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SUSTAINABLE FISHERIES MANAGEMENT PROJECT (SFMP)

NATIONAL COASTAL PLANNING WORKSHOP

June, 2016

THE UNIVERSITY OF RHODE ISLAND GRADUATE SCHOOL OF OCEANOGRAPHY | CRC COASTAL RESOURCES CENTER

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UNIVERSITY OF CAPE COAST

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Cover photo: Unmanned aerial vehicle being used to survey damage in community. Credit: Hen Mpoano.

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Acronyms

CCM	-	Centre for Coastal Management
CRC	-	Coastal Resource Center
DDF	-	District Development Fund
DFAS	-	Department of Fisheries and Aquatic Science
DMFS	-	Department of Marine Fisheries Sciences
EPA	-	Environmental Protection Agency
HSD	-	Hydrological Services Department
GIS	-	Geographic Information System
GNA	-	Ghana News Agency
GTV	-	Ghana Television
ICFG	-	Integrated Coastal and Fisheries Governance
JPDA	-	Joint Development Planning Authority
LoCAL	-	Local Climate Adaptive Living
MESA	-	Monitoring for Environment and Security in Africa
MESTI	-	Ministry of Environment Science and Technology
MMDA	-	Metropolitan, Municipal and District Assemblies
MTDP	-	Medium Term Development Plan
NADMO	-	National Disaster Management and Relief Organisation
NDPC	-	National Development Planning Commission
NGOs	-	Non-Governmental Organizations
PBCRGs	-	Performance Based Climate Resilience Grants
SDF	-	Spatial Development Framework
SFMP	-	Sustainable Fisheries Management Project
SPEA	-	Stakeholder Political Economy Analysis
UCC	-	University of Cape Coast
UG	-	University of Ghana
UAV	-	Unmanned Aerial Vehicle
UNCDF	-	United Nations Capital Development Fund
UNDP	-	United Nations Development Program
URI	-	University of Rhode Island
USAID	-	United States Agency for International Development
VRA	-	Volta River Authority
WACA	-	West Africa Coastal Areas Management Project

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Executive Summary

In April, 2016, extreme tidal events along the coast of Ghana reported as “Tidal Waves” did considerable damage to private and public infrastructure. The events underscored the vulnerability of many coastal and shorefront communities to coastal hazards. These will only become more severe and frequent due to the impacts of climate change and rising sea level. There have been calls for costly sea walls to protect private and public infrastructure, even though communities in areas where expensive shoreline protection projects have already been in place were also severely impacted. Emergency relocation of entire communities has also been proposed in some vulnerable areas.

The wave events and destruction that followed has highlighted the need for a forum to discuss the issues, learn lessons and put institutional arrangements in place to plan for and respond to coastal hazards. The workshop’s objectives included understanding the nature and extent of these events and exploring ways to help address such losses in the future and consider the range of options to protect, rehabilitate, relocate and redesign vulnerable settlements and infrastructure. A total of 34 participants from local and international institutions, as well as representatives of affected communities, attended the 2-day workshop held at the Pempamsie Hotel in Cape Coast.

The presentations and issues discussed covered a wide range of topics including the extent of damage to the impacted communities, damage assessment and monitoring coastal erosion and flooding using small unmanned aircrafts (drones), coastal planning, erosion control and mitigation options to reduce hazards and vulnerabilities, disaster preparedness and response and lessons from coastal engineering works in Ghana. Other issues discussed were special area planning processes, and coastal and marine spatial planning experiences. Also, a World Bank Consultant on the West African Coastal Areas Management Program (WACA) and a representative of the UN Capital Development Project discussed a new climate resilience building program – Local Climate Adaptive Living (LoCAL), which is being piloted in 3 districts in Ghana.

