

CTCN assistance in Ghana

Improving Resiliency of Crops to Drought through Strengthened Early Warning within Ghana



Deliverable 2 (activity 2.1.1) Minutes from National Workshop held on 26 October in Accra, Ghana

Draft final 16th of November 2016

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CTCN assistance in Ghana

Improving resiliency of crops to drought through strengthened early warning within Ghana Needs Assessment report

Deliverable 2 (activity 2.1.1) Minutes from National workshop

Prepared for **UNEP**
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Acronyms and Abbreviations

CREW	Community Resilience Early Warning
CTCN	Climate Technology Centre & Network
DHI	DHI - see more at www.dhigoup.com
EPA	Environmental Protection Agency
EWS	Early Warning System
GIDA	Ghana Irrigation development Authority
GMET	Ghana Meteorological Agency
GWP	Global Water Partnership
HSD	Hydrological Services Department
MWRWH	Ministry of Water resources, Works and Housing
MWRWH	Ministry of Water resources, Works and Housing
NADMO	National Disaster Management Organisation
SDG	Sustainable Development Goals
UNEP-DHI	UNEP-DHI Partnership – Centre on Water and Environment
VRA	Volta River Authority
WRC	Water Resources Commission
WRI	Water research institute

Minutes from National Workshop

This document gives an overview of the content and main outcome of the national workshop, which was held at Water Resources Commission in Accra on 26 October 2016.

1 Background

The national workshop marked the initiation of the Climate Technology Centre and Network (CTCN) funded technical assistance on “Improving resiliency of crops to drought through strengthening early warning”. The workshop was held at the Water Resources Commission in Accra, Ghana on October 26th, 2016.

The workshop was scheduled for a full day, in which participants from various institutions came together for a presentation of the scope and content of the CTCN technical assistance and for discussions of how the outcomes could be further tailored to benefit the water and agricultural sector in Ghana.

The CTCN funded technical assistance relates to improving resiliency of crops to drought through strengthened early warning within Ghana. The objective is to facilitate transfer and capacity building for climate change adaptation focusing on dry season management and planning. The proposed support will utilise existing knowledge and capacity and further develop and validate these for applications to local issues within Ghana.

The following technical aspects will be included in the technical assistance:

- **Data accessibility:** Increased access to local and satellite based data relevant for drought management.
- **Climate forecasting:** Improved weather forecasting functionalities enabling climate forecasting across different temporal scales.
- **Early warning:** Development of an early drought warning system facilitating the provision of timely and effective information related to the water and agriculture sectors allowing these sectors to take actions to mitigate impacts of the upcoming drought.
- **Early warning communication:** Tools for dissemination of drought related information to national and regional organizations.

2 Purpose of the workshop

The purpose of the workshop is to:

- Present the scope of the CTCN technical assistance to relevant national stakeholders
- Identify the current specific gaps related to drought forecasting and dissemination and the associated needs for including climate variability and climate change in dry season management in Ghana
- Update the inventory of past, existing, and planned similar activities and Ghana based on the participants' knowledge

The outcome of the workshop will guide the detailed content and planning of the CTCN assistance to be presented in the Needs Assessment Report scheduled to be submitted in December 2016.

3 Participating Institutions

The following institutions participated in the workshop:

- Department of Earth Science, University of Ghana
- Environmental Protection Agency
- Ghana Meteorological Agency
- Ghana Irrigation Development Authority
- Global Water Partnership, Ghana
- Hydrological Services Department
- Ministry of Local Government and Rural Development
- National Disaster Management Organisation
- Ministry of Water Resources Works and Housing
- Ministry of Food and Agriculture
- Volta River Authority
- Water research institute
- Water Resources Commission, White Volta
- Water Resources Commission, Black Volta
- Water Resources Commission

List of participants is shown in Appendix 1.

4 Minutes from the meeting

4.1 Agenda

National workshop		
Presentation of the scope, objectives and outcomes		
Time	Title	Presenter
09.00 – 09.30	Registration	
09.30 – 09.45	Welcome and presentation of the objective with the workshop	Mr. Ben Ampomah, executive secretary, WRC
09.45 – 10.00	Presentation of participants	
10.00 – 10.30	Presentation of CTCN <ul style="list-style-type: none"> Objectives Ongoing projects Opportunities for CTCN support 	Mr. Joseph Bafoe, CTCN Mr. Bob Alfa, WRC
10.30 – 10.45	Q&A	
10.45 – 11.00	Break	
11.00 – 11.45	Objectives and scope with the CTCN technical assistance <ul style="list-style-type: none"> Objectives and outcomes Workplan 	Oluf Jessen, DHI Per Hansen, DHI
11.45 – 12.30	Q&A	
12.30 – 13.30	Lunch	
13.30 – 15.30	Roundtable discussions <ul style="list-style-type: none"> Requirements for drought early warning systems Previous experience in Ghana Feedback on scope and content 	Per Hansen, DHI and Bertrand Richaud, DHI
15.30 – 15.45	Break	
15.45 – 16.30	<ul style="list-style-type: none"> All 	all

4.2 Opening

Presenter: Ben Ampomah (WRC) representing the host organisation

Key messages:

- Opening of the meeting
- Individual presentation of the participants
- Much experience related to flood forecasting and warning exist in Ghana, but little with respect to drought.
- The CTCN technical assistance is an opportunity to tackle the issue of drought especially in relation to climate change adaptation.
- Highlighted the objective of this meeting: *receive input from stakeholders in order to shape the technical assistance to strengthen the scope.*

4.3 General presentation of CTCN

Presenter: Joseph Baffoe (EPA)

Key messages:

- Presentation with the following agenda points: origins of CTCN, CTCN mission, CTCN structure, overview of CTCN functions and services, core functions services, CTCN technical assistance cycle, Generating a request and Requests submitted by Ghana
- Mission: stimulate technology cooperation and enhance development of transfer of technologies to developing country parties at their request.
- Functions and services: Technical assistance, information and knowledge, collaboration and networking
- Ultimate goals: reduce greenhouse gas emission and increase resilience to climate change

Presentation is included in Appendix 2.

Questions:

What kind of services can be supported by the CTCN?

- Clarification of the potential services in form of technical assistance, information and knowledge, collaboration and networking

More details on the process to submit new requests for Ghana?

- Clarification of the application process using the current technical assistance as an example

4.4 Presentation of this CTCN Technical Assistance

Presenter: Bob Alfa (WRC)

Key messages:

- Existing Flood early warning system for the White Volta – financed by the World Bank in 2010. One of the main recommendations from the final workshop in 2013 was to work towards a drought early warning system. This recommendation was the background for the CTCN request defining this technical assistance.
- The basis for the current technical assistance are:
 - Agriculture in Ghana is predominately rain fed
 - Rising temperature and decreasing rainfall
 - Increase land degradation and desertification
 - Current information system is lacking the facilities to deal with extreme drought events.

- Background and summary of the CTCN technical assistance:
 - Initiated by WRC in collaboration with EPA. Technical assistance by UNEP-DHI partnership and DHI
 - Objectives: Support relevant organisations with timely and detailed information for them to plan and implement drought management actions to minimise drought impacts
 - Impacts:
 - Impact 1: Contribution to reduced crop losses and improved livelihood of farmers in Ghana
 - Impact 2: Improved information provision on drought characteristics to help farmers proactively take adaptive measures
 - Impact 3: Contribution to Sustainable Development Goals (3, 5, 6 and 13) Reduce crop losses, Improve information provision on drought, Contribution to SDGs

Presentation is included in Appendix 2.

4.5 Presentation of objectives and outcomes of the CTCN technical assistance

Presenter: Oluf Jessen (DHI) and Per B. Hansen (DHI)

Key messages:

- Agenda: DHI – short introduction, drought early warning and risk management (what is drought early warning?), objectives and background, work plan and activities, outcomes from the technical assistance.
- Presentation of DHI and past projects in the region: VBA Observatory, ECOWAS Observatory
- Drought early warning systems and risk management
 - Short introduction to drought and drought definitions
 - Early warning systems as part of a drought risk management approach
 - Examples of early warning systems
- Objectives and background
 - Presentation of the objectives and the process of developing the technical assistance
 - Presentation of the activities and deliverables

Presentation is included in Appendix 2.

Questions:

- Will the technical assistance need data from the neighbouring countries? Answer: the technical assistance will mainly rely on the use of satellite data.

- Is NDVI the only drought index to be used? Answer: not only NDVI, this was just an example used in the presentation. The technical assistance will use a wide range of drought indices, which will be selected together with the stakeholders.
- Is downscaling of climate model part of the technical assistance? Answer: the intention is to use regional climate models, but the technical assistance might look into downscaling methods for climate models.
- System to forecast a drought? Main output from the system seems to be probabilities, how are we going to translate the probabilities to the public? Answer: The technical assistance will use 2 types of ensemble forecast (probabilistic forecast) which will be used in the early warning system. The tool will not be used at the farmer level but at the governmental organisations. The outputs from the system will then be disseminated using the current dissemination options.
- What is the extent of the North of Ghana? How widely the pilot areas will cover? Answer: The tool will probably cover the entire country but it will be only validated in one given area. The selection criteria for the pilot area will be discussed as part of the roundtable discussions.
- Data availability should also be taken into account when choosing the pilot area. Answer: This will be taken into consideration.
- Next technical deliverable on this assignment, which can be used to give feedback? Answer: First version of the system in mid-April 2017.



Figure 1 Participants listening to the presentations

4.6 Roundtable discussion

The afternoon of the workshop was used for group work to discuss a number of relevant topics related to the technical assistance. The objectives were to:

- Present challenges related to drought management in Ghana
- Discuss related programmes, initiatives or projects in Ghana and lessons learnt
- Provide feedback to the scope and outcomes of the presented CTCN technical assistance

The participants were divided into two groups with a moderator from the project team facilitating the discussions. The two groups provided their results in different structures due to the way the discussions went in the groups.



