and meetings with national partner agencies should occur in close cooperation with the VBA and GWP-WA. They also expressed the need to know on the basis of which criteria local project actors would be selected for the MTE process.

They also expressed the need to inform the national agencies of the six Volta basin countries about the MTE evaluation visits through the VBA secretariat. He asked that the MTE consultants provide a list of institutions that are going to be involved in the MTE process.

Mr. Houanye also mentioned that other programmes involved at the regional level, which include CEDEAO, UEMOA, CILSS, WASCAL, programmes, should in his view be part of the MTE process. The question catalogue proposed for the MTE process should be shared beforehand with national partners.

The necessary data collection for the ongoing Component 2 is still slow due delays in installing measurement equipment.

Mr. Reggiani agreed with this way of proceeding and promised to forward an up-to date plan of the scheduled MTE meetings to GWP-WA and VBA before 13 of April. The final plan is reported in Table 2.

At a different note, Mr. Dessouassi noted that VBA and GWP-WA plays an important role in collecting and providing written information on project progress which they consider essential for inclusion in the MTE report.

Mr Reggiani encouraged the EE representatives to express possible concerns on the project implementation. Another concern voiced by Mr. Dessouassi was the need to extend the project on a budget-neutral basis for 12 months, as delays due to pandemic-related travel restrictions, have slowed work progress. Mr. Dessouassi also raised the issue of financial management, stating that delays have occurred in using project funds with respect to the planned schedule due to the same reasons, that have slowed work progress.

Mr Reggiani agreed that he would include the request for a project extension in the MTE report.

Mr. Dessouassi proposed to call in a 2nd meeting between the consultants and the EE on 19th or 20th of April, after they had received the updated MTE schedule and list of national VFDM project partners to be involved into the MTE process.

The meeting was closed at 12:15 hours CET.

8. Meeting minutes technical external partners

A single virtual meeting was carried out with the technical partners on the 21st of April. The online meeting started at 10:00 CET. The following people joined the meeting: Mr Gabriele Quinti (Knowledge and Innovation – K&I), Ms. Anna Mapelli (CIMA Foundation) and Ms. Veronica Ruiz (K&I/CERFE). The interview was conducted by Paolo Reggiani.

After a brief introduction, the participants explained the role of their organizations in the project. The role of K&I is the analysis of vulnerability exposure in the six countries involved in the VFDM project. The role of CIMA is the development of the VoltAlarm, early warning platform, that constitutes a core element of the project. The role of CERFE is the analysis of ecosystem with the aim to identify climate-related vulnerability of various environmental components. In sequence CERFE supports the development and provide guidance in the implementation of nature-based solutions to strengthen climate adaptation and mitigate climate-related environmental vulnerability. Proposed solutions include among others the nursing and planting of climate resistant plant species that help slowing soil erosion and protect water resources.

All three organizations were originally planning to perform their interventions on-site, but were forced, after some initial field work had taken place, to resort to virtual communication due to the SARS-COV2 pandemic. It is expected that face-to-face contact resume as soon as conditions have further improved and travel restrictions ease.

Mr Quinti explained that his organization is supporting 55 communities in the 6 countries. Despite the support being performed virtually, communication has not suffered. The support was performed by exploiting local knowledge and guiding it appropriately. One of his major concerns is the dichotomy of the project due to the English/French language barrier. The only anglophone country, Ghana, is isolated among the other countries. The knowledge of English is low among the remaining Volta Basin countries at all levels and vice versa with French. The language barrier hampers the project-related interactions across all six basin countries. Concerning gender equality, Mr. Quinti explains that the interaction with female participants has been partially more productive than with male counterparts, despite the latter being more strongly represented.

Ms. Ruiz confirmed that the lower presence of women was also due to an insufficient number of women with MINT education, that could take on the respective jobs in the national or regional bodies. Despite efforts being made across most of the Volta basin countries to increase the number of female involvements, the overall number remains behind expectations.

At a different note, the role of the technical external partners is not well understood by project participating bodies. Expectations from the side of the actors diverges from the planned work programme and need to be managed accordingly. The contribution of the organization CERFE consist in a set of concept notes that need to serve as a guideline to local actors for environmental restoration and the implementation of nature-based solutions.

Mr. Quinti further observed that there is a necessity to strengthen the social component and to build capacity of social scientists to be able to reach out to the communities. Overall, there is a higher presence of professional local women in the social field. In Ghana, female participation is particularly low.

Ms. Mapelli intervened, saying that as far as the flood forecasting component is concerned, the reaction of national focal points in the 6 countries has been very slow, thus delaying work progress. Ms. Ruiz observed that with respect to the environmental agencies in the countries,

that are involved on the aspect of ecosystem vulnerability and nature-based solutions, the coordination through the national focal points has been particularly poor.

Ms Mapelli observed that with respect to the civil protection structure in the six countries, which will need to be involved, particularly in the 3rd component of the project, mandates are not clear and the system structure difficult to comprehend.

Ms Quinti observed, that in Mali and Burkina Faso the project was affected by the recent political turmoil and change of government. Some of the selected communities, especially in the border regions, where violence has erupted, remain seriously affected.

Ms Ruiz also noted that at the governmental level the environment and climate-related problems do not seem to have a high priority across most Volta basin countries. This prevents the exchange of information that is necessary to understand the interconnection between water resources and social conflict.

Ms. Mapelli finally noted that in her work she found that Burkina Faso and Benin play a very active role, and Ghana is characterized by an overall good governance. The interaction with the remaining countries, in particular Mali, remain slow. In Ivory Coast bureaucracy constitutes a considerable impediment to work progress. Also, the deployment of meteorological stations, which is a key infrastructural element in the development of the VoltAlarm early warning system, has been very slow.

The meeting was closed at 11:30 CET.

Figure 6: Working groups during the PTAC meeting in the Hotel Royal Benin, Cotonou, on May 6th 2022.

9. Second project technical advisory committee (PTAC) meeting

On the 6th of May the PC, P. Reggiani, and LC2, A. Dossou-Togbe, participated at the 2nd Project Technical Advisory Committee (PTAC) meeting, which took place at the Hotel Royal Benin, Cotonou. Aim of the meeting was an assembly of national technical agency members. The responsibilities and duties of the PTAC members in the project are as follows:

- Review the project outputs/outcomes and identify the strong/weak points with respect to the objectives of the projects and the applications of the results (open-source, sustainable and tailored products and services with institutional strengthening);
- Comment on the project teams' skills and the relevance of their proposals and actions;
- Link the project stakeholders' efforts to other initiatives to build synergies, optimize resources and assure coherence;
- Promote the exposure of VFDM Project activities.

The objectives of the second Annual PTAC meeting are to present and review the initial findings of the MTE as well as project progress, mainly the project activities, carried out together with the national and regional agencies. This to assess the effectiveness and applicability of the implementation results, challenges encountered, and the way forward.

During the PTAC meeting representatives of the agencies provided presentations about the status of the project in their respective countries. In this context also difficulties were highlighted and reasons for delays explained. Ample room was left for question and answer (Q&A) sessions.

The EE WMO representative, Mr. Ramesh Tripathi, provided an overview presentation to the audience about the status if project progress, including the financial status and open questions. The presentation also provided a financial overview of means spent to date. Due to project delays and lack of efficiency, at the time of the PTA meeting, out of a total project budget of 7,122,000 $US, only 2,797,357 $USD were spent with another 790,000 $US tied up for obligations. An amount of 3534643 $US resulted still unspent.

In occasion of the PTA meeting the PC and LC2 presented their preliminary MTE findings to the PTA members and the executive entities VBA and GWP-WA. The preliminary results were well received by the audience, in particular VBA and GWP-WA. The slides of the presentation given by the MTE consultants is included in an Appendix.

10. Meetings with national agencies

The following pages show screen shots of online meetings between the MTE team and representatives of national agencies. The outcomes of these meeting have been integrating part of the analysis performed for this report. The meetings were organized and scheduled with the help of VBA and GWP-WA, who wrote invitation letters to the national ministries and the national focal points in the six basin countries.

10.1. Meeting Benin (25. April 2022, 15-17 GMT)

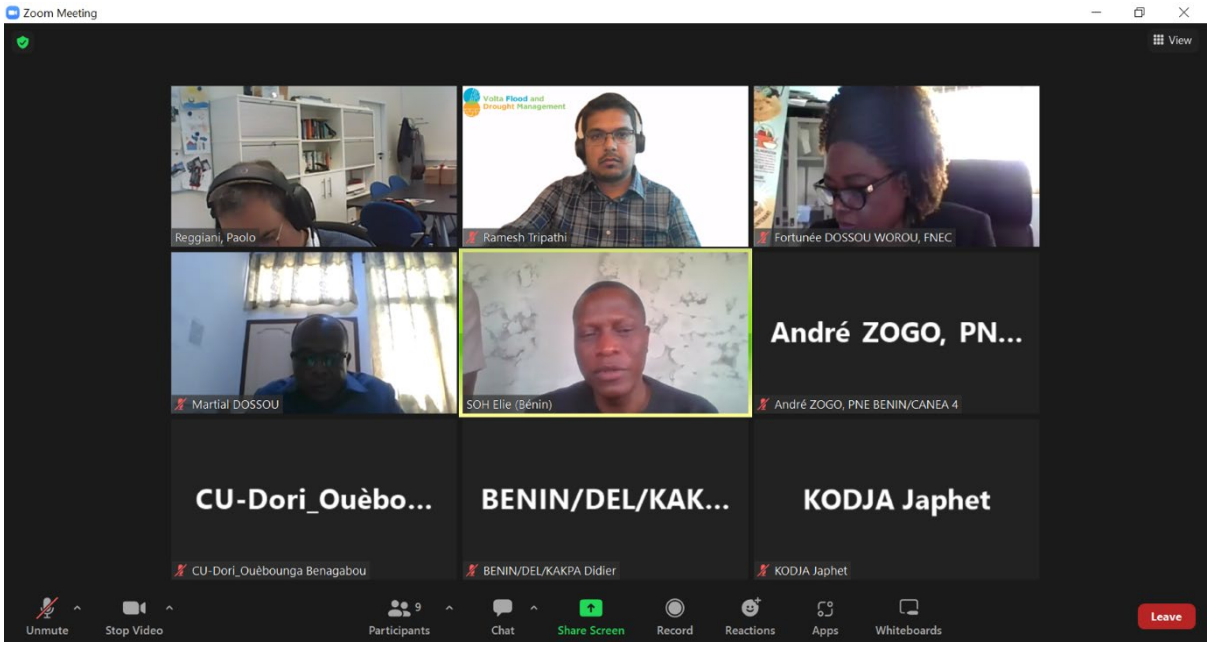


Figure 7: Participants at the meeting with technical partners in Benin

Participating national partners in the project:

- technical advisory committee composed of 3 Focal Points as follows 1-the General Directorate of Water (Ministry of Water and Mines); 2-the National Agency of Meteorology of Benin (Ministry of Infrastructure and Transport) and 3-the National Agency of Civil Protection (Ministry of Interior and Public Security)
- National working group in charge of the follow-up of the studies conducted in the framework of the implementation of the project declined as follows 1-INE; 2-DGEC; 3- Red Cross; 4-DG ANPC; 5-Meteo-Benin; 6-LACED; 7 National Water Partnership.

Its mandate is to review the documents produced by the consultants but also to guide them during the information gathering phase. It is a committee suggested during a regional workshop to address the difficulties of national consultants in mobilizing country data. The establishment of such a committee is done as needed, when the actors justify its necessity.

Institutions present at the online session:

- DG Water
- Meteorology
- PNE
- LACED

- FNEC

Activities carried out in the project:

- Organization of training workshops for technical staff, reflection on various topics related to flood and drought management. Efforts have been made to consider gender and stakeholder representation.
- At the community level: awareness raising and training activities of the local NGO within the community. Establishment of a nursery for reforestation activities.
- Installation of the automated hydrometeorological station.

Strong points:

- Good implementation of activities at the community level with an effective involvement of local authorities and gender.
- Good institutional communication with the regional level, i.e. VBA and GWP-WA.
- Efforts have been made within the framework for the considering of gender and the representation of the stakeholders.
- Collaboration and presence of meteorological staff at the reception of the equipment at the implementation site.

Difficulties encountered in the implementation:

- The cumulative context of the SARS-COV2 pandemic disrupted the implementation of activities.
- Difficulties at the outset regarding the role and responsibility of each of the partners in the implementation of the project.
- Weak articulation and collaboration between national institutions and the local NGO in charge of social intermediation at the community level.
- Insufficient involvement of the National Agency for Civil Protection in the implementation of the project.
- Some difficulties for some institutions to be represented during the workshops due to the high demand on the managers for other current activities.
- The "online training and online meetings" format due to the context of the SARS-COV2 pandemic has sometimes limited the level of ownership.
- Budgetary difficulties that limit the realization of the activities assigned to the focal point. This limits the number of participants invited to the training sessions as well as the deployment of field activities.
- Insufficient human and financial resources available to the national institutions to carry out activities within their mandate.
- Difficulties in accessing data for diagnostic studies.

Note: Difficulties were also encountered in the implementation of certain activities, particularly the pilot field studies (focus group discussions and semi-structured interviews) with communities to identify the multidimensional factors of vulnerability and risk (social, economic, ecological, cultural, political and infrastructural determinants of vulnerability) in the Volta Basin areas that are highly exposed to different hydrometeorological hazards.) Thus, the establishment of risk maps carried out in the project intervention area was confronted with constraints (lack of updated data) forcing the use of satellite data dating from colonial periods. Although field visits improved the quality of the results for some areas, some areas still lacked a collection station. The types of data used are (MLT, vegetation framework, vegetation maps, land use, ...). The stakeholders also expressed reservations about the acquisition of the hydro-meteorological station acquired during the project that should be installed in a locality in Benin (name of locality). They suggested

their involvement in the acquisition of this equipment. This would be a guarantee for a quick appropriation of the functioning of the device.

Recommendations

At the national level:

- Organize sessions to share the knowledge acquired during training with the team responsible for risk prevention and early warning in each department. This will allow each institution to increase the core competence of various themes and thus ensure the sharing and sustainability of knowledge.
- Substitute or assist the heads of the services to avoid vacancies during transfers/assignments of agents with the skills.
- Carry out a new planning of the remaining project activities to adjust the financial resources allocated. The financial resources planned for certain activities are insufficient to carry them out. In fact, throughout the implementation, anomalies have been highlighted and those related either to an under-budgeting of certain activities or to missing steps (non-planning of certain activities, even though they are the linchpin for carrying out other activities).
- Ensure during the second half of the project the effective involvement of the ANPC and a better articulation between the national and local levels.

The sustainability of the project depends on the ownership of the project and an internalization of the knowledge produced and provided to the different actors at different levels (local, national). For this purpose, the choice was made to use the "Benin Meteorological Office" to collect data from the hydro-meteorological stations in view of its capacity (modernized tool, good material and equipment endowment, financially well-funded with a consistent and regular supply to ensure its prerogatives).

10.2. Meeting Togo (29. April 2022, 09-11 GMT)

Participating national partners:

- National Water Resources Agency (Focal point)
- National Meteorological Agency of Togo
- Environment Directorate
- Civil protection

Togo notes a communication problem between the national structure (the department in charge of water resources) and the regional coordination at VBA and GWP-WA.

- It was found that the implementation of activities by the local NGO has some shortcomings and it is proposed that METEO takes the lead in the execution of the activity concerning the installation of weather stations. Indeed, Togo states that there is a difficulty in monitoring the activities of the local NGO "Jeune Volontaire de l'Environnement (JVE)". The NGO JVE reports only to regional actors.
- The participation rate of women in the project's activities was higher, at nearly 50%.

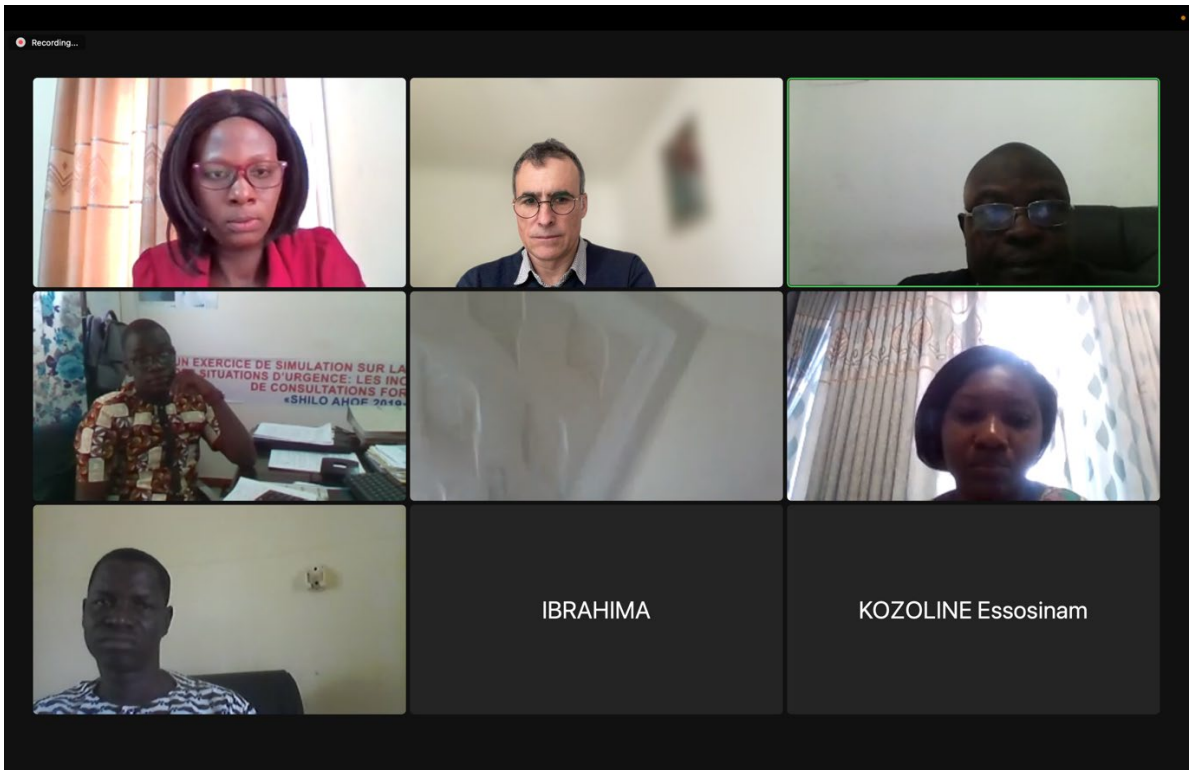


Figure 8: Participants at the meeting with technical partners in Togo

Sustainability of the project actions:

- To ensure the sustainability of the project's actions, the Togolese actors propose to improve the communication component between the national structure and the regional coordination, and to strengthen the capacities of the structures in order to make the actions sustainable in time and space. In terms of capacity building, they mentioned not only the lack of qualified human resources but also the fact that the staff is aging.
- They also indicated the need for financial support from the project to put the station into operation and to support its functionality throughout the project. This step is necessary before the station is really taken over by the State resources in order to give time to the weather service to foresee resources in the State budget and to integrate them in its

programming. Indeed, the installation of a meteorological station is an activity that involves investment in time and financially to make it operational.