Challenges to effective coastal management were identified including: limited personnel capacity, inadequate logistics and budgetary constraints, data standardization and sharing problems and difficulty in integrating data from other institutions. Also identified was the need for strategic coordination between institutions relevant to coastal management and for strengthening the Statutory Planning Committees at the District to take responsibility for coastal management issues. A recommended imperative for the National Development Planning Commission (NDPC) with respect to the district assemblies was to emphasize coastal management issues and expand the spatial planning function to cater for coastal management. The NDPC was also urged to establish a vision on coastal management for Ghana.

Generally, participants cited the need for an interagency group to focus on integrated coastal management the issues confronting Ghana’s coastline, as no single line agency could handle coastal management under the current legal and institutional arrangements. The setting up of such a group should be accompanied by the authority and mandate of the Presidency.

Participants recognized that the most expensive investments of the country are within the coastal zone and most importantly, more than 30% of Ghanaians live on six percent of coastal lands where climate change stressors including flooding, sea level rise and coastal erosion frequently wreak havoc. Participants stressed the need to take action NOW, while details of such a coastal management program together with its institutional and legal framework should be among the priorities of government.

1.0 Background to the Workshop

Extreme tidal events along the coast of Ghana and reported as "Tidal Waves" during the last week of April, 2016 did considerable damage to private and public infrastructure. These events were likely to be storm surges or strong surf events coupled with high tides. The events underscored vulnerabilities of many coastal and shorefront communities to coastal hazards that will only become more severe and frequent due to the impacts of climate change and rising sea levels. There have been calls for costly sea walls to protect private and public infrastructure, even though communities in areas where expensive shoreline protection projects have been in place were also severely impacted. Emergency relocation of entire communities has also been proposed in some vulnerable areas.

1.1 Workshop Objectives

The objectives of the workshop were to:

- Determine what is presently understood about the nature and extent of the events.
- Share information on preliminary damage assessments.
- Demonstrate the utility of low cost drones to assist in conducting damage assessments and planning.
- Discuss likelihood of these events recurring in the future, considering climate change, erosion and coastal development patterns.
- Explore ways that coastal planning can help address such losses in the future and range of options to protect, rehabilitate, retreat, redesign or relocate vulnerable settlements and infrastructure.

1.2 Expected outcomes

Expected outcomes of the workshop included:

- Lessons learned from hazard situation and efforts to deal with them.
- Future arrangements to respond to community hazards and disasters mapped.
- Organizations involved in hazard response identified and roles clarified for early warning and response.
- Action plans developed for coastal disaster assessment and responses.

1.3 The Workshop

A two-day workshop on ***Coastal Community Vulnerabilities, Hazards and the need for Coastal Resilience, Hazard and Spatial Planning*** was held at Pempamsie Hotel, Cape-Coast on 14-15 June, 2016. The workshop organization was a collaboration between the Universities of Ghana, Cape Coast and USAID/Ghana Sustainable Fisheries Management Project (SFMP) and sponsored USAID Ghana. It brought together 34 stakeholders from impacted communities in the Western and Volta Regions, Universities of Ghana, Cape Coast, Rhode Island (USA), government departments and agencies, international consultants, UNCDF, civil society groups and the press (see Appendix 1) for participants list. The workshop agenda is presented in Appendix 2.

Figure 1: Workshop participants

2.0 Opening

2.1 Opening Remarks

Mr. Kofi Agbogah, Director of Hen Mpoano and National Activities Manager of the USAID/ Ghana Sustainable Fisheries Management Project (SFMP) who facilitated the workshop welcomed participants and expressed his desire for a fruitful two days. He referred to the recent tidal waves which hit various coastal communities along the coast of Ghana has necessitated the need for such a forum to discuss the issues and institutional arrangements in place to plan for and respond to such coastal hazards and occurrences as well as other coastal management issues. He acknowledged the support of USAID in the organization of the workshop. He recognized other coastal management programs currently running at the Universities of Ghana and Cape Coast and the reason the SFMP collaborated with them to organize the workshop.