Figure 2 Roundtable discussions

4.6.1 Outcome from group 1

Related projects:

Past/ongoing project experiences related to this technical assistance:

- Africa risk capacity (ARC) project: manage the aftermath of drought. Development of drought and river flow models. It is also developing a drought forecasting system in terms of insurances. Ministry of finance is managing this project.
- CREW UNDP (sponsored by Norwegian gov.) project. 10 pilot districts/communities where floods are eminent. Develop EWS for the entire country. Flood was the basis but in the northern part of the country drought.
- Company developing software for the farmers that can be accessed directly on the phone. G-Met would know more about this initiative.

Lessons learnt from past projects:

Key outcomes:

- Important to build sufficient capacity to support the outcomes
- Important to focus on the long term sustainability

Needs for represented organisations:

The specific requirements or needs from each of the organisations in the group was discussed.

- WRI: needs for reliable and good data sources as well as analytical methods
- WRC:

- One of the mandates is to allocate water for various water users. Need for DSS allocating water to new users.
- Other mandate is to manage effective use of water. Awareness to safe water.
- IWRM plan for the basin. Planning for the water resources management of the basin.
- Short-term and long-term climate forecast are important.
- Ghana water company:
 - Prioritise the use of water resources among different institutions (concurrent uses). Prioritise drinking water over irrigation
 - Deal with short term shortages
 - Long term planning.
- VRA:
 - Short term and long term forecast for hydropower production are critical
 - Tools for updating the rating curve for the hydrological model
- NADMO:
 - Plan for the management to recover from the drought impact.
- HSD:
 - This technical assistance can help in having a reliable data management platform and reliable information used for modelling purposes.
 - Water allocation models to understand the water scarcity are needed

4.6.2 Outcome from group 2

The roundtable discussion in group 2 was initiated by a short introduction by each of the participants with relation to their work regarding drought.

Ghana Irrigation Department

- Mainly work with irrigation infrastructure and water management
- The objective is to secure the food production within Ghana
- Advises the farmers with respect to the operation of irrigation structures during drought events

Ministry of Local Government

- Their main mandate is to oversight the regions and local municipalities
- Have a recent project focusing on food security implemented in the northern part of Ghana. The project was funded by CIDA (Canada) and worked with the rural population on the food security aspect and also covered drought.

Meteorological Department

- Producing their own seasonal forecast based on the NOAH CFS model and local data
- Seasonal forecast for the coming months are developed every March and updated in June
- Drought indices are currently not used for drought forecasting as it is mainly based on rainfall forecast
- The seasonal forecast is disseminated to MOFA
- Possibilities for collaboration on 1) downscaling of global climate forecast, ii) drought indices and iii) dissemination of results related to climate or drought forecast

University of Ghana

- Don't have much projects or experience within the area of drought
- There might be potential for collaboration within a research projects on water resource assessment in the Northern Ghana, which also has the participation of the Danish Geological Survey (GEUS)

Ministry of Water Resources

- Responsible for formulation of water policies and regulations
- Main priorities are on water availability and water quality
- Drinking water framework – catchment to end user

Global Water Partnership (GWP)

- Not a lot of focus on drought, more focus on flood in Ghana
- Participating in the Flood Management project in Ghana
- Regional GWP-West Africa is planning to initiate “drought project in Western Africa”

Black Volta Basin

- Regulating body with focus on water availability and management
- Participated in a water security and resilience project (GWP project)
- Developing water management plans taking climate change into account

- Drought forecast could improve their water allocation methods

Environmental Protection Agency (EPA)

- Water availability and drought issues are important for wetland, water quality and environmental flow

Lessons learned from previous projects:

The group discussed lessons learned from other related projects.

- Purchase of equipment. New equipment need to fit with the existing equipment.
- Respect existing procedures and do not use the projects to introduce new ones without consensus with the institutions that shall carry out the work after project completion.
- Exit strategy is very important, especially the long term sustainability including ensuring sufficient funds for the exit strategy.
- Review of the project results shall take place within the project period so that there is time to adjust according to the results.
- Nomination and involvement of contact persons within the key organisations are important to ensure an effective workflow within the project.
- Procedures and technologies shall be as simple as possible in order to increase the number of people/institutions that can apply them.
- Access to data and information created by the project shall be made not only for implementing institutions.
- Options for downscaling shall be taken into account during the project.

Criteria for selection of pilot area:

The group discussed the criteria for selection of a pilot area for the CTCN assistance

- The drought management challenges shall be well described with clear identification of the exact gaps. The gaps shall match the scope/resources of the CTCN assistance.
- Required data should be available
- Involved institutions shall see a benefit e.g. the assistance shall make their work more efficient. Options for monitoring of short-term impacts to be considered.
- Stakeholder input is critical for the selection of the area
- Important that the pilot area matches the institutional context – meaning clear division of mandates between the involved institutions
- Build upon existing dissemination system(s)

The following table summarises the outcome from the group 2 discussion.

No.	Programme involving drought	Institution	Challenges/lessons learned	Scope and content for DEW
1	INCARTEMA – providing groundwater systems for irrigated farming	Ghana Irrigation Development Authority	<ul style="list-style-type: none"> - Purchase of equipment disregarding existing procedures and systems - Site selection - Exit/sustainability strategies developed prior to implementation - Commitment/buy-in of institutions to continuity (high level discussion) - Data access (knowledge management portals) in a timely manner(identify contact persons in institutions for onward details) - Downscaling of regional data - Keep the model simple for end-users to continue its use 	<ul style="list-style-type: none"> - Hold detail discussions with relevant institutions (WRC, GMet., EPA, NADMO, etc.) on the suitable technology - To be able to use output of model to advice farmers - Output of model to inform drought management planning - Dissemination of products should be tailored using existing channels
2	Ensuring Food security in the three northern regions (2008 –Nov. 2016)	Min. Local Government and Rural Development		
3	Enhancing resilience to climate and ecosystem changes : extreme value analysis (2012- Ongoing)	Ghana Meteorological Agency		
4	Africa Adaptation Project (2010-2012)	EPA		
5	Weather research and forecasting modeling – Ongoing	Ghana Meteorological Agency		
6	Monitoring for Env. And Security in Africa – Ongoing	Ghana Meteorological Agency		
7	Scenarios study in White and Black Volta, Studying and gathering data on the geological formation and recharge for dry season farming – Ongoing	Department of Earth Science Univ. of Ghana		
8	Water allocation for efficient water use – Ongoing	Water Resources Commission		
9	Supporting provision and construction of water infrastructure (CCAP- Danida 2009 - 2011)	Water Resources Commission		
10	Monitoring water availability for allocation taking into consideration drought – Ongoing	Water Resources Commission		
11	Water resources planning for all scenarios including drought	Water Resources Commission		

12	Community Resilience and Early Warning – Ongoing	National Disaster Management Organisation		
13	Creation and enforcement of buffer zones and catchment areas of surface water resources – Ongoing	Water Resources Commission		
14	Build capacity of stakeholders in drought and water systems monitoring – Ongoing	Volta Basin Authority		
15	Support in sector agency policies and coordinating their activities	Ministry of Water Resources Works and Housing		
16	Water Development and climate resilience project (WACDEP)- Ongoing	Global Water Partnership		

5 Key outcomes from the workshop

The workshop was very successful with participation of all the invited stakeholders except the Ministry of Food and Agriculture. The project will try to arrange a separate meeting with the ministry at a later stage as they are an important stakeholder for the technical assistance.

The key outcomes from the first national workshop are:

- All participating institutions appreciated the CTCN initiative and offered to support the technical assistance through possible future stakeholder meetings and through review of relevant project outputs.
- The workshop concluded that drought is a very relevant topic to support in Ghana as only few organisations and projects address drought management. Previous water resource management projects mainly focused on flooding although drought is often affecting more people over a longer time period compared to drought.
- It was agreed that the pilot area will be located in the Northern part of Ghana where drought is more often experienced compared to the Central and Southern Ghana.
- There is a scope for improving the existing drought monitoring and forecasting methodologies in Ghana based on latest Earth Observation technologies.
- The main activities of the CTCN technical assistance is likely to be focused towards improved drought forecasting (in terms of timeliness, quality, and format).
- The dissemination aspects – including how to reach female farmers – needs to be investigated via consultations with the Ministry of Food and Agriculture as dissemination of drought warnings to the farmers are their responsibility.
- The key stakeholders for the technical assistance will be:
 - Water Resources Commission as they are responsible for the overall water resource management in Ghana including the basin organisation in the Northern Ghana where the pilot area is likely to be located.
 - Department of Meteorology as they have experience with drought management and are currently providing seasonal forecast to different ministries.
 - Ministry of Food and Agriculture as they are the main organisation disseminating drought related information in Ghana via their regional and local structures.
- It is important that the outcomes from the technical assistance supports the existing dissemination processes e.g. dissemination from ministries to farmers and related organisations.
- There will be a need for follow-up meetings with some of the key stakeholders within the coming months to further understand how the technical assistance results should embed into the current dissemination processes related to drought management in Ghana.