- It is also desired to provide spare parts for the maintenance of the equipment over a period of time to be defined in order to ensure the functionality of the station before a total takeover by the weather.
- Finally, it is requested an assistance to the weather service to facilitate the extraction of data from the station but also its configuration on the data management systems already established in these structures. Meeting Burkina Faso (29. April 2022, 15-17 GMT)

10.3. Meeting Burkina Faso (29. April 2022, 15-17 GMT)

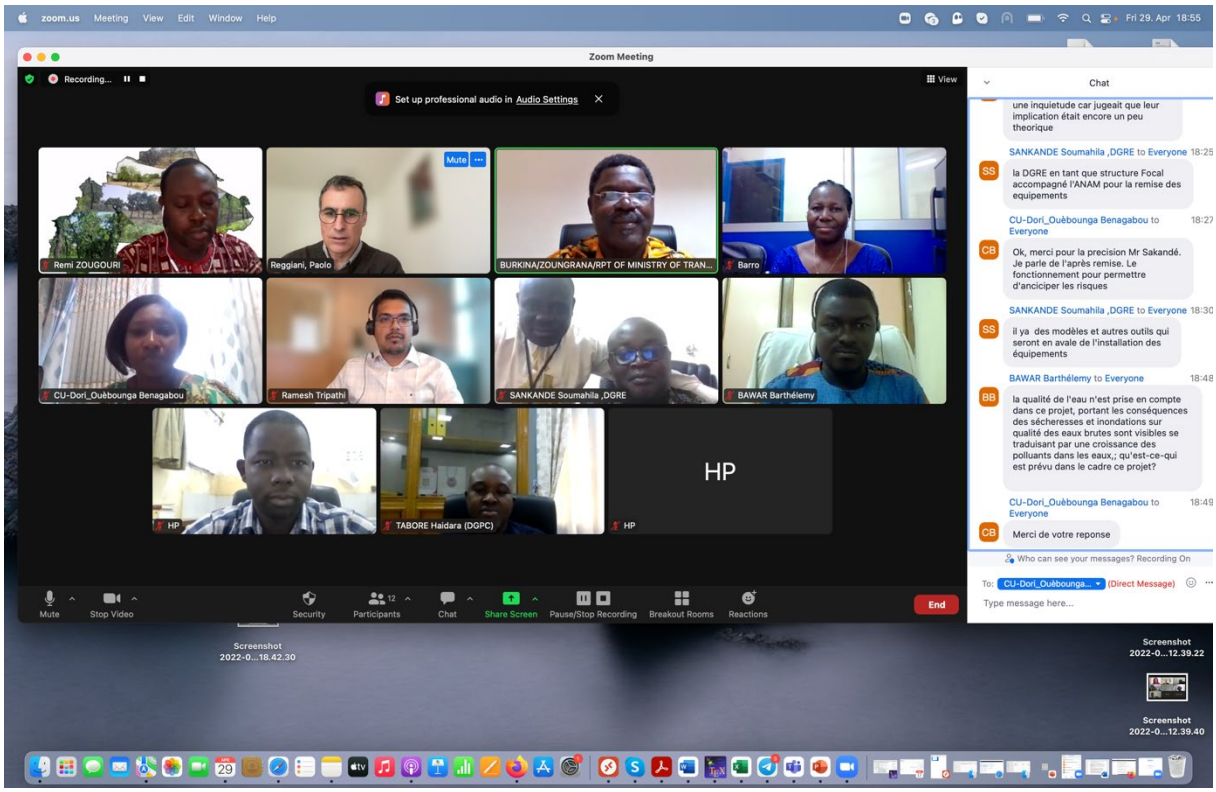


Figure 9: Participants at the meeting with technical partners in Burkina Faso

Participating national partners:

- General Directorate of Water Resources (DGRE): Focal Point
- National Meteorological Agency (ANAM)

Activities carried out:

- Organization of training workshops for technical staff, reflection on various topics related to flood and drought management. Efforts have been made in the framework for the considering of the gender and the representation of the stakeholders.

Strengths:

- The project is relevant and addresses the climatic difficulties encountered by Burkina since the 1970s. Indeed, the country has faced several climatic crises, the most severe being those of 1973, 1984 to mention only those

- Good institutional communication with the regional level, notably the VBA and GWP-WA.
- Efforts have been made within the framework to consider gender and stakeholder representation.
- The installation of the hydrometeorological station in Bama is an additional effort in the process of densification of the network. The collection of climatic data will ensure better anticipation of the climatic risks encountered in the region.

Difficulties encountered in the implementation:

- The combined context of the HIV/AIDS pandemic and the security situation has disrupted the implementation of activities. The security context is particularly deteriorating and will have to be considered in the continuation of the activities.
- Initial difficulties regarding the definition of roles and responsibility of each partner in the implementation of the project.
- Weak articulation and collaboration between national institutions and the local NGO in charge of social intermediation at the community level.
- Some difficulties for some institutions to be represented at the workshops due to the high demand on their managers for other current activities.
- The "online training and online meetings" format, due to the context of the SARS-COV2 pandemic, has sometimes limited the level of appropriation.
- Budgetary difficulties that limit the realization of the activities assigned to the focal point. This limits the number of participants invited to the training sessions as well as the deployment of field activities.
- Insufficient human and financial resources available to the national institutions to carry out the activities within their mandate.
- Other difficulties: The ageing of the technical staff of the various technical services.

Recommendations:

- Strengthen the involvement of grassroots actors who will ensure the sustainability of the project's effects in the medium and long term.
- To achieve this, the appropriation of strategic objectives, issues and challenges would make it possible to overcome this difficulty.

10.4. Meeting Ghana (3. Mai 2022, 11-13 GMT)

Participating national partners:

- National hydrological Service
- National meteorological Service

Activities carried out in the context of the VFDM project:

- Organization of training workshops for technical staff, reflection on various themes related to flood and drought management. Efforts have been made to consider gender and stakeholder representation.
- At the community level: sensitization and training activities of the local NGO within the community.

- Installation of the automated hydrometeorological station.

Strong points:

- Good implementation of activities at community level with an effective involvement of local authorities and gender.
- Good institutional communication with the different levels of WMO, regional level including VBA and GWP-WA.
- Efforts have been made within the framework to consider gender and stakeholder representation.
- Effective collaboration and presence of meteorological personnel and representatives of water management services at the reception of equipment at the site.

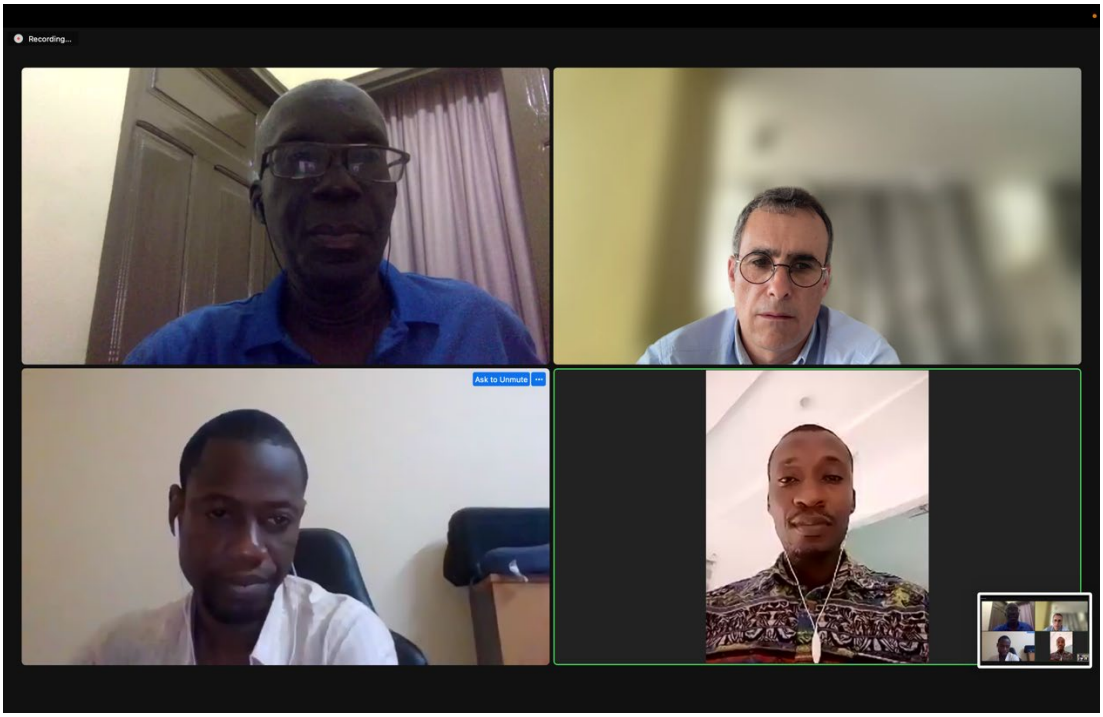


Figure 10: Participants at the meeting with technical partners in Ghana

Difficulties encountered in the project implementation:

- The cumulative context of the SARS-COV2 pandemic disrupted the implementation of activities.
- Weak articulation and collaboration between national institutions and the local NGO in charge of social intermediation at the community level.
- The format of "online training and online meetings" due to the context of the SARS-COV2 pandemic has sometimes limited the level of appropriation.
- Budgetary difficulties that limit the realization of the activities assigned to the focal point. This limits the number of participants invited to the training sessions as well as the deployment of field activities.
- Insufficient human and financial resources available to the national institutions to carry out the activities within their mandate.
-

10.5. Meeting Ivory Coast (3. Mai 2022, 13-15 GMT)

Participating national partners:

- SODEXAM: Company of exploitation and development of the airport, aeronautics and meteorology.
- DGPRE: Directorate for Water Resources Management and Planning.

Activities carried out in the context of the VFDM project:

- The DGPRE organized workshops that were attended by the project stakeholders. These included training and brainstorming workshops on the subject of flood and drought management.
- The communication between the national focal structure and the regional coordination was highly appreciated, as it allowed for a better organization of the activities under the responsibility of the national structures.

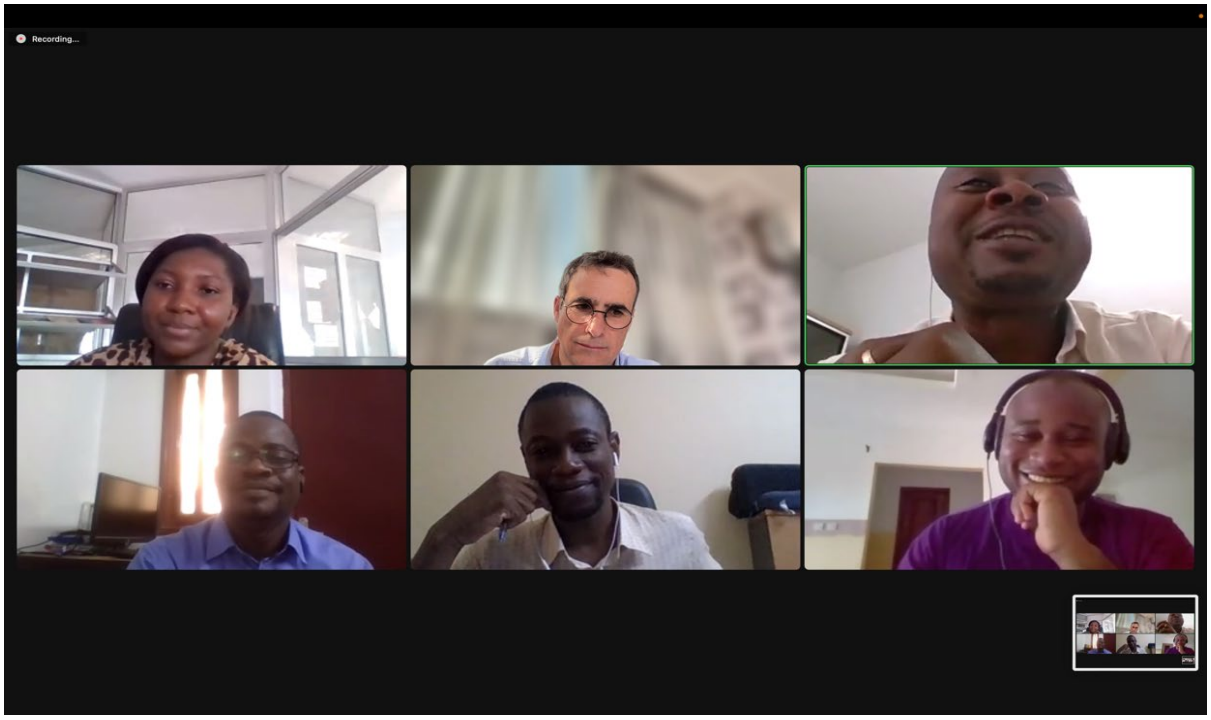


Figure 11: Participants at the meeting with technical partners in Ivory Coast

Installation of the weather station:

- Although the station was not yet installed in Ivory Coast at the time of the interview, it was in the process of being set up. The equipment had already been received. In fact, a site identification mission had been carried out and the METEO service CODEXAM had been designated to implement this activity and maintain the equipment.
- In view of the difficulties experienced, the stakeholders would like to see the project coordinated at the national level to ensure greater efficiency in the implementation of the project. This would improve the functioning of their service and, in turn, the results of the project.

To ensure the sustainability of the project, the national actors propose:

- The timely provision of financial resources to carry out the activities; This means providing SODEXAM with a monitoring and maintenance line.
- The maintenance of the equipment by the weather service and the communities at the base.
- The national weather service (SODEXAM) will have to integrate the new station in their action plan to materialize the appropriation by the weather service at the end of the project and the continuity of the service at the end of the project.

10.6. Meeting Mali (9. June2022, 11-13 GMT)

Participating national partners:

- National Directorate of Hydraulics (DNH)
- National Meteorological Agency (ANM)
- Agency for the Environment and Sustainable Development (AEDD)

Activities carried out in the context of the VFDM project:

- Organization of training workshops for technical staff, reflection on various topics related to flood and drought management. Efforts have been made to consider gender and stakeholder representation.

Strengths:

- The benefits of the project for the target communities are effective (capacity building of the populations in terms of prevention and response to extreme climatic events) even if the security context has limited the implementation of the activities.