Mr. Agbogah stressed the need to protect people living on the margins of the Ghanaian coastline from the imminent impacts climate stressors. He bemoaned important infrastructure developments along the coast that lacked climate smart assessments as well as the lack of holistic approach to managing and solving the problems of Ghana's coastline. He expressed the hope that the forum will help stakeholders come up with ideas that will help address coastal vulnerabilities and hazards that are predicted to occur with higher frequencies.

2.2 Other Remarks

Dr. Aheto, a Senior Lecturer at the University of Cape Coast gave a brief on the activities of the Department of Fisheries and Aquatic Sciences and the Centre for Coastal Management at the University of Cape Coast. He noted that the coastal zone of Ghana and the associated dynamics call for the need for a centre or institution that will provide continuous support through integrated studies of the issues. He said Centre of Coastal Management at the University of Cape Coast is a response to such a felt need. He thanked USAID for their support to help strengthen the establishment and activities of the Centre.

Dr. Aheto explained that the events reported in the media as 'tidal waves' was actually 'storm surges' driven by wind action. He said the coastal zone is vulnerable to such ocean related events and called for conscious and concerted efforts by stakeholders to address the imminent impacts of climate change. He stressed the need for solutions both from industry and the grassroots using both high and low-tech approaches augmented by the use of local knowledge. He further noted that climate change has the potential to adversely affect various sectors of the Ghanaian economy and extreme weather events are bound to continue with high frequency. He pointed to various sectors of the Ghanaian economy that are sensitive to climate change including, health, agriculture, forestry, environment, etc.), and that studies have shown African countries to be the most vulnerable, especially their fisheries and coastal livelihoods. Concluding, he said over a quarter of the Ghanaian population lives in the coastal zone lamented the lack of financial support limiting climate change mitigation measures in Ghana. He informed the workshop that the CCM was building capacity in coastal management as well as support extension activities in coastal communities. The CCM was also establishing an environmental and GIS data hub to develop fisheries databases (FishCom) to help service the needs of the scientific and allied communities.

Jose de la Maza, InfraPPP (World Bank Consultant on the West Africa Coastal Areas Management (WACA) Project

Jose de la Maza expressed his appreciation to the organizers for the opportunity to be part of the workshop and was working on the World Bank sponsored WACA initiative to assist coastal countries of Benin, Togo, Ghana and Cote D'Ivoire. He expressed the hope that the forum will give some valuable inputs into their work as consultants on the WACA Project.

Figure 2: Collapsing coastal structures in the Volta Region

2.3 Statements by Community Representatives Affected by Wave Events

Challenges, response, ideas and approaches to addressing community flooding need and improving resilience: Testimonials from Sanwoma, Axim and Fuveme Communities

Mr. Frank Kofigah, Fuveme - Volta Region

Fuveme community lies on a dune (sandbar) on a coastal strip near Keta. The community was battered by the recent storm surge. Other flashpoints communities included Keta and Horvi. The sandbar which protected vulnerable communities was artificially breached by the VRA to mitigate a bilharzia scare and this led to significant coastal erosion. Before breaching the sandbar, the sea was about 5km from the coastline. At the time of this report, it was less than 5m to land. During high tides, the sea could move several kilometres inland. The recent wave event washed away about 30 houses including the only school in the village. The movement of locals to higher grounds has pushed them into mangrove swamp areas. There was not much the National Disaster Management Organization (NADMO) could after the event. The promised sea defence structure was yet to be constructed. The imperative is to adopt a holistic approach to resolving the danger posed by high wave events as residents have nowhere else to go.

Michael Nokoe - Axim, Western Region

Axim is coastal town about 50 km west of Takoradi. A natural cove serves as a landing site with the fishermen. Over the years, the sea has significantly eroded parts of the cove. A defence wall constructed in the past has been lost to the sea and a bridge linking Emanfukumamu and Brawire was destroyed by the storm surge. Seawater moved inland through storm drains to flood homes. Two lives were lost as a result. It happened so quickly and fisherfolk could do nothing to save the situation.