APPENDICES

APPENDIX 1: List of participants

	Name	Organisation	Position	Email
1	Suzzy Abaidoo	Ministry of Water resources, Works and Housing (MWRWH)	KASH prog. officer	sabaidoo@yahoo.com
2	Max Boateng	Global Water Partnership (GWP)	Executive secretary	boatgyimax2@gmail.com
3	Philip T. Kabi	Volta River Authority (VRA)	Engineer	Philip.padi@vra.com
4	Ayilari-Naa Juati	Ghana Meteorological Agency (GMET)	Director Synoptic Meteorology & Forecasting	juatia@yahoo.com
5	Mark Benegali	Ghana Irrigation development Authority (GIDA)	Engineer	Makmaben@gmail.com
6	K. Kankam-Yeboah	Water research institute (WRI)	Head of surface water division	Kyeb59@yahoo.com
7	Aaron Aduna	Water Resources Commission (WRC) White Volta	Principal basin officer	aaronaduna@yahoo.com
8	Joachim Ayiwe ABUNGBA	Water Resources Commission (WRC) Black Volta	Ag. Basin officer	joachimayiwe@yahoo.com
9	Sylvester Dark	Hydrological Services Department (HSD)	Senior Hydrologist	slykwesi@yahoo.com
10	Daniel Bampoh	GWCL	Director, Water Resources Unit	wsrs@ghana.com
11	Gavivina Yao Tamakloe	NADMO	Director Relief / Reconstruction	gavivinaytamakloe@gmail.com
12	Settuna Okornae	Ministry of Water resources, Works and Housing (MWRWH)	Assistant director	settinao@yahoo.com

13	Mickael Onwona Kwakye	EPA	Chief Programme Officer	Mickael.kwakye@epa.gov.gh
14	Yvonne Sena A Loh	Dept. of Earth Science UG	Lecturer and hydrogeologist	sloh@ug.edu.gh
15	Benedicta Boateng	Ministry of Water resources, Works and Housing (MWRWH)	N.S.P	Bennyb.boateng@gmail.com
16	Tina Quarshie	Ministry of Water resources, Works and Housing (MWRWH)	PLG Officer	quarshiechristina@gmail.com
17	Joseph Baffoe	EPA	CTCN focal point	jabaffoe@gmail.com
18	Ben Ampomah	Water Resources Commission (WRC)	Executive secretary	byampomah@yahoo.com
19	Bob Alfa	Water Resources Commission (WRC)	Head of Surface water resources	bobalfa@yahoo.com
20	Per B. Hansen	DHI	Institutional expert	pbh@dhigroup.com
21	Oluf Jessen	DHI	Project manager	ozj@dhigroup.com
22	Bertrand Richaud	DHI	Water resources specialist	ber@dhigroup.com

APPENDIX 2: Presentations

Climate Technology Center and Network (CTCN)

Joseph Amankwa Baffoe
EPA/National Designated Entity
Accra

Outline

- ORIGINS OF THE CTCN
- CTCN MISSION
- CTCN STRUCTURE
- OVERVIEW OF CTCN FUNCTIONS AND SERVICES
- CORE FUNCTIONS SERVICES
- CTCN TECHNICAL ASSISTANCE CYCLE
- GENERATING A REQUEST
- REQUESTS SUBMITTED BY GHANA

Origins of the CTCN

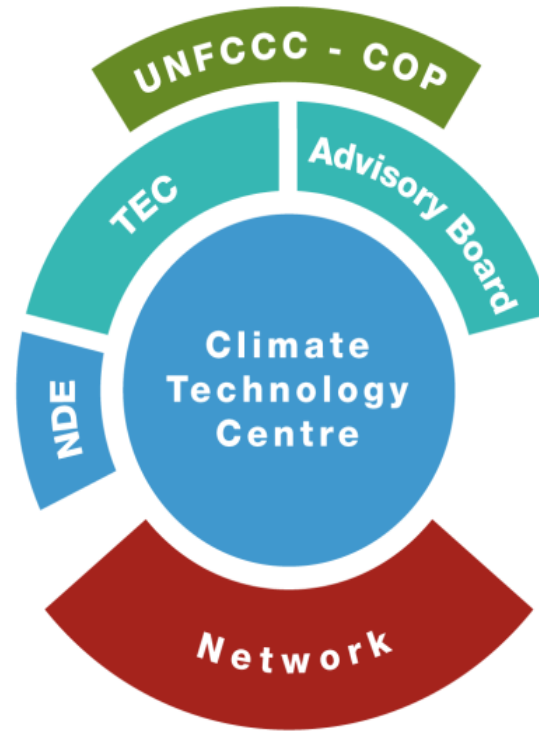
Decisions: UN Framework Convention on Climate Change

- COP 15 (Copenhagen) 2009: agreement to establish a “Technology Mechanism”
- COP 16 (Cancun) 2010: Technology Mechanism further elaborated (TEC and CTCN) and Technology Executive Committee created
- COP 17 (Durban) 2011: establishment of the Climate Technology Centre and Network; selection procedure for host agreed
- COP 18 (Doha): formal selection of UNEP as host of the Centre

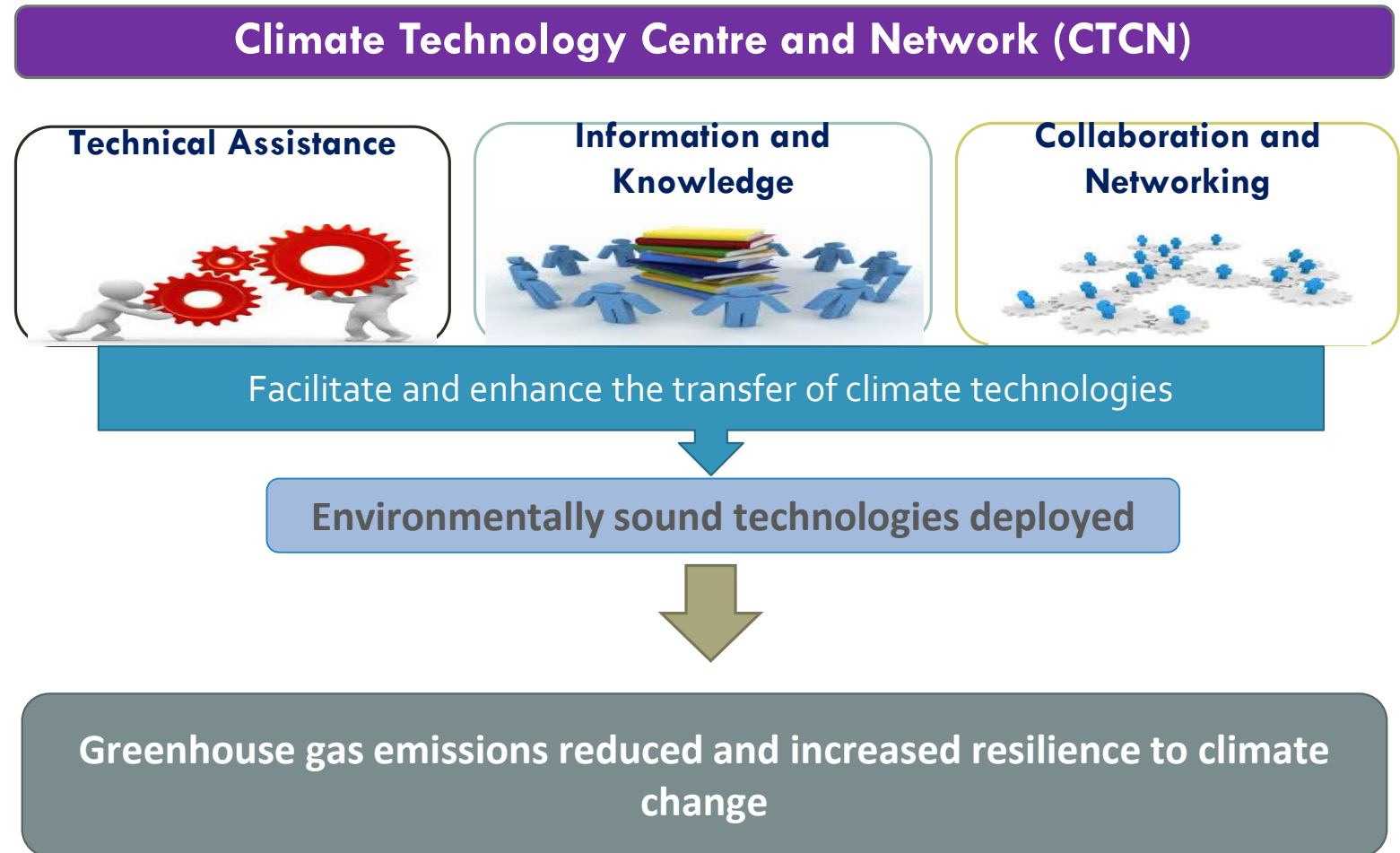
CTCN Mission

***“TO STIMULATE TECHNOLOGY COOPERATION AND
ENHANCE THE DEVELOPMENT AND TRANSFER OF
TECHNOLOGIES TO DEVELOPING COUNTRY PARTIES
AT THEIR REQUEST.”***

CTCN Structure



Overview of CTCN functions and services -



Core Functions

Main functions:

- Manage requests from developing country **National Designated Entities (NDEs)** and deliver responses
- Foster collaboration and access to information and knowledge to accelerate climate technology transfer
- Strengthen networks, partnerships and capacity building for climate technology transfer

National Designated Entities (NDEs)

- Acting as the national CTCN focal point
- Coordinating activities and services of the CTCN in the country (request generation - submission - monitoring and evaluation)
- Acting as an active member of the Climate Technology Network (CTN)

Core Services

Three core services:

- **Provide technical assistance to developing countries to enhance transfer of climate technologies**