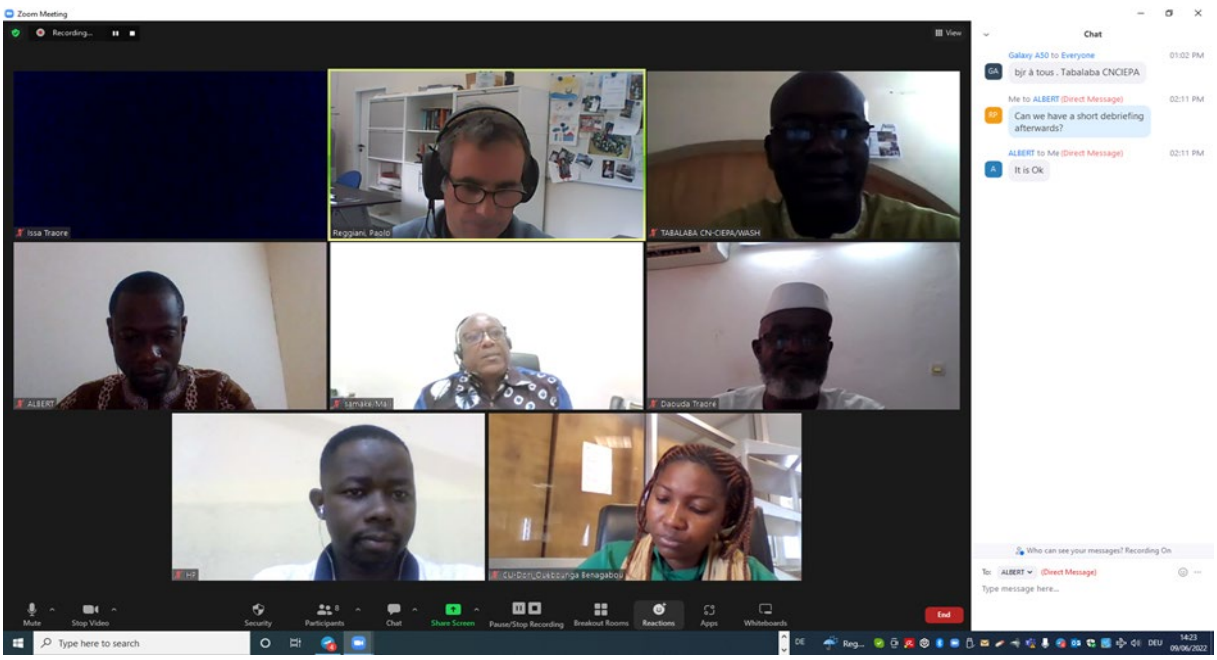


Figure 52: Participants at the meeting with technical partners in Mali

Difficulties encountered in the implementation:

- The project's organizational structure is not considered flexible enough and limits the effective, inclusive and collaborative implementation of activities at the country level. The management and organization of the implementation is too centralized and concentrated at the level of the ABV, GWPA and WMO. Desire is for project team at the head of each country with operational means and capacities of project implementation.
- Change of DNH management during the implementation of the project, which has negatively impacted the activities.
- Insufficient communication at the start of the project, which limited the appropriation of the roles and responsibilities of the different actors, particularly misunderstandings about the terms of collaboration between the local NGO and the meteorological department. In addition, the Malian Meteorological service would have liked to be associated with or informed of the technical characteristics of the meteorological station before its purchase.
- Insufficient collaboration between the national and local levels.
- Unstable security context limiting the realization of many activities. Difficulties in transporting the meteorological station to the pilot site due to the highly degraded security context making the transport routes from Ouagadougou dangerous.
- Level of gender involvement: The low representation of women within the technical team (less than 5%) involved in the capacity building activities of the VFDM project. At the level of the administration it is sometimes difficult to observe a maximum representation of all the structures because existing constraints: lack of qualified manpower, lack of technical skills of certain agents, low representation of women for certain positions. Despite the efforts made at this level, it is clear that the difficulties that arise during implementation can only be resolved in the long term.
- Insufficient involvement of civil society, particularly CN-CIEPA/WASH, in the implementation of the project.

Recommendations:

- Initiate and facilitate collaboration between the local NGO and the national meteorological service in order to finalize the reception of the equipment and its installation in the proper manner. Strengthen the effective involvement of the meteorological services in order to ensure the sustainability and in particular the follow-up and maintenance of the meteorological station.
- Plan the activities by resituating the persons in charge and the deadlines for execution over the remaining period of the project.
- Extend the duration of the project in order to facilitate the realization of the remaining activities and to make up for the delays in implementation.
- Improve the participation of civil society, particularly CN-CIEPA/WASH.

11. Pilot Sites

11.1. Tabota, Boukumbe, Benin

Questionnaire

What are the main actions that your community benefited from within the framework of the VFD project and what did they consist of?

a) The realization of an activity of awareness rising of the population of Tabota (Flood and drought, events and local mitigating actions - 82 participants including 38 women-, awareness on barrier gestures in the framework of the fight against the SARS-COV2 pandemic). This activity in still progress because it concerns several sessions. The level of completion at the date of the last report is about 30%.

b) The establishment of a flood and drought management committee and the three constituent sub-committees (CGCIS) of 21 members including 8 women (dissemination and early warning committee; committee in charge of response and evacuation; committee in charge of first aid).

The groups of actors represented in the committee are: Women's association, Youth association, Farmers, Breeders, Craftsmen association, Customary and religious authorities, Village land management structures

A messaging group has been set up to ensure communication between group members.

c) Conducting a survey at the local level on the levels of endogenous knowledge on flood and drought management

d) Development of a community flood and drought management plan (CFMP)

e) Training of committee members on the following themes:

- Module 1: Role and responsibility of CGCIS members.
- Module 2: Administrative and associative management of the committee.
- Module 3: Communication and animation techniques.
- Module 4: Notion of climate change.
- Module 5: Gender balance and its consideration in the implementation of initiatives.

No participatory vulnerability map of the community in Tabota exists. The village is located in a transition zone towards an arid climate with specific variations between villages. The climate is of savannah type with a dry winter (Aw) according to the Köppen-Geiger classification and is characterized by 7 dry months (November to May), and 5 wet months (June to October). As a result, insufficient rainfall (delayed rains, shifting seasons) and its negative impacts on crops are felt. The Tabota village is located on a hilly terrain with fields situated on the hillslopes or in the lowlands. The main climate-related damage is caused by runoff on the slopes that damages crops and leads to accumulation of water in the lowlands. Since the fields are located on the hillslopes, the winds are more violent and more harmful for crops (plant lodging) and to the houses. The control of water for agricultural purposes remains the major problem for producers, followed by the availability of fertilizers for the crops.

For the pilot site the exists no census of people affected by climatic phenomena.

The following climatic phenomena mainly affect the area: flooding due to runoff on the slopes and flooding of the Pendjari river tributaries. Mild impact by strong winds, severe impacts by drought.

f) Installation of an autonomous hydrometeorological station in the village.

g) Training on the establishment and maintenance of a tree nursery for nature-based solutions.

h) Establishment of a nursery as planned by the PGCIS with the objective of producing more than 1500 plants for reforestation for nature-based solutions.

In the overall context the importance of the coverage of the project activities by the local Dinaba radio station is emphasized.

Who are the main categories of people who participated or benefited from it and what is their representation in decision-making? Seniors, women, youth?

Different decision levels:

- A standing committee of 21 members including 8 women for dissemination and early warning; a committee in charge of response and evacuation; a committee in charge of first aid and rescue. The groups of actors present in the committee are the women's association, youth association, farmers, cattle breeders, the craftsmen association, customary and religious authorities, village land management structures.
- Next, there is the community and end-user level. The standing committee disseminates the capacities acquired during the training sessions within the community and to end-users.

Participative decision-making process:

The participation of women in the committee's activities is proven by strong female presence. Women are represented in the management committee and participate, or at least their reactions and interventions during the focus groups suggest that they are not marginalized in the project implementation process.

What new things have you learned, what more do you have thanks to this project which allows you to better react to extreme weather events? (strong winds, floods and drought). Compare before vs. after the project?

New insights and understanding gained through the project:

- Understanding of a natural, what causes it and how to respond to it to reduce its negative impact on the population.
- Understanding how to get organized within the 3 sub-committees in response to natural disasters.
- Themes of the training sessions that were covered:

    - Module 1: Role and responsibility of CGCIS members.
    - Module 2: Administrative and associative management of the committee.
    - Module 3: Communication and facilitation techniques.
    - Module 4: Transfer of the concept of climate change.
    - Module 5: Concept of GENDER and its consideration in the implementation of initiatives

What are the main benefits of this project within your community?

- We are better prepared to deal with natural disasters and we know exactly what to do from now on which was not the case.
- The committee set up is functional and monitors the weather.

– The autonomous station installed allows us to prevent natural disasters and will help us to take precautions before they occur.

How do you think the sustainability of your achievements under this support at the end of the project (knowledge, tools, community plan, flood marking plates, equipment, EWS communications, meteo stations)?

– The committee and the 3 sub-committees set up are very motivated and committed to their functions. They disseminate the various lessons learned during the training to the community and this reinforces the sharing of information within the village.
– The committee is in charge of the follow-up and maintenance of the equipment facilities and ensures its protection.

Witness report

Our village had received a visit in November 2020 from a gentleman with whom we had toured the flooded fields, the huts whose roofs had been blown away by the winds and especially discussed with the population the problems we were facing. I thought, like the other inhabitants, that it was a visit like the many others that we receive every year and that afterwards did not lead to any result. It was with great surprise that we discovered upon the arrival of the NGO facilitator that we had not been forgotten and that it is with our village that the work will continue. If our village is usually divided by political issues, the actions of this project have united us in action because they are concerned with our daily difficulties in the face of floods, drought and violent winds. I thank the team that made the choice of our village out of the 10 villages in the north previously chosen.

Figure 1: Nursery for trees to be used for reforestation (nature-based solutions).

Figure 2: Construction of a basement for the meteo station to be installed in the Tabota community

Figure 3: Workshop with the Tabota community.

Figure 4: Rice filed damaged by flooding.

11.2. Bama Community, Badara, Burkina Faso

Questionnaire

What are the main actions that your community benefited from within the framework of the VFD project and what did they consist of?

1.Preliminary exchange meeting with the local actors of the project.

The field meeting was initiated by the NGO and was aimed at supporting the project in all its specific categories. During these meetings, several actors were met. These include the Regional Directorate, the Provincial Directorate and the Departmental Service of Environment, Green Economy and Climate Change; the Regional Directorate and the Provincial Directorate of Water and Sanitation; the Departmental Services of Agriculture, Livestock, and Social Action; the Bama City Hall; the Bama Prefecture; and members of the Badara Community.

During a series of meetings of visit and exchanges, a brief and succinct presentation of the project to all the actors was given, as well as their expectations managed. During the meeting the need for their full commitment for the success of the project activities was solicited. Also, the reason for the flood and drought management committee was discussed.

2. Action planning and project launch meeting

The workshop was attended by the Departmental Service of the Environment, Green Economy and Climate Change; the Departmental Service of Agriculture, Hydraulic Development and Mechanization; the Departmental Service of Animal and Fisheries Resources; the Departmental Service of Social Action; the Regional Directorate of Meteorology represented by ASECNA Bobo; the Municipality of Bama; the Prefecture of Bama; the Community of Badara. The workshop was attended by the project executing entities (EE) including the Volta Basin Authority (ABV) and the Global Water Partnership for West Africa (GWPAO).

At this workshop a more detailed presentation of the strategic information was presented to the stakeholders by the EE (GWPAO, ABV, PNE) in order to improve the understanding of the community of what can be expected from the project. This was also an opportunity for the community to express their gratitude for the choice of their locality, and to express their satisfaction with the significant progress and relief that this could bring to their daily lives in order to strengthen their resilience in the context of recurrent crises.

3. Activity 1

Organization of two training sessions on flood and drought prevention for the people of Badara.

4. Activity 2

Capacity building in flood and drought early warning system initiation.

5. Activity 3

Elaboration of a response plan to the effects of floods and drought: causes of floods, solutions to consider in case of floods, resilience strategies.

6. Activity 4

Establishment of a flood and drought management committee: This committee will be responsible for early warning and implementation of the flood response plan in the village (See Annex, Table I).

7. Activity 5 (ongoing)

Realization of a flood management platform in Badara including a proposal to improve the existing village warning system by installing beacons to better sense rising water level.

8. Activity 6 (ongoing)

Census of vulnerable households.

9. Activity 7 (ongoing)

Receipt and installation of equipment for an autonomous hydrometeorological station.

Who are the main categories of people who participated or benefited from it and what is their representation in decision-making? Seniors, women, youth?

If we look at the composition of the management committee, we can see that the elderly, women and young people are considered. The committee consist of:

- 2 women
- 2 elderly people
- 3 young people

At the level of the local population the management committee ensures a close monitoring of the project activities and proceeds to a restitution for the benefit of the local population of the village of Badara for an equitable levelling of information.

A diagnostic survey of vulnerable households is being conducted. The results of this survey will undoubtedly show the number of women, youth and elderly beneficiaries of the project activities.

What new things have you learned, what more do you have thanks to this project which allows you to better react to extreme weather events? (strong winds, floods and drought). Compare before vs. after the project?

New methods acquired during the project:

New techniques for assessing flood water levels from markers drawn on trees or bridges were acquired. This was made possible thanks to capacity building and training of local people. Capacity building has improved the level of inside knowledge of communities. The tools and approaches, including modern knowledge made available to them, improve the effectiveness of early warning to guard against consequences. During capacity building session on the roles and functions of a disaster management committee, the following elements were addressed:

- Knowledge of natural disasters;
- Causes and consequences of natural disasters;
- the mastery of an early warning system;
- To learn about modern tools that exist to facilitate risk monitoring;

What are the main benefits of this project within your community?

The benefits of this project are numerous according to the communities of Bama (Badara), but specifically, they believe that:

- They have more accurate and reliable information for early warning from possible flooding in the village of Badara;
- The standing of the village is enhanced by the acquisition of advanced early warning equipment. Indeed, the competition that is increasingly emerging between neighbouring communities that interact strongly is very often an opportunity or source of development of practices and therefore advancement in several sectors. In this regard, the people of

Badara feel honoured by the privilege granted to their locality by the opportunity to host the VFDM project;

How do you think the sustainability of your achievements under this support at the end of the project (knowledge, tools, community plan, flood marking plates, equipment, EWS communications, meteorological stations)?

With regard to the sustainability of the project actions and the management of the facilities/equipment after the project, the communities are currently reflecting on this. However, they point to the existence of the management committee as a force that would lead sustainability. Indeed, a special committee has been set up for the organized management of the facilities. The management capacities of the committee will be strengthened by the local NGO. The communities also rely on the wisdom of the village elders for sound advice.

Finally, they are thinking of seeking the support of the mayor's office, which is already willing to assist them in managing the facilities. They have expressed their interest for the project to accompany them until the end of the process to enable them to take over the practical management of the equipment and the required know-how. The community still considers the know-how acquired in the framework of this project as theoretical and hopes for a smooth and fluid transition towards the practical use of the acquired know-how.

What actions would you like the project to take next and what are your recommendations?

In terms of other types of actions to be developed, the community believes that it would be appropriate to consider supporting vulnerable members to change their activities. Indeed, some actors live in flood-prone areas. Having no alternatives increases their vulnerability. The communities would like the project to support them in changing their type of activities. According to them, cattle breeding could be such alternative.

As far as recommendations are concerned, the communities mentioned the need for:

- Capacity building for members of the management committee on and support and maintenance of the hydrometeorological equipment.
- To accelerate the installation of water level markers for early warning of floods across the village.

Figure 1: Exchange with community members at Badara

Figure 2: Exchange with community members at Badara

Figure 3: Meteorological station unboxing

Figure 4: Workshop ad group work on risk assessment

11.3. Kunkua Community, Ghana

Questionnaire

What are the main actions that your community benefited from within the framework of the VFD project and what did they consist of?

- The realization of an activity of awareness rising of the population of Bongo Kunkua (perception of the populations actors on the impacts of floods and drought on the life of the communities; exchange and communication on the differentiated effects).
- Establishment of a flood and drought management committee and its 3 sub-committees (dissemination and early warning committee; response and evacuation committee; first aid committee)
- Training of committee members on flood and drought risk management
- Themes of the trainings:

  Natural disasters; roles and functions of a disaster management committee and the three constituent sub-committees; causes of natural disasters; functions of the evacuation committee; interactions between the environment and humans in the event of a natural disaster; what is first aid and how to provide it in practice.

- Identification of vulnerable households.
- Design and production of a participatory community vulnerability map including flood prone areas. (Kunkua village is located in the VEA dam basin next to Bolgatanga town. The climate is sub-Saharan with an average rainfall of between 600 and 900 mm/year and about 74 days of rainfall per year. Average temperatures range between 28°C and 29°C). The whole area surrounding the village is inclined and drains runoff water towards the dam. As a result, there is significant soil erosion, gullying of rural tracks and significant rock outcrops. Violent winds and sandstorms are also frequent, as well as episodes of drought and violent rains.)
- The installation of an autonomous hydrometeorological station in the village.

Who are the main categories of people who participated or benefited from it and what is their representation in decision-making? Seniors, women, youth?

Committee level. The committee consists of 4 women, 4 men:

- village chief
- traditional chief
- youth representative
- female agricultural technician from the public extension service
- volunteer from the community
- women's representative
- representative of women with disabilities
- representative of women's associations

At the community/end-beneficiary level:
The committee in place disseminates the capacities acquired during the trainings within the community. The census of people affected by extreme weather events in the community is as follows: (1251 households; 362 men; 369 women; 244 children; 7 vulnerable women, 9 vulnerable men, 2 vulnerable boys, 2 vulnerable girls and 20 vulnerable households)

What new things have you learned, what more do you have thanks to this project which allows you to better react to the vagaries of the weather? (Strong winds, floods and droughts) Before and After the project?

New apprehension:

- What a natural disaster is, what causes it and how to respond to them to reduce their negative impact on the population.
- How to get organized within the 3 sub-committees in response to natural disasters.

Themes of the training sessions covered:
Natural disasters; roles and functions of a disaster management committee and the 3 constituent sub-committees; causes of natural disasters; functions of the evacuation committee; interactions between the environment and humans in the event of a natural disaster; what is first aid and how to provide it practically.

What are the main benefits of this project within your community?

- We are better prepared to deal with natural disasters and we know exactly what to do now, which was not the case before.
- The committee set up is functional and monitors the weather.
- The autonomous station installed allows us to prevent natural disasters and will help us take precautions before they happen.

How do you think the sustainability of your achievements under this support at the end of the project (knowledge, tools, community plan, flood marking plates, equipment, EWS communications, meteorological stations)?

- The committee and the 3 sub-committees set up are highly motivated and committed to their functions. They disseminate the various lessons learned during the training to the community and this strengthens the sharing of information within the village.
- The committee is responsible for the monitoring and maintenance of the equipment facilities and ensures its protection.