Figure 3: Axim community and collapsing sea defense wall

Discussion

Mr. Owusu Donkor of Spatial Solutions pointed to the need for the involvement of the locals in any given area in the development of manmade structures while Mr. Ernest Kusi Menkah of HSD affirmed that engineering works are planned taking into consideration several factors including community inputs. There was consensus that community support and involvement is needed for the successful implementation of engineering interventions.

Figure 4 : Axim canoe beach and landing site

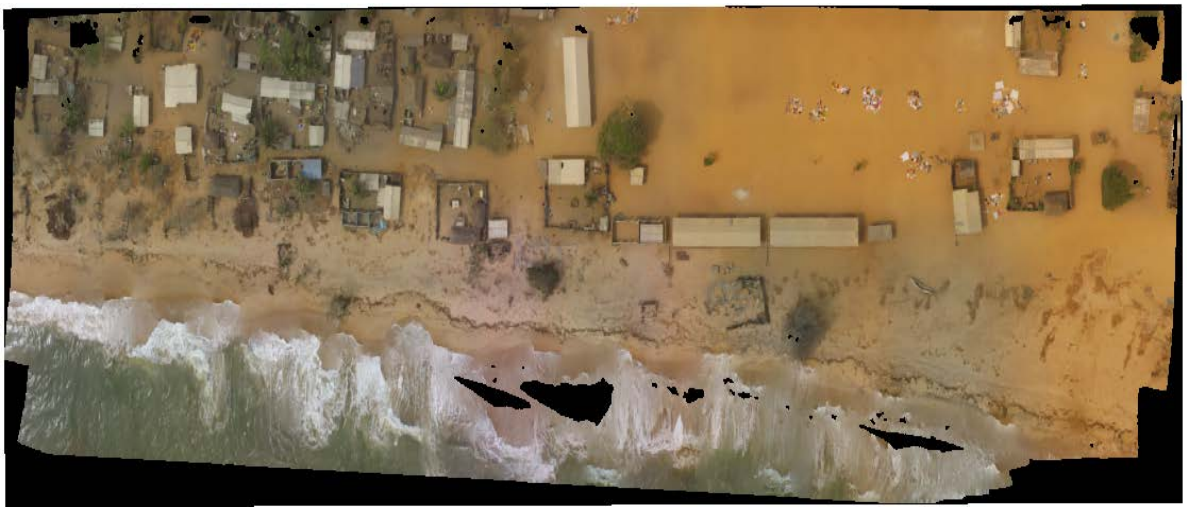

Figure 5 Land-ocean interphase at Fuveme. Waves eating away community structures

3.0 Presentations

3.1 Damage assessments using UAV technologies

Christopher Damon, Environmental Data Center, University of Rhode Island, USA

Mr. Damon explained why the USAID/Ghana SFMP was interested using Unmanned Aerial Vehicles (UAVs) or drones to support spatial planning along Ghana's coast. He noted that UAVs are useful for planning and very helpful tool that comes at less cost. Satellite imagery is often affected by clouds and good images are very costly and good only for large areas. Mr. Damon explained the technology behind UAV with details on how data is captured and processed as well as how technical capacity could be built. He explained that UAVs are a cost effective means of capturing data with high resolution imagery needed for planning and analysis. The output products are compatible with Ghanaian GIS systems.