Technical Assistance = Services of an expert/experts

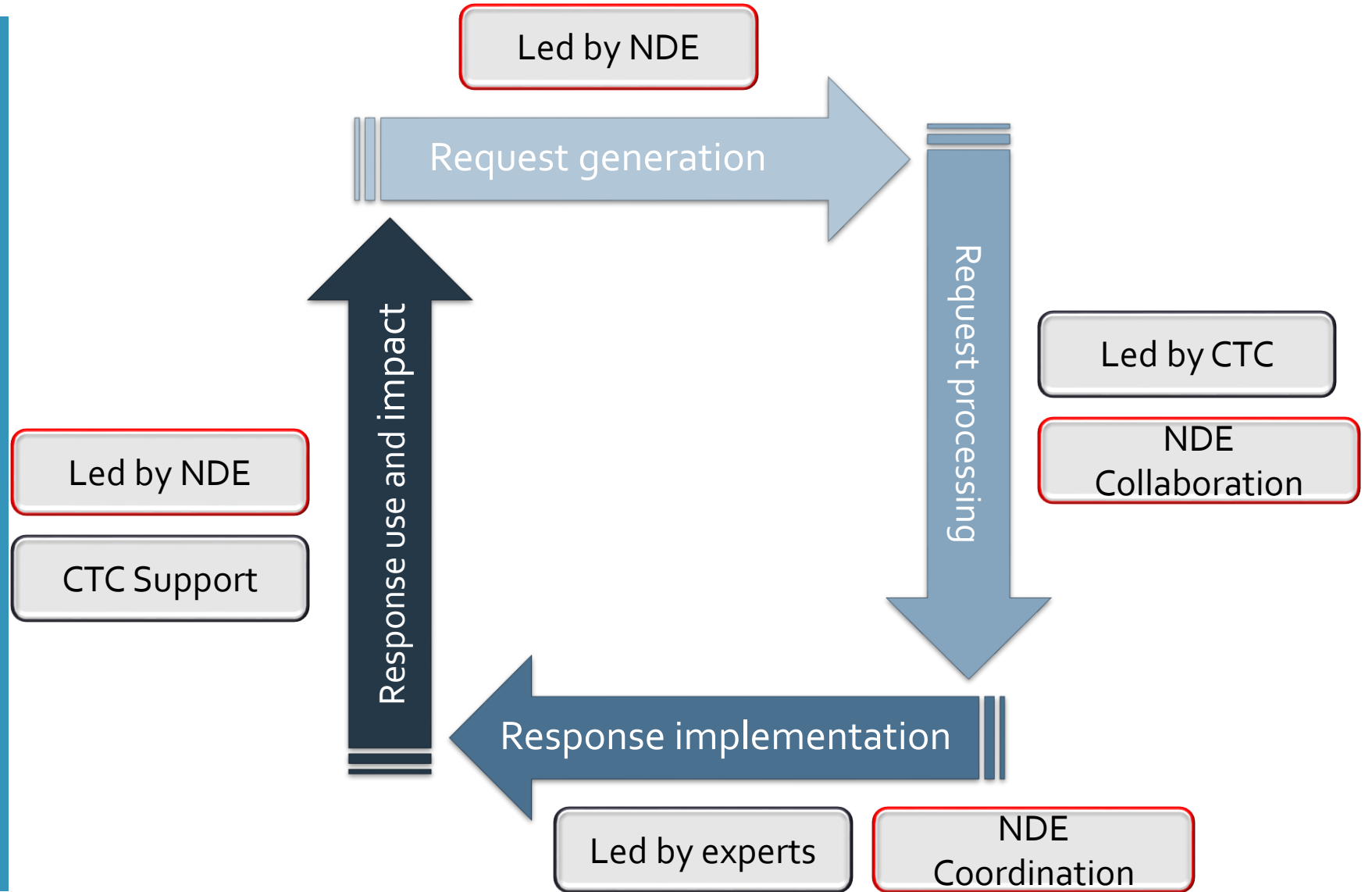
- Technical assessments and recommendations (Technology needs / piloting / deployment / barrier)
- Support to Policy and Planning (strategies/policies / roadmaps / regulations)
- Support to Implement Plan and Mechanisms (project design / business plan)
- Trainings and capacity building (capacities and knowledge)
- Tools and methodologies (information/capacity)

Request Cost Value in range \$50,000 - \$250,000

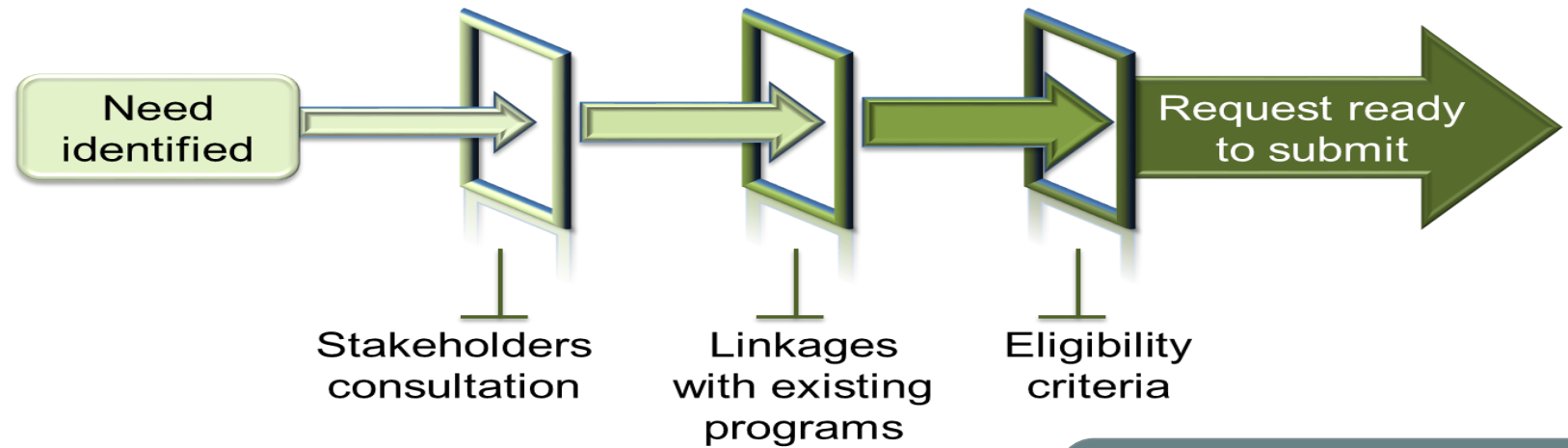
Core Services

- **Provide and share information and knowledge on climate technologies**
 - Broad range of online resources at no cost (Resource database / Training modules)
 - Opportunity to share best practices and lessons learnt
 - Accessible through the Knowledge Management System (KMS)
- **Foster collaboration and networking of stakeholders on climate technologies**
 - Various opportunities for networking with other public and private actors involved in climate technologies (International and regional forums / workshops)
 - A Climate Technology Network of organizations with expertise on climate technologies

CTCN Technical Assistance Cycle



Generating a Request



Priority

Feasibility

Collaboration

Impact

Synergies

National priorities

Funding

Lessons learned

Contribute to increase resilience and/or mitigate emissions and aligned with national plans

Enhance endogenous capacities

Process are in place in the country to monitor and evaluate any support provided

Request submitted by Ghana

Green Cooling Africa Initiative

- Regional Project (Ghana, Kenya, Namibia, Mauritius)
- promote climate-friendly and sustainable cooling technologies with low energy consumption and GHG emission
- 18 months (9/15-3/17)
- Partner: GIZ
- Ongoing
- Initiated by EPA and GIZ
- Cost: 600 USD (Total), 116,000 (Ghana)

Improving resiliency of crops to drought through strengthened early warning

- Initiated by the Water Resources Commission (WRC)
- facilitate transfer and capacity building of practices and technologies for climate change adaptation using drought early warning and forecasting technologies
- 12 months
- Project Just started
- Cost: 243,000 USD

Mainstreaming Gender into climate resilient energy systems in ECOWAS

- ECOWAS Regional project
- equip national actors with the capacity to execute gender-responsive, sustainable energy development that strengthens climate resilience in the energy sector
- 2 years
- Partner: ECOWAS Centre for Renewable Energy and Energy Efficiency (ECREEE)
- At the response plan stage
- Initiated by ECREEE
- Cost: to be determined

Thank You!

Joseph A. Baffoe

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Drought Early Warning and Forecasting System: Improving resiliency of crops to drought through strengthened early warning within Ghana