What actions would you like the project to take next and what are your recommendations?

- To continue the momentum by implementing actions that are of great help to the population.
- Addressing issues related to the epidemics that have ravaged livestock this year.

Figure 1: Risk map drawn up by villagers

Figure 2: First aid course

Figure 3: Preparing the ground for meteorological station installation

Figure 4: Installed meteorological station

11.4. Sangabali community, Ivory Coast

The MTE team did not carry out any visits on the ground in Cote d´Ivoire, but reports here the information received from the VBA. Several workshops have been carried out on the ground in the Tagadi prefecture, Département Boudounkou, Gountougou region, Ivory coast. The following list reports some activities that have taken place, including the gender partitioning.

- Formation of the GCIS committee meeting (51 participants, 7 women and 44 men). The committee formed is composed of 16 people (16 participants, 4 women and 12 men).
- Identification of the site of the meteorological station (53 participants, 8 women and 45 men).
- Advocacy with community leaders for the strong ownership of the project by the whole community (13 participants,2 women and 11 men).
- Identification of vulnerable houses and people. Members of the GCIS committee and the project team visited the village (4 participants, 2 women and 2 men).
- Delivery of loudspeaker equipment for early warning (30 participants, 26 men and 4 women).
- Training on first aid kits (30 participants, 26 men and 4 women).
- The following types of awareness training sessions have been done:

- Awareness on the importance of the weather station (53 participants, 8 women and 53 men).
- Awareness of impacts of drought and flooding risks. (50 participants, 7 women and 43 men).
- Awareness on the correct actions to adopt before, during and after the risks of flooding (30 participants, 4 women and 26men).
- awareness rising on effective actions to adopt before, during and after the risks of droughts (27 participants, 1 woman and 26 men).

– Elaboration of the plan of management of floods and droughts 20 persons of which 16 men and 3 women.
– Marking of the water level markers reached by the previous floods as well as the safety marking using three reference colours (yellow, orange, green).
– The importance of these markings was explained to a group (27 participants, 21 men and 6 women).
– The marking was done with the help of 8 people (8 participants, 5 men and 3 women).

Figure 1: poster with information on drought awareness raising

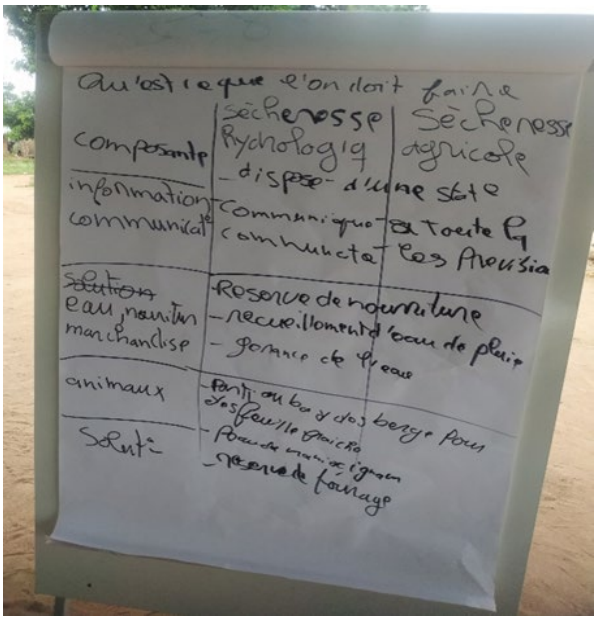


Figure 2: Flip chart with notes from a workshop on drought awareness raising

11.5. Daoudé community, Togo

No visit was possible to the Daoudé Community in Togo by MTE participants due to border restrictions. The meteorological station has been delivered.

11.6. Mali communities

No visit was possible to the Tori, Baye and Dougouténé communities in Mali due to security concerns. Only a virtual meeting was held with Mali representatives.

Appendix A: MTE work timetable

The following table summarizes all activities that have taken place during the MTE visit.

Description	Tasks	Lead/responsible person	Additional comments
VFDM MTE preparation https://www.floodmanagement.info/volta-basin/ https://www.floodmanagement.info/volta-basin/project-concept/	Starting March 15th , review of project materials and develop tool for stakeholders' consultation	MTE team	VFDM project team provides relevant documents and weblinks for information.
VFDM M&E project result framework and KPI update https://www.floodmanagement.info/volta-basin/monitoring-and-evaluation/		MTE team	VFDM project team to fill the project result framework until 31 March 2022.
Prepare Inception report (Table of content, methodology, list of stakeholders to be consulted, list of weblinks or documents to be reviewed etc.)	Due on 10th of April 2022 after meeting with executing partners VBA and GWP-WA.	MTE Principal Consultant P. Reggiani	
Meetings and Field visits with Country/Organizations	**Mode of meeting and date**	**Lead**	**VFDM project team support**
VFDM Executing Partners (VBA and GWP-WA)	Virtual and physical on 7th of April 2022, 11 am -1 pm CET	P. Reggiani leading the meeting with national consultant Ms. I. Benagabou present physically at VBA/GWP-WA office, Ouagadougou	Ensure participation of the project executing partners
1st VFDM technical partners (CIMA Research Foundation, K&I, IUCN, UNITAR/UNOSAT, etc.)	21st of April, 2022, virtual.	Virtual conference	Interview participants
Benin (25. April) Togo (29. April) Burkina Faso (29.April) Ghana (3. May) Cote d'Ivoire (3.May) Mali (9. June)	National agencies, virtual meetings of 2 hours each between 25th of April and the 9th of June	Virtual conference led by P. Reggiani.	Inform and invite all national stakeholders to the meeting beforehand (Meteo Service, Hydrological/Water resources dept., civil protection dept., environment agency..). Prepare the ToR
Community visit – Kunkua, Ghana	7th and 8th April 2022	Mr. A. Dossou & Mr. R. Tripathi travel to Ghana on 6th April	
2nd VFDM Executing Partners (VBA and GWP-WA)	Virtual on 19.4 16 -17pm CET (preparatory)	P. Reggiani and Mr A. Dossou virtual, Ms	Feedback on contacting national partner agencies

	and (full) 22.4 16-18 CET	Beanagabou physically present	
Community visit – Tabota community in Tanguieta, Benin.	28-29 April	Mr. A. Dossou travelled to rural community	
Community visit – Badara Community, Prov. Houet, Bama dept., BF	Live interviews in the Badara community.	Ms. I. Benagabou travelled to area on the 22nsd of April.	
Project Technical Advisory Committee meeting and Workshop, Cotonou, Benin	4th - 6th May 2022 Project regional Workshop. Meeting of Project Technical Advisory Committee members with Mr. P. Reggiani on 6th May	P. Reggiani and Mr. Albert Dossou, in presence in Cotonou	Moderation of workshop, presentations
Development of the draft VFDM MTE Report	30st of June 2022	MTE team	VFDM project team to share the draft MTE report with the regional and national stakeholders for their review and feedback
Development of the final VFDM MTE Report	1st of September 2022	MTE team	WMO to send the MTE report to the Adaptation Fund

Appendix B: Questionnaire to Local Communities

For local communities a reduced set of targeted questions has been developed. Answers to these questions for three communities in Burkina Faso (Bama), Benin (Tabota) and Ghana (Kunkua) are reported in Chapter 12.

N°	Questions/Questions	Reponses/Answers
1	What are the main actions that your community benefited from within the framework of the VFD project and what did they consist of?	
2	Who are the main categories of people who participated or benefited from it and what is their representation in decision-making? Senior citizens, women, youth….	
3	What new things have you learned, what more do you have thanks to this project which allows you to better react to the vagaries of the weather? (Strong winds, floods and droughts) Before and after the project?	
4	What are the main benefits of this project within your community?	
5	What is your opinion on the sustainability of your achievements under this support at the end of the project? (knowledge, tools, community plan, flood marking plates, equipment, EWS communications, meteorological observing stations)	
6	What actions would you like the project to take next and what are your recommen-dations?	

Appendix C: Questionnaire to Regional and National partners

Comprehensive list of questions, from where selected questions were asked during interviews.

Project Implementation

- What is the relevance of the VFDM project to the country's overall action plan and strategies for preparing for and managing climate change events such as
- Floods and drought?
- What is the relevance of the VFDM project to country needs?
- What is the comparative advantage of the VFDM project over other in-country or regional early warning programs or projects?
- To what extent does the VFDM project contribute to the strategic objectives of the donor, implementing and executing partners?
- To what extent does the VFDM project meet the requirements of stakeholders and beneficiaries, contributing primarily to long-term outcomes and impacts?
- If there are major areas of concern, recommend areas for improvement.
- Are the desired outcomes, outputs, and results of the project, as defined in the project's logical framework, being achieved or not?
- What were the enabling and/or inhibiting factors in this regard?

Effectiveness

- How effective is the process of developing and implementing the VFDM project?
- How was this achieved at the regional, national and local levels?
- How successful has the project been in targeting end-users of early warning services?
- How is it able to design and deliver tailored observations, forecasts and early warnings to different end-users (i.e. national meteorological and hydrological services, water resources, farmers, fishermen, civil protection, etc.)?
- How successful has the project been in supporting increased access to early warning and risk information, particularly for the most vulnerable populations?
- To what extent has the VFDM project been successful in linking 1) risk assessment, 2) local hazard monitoring (forecasting), 3) warning service for dissemination and communication, and 4) public response?
- To what extent has the VFDM project fostered connections between providers of forecasting and prediction products and preparedness and response plans?
- At what level-regional, national, local-has the VFDM project supported early warning awareness activities?
- Have VFDM investments created an enabling environment for improving the hydrometric infrastructure observation network?
- How has the VFDM project integrated gender aspects so far? For example, participation and involvement in the implementation of project activities, capacity development, involvement of women in decision making, is there a method of collecting sex-disaggregated data on project beneficiaries, has a gender analysis been conducted, or have gender-targeted interventions been implemented?
- To what extent has the VFDM project produced, or is likely to produce, results in a cost-effective and timely manner?

- Is the development of the VFDM project and its implementation (consultation, participation, decision-making) tailored to meet the needs of your country?
- How effective is the project approach in achieving the desired results?
- How can it be improved?
- Are the partner organizations working together effectively? Is the partnership structure effective in achieving the desired results?
- How effective has the project monitoring been in tracking the achievement of desired outcomes? Are any changes needed?
- Review the indicators against the progress toward the end-of-project goals available in the project proposal.
- Compare and analyse the tracking of Adaptation Fund (AF) outcomes in the Project Performance Report (PPR) at baseline with that completed just prior to the CWW.
- Identify remaining barriers to achieving the project goal for the remainder of the project.
- Looking at aspects of the project that have already been successful, identify ways in which the project can extend those benefits.

Efficiency

- How effective is the VFDM project in relation to other existing national-level early warning projects or initiatives (completed and ongoing in-country such as CREWS, World Bank HydroMet projects)?
- Are the technical and financial resources available sufficient to carry out the project plans?
- Are project resources (human and financial) used efficiently (value for money)?
- Sustainability of the project (questions only to be asked at national or regional level)
- To what extent are the benefits of the VFDM project likely to be sustained?
- What systems and structures does the VFDM project have in place to ensure delivery beyond the VFDM project timeframe?
- What measures are needed to strengthen the institutional sustainability of the EWS?
- How has the VFDM project followed a comprehensive approach to risk governance, for example, by helping to build capacity for strategic planning.

Sustainability

- To which extent the net benefits of the VFDM project are likely to continue?
- What systems and structures have VFDM project put in place to sustain delivery beyond the timescales of the VFDM project?
- What measures are needed to strengthen institutional sustainability for the EWS?
- How did VFDM follow a comprehensive approach to risk governance, for example in contributing to enhanced capacities for strategic planning?

Volta Flood and Drought Management

ADAPTATION FUND

Appendix D: Regional Workshop participants

Date : Jeudi 05 mai 2022

Lieu : Benin Royal hôtel, Cotonou

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Appendix E: VFDM project result framework, tracking table at the MTE – May 2022

ACTITVITY DESCRIPTION	INITIAL INDICATOR	TARGET	SOURCE DE VERIFICATION	BASELINE	Progress Year 1	Progress Year 2	Progress Year 3
Activity 1.1.1.1 Conduct a desk study (compilation of existing evidence-based past data (topographic maps, satellite images etc.), studies of extreme events, reports of disasters, etc.) and field visits to gather available information on VCERs and identify gaps or additional needs.	Number of desk study and field visit conducted Number of Agencies consulted Number of women consulted	1 desk study per country; 1 field visit per country	National consultation report ; semestrial and annual report, PPR	0 (No deskstudy completed) Number of women consulted are very few	Desk study carried out at National and regional levels to get the available information on VCERS and EWS for floods and drought - Meeting with the National agencies (Meteo, Hydrology, Civil protection/Disaster Manager) to gather available products, tools and skills on flood and drought management National consultation report for each country and VBA are available: https://www.floodmanagement.info/volta-basin/deliverables/ Number of women consulted during meeting in October - November 2019: Number of Men consulted during meeting in October - November 2019:		
Activity 1.1.1.2 Develop an action plan to complement gathered information on the VCERs	Number of actions plans developped	Action plan for each country developed with recommendations	National Consultation report, Monitoring report, semestrial and annual report, PPR	0 (Transboundary/National level EWS action plan is not available)	Action plan is developed and jointly reviewed with the National agencies and it is available for each National consultation report for the 6 countries and VBA https://www.floodmanagement.info/volta-basin/deliverables/		

Activity 1.1.1.3 Organize meetings with the relevant stakeholders working on risk management to select priority areas for community consultations	Number of meeting conducted; Numbers of participant; number of young and women participats	one workshop per country Atleast 20 participants from 5 or more agencies/organization Atleast 50% should be women participants	Meeting/worksh op technical report, semestrial and annual report, PPR	0 (National level consultation through workshops for flood and drought EWS was not conducted in last 3 years)	A National workshop is organized in each of the Volta Basin countries and one day workshop with VBA In each workshop: 242 in total Number of women participate: Number of Men participate: Additional Comment on the participation of the stakeholders??		
Activity 1.1.1.4 Conduct pilot field studies (focus group discussion and semi-structured interviews) with communities to identify the multi-dimensional drivers of vulnerability and risk (social, economic, ecological, cultural, political and infrastructural determinants of vulnerability) in the Volta Basin areas highly exposed to different hydro-meteorological hazards	Numbers of pilote field studies conducted Number of stakeholders/beneficiares consulted Number of women and youths consulted	7-10/per country	Pilote studies reports,semestrial and annual report, PPR	0 (studies to understand community vulnerabilities and capacities were not conducted in last 4-5 years)	Local studies are carried out by the locla researchers in the 60 pilot sites of the Volta Basin Country wise report available: https://www.floodmanagement.info/volta-basin/deliverables/ Numbers of pilote field studies conducted:60 Number of stakeholders/beneficiares consulted: Number of women and youths consulted:		

Activity 1.1.1.5 Draft the field studies reports and the Volta-atlas	Number of field studies report available; Number of volta atlas Information visulaized on the web-based EWS	1 field studies report/country ; 1 volta atlas Information of the study sites are visualized on the web-based EWS	Pilote studies reports ; Volta atlas	0(community level study report are not available for floods and drought related viulnerabilities in last 4 years)	Volta Atlas report available here: https://www.floodmanagement.info/floodmanagement/wp-content/uploads/2021/07/syntheseFinal_Local-mapping-study-60-sites.pdf Information visulaized on the web-based EWS https://volta.mydewetra.world		
Activity 1.1.2.1 Assess the available IT equipment (computers, servers, databases, etc.) and IT/GIS expertise at the VBA observatory, the NMHSs services and other relevant services (e.g. Geographical Institute, Civil security, etc.). Purchase additional equipment if necessary	Number of specifics IT equipement and IT/GIS equipements currently at VBA observatory, the NMHS services. Number of additional equipments purchased Number of agencies consulted in each ccountry	Based on the National consultation and assessment (tbc): xx equiment available XX equipement purchased xx services provided	national report for the IT/Database need and capacities available, Purchase report, Invoice, Physical availability of equipment	xx specifics IT and IT/GIS equipment currently available;	Number of Agencies consulted in each country: Benin- 3 Burkina Faso - 6 Cote d'Ivoire - 5 Ghana - 6 Mali - 5 Togo- 4 Details regarding number of equipment available: https://www.floodmanagement.info/volta-basin/deliverables/ Equipment and services provided: On-going	Assessment carried out in the Six countries with Survey and face-to-face meetings Assessment reports are available by each country: https://www.floodmanagement.info/volta-basin/deliverables/	

Activity 1.1.2.2 Create the Volta Basin information exchange IT network by connecting the VBA observatory and the national services	Nomber of Volta Basin's and National IT network and Database architecture design	1 IT network and Database architecture available for each country and VBA	Country IT network architecture report	0 (VBA and National IT and Database network architecture are not available)	IT network and Database architecture available for each country and VBA : available under each country report available here https://www.floodmanagement.info/volta-basin/deliverables/	Volta Basin IT exchange network created for each country: Report named 1.1.2.2 https://www.floodmanagement.info/volta-basin/deliverables/	
Activity 1.1.2.3 Develop the database and create the links with the existing databases for the collected information on VCER including the main driving hydro-meteorological parameters for floods and drought events (e.g. precipitation, water levels, temperature, soil moisture, soil type, etc.)	Numbers of functionnal and operational database linked with the existing database created	XX equipement purchased atleast 5 staff trained in eahc country for the Database management and IT related	linked Database availablity in each country	0(Centralized/National database is not available in each country)	Equipment purchased: on-going	National agency to host database identified in each country and ToR for procurement is under process Numbers of functionnal and operational database linked with the existing database created - FANFAR project and FEW Oti and White Volta integration on-going Once the centralized database is established at each country, National database from the agencies will be integrated or connected	