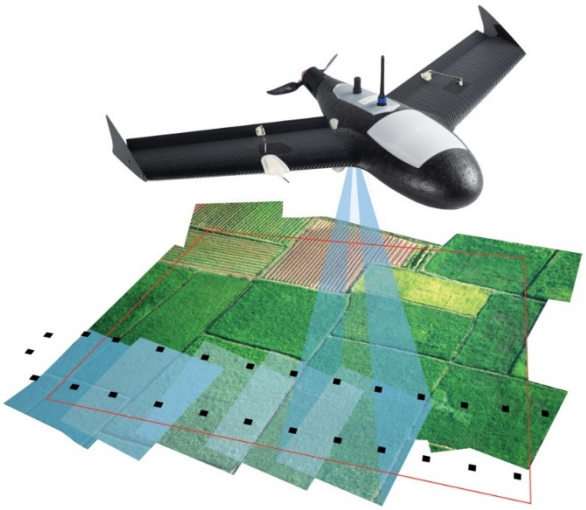

Figure 6: Fixed wing aircraft (drone) for aerial assessment of land resources

He demonstrated three case studies from Axim and Sanwoma (Western Region) and Iture (Central Region) where the drone has been used to map out the coastal areas. For Sanwoma, Dr. Damon detailed the rate of shoreline erosion and accretion over a time period as well as inundation/flooding. This can be quantified for solutions to be proposed. At Iture, drone imagery was used to demonstrate the mangrove system affected by human activity; it also proved very useful in predicting mangroves cover and depletion.

In Axim, drone imagery was employed to determine information on the layout of the community and as well as map out areas where shoreline protection was failing and how drainage from the town was impacting fish landing and processing areas.