Bob Alfa
WRC

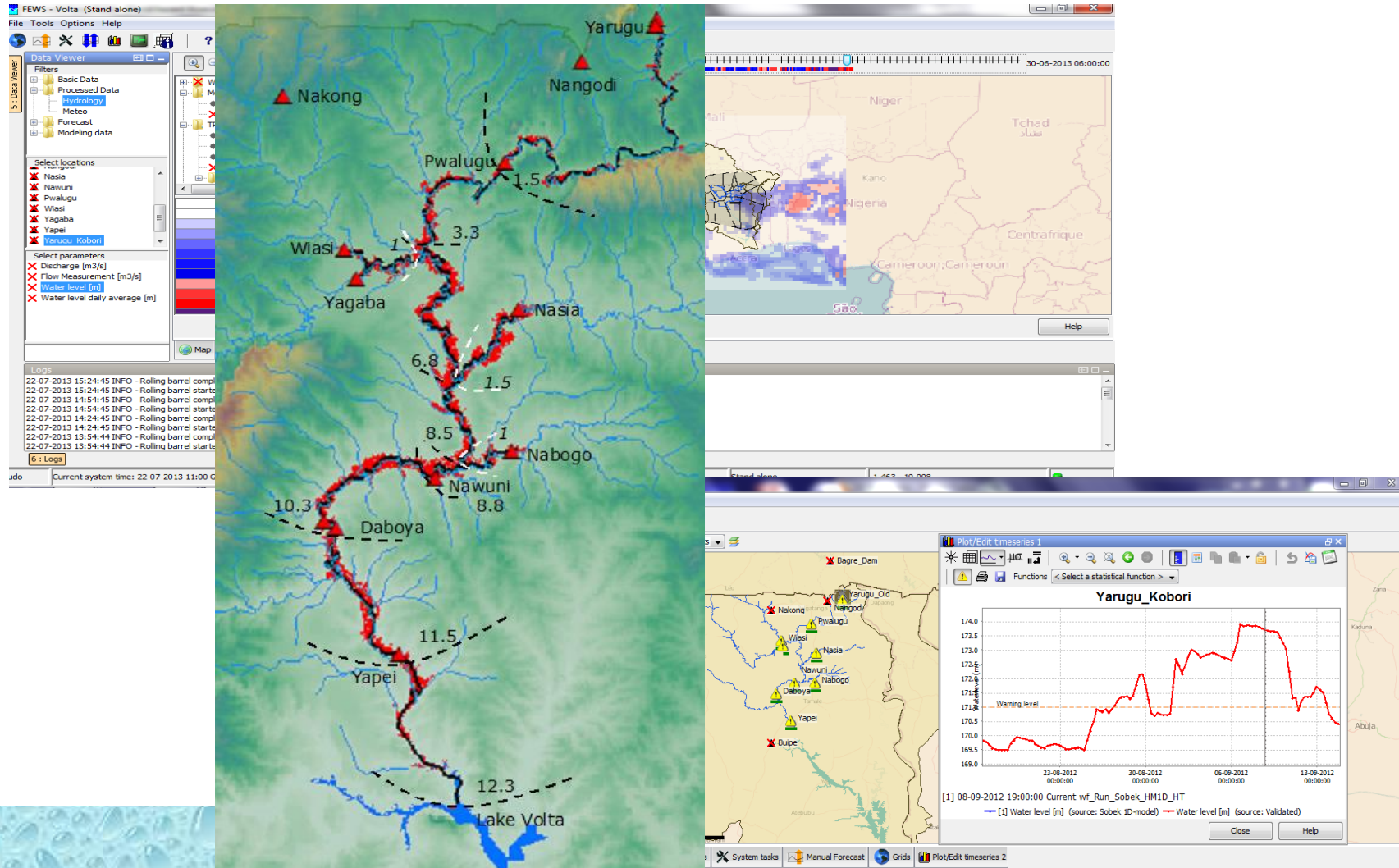
October 26, 2016

Conference Room of WRC



Drought Early Warning system

Flood early warning system White Volta



Recommendation

- Strengthen capacity at local level to effectively communicate flood information
- Expand and improve current system of monitoring networks (hydro meteorological)
- Develop and validate flood risk maps
- Training and capacity building of Relevant personnel on flood Management
- Improve coordination at both regional and National level on Disaster management
- **Work towards the development of drought Early Warning system**
- Develop a comprehensive response mechanism for Disaster

The bases...

- Agriculture is predominantly rainfed therefore climate sensitive
- Situation of rising temperatures and decreases in mean annual rainfall in most of the country is expected to continue over the coming decades
- Increased land degradation and desertification
- Current information and early warning systems are insufficient to adequately prepare and cope with the extreme climate events

Project Summary

- Initiated by the Water Resources Commission in collaboration with EPA
- Technical assistance for planning and implementation by UNEP-DHI Partnership
- Project duration is 12 months
- Introduce, adjust and validate drought early warning and forecasting technologies to local conditions
- Create stronger collaboration among national and local institutions for drought management and climate resilience of crop production
- Design a road map to scale up deployment of technology with appropriate financing

Objectives and Intended Impacts

- Support farmers with timely and detailed information for them to plan and implement drought management actions to minimise drought impacts
- Enhance awareness and expertise to use spatially distributed drought information
- Increase the accessibility of drought-related data on relevant near real-time satellite information
- Strengthen institutional coordination for disseminating drought early warning information
- **Impact 1:** Contribution to reduced crop losses and improved livelihood of farmers in Ghana
- **Impact 2:** Improved information provision on drought characteristics to help farmers proactively take adaptive measures
- **Impact 3:** Contribution to Sustainable Development Goals (3, 5, 6 and 13)



THANK YOU !!!!!!!



CTCN technical assistance on:

Improving resiliency of crops to drought and changing climate through strengthened early warning

in Accra, on the 26th of October 2016

Oluf Z. Jessen – DHI

Bertrand Richaud – DHI

Per B. Hansen – DHI



Agenda


- **DHI – short introduction**
- **Drought early warning and risk management**
 - What is drought early warning?
- **Project objectives and background**
- **Project workplan and activities**
 - Workplan and activities
 - Project outcomes



Project overview

Request from **Water Resources Commission** in Ghana through the Climate Technology Network Center for technical assistance on:

- Improved **preparedness for drought**
- **Increased capacity and technologies** for improved and timely early warning information provided to the relevant sectors and organisations

A map of the African continent is shown in a light grey color. The country of Ghana is highlighted in a darker grey color, indicating its location on the western coast of Africa.

Ghana

Applicant: Water Resource Commission

National Designated Entity: Mr. Joseph Amankwa Baffoe, Environment Protection Agency

Duration: 12 months

Status: Under implementation

Budget: 240,000 USD

Development of drought early warning system for improved resilience to drought and changed climate

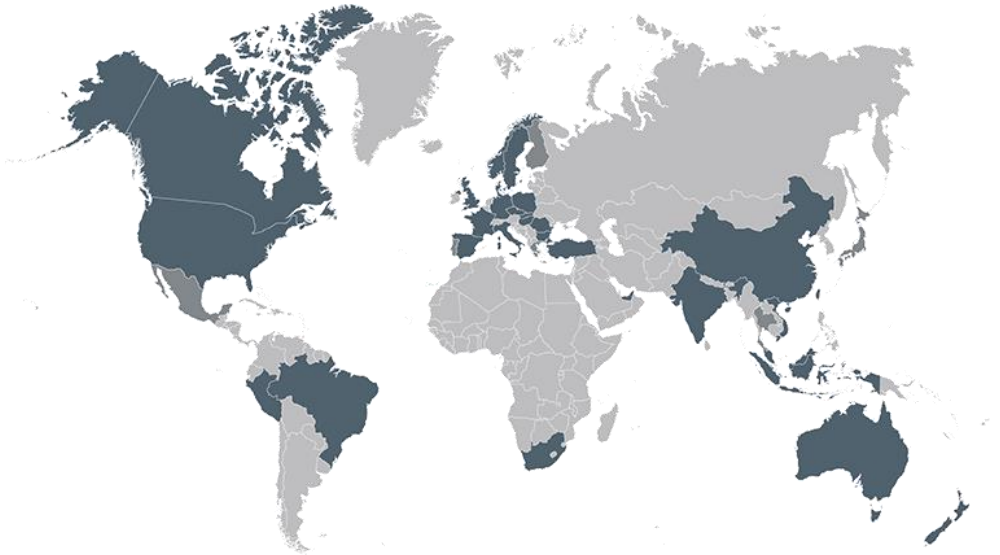
DHI in short



We're an independent, private and not-for-profit organisation

- **We are global**

- Our network of offices spans more than 30 countries worldwide
- We have experience from projects in over 150 countries



Areas of expertise:



Aquaculture and agriculture



Energy



Climate change



Coast and marine



Surface and ground water



Urban water



Industry



Environment and ecosystems



Product safety and environmental risk

www.dhigroup.com



Experts in project team:



Oluf Jessen

- Project manager
- 20 years of experience



Per Hansen

- Institutional expert
- > 30 years of experience

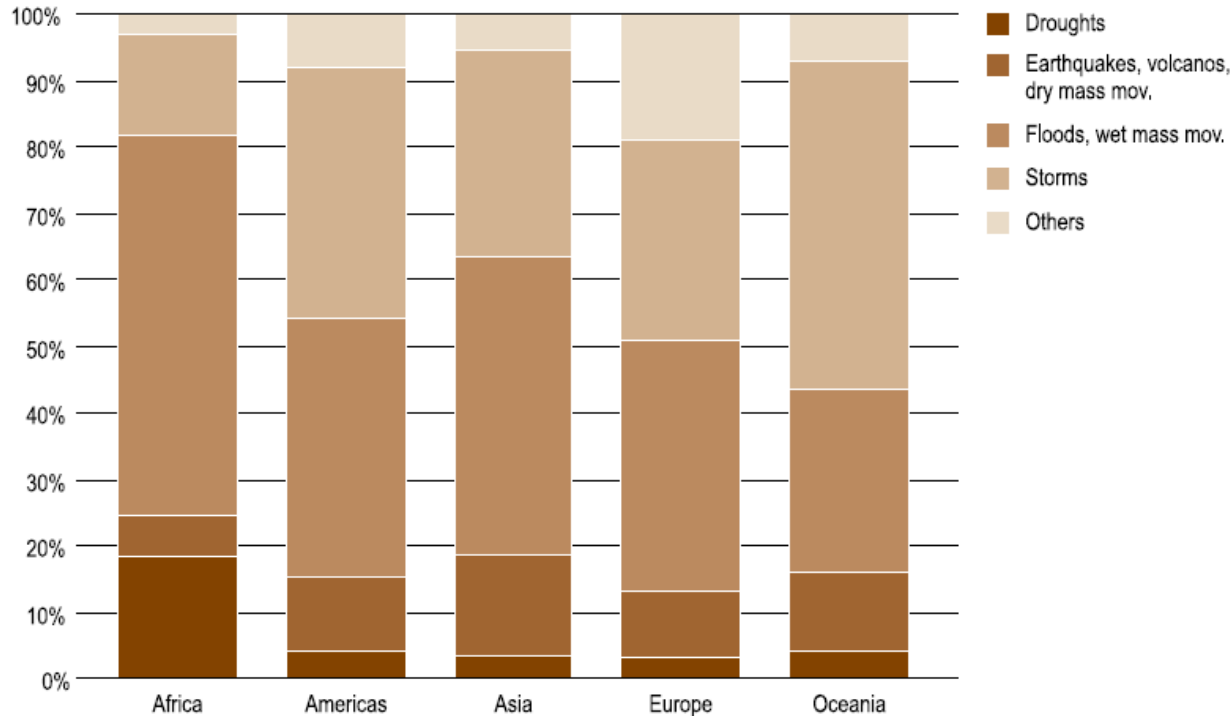


Bertrand Richaud

- Water resources and drought specialist
- 10 years of experience

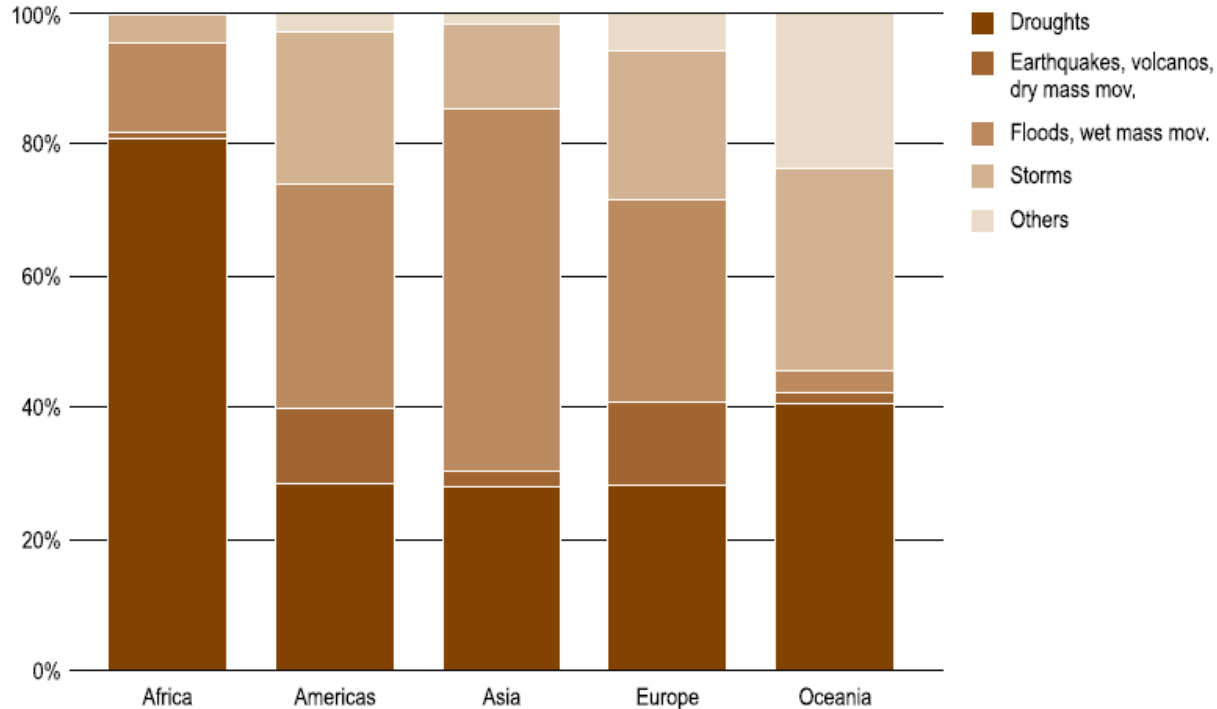
Drought early warning and risk management

Disaster occurrence by continent (1970 – 2008)



Droughts tend to occur less frequently than other hazards as floods or storms

Disaster impacts on population (1970 – 2008)



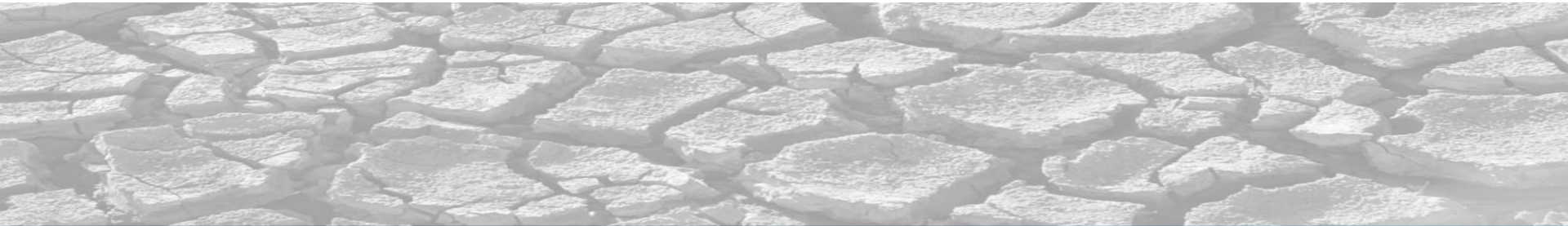
Droughts affect a larger part of the population as it often lasts for seasons or years

Drought definition

Drought is generally a deficiency of precipitation over an extended period of time, usually a season or more, which results in a water shortage for some activity, group, or environmental sectors.

Drought is defined as a relative condition

- Comparison of current condition to what would be expected



Drought definition

Drought categories:

- **Meteorological** – rainfall deficit compared to what is expected
- **Agricultural** – reduced water availability for crops
- **Hydrological** – deficit in surface or groundwater availability
- **Socio-economic** – water demand exceeds supply causing socio-economic impact

Meteorological
drought

Agricultural
drought

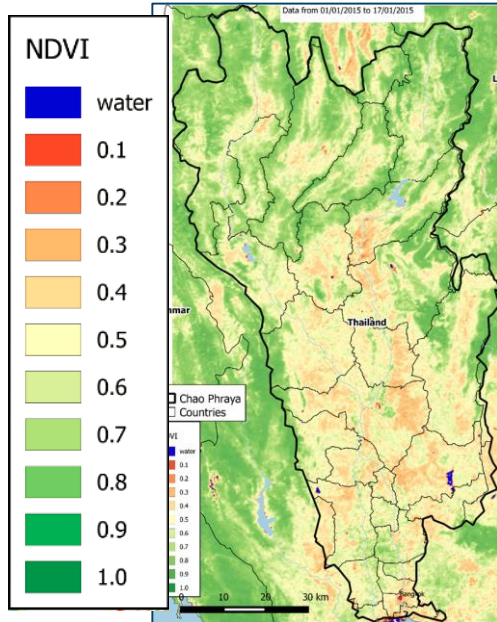
Hydrological
drought

Socio-economic drought

Time/duration



How to measure a drought?



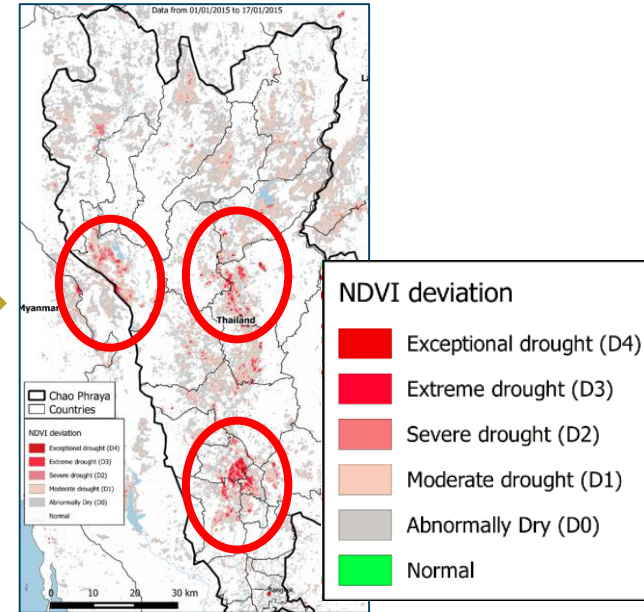
Satellite data (NDVI)

Drought index

Compare current value
with historical value?

Expressed as a deviation,
anomaly, percentile etc.

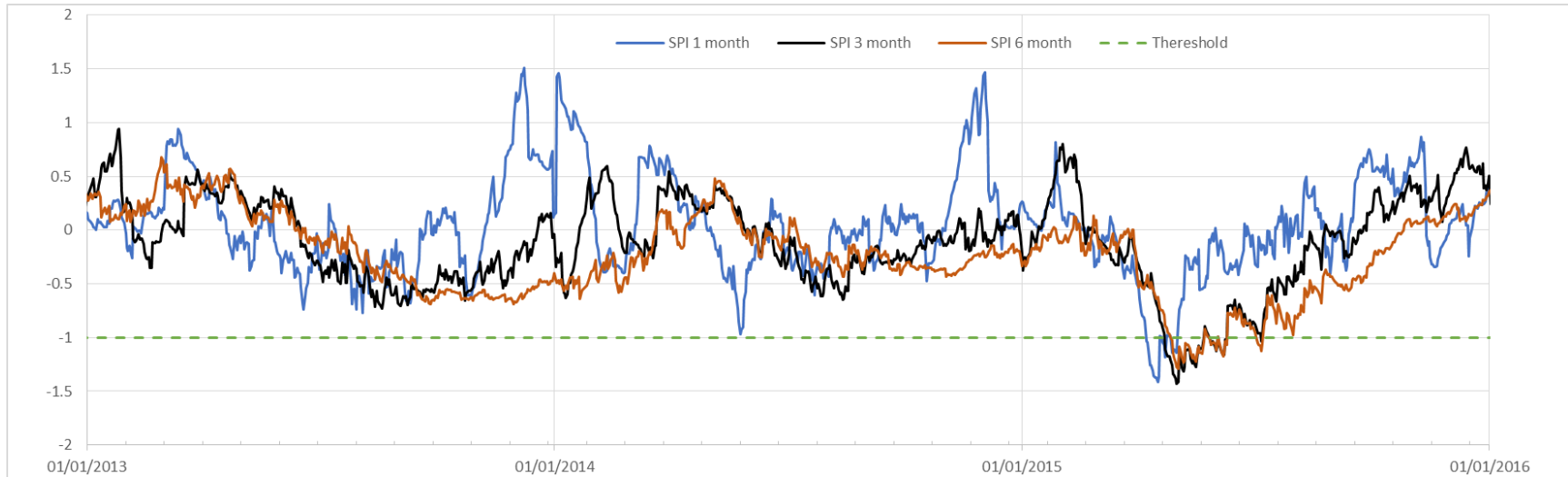
A large number of different
drought indices exists.