Activity 1.1.2.4 Develop web-based flood and drought risk maps using the VCER database and existing maps developed in Ghana through the past projects funded by the World Bank and the Global Environment Facility (see part G for more information)	Number of functional and operational webbased flood and drought risk map developed Number of technciains trained Number of training sessions carried out Number of Agencies consulted and data and information shared	Development of floods and drought risk map for the Volta Basin region	Web-based flood and drought risk availability under the VoltAlarm EWS	One existing maps in ghana (funded by world bank) -Other National level maps and data available -Volta Basin floods and drought risk maps are not available		64 Technicians from the countries are contracted for developing flood and drought risk maps Number of Male technicians: 52 Number of female technicians: 12 Number of functional and operational webbased flood and drought risk map developed: 20 Number of training sessions carried out: 14 (2face-to-face in each countries and 2 joint virtually) Number of Agencies consulted and data and information shared: ??	
Activity 1.1.2.5 Assign roles and responsibilities to the agencies and organisations forming a task team to regularly complement and improve the database and risk maps and also to monitor and report on the new updates.	Number of staffs assigned and responsabilities plan available on complementing the database developped	atleast 2 staff in each country and 1 VBA staff assigned and responsabilities plan available	Report; assignment and responsabilities plan, semestrial and annual report, PPR	0 (Volta Basin level floods and drought risk maps are not available and staffs are not available for developing and updating it)		64 Technicians from the countries are available with knowledge and skills for updating the flood and drought risk maps	
Activity 1.1.3.1 Organize training workshop for local professionals (hydrologists, disaster managers, GIS experts etc.) to convey knowledge and improve skills needed for using risk maps	Numbers of online and face-to-face training workshop for local professionnel organised; Number of local professionnel reinforced Numberof women	atleast 2 training workshops per country	Training workshops/meetings reports; semestrial and annual report, PPR,	0 (National staff trainings for risk maps development are not carried out)		Two workshops in each country were organized Number of Male participants trained: 52 Number of female participants trained: 12	

	participants trained						
Activity 1.1.3.2 Organize joint workshops for stakeholders to deliver knowledge on VCERs and Floods and Drought risk maps of Volta Basin and to gather feedbacks and suggestions for improvement.	Numbers of joint workshops organised on VCERs and risk maps	1 regional workshop organised	Joint workshop reports; semestrial and annual report, PPR	0 (regional workshop to presene the risk maps processes and methodology are not carried out at the regional level)		A two day regional workshop in Cote d'Ivoire as organized during late December 2021 Number of women participate: 5 Number of Men participate: 40	
Activity 1.1.3.3 Take advantage of community meetings to raise awareness of a larger number of Floods and Drought risk maps' beneficiaries, to discuss the potential indirect risks that could arise (involuntary resettlement, protection of natural habitats, conservation of biological diversity, public health, physical and cultural heritage, lands and soil conservation) and to identify safeguard actions which will help minimizing those potential negative impacts.	Number of sensibilisation's materials developed and shared with the communities	3 sensibilisation materials developed and shared with them	Materials developed and shared, Activity report; semestrial and annual report, PPR Images captured of risk maps posters	risk maps and risk knowledges are not delivered to communities		Risk maps available Community meetings pending Number of sensibilisation's materials developed and shared with the communities: on-going	

Activity 1.1.4.1 Produce technical report on the added value, success and challenges of VCERs and Floods and Drought risk maps for the stakeholders and Adaptation Fund project technical committee	number of technical report produced on VCERS and risk maps added value, success and challenges	one technical report per country	technical report prepared and shared with the stakeholders	No report is available for the risk maps and VCERS database added value		One technical report 'Volta Risk profile' for the Volta Basin region is developed and made available with country specific risk information and recommendations	
Activity 1.1.4.2 Develop documentation for raising public awareness (infographics, videos, mobile phone applications, educational tools for children and students, etc.)	Number and type of raising public awarness documentatton devellopped/ Number of people affecteded by these document	3 types of raising public awareness developped; 10 raising public awareness documetation developped	Raising public awareness, Activity report; semestrial and annual report, PPR	0 (public awareness materials are not available)		Pending Number and type of raising public awarness documentatton devellopped Number of Women sensitized: Number of Men sensitized: Number of people affecteded by the information provided in these document	
Activity 1.2.1.1 Gather all available information on climate change scenarios from best scientific studies and global databases for the Volta basin and select the most relevant datasets	Number of report enhancing climate data needs and available as well as synthesis of climate scenario change from best scientist review	1 country report gathering all data are developed	Activity report; semestrial and annual report, PPR	0 (climate scenarios information are not available for the Volta basin region)		Number of report enhancing climate data needs and available as well as synthesis of climate scenario change from best scientist review: one	
Activity 1.2.1.2 Gather the data on input for socio-economic scenarios of the Volta Basin region over the next decades	Number of report on gathered data and information on socio-economy covering the next decade for the socio economuc scenario	1 country report focused on socio economics data and information scenario	Activity report; semestrial and annual report, PPR	0 (socio-economic data and information are not available for the Volta basin region		In the Volta risk profile, country specific gathered data and information on socio-economy covering the next decades is available for the socio-economic impact	

Activity 1.2.1.3 Organize the data on climate and socio-economic predictions for further integration with VCERs and risk maps developed under outcome 1.1	Number of report with climate change and economics predictions organized	1 report focused on socio economics predictions	Activity report; semestrial and annual report, PPR	0		Information on socio-economic projections are available under the technical report 'Volta Risk profile'	
Activity 1.2.2.1 For areas covered with hydrological and hydraulic models (White Volta, Oti for example) perform a series of runs using the future socio-economic and climate scenarios to determine changes in VCERs and risk maps	Numbers of run using socio economic and climate scenarios in covered area with hyological and hydraulic models	1 series runs's report per country	Activity report; semestrial and annual report, PPR	0 (climate scenarios results are not available for the Volta basin region)		Projected impacts on population, built-up area, economic, agriculture, project areas are available and provided Impact to Water Resources could not be carried due to lack of data and information available from the countries	
Activity 1.2.2.2 For areas not covered with numerical models, carry out a first qualitative assessment of the possible evolution of VCERs and risk maps under future changes	Numbers of first qualitatives assessment of the evolution of VCER and risk map under future changes conducted on uncovered area by hydological and hydraulic models	1 qualitative/quantative assessments per country	Activity report; semestrial and annual report, PPR	0(climate scenarios results are not available for the Volta basin region)		Probablistic risk assessment was carried out for the future risk scenarios	
Activity 1.2.2.3 Draft report with the methodologies and tools used for studying the impacts of future scenarios	Number of draft report developed	1 report for the rVolta Basin regional is made available	Activity report; semestrial and annual report, PPR	0 (future scenarios impact study is not available for the Volta Basin)		One technical report 'Volta Risk profile' for the Volta Basin region is developed and made available with country specific risk information and recommendations	

Activity 1.2.3.1 Define indicators related to environment and ecosystem services (wetlands) conditions	Number of desk studies carried out Number of indicators related to environment and ecosystem services conditions	Volta Basin level report xx indicators defined	Activity report; semestrial and annual report, PPR	0 (report related to the environmental and ecosystem services for the Volta basin is not available)	1 Desk study carried out : Feasibility study of the application of the IUCN Red List of Ecosystems The clean version of the environmental database contains 125 links - but over 200 websites were consulted 14 indicators were proposed plus the use of the use of The Handbook of Drought Indicators and Indices for the selection of targeted indicators according to the country context		
Activity 1.2.3.2Collect and process information for various environmental indicators,	Number of data collection and proccessing activities Number of Agencies contacted for the data collection Number of responses received from the National Agencies	Data collection and processes tools and report available at the Volta basin level	Activity report; semestrial and annual report, PPR	0(National Environmental and ecosystem or regional data and information for the Volta Basin are not available)	123 entries in the environmental database included for the purpose of this project. 35 agencies were contacted directly or via IUCN focal points, only 12 Agencies responded. In some cases, the information was extracted from websites		
Activity 1.2.3.3Select thresholds and carry out analysis for current and future climate scenarios	Numbers of current and future climate scenarios analysed	xx current scenario and future scenarios for the Volta Basin region	Activity report; semestrial and annual report, PPR	0 (Current and future scenarios on ecosystem and environmental servicesfor the Volta Basin not available)	Impact to protected areas analyzed for the current and future climate scenarios Not done- due to data unavailability from the countries, IUCN is currently looking for existing models that could be linked to the MyDewetra		
Activity 1.2.3.4Identify 2 to 3 areas (Ramsar Bagré dam for example) with appropriate dataset on ecosystem services to test the methodology	Number of areas identified to test the methodology	2 or 3 areas for data collection and testing the methodology	Activity report; semestrial and annual report, PPR	0(Data not available for ramsar sites)	Information integrated in the Environmental database - We are currently working with Ramsar to have the latest country profiles in preparation to the Ramsar COP14		

Activity 1.2.3.5Draft report with the methodologies and tools used for studying the impacts of environmental flow and experience of pilot tests.	Number of report developed on the ecosystem and environmental status and services impacts	1 report per Volta Basin available (having Country level information)	Activity report; semestrial and annual report, PPR	0 (report not available on the ecosystem and environmental status and services impacts for the Volta Basin region)	One technical report is developed and made available Feasibility study of the application of the IUCN Red List of Ecosystems which is available here: https://www.floodmanagement.info/volta-basin/deliverables/		
ACTITVIT+H3+G+G3: O101	**INITIAL INDICATOR**	**TARGET**	**SOURCE DE VERIFICATION**	**BASELINE**	**Year 1**	**Year 2**	**Year 3**
Activity 1.1.1.1 Conduct a desk study (compilation of existing evidence-based past data (topographic maps, satellite images etc.), studies of extreme events, reports of disasters, etc.) and field visits to gather available information on VCERs and identify gaps or additional needs.	Number of desk study and field visit conducted Number of Agencies consulted Number of women consulted	2 desk study per country; 1 field visit per country	National consultation report ; semestrial and annual report, PPR	1 (No deskstudy completed) Number of women consulted are very few	Desk study carried out at National and regional levels to get the available information on VCERS and EWS for floods and drought - Meeting with the National agencies (Meteo, Hydrology, Civil protection/Disaster Manager) to gather available products, tools and skills on flood and drought management National consultation report for each country and VBA are available: https://www.floodmanagement.info/volta-basin/deliverables/ Number of women consulted during meeting in October - November 2019: Number of Men consulted during meeting in October - November 2019:		

Activity 1.1.1.2 Develop an action plan to complement gathered information on the VCERs	Number of actions plans developped	Action plan for each country developed with recommendations	National Consultation report, Monitoring report, semestrial and annual report, PPR	1 (Transboundary/National level EWS action plan is not available)	Action plan is developed and jointly reviewed with the National agencies and it is available for each National consultation report for the 6 countries and VBA https://www.floodmanagement.info/volta-basin/deliverables/		
Activity 1.1.1.3 Organize meetings with the relevant stakeholders working on risk management to select priority areas for community consultations	Number of meeting conducted; Numbers of participant; number of young and women participats	one workshop per country Atleast 20 participants from 5 or more agencies/organization Atleast 50% should be women participants	Meeting/worksh op technical report, semestrial and annual report, PPR	1 (National level consultation through workshops for flood and drought EWS was not conducted in last 3 years)	A National workshop is organized in each of the Volta Basin countries and one day workshop with VBA In each workshop: 242 in total Number of women participate: Number of Men participate: Additional Comment on the participation of the stakeholders??		
Activity 1.1.1.4 Conduct pilot field studies (focus group discussion and semi-structured interviews) with communities to identify the multi-dimensional drivers of vulnerability and risk (social, economic, ecological, cultural, political and infrastructural determinants of vulnerability) in the Volta Basin areas highly exposed to different hydro-meteorological hazards	Numbers of pilote field studies conducted Number of stakeholders/beneficiares consulted Number of women and youths consulted	7-10/per country	Pilote studies reports,semestrial and annual report, PPR	1 (studies to understand community vulnerabilities and capacities were not conducted in last 4-5 years)	Local studies are carried out by the locla researchers in the 60 pilot sites of the Volta Basin Country wise report available: https://www.floodmanagement.info/volta-basin/deliverables/ Numbers of pilote field studies conducted:60 Number of stakeholders/beneficiares consulted: Number of women and youths consulted:		

Activity 1.1.1.5 Draft the field studies reports and the Volta-atlas	Number of field studies report available; Number of volta atlas Information visulaized on the web-based EWS	2 field studies report/country ; 1 volta atlas Information of the study sites are visualized on the web-based EWS	Pilote studies reports ; Volta atlas	0(community level study report are not available for floods and drought related viulnerabilities in last 4 years)	Volta Atlas report available here: https://www.floodmanagement.info/floodmanagement/wp-content/uploads/2021/07/syntheseFinal_Local-mapping-study-60-sites.pdf Information visulaized on the web-based EWS https://volta.mydewetra.world		
Activity 1.1.2.1 Assess the available IT equipment (computers, servers, databases, etc.) and IT/GIS expertise at the VBA observatory, the NMHSs services and other relevant services (e.g. Geographical Institute, Civil security, etc.). Purchase additional equipment if necessary	Number of specifics IT equipement and IT/GIS equipements currently at VBA observatory, the NMHS services. Number of additional equipments purchased Number of agencies consulted in each ccountry	Based on the National consultation and assessment (tbc): xx equiment available XX equipement purchased xx services provided	national report for the IT/Database need and capacities available, Purchase report, Invoice, Physical availability of equipment	xx specifics IT and IT/GIS equipment currently available;	Number of Agencies consulted in each country: Benin- 3 Burkina Faso - 6 Cote d'Ivoire - 5 Ghana - 6 Mali - 5 Togo- 4 Details regarding number of equipment available: https://www.floodmanagement.info/volta-basin/deliverables/ Equipment and services provided: On-going	Assessment carried out in the Six countries with Survey and face-to-face meetings Assessment reports are available by each country: https://www.floodmanagement.info/volta-basin/deliverables/	
Activity 1.1.2.2 Create the Volta Basin information exchange IT network by connecting the VBA observatory and the national services	Nomber of Volta Basin's and National IT network and Database architecture design	2 IT network and Database architecture available for each country and VBA	Country IT network architecture report	1 (VBA and National IT and Database network architecture are not available)	IT network and Database architecture available for each country and VBA : available under each country report available here https://www.floodmanagement.info/volta-basin/deliverables/	Volta Basin IT exchange network created for each country: Report named 1.1.2.2 https://www.floodmanagement.info/volta-basin/deliverables/	

Activity 1.1.2.3 Develop the database and create the links with the existing databases for the collected information on VCER including the main driving hydro-meteorological parameters for floods and drought events (e.g. precipitation, water levels, temperature, soil moisture, soil type, etc.)	Numbers of functionnal and operational database linked with the existing database created	XX equipement purchased atleast 5 staff trained in eahc country for the Database management and IT related	linked Database availablity in each country	0(Centralized/National database is not available in each country)	Equipment purchased: on-going	National agency to host database identified in each country and ToR for procurement is under process Numbers of functionnal and operational database linked with the existing database created - FANFAR project and FEW Oti and White Volta integration on-going Once the centralized database is established at each country, National database from the agencies will be integrated or connected	
Activity 1.1.2.4 Develop web-based flood and drought risk maps using the VCER database and existing maps developed in Ghana through the past projects funded by the World Bank and the Global Environment Facility (see part G for more information)	Number of functional and operational webbased flood and drought risk map developed Number of technciains trained Number of training sessions carried out Number of Agencies consulted and data and information shared	Development of floods and drought risk map for the Volta Basin region	Web-based flood and drought risk availability under the VoltAlarm EWS	One existing maps in ghana (funded by world bank) -Other National level maps and data available -Volta Basin floods and drought risk maps are not available		65 Technicians from the countries are contracted for developing flood and drought risk maps Number of Male technicians: 52 Number of female technicians: 12 Number of functional and operational webbased flood and drought risk map developed: 20 Number of training sessions carried out: 14 (2face-to-face in each countries and 2 joint virtually) Number of Agencies consulted and data and information shared: ??	