Drought classification

How to measure a drought?

Temporal data allows for timely monitoring of the drought status

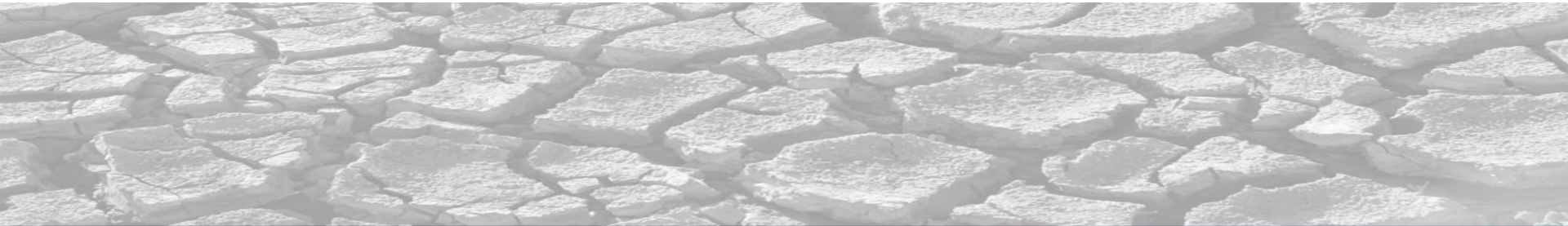


Drought – future vision

Climate change - Increased frequency and severity of meteorological droughts

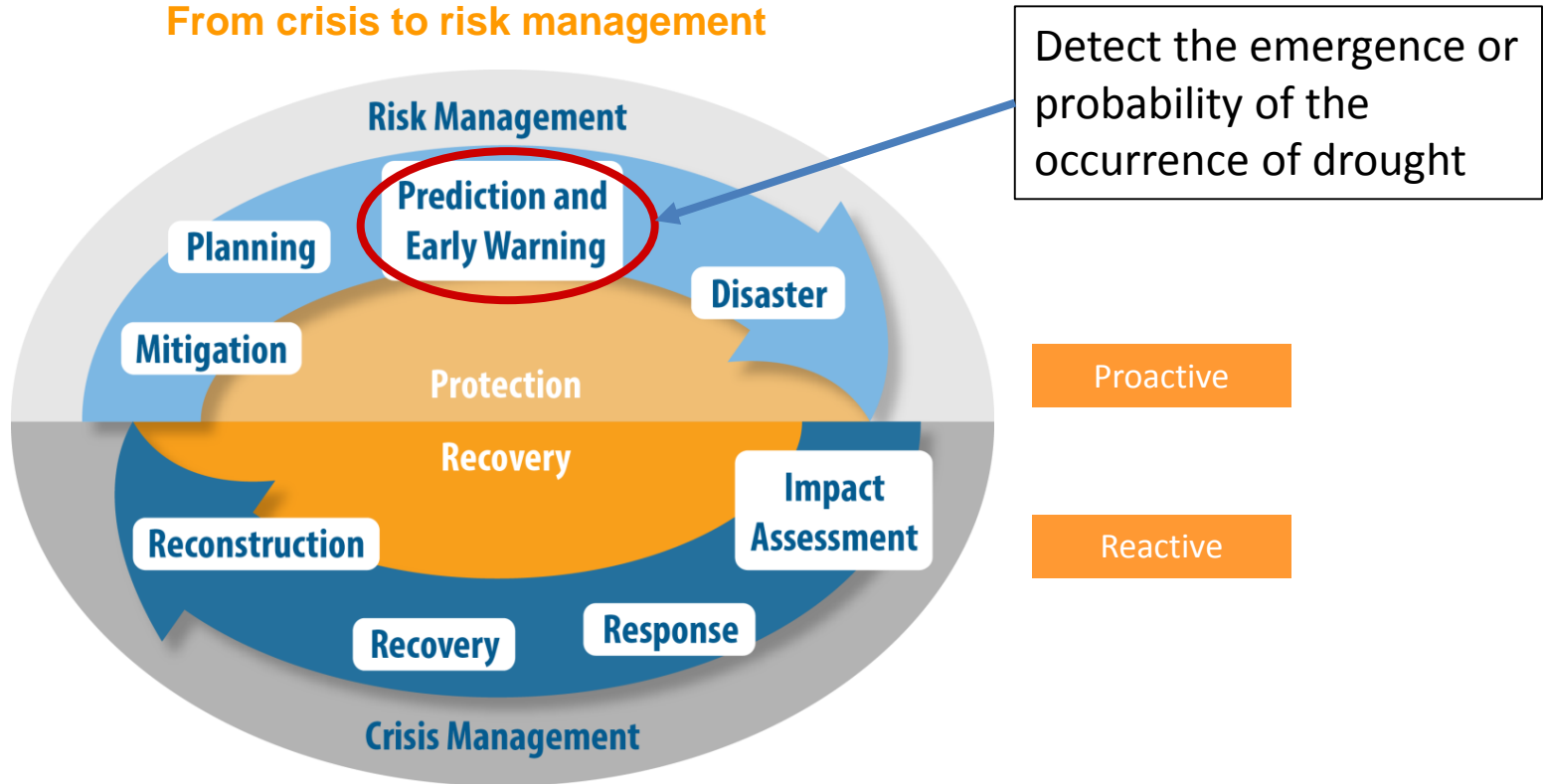
Population and land use change - Increased impacts associated with increased vulnerability

Needs for improved risk management tools for drought



Early warning and detection as part of a risk based approach

From crisis to risk management



A need to develop risk-based drought management policies

Examples of early warning systems

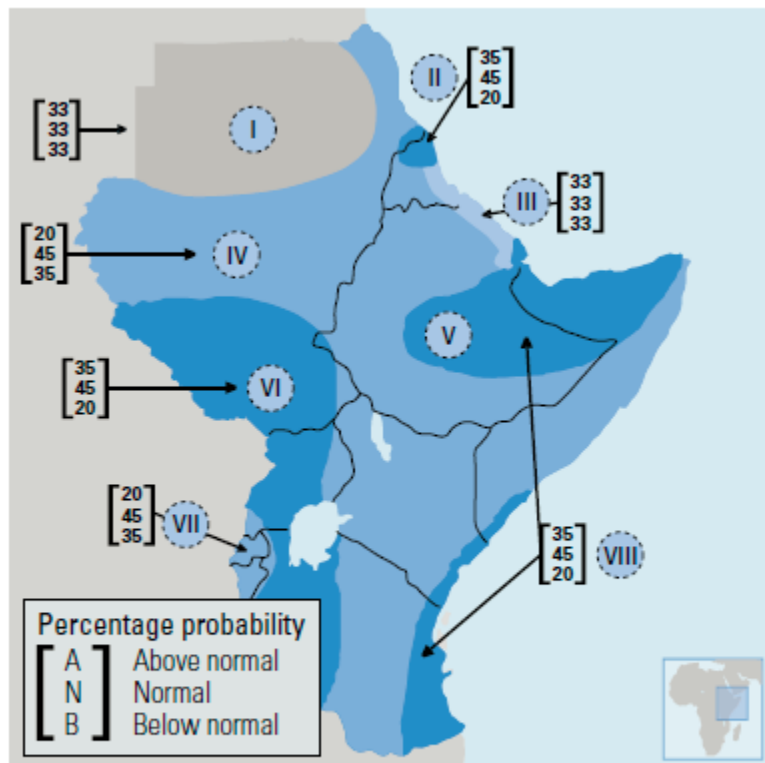


Figure 13. Climate outlook for the Greater Horn of Africa, March to May 2006. (Source: ICPAC)