Activity 1.1.2.5 Assign roles and responsibilities to the agencies and organisations forming a task team to regularly complement and improve the database and risk maps and also to monitor and report on the new updates.	Number of staffs assigned and responsabilities plan available on complementing the database developped	atleast 2 staff in each country and 1 VBA staff assigned and responsabilitie s plan available	Report; assignment and responsabilities plan, semestrial and annual report, PPR	1 (Volta Basin level floods and drought risk maps are not available and staffs are not available for developing and updating it)		65 Technicians from the countries are available with knowledge and skills for updating the flood and drought risk maps	
Activity 1.1.3.1 Organize training workshop for local professionals (hydrologists, disaster managers, GIS experts etc.) to convey knowledge and improve skills needed for using risk maps	Numbers of online and face-to-face training workshop for local professionnel organised; Number of local professionnel reinforced Numberof women participants trained	atleast 2 training workshops per country	Training workshops/meet ings reports; semestrial and annual report, PPR,	1 (National staff trainings for risk maps development are not carried out)		Two workshops in each country were organized Number of Male participants trained: 52 Number of female participants trained: 13	
Activity 1.1.3.2 Organize joint workshops for stakeholders to deliver knowledge on VCERs and Floods and Drought risk maps of Volta Basin and to gather feedbacks and suggestions for improvement.	Numbers of joint workshops organised on VCERs and risk maps	2 regional workshop organised	Joint workshop reports; semestrial and annual report, PPR	1 (regional workshop to presene the risk maps processes and methodology are not carried out at the		A two day regional workshop in Cote d'Ivoire as organized during late December 2021 Number of women participate: 5 Number of Men participate: 41	

				regional level)			
Activity 1.1.3.3 Take advantage of community meetings to raise awareness of a larger number of Floods and Drought risk maps' beneficiaries, to discuss the potential indirect risks that could arise (involuntary resettlement, protection of natural habitats, conservation of biological diversity, public health, physical and cultural heritage, lands and soil conservation) and to identify safeguard actions which will help minimizing those potential negative impacts.	Number of sensibilisation's materials developed and shared with the communities	4 sensibilisation materials developed and shared with them	Materials developed and shared, Activity report; semestrial and annual report, PPR Images captured of risk maps posters	risk maps and risk knowledges are not delivered to communities		Risk maps available Community meetings pending Number of sensibilisation's materials developed and shared with the communities: on-going	
Activity 1.1.4.1 Produce technical report on the added value, success and challenges of VCERs and Floods and Drought risk maps for the stakeholders and Adaptation Fund project technical committee	number of technical report produced on VCERS and risk maps added value, success and challenges	one technical report per country	technical report prepared and shared with the stakeholders	No report is available for the risk maps and VCERS database added value		One technical report 'Volta Risk profile' for the Volta Basin region is developed and made available with country specific risk information and recommendations	

Activity 1.1.4.2 Develop documentation for raising public awareness (infographics, videos, mobile phone applications, educational tools for children and students, etc.)	Number and type of raising public awarness documentatton devellopped/ Number of people affecteded by these document	4 types of raising public awareness developped; 10 raising public awareness documetation developped	Raising public awareness, Activity report; semestrial and annual report, PPR	1 (public awareness materials are not available)		Pending Number and type of raising public awarness documentatton devellopped Number of Women sensitized: Number of Men sensitized: Number of people affecteded by the information provided in these document	
Activity 1.2.1.1 Gather all available information on climate change scenarios from best scientific studies and global databases for the Volta basin and select the most relevant datasets	Number of report enhancing climate data needs and available as well as synthesis of climate scenario change from best scientist review	2 country report gathering all data are developed	Activity report; semestrial and annual report, PPR	1 (climate scenarios information are not available for the Volta basin region)		Number of report enhancing climate data needs and available as well as synthesis of climate scenario change from best scientist review: one	
Activity 1.2.1.2 Gather the data on input for socio-economic scenarios of the Volta Basin region over the next decades	Number of report on gathered data and information on socio-economy covering the next decade for the socio economuc scenario	2 country report focused on socio economics data and information scenario	Activity report; semestrial and annual report, PPR	1 (socio-economic data and information are not available for the Volta basin region		In the Volta risk profile, country specific gathered data and information on socio-economy covering the next decades is available for the socio-economic impact	
Activity 1.2.1.3 Organize the data on climate and socio-economic predictions for further integration with VCERs and risk maps developed under outcome 1.2	Number of report with climate change and economics predictions organized	2 report focused on socio economics predictions	Activity report; semestrial and annual report, PPR	1		Information on socio-economic projections are available under the technical report 'Volta Risk profile'	

Activity 1.2.2.1 For areas covered with hydrological and hydraulic models (White Volta, Oti for example) perform a series of runs using the future socio-economic and climate scenarios to determine changes in VCERs and risk maps	Numbers of run using socio economic and climate scenarios in covered area with hyological and hydraulic models	2 series runs's report per country	Activity report; semestrial and annual report, PPR	1 (climate scenarios results are not available for the Volta basin region)		Projected impacts on population, built-up area, economic, agriculture, project areas are available and provided Impact to Water Resources could not be carried due to lack of data and information available from the countries	
Activity 1.2.2.2 For areas not covered with numerical models, carry out a first qualitative assessment of the possible evolution of VCERs and risk maps under future changes	Numbers of first qualitatives assessment of the evolution of VCER and risk map under future changes conducted on uncovered area by hydological and hydraulic models	2 qualitative/quantative assessments per country	Activity report; semestrial and annual report, PPR	0(climate scenarios results are not available for the Volta basin region)		Probablistic risk assessment was carried out for the future risk scenarios	
Activity 1.2.2.3 Draft report with the methodologies and tools used for studying the impacts of future scenarios	Number of draft report developed	2 report for the rVolta Basin regional is made available	Activity report; semestrial and annual report, PPR	1 (future scenarios impact study is not available for the Volta Basin)		One technical report 'Volta Risk profile' for the Volta Basin region is developed and made available with country specific risk information and recommendations	
Activity 1.2.3.1 Define indicators related to environment and ecosystem services (wetlands) conditions	Number of desk studies carried out Number of indicators related to environment and ecosystem services conditions	Volta Basin level report xx indicators defined	Activity report; semestrial and annual report, PPR	1 (report related to the environmental and ecosystem services for the Volta basin is not available)	2 Desk study carried out : Feasibility study of the application of the IUCN Red List of Ecosystems The clean version of the environmental database contains 125 links - but over 200 websites were consulted 14 indicators were proposed plus the use of the use of The Handbook of Drought Indicators and Indices for the selection of targeted indicators according to the country context		

Activity 1.2.3.2Collect and process information for various environmental indicators,	Number of data collection and proccessing activities Number of Agencies contacted for the data collection Number of responses received from the National Agencies	Data collection and processes tools and report available at the Volta basin level	Activity report; semestrial and annual report, PPR	0(National Environmental and ecosystem or regional data and information for the Volta Basin are not available)	124 entries in the environmental database included for the purpose of this project. 35 agencies were contacted directly or via IUCN focal points, only 12 Agencies responded. In some cases, the information was extracted from websites		
Activity 1.2.3.3Select thresholds and carry out analysis for current and future climate scenarios	Numbers of current and future climate scenarios analysed	xx current scenario and future scenarios for the Volta Basin region	Activity report; semestrial and annual report, PPR	1 (Current and future scenarios on ecosystem and environmental servicesfor the Volta Basin not available)	Impact to protected areas analyzed for the current and future climate scenarios Not done- due to data unavailability from the countries, IUCN is currently looking for existing models that could be linked to the MyDewetra		
Activity 1.2.3.4Identify 2 to 3 areas (Ramsar Bagré dam for example) with appropriate dataset on ecosystem services to test the methodology	Number of areas identified to test the methodology	3 or 3 areas for data collection and testing the methodology	Activity report; semestrial and annual report, PPR	0(Data not available for ramsar sites)	Information integrated in the Environmental database - We are currently working with Ramsar to have the latest country profiles in preparation to the Ramsar COP15		
Activity 1.2.3.5Draft report with the methodologies and tools used for studying the impacts of environmental flow and experience of pilot tests.	Number of report developed on the ecosystem and environmental status and services impacts	2 report per Volta Basin available (having Country level information)	Activity report; semestrial and annual report, PPR	1 (report not available on the ecosystem and environmental status and services impacts for the Volta Basin region)	One technical report is developed and made available Feasibility study of the application of the IUCN Red List of Ecosystems which is available here: https://www.floodmanagement.info/volta-basin/deliverables/		

ACTITVIT+H3+G+G3: O102	INITIAL INDICATOR	TARGET	SOURCE DE VERIFICATION	BASELINE	Year 1	Year 2	Year 3
Activity 1.1.1.1 Conduct a desk study (compilation of existing evidence-based past data (topographic maps, satellite images etc.), studies of extreme events, reports of disasters, etc.) and field visits to gather available information on VCERs and identify gaps or additional needs.	Number of desk study and field visit conducted Number of Agencies consulted Number of women consulted	3 desk study per country; 1 field visit per country	National consultation report ; semestrial and annual report, PPR	2 (No deskstudy completed) Number of women consulted are very few	Desk study carried out at National and regional levels to get the available information on VCERS and EWS for floods and drought - Meeting with the National agencies (Meteo, Hydrology, Civil protection/Disaster Manager) to gather available products, tools and skills on flood and drought management National consultation report for each country and VBA are available: https://www.floodmanagement.info/volta-basin/deliverables/ Number of women consulted during meeting in October - November 2019: Number of Men consulted during meeting in October - November 2019:		
Activity 1.1.1.2 Develop an action plan to complement gathered information on the VCERs	Number of actions plans developped	Action plan for each country developed with recommendations	National Consultation report, Monitoring report, semestrial and annual report, PPR	2 (Transboundary/National level EWS action plan is not available)	Action plan is developed and jointly reviewed with the National agencies and it is available for each National consultation report for the 6 countries and VBA https://www.floodmanagement.info/volta-basin/deliverables/		

Activity 1.1.1.3 Organize meetings with the relevant stakeholders working on risk management to select priority areas for community consultations	Number of meeting conducted; Numbers of participant; number of young and women participats	one workshop per country Atleast 20 participants from 5 or more agencies/organization Atleast 50% should be women participants	Meeting/worksh op technical report, semestrial and annual report, PPR	2 (National level consultation through workshops for flood and drought EWS was not conducted in last 3 years)	A National workshop is organized in each of the Volta Basin countries and one day workshop with VBA In each workshop: 242 in total Number of women participate: Number of Men participate: Additional Comment on the participation of the stakeholders??		
Activity 1.1.1.4 Conduct pilot field studies (focus group discussion and semi-structured interviews) with communities to identify the multi-dimensional drivers of vulnerability and risk (social, economic, ecological, cultural, political and infrastructural determinants of vulnerability) in the Volta Basin areas highly exposed to different hydro-meteorological hazards	Numbers of pilote field studies conducted Number of stakeholders/beneficiares consulted Number of women and youths consulted	7-10/per country	Pilote studies reports,semestrial and annual report, PPR	2 (studies to understand community vulnerabilities and capacities were not conducted in last 4-5 years)	Local studies are carried out by the locla researchers in the 60 pilot sites of the Volta Basin Country wise report available: https://www.floodmanagement.info/volta-basin/deliverables/ Numbers of pilote field studies conducted:60 Number of stakeholders/beneficiares consulted: Number of women and youths consulted:		
Activity 1.1.1.5 Draft the field studies reports and the Volta-atlas	Number of field studies report available; Number of volta atlas Information visulaized on the web-based EWS	3 field studies report/country ; 1 volta atlas Information of the study sites are visualized on the web-based EWS	Pilote studies reports ; Volta atlas	0(community level study report are not available for floods and drought related viulnerabilities in last 4 years)	Volta Atlas report available here: https://www.floodmanagement.info/floodmanagement/wp-content/uploads/2021/07/syntheseFinal_Local-mapping-study-60-sites.pdf Information visulaized on the web-based EWS https://volta.mydewetra.world		

Activity 1.1.2.1 Assess the available IT equipment (computers, servers, databases, etc.) and IT/GIS expertise at the VBA observatory, the NMHSs services and other relevant services (e.g. Geographical Institute, Civil security, etc.). Purchase additional equipment if necessary	Number of specifics IT equipement and IT/GIS equipements currently at VBA observatory, the NMHS services. Number of additional equipments purchased Number of agencies consulted in each ccountry	Based on the National consultation and assessment (tbc): xx equiment available XX equipement purchased xx services provided	national report for the IT/Database need and capacities available, Purchase report, Invoice, Physical availability of equipment	xx specifics IT and IT/GIS equipment currently available;	Number of Agencies consulted in each country: Benin- 3 Burkina Faso - 6 Cote d'Ivoire - 5 Ghana - 6 Mali - 5 Togo- 4 Details regarding number of equipment available: https://www.floodmanagement.info/volta-basin/deliverables/ Equipment and services provided: On-going	Assessment carried out in the Six countries with Survey and face-to-face meetings Assessment reports are available by each country: https://www.floodmanagement.info/volta-basin/deliverables/	
Activity 1.1.2.2 Create the Volta Basin information exchange IT network by connecting the VBA observatory and the national services	Nomber of Volta Basin's and National IT network and Database architecture design	3 IT network and Database architecture available for each country and VBA	Country IT network architecture report	2 (VBA and National IT and Database network architecture are not available)	IT network and Database architecture available for each country and VBA : available under each country report available here https://www.floodmanagement.info/volta-basin/deliverables/	Volta Basin IT exchange network created for each country: Report named 1.1.2.2 https://www.floodmanagement.info/volta-basin/deliverables/	
Activity 1.1.2.3 Develop the database and create the links with the existing databases for the collected information on VCER including the main driving hydro-meteorological parameters for floods and drought events (e.g. precipitation, water levels, temperature, soil moisture, soil type, etc.)	Numbers of functionnal and operational database linked with the existing database created	XX equipement purchased atleast 5 staff trained in eahc country for the Database management and IT related	linked Database availablity in each country	0(Centralized/National database is not available in each country)	Equipment purchased: on-going	National agency to host database identified in each country and ToR for procurement is under process Numbers of functionnal and operational database linked with the existing database created - FANFAR project and FEW Oti and White Volta integration on-going Once the centralized database is established at each country, National database from the	

						agencies will be integrated or connected	
Activity 1.1.2.4 Develop web-based flood and drought risk maps using the VCER database and existing maps developed in Ghana through the past projects funded by the World Bank and the Global Environment Facility (see part G for more information)	Number of functional and operational webbased flood and drought risk map developed Number of technciains trained Number of training sessions carried out Number of Agencies consulted and data and information shared	Development of floods and drought risk map for the Volta Basin region	Web-based flood and drought risk availability under the VoltAlarm EWS	One existing maps in ghana (funded by world bank) -Other National level maps and data available -Volta Basin floods and drought risk maps are not available		66 Technicians from the countries are contracted for developing flood and drought risk maps Number of Male technicians: 52 Number of female technicians: 12 Number of functional and operational webbased flood and drought risk map developed: 20 Number of training sessions carried out: 14 (2face-to-face in each countries and 2 joint virtually) Number of Agencies consulted and data and information shared: ??	
Activity 1.1.2.5 Assign roles and responsibilities to the agencies and organisations forming a task team to regularly complement and improve the database and risk maps and also to monitor and report on the new updates.	Number of staffs assigned and responsabilities plan available on complementing the database developped	atleast 2 staff in each country and 1 VBA staff assigned and responsabilities plan available	Report; assignment and responsabilities plan, semestrial and annual report, PPR	2 (Volta Basin level floods and drought risk maps are not available and staffs are not available for developing and updating it)		66 Technicians from the countries are available with knowledge and skills for updating the flood and drought risk maps	

Activity 1.1.3.1 Organize training workshop for local professionals (hydrologists, disaster managers, GIS experts etc.) to convey knowledge and improve skills needed for using risk maps	Numbers of online and face-to-face training workshop for local professionnel organised; Number of local professionnel reinforced Numberof women participants trained	atleast 2 training workshops per country	Training workshops/meetings reports; semestrial and annual report, PPR,	2 (National staff trainings for risk maps development are not carried out)		Two workshops in each country were organized Number of Male participants trained: 52 Number of female participants trained: 14	
Activity 1.1.3.2 Organize joint workshops for stakeholders to deliver knowledge on VCERs and Floods and Drought risk maps of Volta Basin and to gather feedbacks and suggestions for improvement.	Numbers of joint workshops organised on VCERs and risk maps	3 regional workshop organised	Joint workshop reports; semestrial and annual report, PPR	2 (regional workshop to presene the risk maps processes and methodology are not carried out at the regional level)		A two day regional workshop in Cote d'Ivoire as organized during late December 2021 Number of women participate: 5 Number of Men participate: 42	
Activity 1.1.3.3 Take advantage of community meetings to raise awareness of a larger number of Floods and Drought risk maps' beneficiaries, to discuss the potential indirect risks that could arise (involuntary resettlement, protection of natural habitats, conservation of biological diversity, public health, physical and cultural heritage, lands and soil conservation) and to identify safeguard actions which will help minimizing those potential negative impacts.	Number of sensibilisation's materials developed and shared with the communities	5 sensibilisation materials developed and shared with them	Materials developed and shared, Activity report; semestrial and annual report, PPR Images captured of risk maps posters	risk maps and risk knowledges are not delivered to communities		Risk maps available Community meetings pending Number of sensibilisation's materials developed and shared with the communities: on-going	

Activity 1.1.4.1 Produce technical report on the added value, success and challenges of VCERs and Floods and Drought risk maps for the stakeholders and Adaptation Fund project technical committee	number of technical report produced on VCERS and risk maps added value, success and challenges	one technical report per country	technical report prepared and shared with the stakeholders	No report is available for the risk maps and VCERS database added value		One technical report 'Volta Risk profile' for the Volta Basin region is developed and made available with country specific risk information and recommendations	
Activity 1.1.4.2 Develop documentation for raising public awareness (infographics, videos, mobile phone applications, educational tools for children and students, etc.)	Number and type of raising public awarness documentatton devellopped/ Number of people affecteded by these document	5 types of raising public awareness developped; 10 raising public awareness documetation developped	Raising public awareness, Activity report; semestrial and annual report, PPR	2 (public awareness materials are not available)		Pending Number and type of raising public awarness documentatton devellopped Number of Women sensitized: Number of Men sensitized: Number of people affecteded by the information provided in these document	
Activity 1.2.1.1 Gather all available information on climate change scenarios from best scientific studies and global databases for the Volta basin and select the most relevant datasets	Number of report enhancing climate data needs and available as well as synthesis of climate scenario change from best scientist review	3 country report gathering all data are developed	Activity report; semestrial and annual report, PPR	2 (climate scenarios information are not available for the Volta basin region)		Number of report enhancing climate data needs and available as well as synthesis of climate scenario change from best scientist review: one	

Activity 1.2.1.2 Gather the data on input for socio-economic scenarios of the Volta Basin region over the next decades	Number of report on gathered data and information on socio-economy covering the next decade for the socio economuc scenario	3 country report focused on socio economics data and information scenario	Activity report; semestrial and annual report, PPR	2 (socio-economic data and information are not available for the Volta basin region		In the Volta risk profile, country specific gathered data and information on socio-economy covering the next decades is available for the socio-economic impact	
Activity 1.2.1.3 Organize the data on climate and socio-economic predictions for further integration with VCERs and risk maps developed under outcome 1.3	Number of report with climate change and economics predictions organized	3 report focused on socio economics predictions	Activity report; semestrial and annual report, PPR	2		Information on socio-economic projections are available under the technical report 'Volta Risk profile'	
Activity 1.2.2.1 For areas covered with hydrological and hydraulic models (White Volta, Oti for example) perform a series of runs using the future socio-economic and climate scenarios to determine changes in VCERs and risk maps	Numbers of run using socio economic and climate scenarios in covered area with hyological and hydraulic models	3 series runs's report per country	Activity report; semestrial and annual report, PPR	2 (climate scenarios results are not available for the Volta basin region)		Projected impacts on population, built-up area, economic, agriculture, project areas are available and provided Impact to Water Resources could not be carried due to lack of data and information available from the countries	

Activity 1.2.2.2 For areas not covered with numerical models, carry out a first qualitative assessment of the possible evolution of VCERs and risk maps under future changes	Numbers of first qualitatives assessment of the evolution of VCER and risk map under future changes conducted on uncovered area by hydological and hydraulic models	3 qualitative/quantative assessments per country	Activity report; semestrial and annual report, PPR	0(climate scenarios results are not available for the Volta basin region)		Probablistic risk assessment was carried out for the future risk scenarios	
Activity 1.2.2.3 Draft report with the methodologies and tools used for studying the impacts of future scenarios	Number of draft report developed	3 report for the rVolta Basin regional is made available	Activity report; semestrial and annual report, PPR	2 (future scenarios impact study is not available for the Volta Basin)		One technical report 'Volta Risk profile' for the Volta Basin region is developed and made available with country specific risk information and recommendations	
Activity 1.2.3.1 Define indicators related to environment and ecosystem services (wetlands) conditions	Number of desk studies carried out Number of indicators related to environment and ecosystem services conditions	Volta Basin level report xx indicators defined	Activity report; semestrial and annual report, PPR	2 (report related to the environmental and ecosystem services for the Volta basin is not available)	3 Desk study carried out : Feasibility study of the application of the IUCN Red List of Ecosystems The clean version of the environmental database contains 125 links - but over 200 websites were consulted 14 indicators were proposed plus the use of the use of The Handbook of Drought Indicators and Indices for the selection of targeted indicators according to the country context		

Activity 1.2.3.2Collect and process information for various environmental indicators,	Number of data collection and proccessing activities Number of Agencies contacted for the data collection Number of responses received from the National Agencies	Data collection and processes tools and report available at the Volta basin level	Activity report; semestrial and annual report, PPR	0(National Environmental and ecosystem or regional data and information for the Volta Basin are not available)	125 entries in the environmental database included for the purpose of this project. 35 agencies were contacted directly or via IUCN focal points, only 12 Agencies responded. In some cases, the information was extracted from websites		
Activity 1.2.3.3Select thresholds and carry out analysis for current and future climate scenarios	Numbers of current and future climate scenarios analysed	xx current scenario and future scenarios for the Volta Basin region	Activity report; semestrial and annual report, PPR	2 (Current and future scenarios on ecosystem and environmental servicesfor the Volta Basin not available)	Impact to protected areas analyzed for the current and future climate scenarios Not done- due to data unavailability from the countries, IUCN is currently looking for existing models that could be linked to the MyDewetra		

Activity 1.2.3.4Identify 2 to 3 areas (Ramsar Bagré dam for example) with appropriate dataset on ecosystem services to test the methodology	Number of areas identified to test the methodology	4 or 3 areas for data collection and testing the methodology	Activity report; semestrial and annual report, PPR	0(Data not available for ramsar sites)	Information integrated in the Environmental database - We are currently working with Ramsar to have the latest country profiles in preparation to the Ramsar COP16		
Activity 1.2.3.5Draft report with the methodologies and tools used for studying the impacts of environmental flow and experience of pilot tests.	Number of report developed on the ecosystem and environmental status and services impacts	3 report per Volta Basin available (having Country level information)	Activity report; semestrial and annual report, PPR	2 (report not available on the ecosystem and environmental status and services impacts for the Volta Basin region)	One technical report is developed and made available Feasibility study of the application of the IUCN Red List of Ecosystems which is available here: https://www.floodmanagement.info/volta-basin/deliverables/		

ACTITVIT+H3+G+G3: O103	INITIAL INDICATOR	TARGET	SOURCE DE VERIFICATION	BASELINE	Year 1	Year 2	Year 3
Activity 1.1.1.1 Conduct a desk study (compilation of existing evidence-based past data (topographic maps, satellite images etc.), studies of extreme events, reports of disasters, etc.) and field visits to gather available information on VCERs and identify gaps or additional needs.	Number of desk study and field visit conducted Number of Agencies consulted Number of women consulted	4 desk study per country; 1 field visit per country	National consultation report ; semestrial and annual report, PPR	3 (No deskstudy completed) Number of women consulted are very few	Desk study carried out at National and regional levels to get the available information on VCERS and EWS for floods and drought - Meeting with the National agencies (Meteo, Hydrology, Civil protection/Disaster Manager) to gather available products, tools and skills on flood and drought management National consultation report for each country and VBA are available: https://www.floodmanagement.info/volta-basin/deliverables/ Number of women consulted during meeting in October - November 2019: Number of Men consulted during meeting in October - November 2019:		

Activity 1.1.1.2 Develop an action plan to complement gathered information on the VCERs	Number of actions plans developped	Action plan for each country developed with recommendations	National Consultation report, Monitoring report, semestrial and annual report, PPR	3 (Transboundary/National level EWS action plan is not available)	Action plan is developed and jointly reviewed with the National agencies and it is available for each National consultation report for the 6 countries and VBA https://www.floodmanagement.info/volta-basin/deliverables/		
Activity 1.1.1.3 Organize meetings with the relevant stakeholders working on risk management to select priority areas for community consultations	Number of meeting conducted; Numbers of participant; number of young and women participats	one workshop per country Atleast 20 participants from 5 or more agencies/organization Atleast 50% should be women participants	Meeting/worksh op technical report, semestrial and annual report, PPR	3 (National level consultation through workshops for flood and drought EWS was not conducted in last 3 years)	A National workshop is organized in each of the Volta Basin countries and one day workshop with VBA In each workshop: 242 in total Number of women participate: Number of Men participate: Additional Comment on the participation of the stakeholders??		
Activity 1.1.1.4 Conduct pilot field studies (focus group discussion and semi-structured interviews) with communities to identify the multi-dimensional drivers of vulnerability and risk (social, economic, ecological, cultural, political and infrastructural determinants of vulnerability) in the Volta Basin areas highly exposed to different hydro-meteorological hazards	Numbers of pilote field studies conducted Number of stakeholders/beneficiares consulted Number of women and youths consulted	7-10/per country	Pilote studies reports,semestrial and annual report, PPR	3 (studies to understand community vulnerabilities and capacities were not conducted in last 4-5 years)	Local studies are carried out by the locla researchers in the 60 pilot sites of the Volta Basin Country wise report available: https://www.floodmanagement.info/volta-basin/deliverables/ Numbers of pilote field studies conducted:60 Number of stakeholders/beneficiares consulted: Number of women and youths consulted:		

Activity 1.1.1.5 Draft the field studies reports and the Volta-atlas	Number of field studies report available; Number of volta atlas Information visulaized on the web-based EWS	4 field studies report/country ; 1 volta atlas Information of the study sites are visualized on the web-based EWS	Pilote studies reports ; Volta atlas	0(community level study report are not available for floods and drought related viulnerabilities in last 4 years)	Volta Atlas report available here: https://www.floodmanagement.info/floodmanagement/wp-content/uploads/2021/07/syntheseFinal_Local-mapping-study-60-sites.pdf Information visulaized on the web-based EWS https://volta.mydewetra.world		
Activity 1.1.2.1 Assess the available IT equipment (computers, servers, databases, etc.) and IT/GIS expertise at the VBA observatory, the NMHSs services and other relevant services (e.g. Geographical Institute, Civil security, etc.). Purchase additional equipment if necessary	Number of specifics IT equipement and IT/GIS equipements currently at VBA observatory, the NMHS services. Number of additional equipments purchased Number of agencies consulted in each ccountry	Based on the National consultation and assessment (tbc): xx equiment available XX equipement purchased xx services provided	national report for the IT/Database need and capacities available, Purchase report, Invoice, Physical availability of equipment	xx specifics IT and IT/GIS equipment currently available;	Number of Agencies consulted in each country: Benin- 3 Burkina Faso - 6 Cote d'Ivoire - 5 Ghana - 6 Mali - 5 Togo- 4 Details regarding number of equipment available: https://www.floodmanagement.info/volta-basin/deliverables/ Equipment and services provided: On-going	Assessment carried out in the Six countries with Survey and face-to-face meetings Assessment reports are available by each country: https://www.floodmanagement.info/volta-basin/deliverables/	
Activity 1.1.2.2 Create the Volta Basin information exchange IT network by connecting the VBA observatory and the national services	Nomber of Volta Basin's and National IT network and Database architecture design	4 IT network and Database architecture available for each country and VBA	Country IT network architecture report	3 (VBA and National IT and Database network architecture are not available)	IT network and Database architecture available for each country and VBA : available under each country report available here https://www.floodmanagement.info/volta-basin/deliverables/	Volta Basin IT exchange network created for each country: Report named 1.1.2.2 https://www.floodmanagement.info/volta-basin/deliverables/	
Activity 1.1.2.3 Develop the database and create the links with the existing databases for the collected information on VCER including the main driving hydro-meteorological parameters for floods and drought events (e.g. precipitation, water levels,	Numbers of functionnal and operational database linked with the existing database created	XX equipement purchased atleast 5 staff trained in eahc country for the Database management and IT related	linked Database availablity in each country	0(Centralized/National database is not available in each country)	Equipment purchased: on-going	National agency to host database identified in each country and ToR for procurement is under process Numbers of functionnal and operational database linked with the existing database created - FANFAR project and FEW Oti and White Volta integration on-	

temperature, soil moisture, soil type, etc.)						going Once the centralized database is established at each country, National database from the agencies will be integrated or connected	
Activity 1.1.2.4 Develop web-based flood and drought risk maps using the VCER database and existing maps developed in Ghana through the past projects funded by the World Bank and the Global Environment Facility (see part G for more information)	Number of functional and operational webbased flood and drought risk map developed Number of technciains trained Number of training sessions carried out Number of Agencies consulted and data and information shared	Development of floods and drought risk map for the Volta Basin region	Web-based flood and drought risk availability under the VoltAlarm EWS	One existing maps in ghana (funded by world bank) -Other National level maps and data available -Volta Basin floods and drought risk maps are not available		67 Technicians from the countries are contracted for developing flood and drought risk maps Number of Male technicians: 52 Number of female technicians: 12 Number of functional and operational webbased flood and drought risk map developed: 20 Number of training sessions carried out: 14 (2face-to-face in each countries and 2 joint virtually) Number of Agencies consulted and data and information shared: ??	

Activity 1.1.2.5 Assign roles and responsibilities to the agencies and organisations forming a task team to regularly complement and improve the database and risk maps and also to monitor and report on the new updates.	Number of staffs assigned and responsabilities plan available on complementing the database developped	atleast 2 staff in each country and 1 VBA staff assigned and responsabilitie s plan available	Report; assignment and responsabilities plan, semestrial and annual report, PPR	3 (Volta Basin level floods and drought risk maps are not available and staffs are not available for developing and updating it)		67 Technicians from the countries are available with knowledge and skills for updating the flood and drought risk maps	
Activity 1.1.3.1 Organize training workshop for local professionals (hydrologists, disaster managers, GIS experts etc.) to convey knowledge and improve skills needed for using risk maps	Numbers of online and face-to-face training workshop for local professionnel organised; Number of local professionnel reinforced Numberof women participants trained	atleast 2 training workshops per country	Training workshops/meet ings reports; semestrial and annual report, PPR,	3 (National staff trainings for risk maps development are not carried out)		Two workshops in each country were organized Number of Male participants trained: 52 Number of female participants trained: 15	
Activity 1.1.3.2 Organize joint workshops for stakeholders to deliver knowledge on VCERs and Floods and Drought risk maps of Volta Basin and to gather feedbacks and suggestions for improvement.	Numbers of joint workshops organised on VCERs and risk maps	4 regional workshop organised	Joint workshop reports; semestrial and annual report, PPR	3 (regional workshop to presene the risk maps processes and methodology are not carried out at the regional level)		A two day regional workshop in Cote d'Ivoire as organized during late December 2021 Number of women participate: 5 Number of Men participate: 43	

Activity 1.1.3.3 Take advantage of community meetings to raise awareness of a larger number of Floods and Drought risk maps' beneficiaries, to discuss the potential indirect risks that could arise (involuntary resettlement, protection of natural habitats, conservation of biological diversity, public health, physical and cultural heritage, lands and soil conservation) and to identify safeguard actions which will help minimizing those potential negative impacts.	Number of sensibilisation's materials developed and shared with the communities	6 sensibilisation materials developed and shared with them	Materials developed and shared, Activity report; semestrial and annual report, PPR Images captured of risk maps posters	risk maps and risk knowledges are not delivered to communities		Risk maps available Community meetings pending Number of sensibilisation's materials developed and shared with the communities: on-going	
Activity 1.1.4.1 Produce technical report on the added value, success and challenges of VCERs and Floods and Drought risk maps for the stakeholders and Adaptation Fund project technical committee	number of technical report produced on VCERS and risk maps added value, success and challenges	one technical report per country	technical report prepared and shared with the stakeholders	No report is available for the risk maps and VCERS database added value		One technical report 'Volta Risk profile' for the Volta Basin region is developed and made available with country specific risk information and recommendations	
Activity 1.1.4.2 Develop documentation for raising public awareness (infographics, videos, mobile phone applications, educational tools for children and students, etc.)	Number and type of raising public awarness documentatton devellopped/ Number of people affecteded by these document	6 types of raising public awareness developped; 10 raising public awareness documetation developped	Raising public awareness, Activity report; semestrial and annual report, PPR	3 (public awareness materials are not available)		Pending Number and type of raising public awarness documentatton devellopped Number of Women sensitized: Number of Men sensitized: Number of people affecteded by the information provided in these document	

Activity 1.2.1.1 Gather all available information on climate change scenarios from best scientific studies and global databases for the Volta basin and select the most relevant datasets	Number of report enhancing climate data needs and available as well as synthesis of climate scenario change from best scientist review	4 country report gathering all data are developed	Activity report; semestrial and annual report, PPR	3 (climate scenarios information are not available for the Volta basin region)		Number of report enhancing climate data needs and available as well as synthesis of climate scenario change from best scientist review: one	
Activity 1.2.1.2 Gather the data on input for socio-economic scenarios of the Volta Basin region over the next decades	Number of report on gathered data and information on socio-economy covering the next decade for the socio economuc scenario	4 country report focused on socio economics data and information scenario	Activity report; semestrial and annual report, PPR	3 (socio-economic data and information are not available for the Volta basin region		In the Volta risk profile, country specific gathered data and information on socio-economy covering the next decades is available for the socio-economic impact	
Activity 1.2.1.3 Organize the data on climate and socio-economic predictions for further integration with VCERs and risk maps developed under outcome 1.4	Number of report with climate change and economics predictions organized	4 report focused on socio economics predictions	Activity report; semestrial and annual report, PPR	3		Information on socio-economic projections are available under the technical report 'Volta Risk profile'	
Activity 1.2.2.1 For areas covered with hydrological and hydraulic models (White Volta, Oti for example) perform a series of runs using the future socio-economic and climate scenarios to determine changes in VCERs and risk maps	Numbers of run using socio economic and climate scenarios in covered area with hyological and hydraulic models	4 series runs's report per country	Activity report; semestrial and annual report, PPR	3 (climate scenarios results are not available for the Volta basin region)		Projected impacts on population, built-up area, economic, agriculture, project areas are available and provided Impact to Water Resources could not be carried due to lack of data and information available from the countries	

Activity 1.2.2.2 For areas not covered with numerical models, carry out a first qualitative assessment of the possible evolution of VCERs and risk maps under future changes	Numbers of first qualitatives assessment of the evolution of VCER and risk map under future changes conducted on uncovered area by hydological and hydraulic models	4 qualitative/quantative assessments per country	Activity report; semestrial and annual report, PPR	0(climate scenarios results are not available for the Volta basin region)		Probablistic risk assessment was carried out for the future risk scenarios	
Activity 1.2.2.3 Draft report with the methodologies and tools used for studying the impacts of future scenarios	Number of draft report developed	4 report for the rVolta Basin regional is made available	Activity report; semestrial and annual report, PPR	3 (future scenarios impact study is not available for the Volta Basin)		One technical report 'Volta Risk profile' for the Volta Basin region is developed and made available with country specific risk information and recommendations	
Activity 1.2.3.1 Define indicators related to environment and ecosystem services (wetlands) conditions	Number of desk studies carried out Number of indicators related to environment and ecosystem services conditions	Volta Basin level report xx indicators defined	Activity report; semestrial and annual report, PPR	3 (report related to the environmental and ecosystem services for the Volta basin is not available)	4 Desk study carried out : Feasibility study of the application of the IUCN Red List of Ecosystems The clean version of the environmental database contains 125 links - but over 200 websites were consulted 14 indicators were proposed plus the use of the use of The Handbook of Drought Indicators and Indices for the selection of targeted indicators according to the country context		
Activity 1.2.3.2Collect and process information for various environmental indicators,	Number of data collection and proccessing activities Number of Agencies contacted for the data collection Number of responses received from the National Agencies	Data collection and processes tools and report available at the Volta basin level	Activity report; semestrial and annual report, PPR	0(National Environmental and ecosystem or regional data and information for the Volta Basin are not available)	126 entries in the environmental database included for the purpose of this project. 35 agencies were contacted directly or via IUCN focal points, only 12 Agencies responded. In some cases, the information was extracted from websites		

Activity 1.2.3.3Select thresholds and carry out analysis for current and future climate scenarios	Numbers of current and future climate scenarios analysed	xx current scenario and future scenarios for the Volta Basin region	Activity report; semestrial and annual report, PPR	3 (Current and future scenarios on ecosystem and environmental servicesfor the Volta Basin not available)	Impact to protected areas analyzed for the current and future climate scenarios Not done- due to data unavailability from the countries, IUCN is currently looking for existing models that could be linked to the MyDewetra		

Appendix F: Terms of Reference for conducing the Mid-term evaluation

ADAPTATION FUND

VFDM project 'Integrating Flood and Drought Management and Early warning for the Climate Change Adaptation in the Volta Basin'

Terms of Reference for carrying out mid-term evaluation of the VFDM project

Call for Expressions of Interest

December 2021

WORLD METEOROLOGICAL ORGANIZATION

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

Global Water Partnership West Africa

Implementing Partners

1. Brief Background on VFDM project and context

The consortium comprising of the World Meteorological Organization (WMO), a specialized United Nations Agency, the Volta Basin Authority (VBA) and the Global Water Partnership-West Africa (GWP-WA) are implementing the project entitled 'Integrating Flood and Drought Management and Early Warning Systems in the Volta Basin' (VFDM), funded by the Adaptation Fund. The implementation of the VFDM project started in June 2019 and will complete by the end of June 2023.