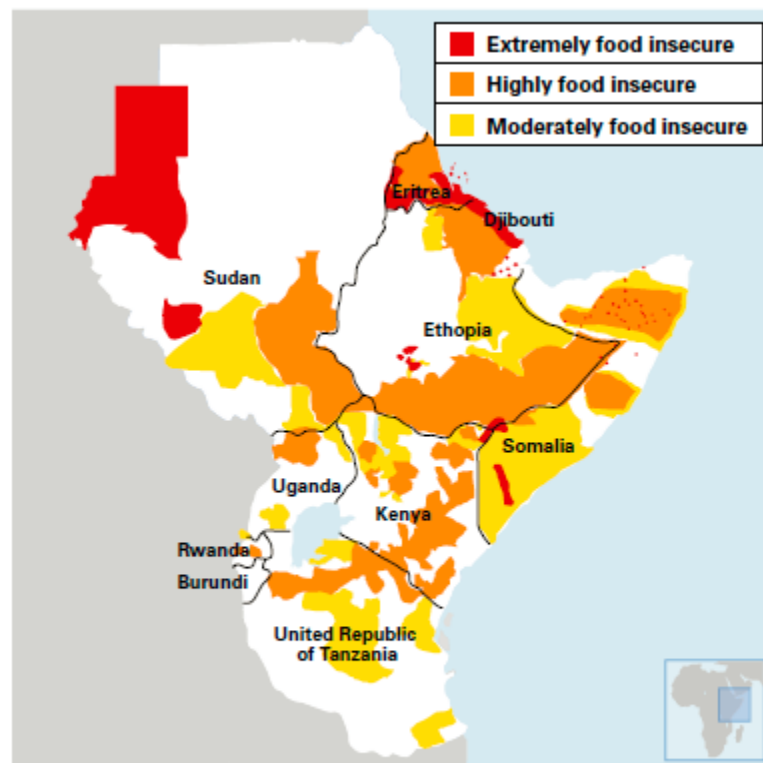
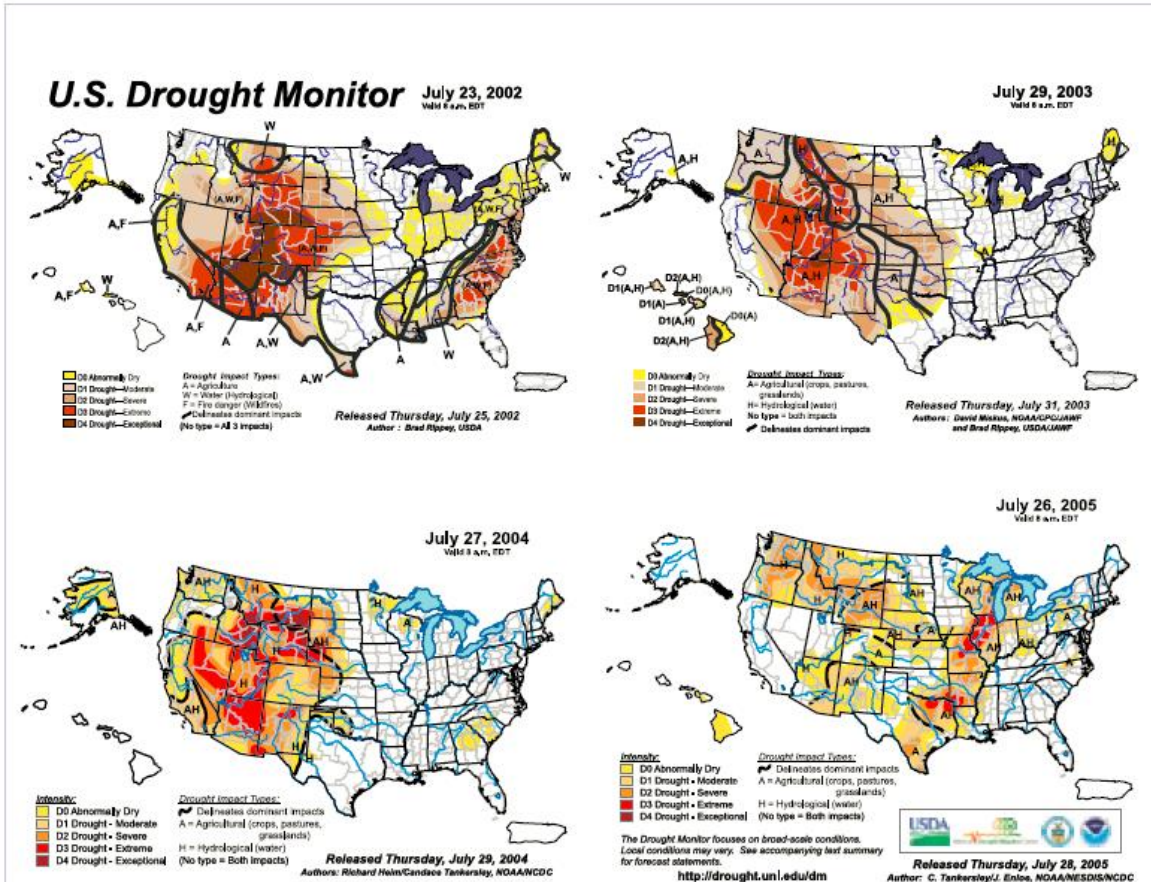


Figure 14. Food security outlook for the Greater Horn of Africa, September to December 2005. (ICPAC)

Examples of early warning systems



Project objectives and background

Project objectives

- **Improving resiliency to drought and changing climate in Ghana**
- **Enhance the capacity** of relevant local government agencies to address drought related issues
- **Provide scientific based technology** for drought early warning and forecasting within Ghana

A dark grey silhouette map of the African continent is shown. The country of Ghana is highlighted in a light green color. The map is set against a light blue background.

Ghana

Applicant: Water Resource Commission
National Designated Entity: Mr. Joseph Amankwa Baffoe, Environment Protection Agency
Duration: 12 months
Status: Under implementation
Budget: 240,000 USD

Development of drought early warning system for improved resilience to drought and changed climate

Project outcomes

Tools supporting the issue of timely information and warnings related to drought to key stakeholders.

Development of a Drought Early Warning System:

- Assessment of **current drought status**
- Forecasting how a **drought will evolve over the coming months**
- Impacts from **climate change**

- **Dissemination warnings** to relevant stakeholder

Project outcomes

Data access

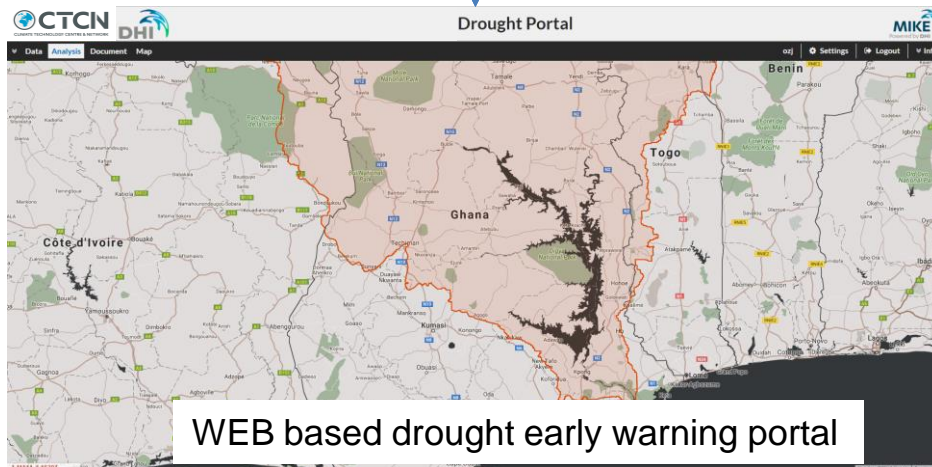
Historic and near real-time data
Forecast and climate change data

Drought assessment

Identify current and future drought impacted areas

Drought warning and dissemination

Warnings related to impact on crops, water availability etc.



Relevant organisations and stakeholders in Ghana
Receive information supporting dry season management in Ghana
Improve resiliency to drought and a changing climate

Key technical areas



Data access: near real time satellite and historical data

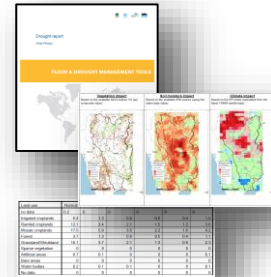
Climate forecast: Improved seasonal forecast information

Climate change: Access to the latest climate change results

Drought indices: Calculation of a range of drought indices

Drought impact: Tools for calculating impact on crop, water availability etc.

Drought reporting: Tools for dissemination and reporting to key stakeholders and end-users.



Project workplan and activities

Project activities



Activity 1 – Stakeholders consultation

Present the scope of the project to a wide range of stakeholders in Ghana and identify the needs for improved dry season management technologies.

Activity 2 – Technology implementation

Develop the early warning and forecasting system and validating the use of it on a selected location within northern Ghana.

Activity 3 – Technology transfer and dissemination

Ensuring the transfer of knowledge and technology to the local and regional stakeholders

Activity 1 – Stakeholders consultation

Activity 1.1 – National workshop to identify priorities for the CTCN assistance

- Present the scope of the CTCN project
- Identify the current gaps related to drought management
- Stakeholder feedback on project scope

Deliverables	Delivery date
<i>List of relevant stakeholders drafted</i>	<i>Week 2</i>
<i>National workshop (minutes from workshop) reports</i>	<i>Week 8</i>

Activity 1.2 – Needs assessment

- Map specific needs and requirements for the CTCN project

Deliverables	Delivery date
<i>Needs assessment report</i>	<i>Week 10</i>

Activity 1.3 – Technology description

- Detailed description of the proposed technology
- Development and validation plan

Deliverables	Delivery date
<i>Technology specification report</i>	<i>Week 14</i>

Activity 2 – Technology implementation

Activity 2.1 – Technology adjustment and development to local conditions

- Development of the required technologies
- Web-based early warning and forecasting system

Deliverables	Delivery date
<i>Methodology for validation and testing</i>	<i>Week 15</i>
<i>First version of the system for QA and testing by the main applicant</i>	<i>Week 35</i>

Activity 2.2 – Technology validation

- Validated on a selected location in northern Ghana
- Ensure validated outcomes
- Ensure outcomes can support the relevant stakeholders

Deliverables	Delivery date
<i>Review report from main applicant</i>	<i>Week 40</i>
<i>Technology validation report</i>	<i>Week 45</i>
<i>Technology description and user guide</i>	<i>Week 45</i>

Activity 3 – Technology transfer and dissemination

Activity 3.1 – Second national workshop

- Present the outcomes of the CTCN project
- Create awareness and knowledge of the outcomes

Deliverables	Delivery date
<i>Summary report of the second national workshop</i>	<i>Week 50</i>

Activity 3.2 – Technical training

- Provide detailed knowledge and capacity

Deliverables	Delivery date
<i>Technical training materials</i>	<i>Week 50</i>
<i>Summary report of the technical training</i>	<i>Week 50</i>

Activity 3.3 – Outreach and dissemination

- Regional dissemination
- Road map for upscaling and further development

Deliverables	Delivery date
<i>Lesson learned and recommendation report</i>	<i>Week 52</i>
<i>Roadmap documentation in transfer of technology and scale up</i>	<i>Week 52</i>

Expected targets of CTCN project

- The operational early drought warning system for Ghana is to be **used actively by the stakeholders for dry season management.**
- The outcomes **to be used for seasonal and long term planning** within the agriculture, water and energy sectors in Ghana.
- Project outcomes to **support funding for upscaling** of concept within Ghana and the region.

Questions?

Thank you