Besides the National Agencies in charge of meteorology, hydrology, water resources management, civil protection, etc., the implementation of the project activities involves regional institutions (VBA, GWP-WA, WASCAL, ECOWAS, AGRYHMET) and some WMO technical partners such as the CIMA Research Foundation, the Italian Civil Protection Department, UNITAR/UNOSAT, IUCN and Knowledge & Innovation.

Project Goal: The overall goal of the VFDM project is to strengthen target agencies and communities' resilience and adaptation capacity to the impact of climate change events (floods and drought) with an integrated approach.

Project objectives:

- Assist the six Volta river riparian countries in the implementation of coordinated and joint measures to improve environmental, social and economic development through flood and drought risk maps and future scenarios for the climate variability and change;
- Support basin stakeholders in developing appropriate End-to-End Early Warning Systems for Floods and Drought as well as capacity development activities for climate adaptation measures and mainstreaming gender;
- Provide policy and management guidance by sharing scientific information, knowledge and best practices for integrated disaster risk reduction and climate change adaptation in the Volta basin.

Project Implementing Entity (IE): World Meteorological Organization (WMO)
Project Executing Entities (EE): Volta Basin Authority (VBA)
Global Water Partnership West Africa (GWP-WAF)
World Meteorological Organization (WMO)
Project Targeted Countries: Benin, Burkina Faso, Côte d'Ivoire, Ghana, Mali, and Togo

Project Period: 4 years (2019-2023)

Project website: https://www.floodmanagement.info/volta-basin/

Project Components
Component 1: Develop capacity and established frameworks at the local, national and regional levels to ensure risk informed decision-making

Component 1 will seek to identify and assess the current and future vulnerabilities, capacities, exposures and risks (VCERs). Floods and drought risk maps will be developed at local, national and regional level. Climate scenarios will be gathered and disseminated to the stakeholders, together with the risks maps, to study the possible impact of climate change on the current VCERs during capacity building sessions. This will provide opportunities to draw recommendations for integrating climate change adaptation approaches into the current

disaster risk strategies. It will also provide indicators and tools to raise awareness of stakeholders about the benefits of ecosystem functions for human well-being and the importance of protecting and restoring native ecosystems. Furthermore, these indicators will help in planning strategies for adequate consideration of preserving wetlands and other areas of transboundary importance such as biodiversity hot-spots.

Component 2: Develop concrete adaptation and environmentally friendly actions with an integrated approach

This component will provide the basis for an integrated flood and drought management approach in the region, thanks to the data systems, collaboration frameworks and early warning systems that will be put in place in the basin. The development and implementation of the End-to-End (E2E) Early Warning System for floods and drought at the scale of the Volta basin is the key output of the project. To improve sharing of information, the system will cover the global chain from vulnerability and risk mapping to forecasting, warning dissemination and decision support. The operational use of the new E2E Early Warning platform will be supported by a series of pilot tests in different sub-basins and vulnerable areas, covering different socio-environmental conditions. Capacity development activities will be carried out to ensure an adequate uptake of the new products, services or tools developed. Moreover, self-help capabilities on nature-based solutions and gender-sensitive participatory approaches will be developed at local and national level.

Component 3: Strengthening policy and institutional capacity for integrated flood and drought management at the local, national and transboundary levels.

Component 3 will explore how implementation and coordination efforts will be beneficial to the concerned institutions in order to revise or develop new policies, plans and guidelines on disaster risk reduction and climate change adaptation. Adaptation measures and strategies aligning with AF Environmental and Social Policy (ESP) and gender principles will be discussed at local level in agreement with local organizations and communities to increase the resilience to floods and drought. The participation and engagement of local stakeholders will facilitate the adoption of the strategies and subsequently result in long-term sustainability.

Mid-Term Evaluation (MTE) aim and objectives

As per the guidelines of the Adaptation Fund, the implementing entity must undertake the MTE for projects/programmes that are under implementation for **over four (4) years**.

The objective of the Mid-Term Evaluation (MTE) is to assess progress towards the achievement of the project objectives and outcomes as specified in the Project Document. It will assess early signs of project success or failure in order to identify adjustments to achieve its intended outcomes or results.

Mid-term evaluation will assess at a minimum:

- Outputs and results of the project activities implemented from the Inception to first half of the project's term;
- The quality of implementation, including stakeholders engagement, financial and risk management;
- Assumptions made during the preparation phase, in particular, objectives and agreed upon indicators, against current conditions;
- Factors affecting the achievement of objectives, and;
- M&E systems and their implementation.

- Project alignment with the Adaptation Fund's strategies and objectives

Expected Results

The MTE study report will highlight progress made, issues requiring decisions and actions and present initial lessons learned about project design, implementation, and management. Findings of the review and action suggested will be incorporated as recommendations for the second half of the project's term to ensure that the project stays on track and achieve the deliverables and objectives.

Mid-term evaluation approach and methodology

The MTE must provide evidence-based information that is trustworthy, reliable and useful. As a first step, the MTE consultant will review all relevant sources of information including documents prepared during the project preparation phase such as the project concept note and proposal, the inception workshop report, as well as; the project technical and financial reports.

Secondly, the MTE consultant is expected to follow a collaborative and participatory approach ensuring close collaboration with the Project Team, government counterparts, VBA, GWP-WA and other key stakeholders (ensure gender inclusive approach) involved in the implementation of the activities. The involvement of stakeholders from regional to national to local levels are crucial for a successful MTE; their involvement should be also based on semi-structure interviews or focus group discussion (virtual and/or face-to-face). Specific focus should also be ensured towards those who have been consulted and involved during the preparation and implementation phase. The MTE consultant is expected to conduct field visit missions to some or all the involved National agencies of the Volta Basin countries (Benin, Burkina Faso, Cote d'Ivoire, Ghana, Mali and Togo). Accordingly, the Independent consultant should detail in his/her methodology the approach and tools to put in place for field visits or discussion with the stakeholders.

Mid-term evaluation scope

The MTE consultant will assess the following four categories of project progress.

1) **Project design and relevance**
   The extent to which the objectives of a project intervention are consistent with beneficiaries' requirements, country needs, global priorities and partners' and donors' policies.
   Sample questions:
   - What is the relevance of the overall approach in relation to the Project's objectives?
   - How relevant is VFDM project in the countries overall action plan and strategies for the preparing and managing climate change events such as floods and drought? How relevant is VFDM project in addressing the countries' needs?
   - What is the comparative advantage of VFDM project in relation to other early warning programs or projects in the countries or at the regional level?
   - How relevant is VFDM project in contributing to the strategic objectives of the donor, implementing and executing partners?

- To what extent is VFDM responding to stakeholders and beneficiaries' requirements mainly contribute to long-term results and impacts?
- If there are major areas of concern, recommend areas for improvement.

2) Progress towards Results

The consultant will consider following aspects on understanding the progress towards results:

- Review the log frame indicators against progress made towards the end-of-project targets available in the project proposal.
- Compare and analyze the Adaptation Fund (AF) Results Tracker within the Project Performance Report (PPR) at the Baseline with the one completed right before the MTE.
- Identify the remaining barriers to achieving the project objective in the remainder of the project.
- By reviewing the aspects of the project that have already been successful, identify ways in which the project can further expand these benefits

3) Sustainability

This category looks into the potential of the continuation of benefits from the project intervention as well as the probability of continued long-term benefits out of it. In the case of the VFDM project, it is important to look at how sustainability has been addressed in the early stages of programming and project design.

Sample questions:

- To which extent the net benefits of the VFDM project likely to continue? Special focus on the institutional capacities of the systems needed to sustain net benefits over time.
- What systems and structures have VFDM project put in place to sustain delivery beyond the timescales of the VFDM project?
- How did VFDM follow a comprehensive approach to risk governance, for example in contributing to enhanced capacities for strategic planning?

4) Effectiveness and efficiency

The extent to which the project objectives were achieved, or are expected to be achieved, taking into account their relative importance at the Regional, National and local levels considering the mandate of key agencies or institutes involved in the management of floods and drought. Also, measure of how economically resources/inputs (funds, expertise, time, etc.) are converted to results

Sample questions:

• How effective are VFDM project development and implementation process? how was this carried out at the regional and local level?

• How is VFDM project target the end users of Early Warning Services? How it is able to design and deliver tailor-made observation, forecasting, and early warnings, adapted to the different end-users (i.e. National meteorological and hydrological services, water resources, farmers, fisherfolk, civil protection, etc.)? (linked to project component 1 and 2)

• How VFDM is or will be supporting increased access to early warnings and risk information in particular for the most vulnerable populations?

• To what degree did VFDM project connect 1) assessment of risks, 2) local hazard monitoring (forecast), 3) warning service for dissemination and communication and 4) reaction of the population?
• How did VFDM foster the connections between providers of forecast and prediction products and preparedness and response plans?
• At which level – regional, national, local – did VFDM support activities on awareness raising on early warnings?
• Has VFDM investments provided an environment to enhancing the hydromet infrastructure observations network?
• How have VFDM project so far integrated aspects of gender consideration? For example, participation and involvement in the implementation of the project activities, capacity development, involvement of women in decision making, is there a method for a gender-disaggregated collection of data on beneficiaries, gender-analysis undertaken or any targeted interventions implemented?
To what extent have VFDM project delivered, or are likely to deliver, results in an economic and timely way? Including: is the VFDM project development and implementation process (consultation, involvement, decision-making) adapted to respond to countries' needs?
• What is the efficiency of the VFDM project in relation to other existing early warning programs?

Independent Evaluator: required skills and qualifications
- The Independent evaluator will be responsible for:
- Producing all the evaluation deliverables;
- Recommending additional experts for recruitment, as needed, for the purposes of this evaluation, such as:
▪ Technical expert in climate, or early warning, or preparedness and response
▪ Technical expert in strategic planning and development programming.

- Ensuring the quality of data (validity, reliability, consistency, and accuracy) throughout the analytical and reporting phases. It is expected that the report will be written in an evidence-based manner.

Minimum qualifications for the Independent Evaluator:
- A Master's degree or equivalent in Social Science, or other closely related fields
- A minimum of 8 years' experience in design, management and evaluation of development or climate change adaptation projects, experience in designing evaluation tools that fit the need of the exercise, conducting desk reviews and evaluation missions, drafting of evaluation reports;
- Experience in evaluations of the Adaptation Fund, World Bank and/or UN programmes and projects;
- Experience in the technical areas of climate and early warning, preparedness and response, strategic planning and development programming;
- Experience and knowledge of LDCs in the West Africa;
- Ability/experience to facilitate consultation meetings or workshops;
- Knowledge in gender and vulnerability issues is also preferable; -
Ability to write and speak fluently in English and in French

Expected outputs and deliverables

Deliverables
The following documents/events will be required at the proposed times:
1) MTE Inception Report: Evaluator clarifies objectives and methods of Mid-term Evaluation. The inception report must be containing the evaluation framework, refined mid-term review objectives, detailed evaluation methodology, work plan and logistical arrangements for the field visits.
2) Prepare report and PowerPoint presentation with main findings and tentative recommendations upon data collection and field visits (expected to visit 3-4 countries and two countries virtually).
3) Debriefing workshop (1/2 day) with WMO to discuss the findings, lessons, and proposed recommendations (two days after completing the field trip)
4) Draft mid-term evaluation report in English: Draft report (using guidelines on the content outlined in Annex B) with annexes;
5) Final mid-term evaluation report in English and French: Finalize the report with comments from stakeholders and management responses. Some of interview or meeting tasks may be conducted via skype or video conference All deliverables are subject to the validation by the WMO in respect with the schedule of tasks assigned to the Evaluator.

Payment modalities and specifications
The overall level of effort estimated is 40 person/days spread over 4 months. The daily rate will be discussed with the shortlisted candidate. The payment will be made by WMO to the account specified by the Consultant upon validation of the work required.

The Consultant will travel to 2-3 Volta Basin countries for the purpose of the mission.

The consultant will take in charge airfare tickets, local travel costs for the mission including accommodations and daily allowances.
The WMO and VFDM Project Teams will be responsible for liaising with the MTE consultant to provide all relevant documents, set up stakeholder interviews, and arrange field visits.

Schedule of Payments
a) 30% of payment upon approval of the MTE Inception Report detailing the adopted methodology
b) 40% of payment upon submission and validation of the draft MTE Report
c) 30% of payment upon finalization of the MTE Report

Technical and Financial Proposals Presentation
The application package must include the following:
Signed Curriculum vitae (in English) with contact details of 3 clients for whom you have rendered preferably the similar service
- Methodological note (3 pages maximum) describing the approach to be used by the consultant for the mission execution including a work schedule that specifies the activities, dates, and timeframe.
- Two writing samples/reports in English.
- Minimum of three letters of professional references, contracts, certificates, etc

Financial Proposal

The overall budget proposal should be presented for the below timelines table.

Work stages	Description	Days proposed
1	Desk review of the project – related documents	5
2	Drafting and submission of the MTE Inception Report	3
3	Data Collection, Meetings, consultations (face to face) and field visits in 2-3 Volta Basin countries Virtual discussion with other countries	12
4	Report of key findings and tentative recommendations upon field visits	5
5	Draft MTE Report (English)	10
6	Final MTE Report (English and French)	5
	Total Days	40 days

Important Note 1- The interested consultant should have not participated in the project preparation, formulation, and/or implementation (including the writing of the Project Document) and should not have a conflict of interest with project's related activities.

2- The project document is also downloadable via Adaptation fund website :

https://www.adaptation-fund.org/project/integrating-flood-drought-management-early-warning-climate-change-adaptation-volta-basin-benin-burkina-faso-cote-divoire-ghana-mali-togo/

The M&E manual including result framework for the VFDM project is available here:

https://www.floodmanagement.info/volta-basin/monitoring-and-evaluation/

Application modalities and deadline

Complete applications should be submitted by email to the following address: support@vfdm.info and rtripathi@wmo.int , no later than January 5, 2022, at 5 pm

GMT with the following reference in the subject line: [VFDM/MTE/2021: Consultant for VFDM Project MTE].
Interested applicants must submit all documents as described in the above item entitled " **Technical and Financial Proposals Presentation** " for the eligibility of their applications.
Requests for clarifications should be sent to the same e-mail address (support@vfdm.info and rtripathi@wmo.int).

Annexes

Annex 1: Final Evaluation Report incorporating feedback from stakeholders, for the review and approval of the WMO.
The total length of the MTE report should be a maximum of 50 pages for the main report, excluding annexes. Annexes can provide background and further details on specific components of the project evaluated.
The evaluation report template:
1. Title page
2. Table of contents
3. Executive summary
4. Acronyms
5. Background and description
6. Purpose of MTE
7. Evaluation methodology and evaluation questions
8. Findings per criteria
9. Lessons learnt and potential good practices and models of intervention
10. Conclusions and recommendations
11. Annexes (ToR, list of interviews, overview of meetings, proceedings stakeholder meetings, other relevant information)

Annex 2 List of stakeholders (will be shared later)