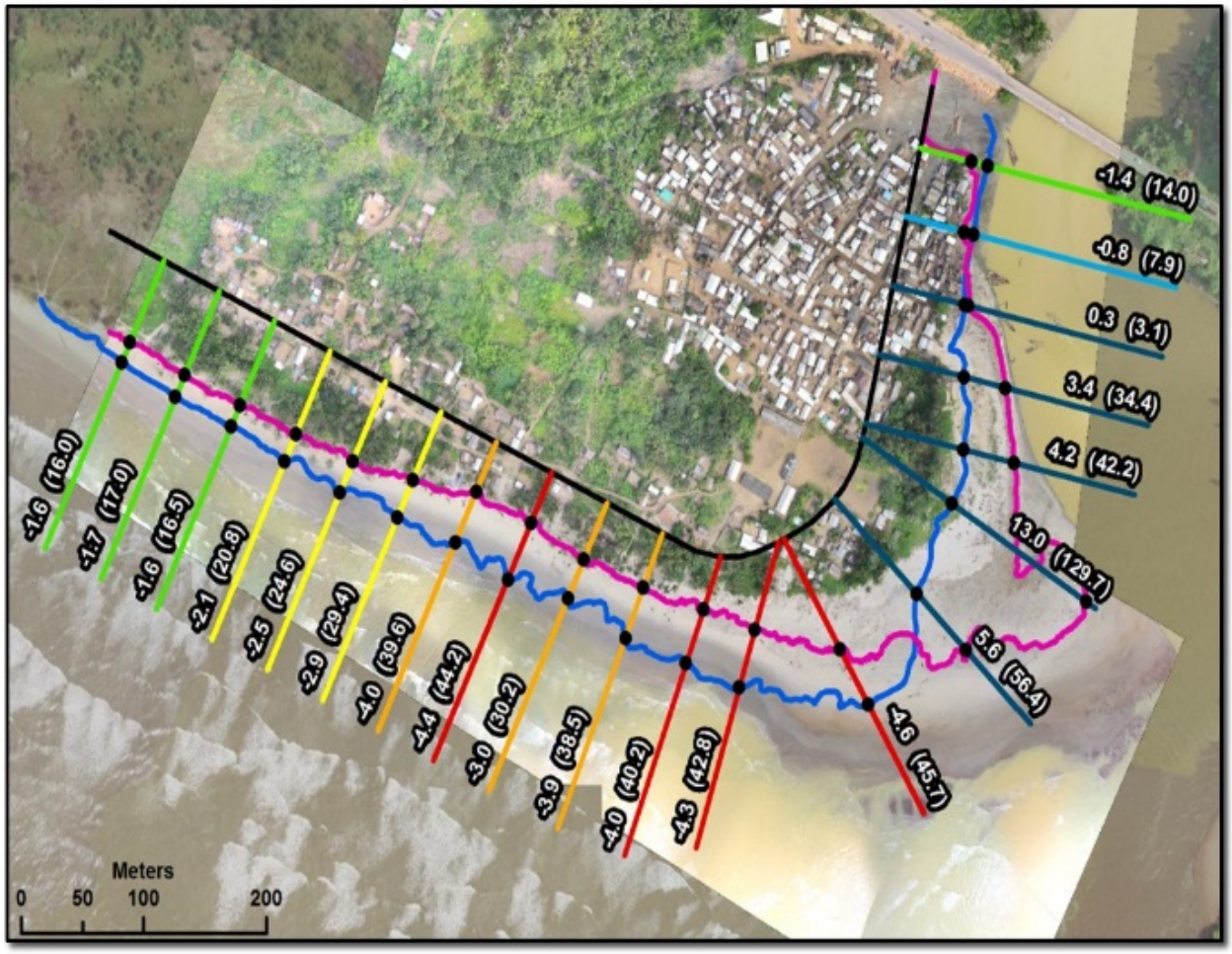

Figure 7: Estimation of shoreline erosion /accretion at Ankobra estuary

Discussions

Chris Damon answered questions related to the cost of implementing such technology explaining that agencies implementing drone technology need to agree on sampling protocols and pointed to the need for a central repository to aid data sharing. Capacity must also be built to help train people to work with such technology.

3.2 Overview of Erosion along the Eastern Coast of Ghana

Monitoring Coastal Erosion and Flooding along the Volta Delta Shoreline using Unmanned Aerial Vehicles (UAV)

Philip Neri Jayson-Quashigah, DMFS/UG

Mr. Jason-Quashigah of the Department of Marine and Fisheries Sciences, University of Ghana gave an overview of erosion along the eastern coast of Ghana, with rates of coastal erosion as high as 8m per year. He explained that drone technology was currently being used to monitor the shoreline in the area. A case study of Fuveme showed significant loss (about

50%) of land area over 3 years. Additionally, monitoring of sea defence structures was being carried out through bimonthly survey of groynes.

Discussion

There were clarifications on technical aspects of the data, especially a limiting factor or challenge in the determination of the "z" coordinate value of elevations using GPS. The need for the collation of historical data to be made available on a shared platform was discussed. It was agreed that government agencies and other related institutions collaborate to fashion out sound measures to mitigate any future events.

Figure 8: Sea defense structure to mitigate coastal erosion at Keta

Figure 9: Children wading through floods resulting from wave action at Fuveme

3.3 Coastal Planning, Erosion Control and Mitigation Options to Reduce Hazards and Vulnerabilities - Hard and Soft Options

Frederick Jonah, CCM/University of Cape Coast

Erosion as a natural phenomenon poses a threat to developments along the coastline. Studies on coastal erosion in Ghana show significant rates of erosion and exposure of coastal communities and assets to coastal hazards.

Coastal erosion affects human settlements and infrastructure, recreation and tourism, water resources, fisheries and aquaculture, agriculture and forestry, among others. The complex nature of the problem requires a comprehensive integrated approach including identification of causes and mitigating factors instead of the usual ad hoc approach.

Figure 10: Coastal infrastructure under threat in the Central Region

Figure 12: Sand winning on the beach in the Central Region

Figure 11: Commercial truck carting away sand from the beach

While we cannot control nature, there is the need to address human induced factors including: dam construction, integrated watershed management, erosion mitigation measures, poor siting of coastal infrastructure and sand mining. Sand mining is the most significant human-related cause of coastal erosion in Ghana. Although sand is the first line of defence against tidal waves and storm surges, it is heavily mined from along sandy sections of the Ghanaian coastline.

An estimated 285,376 cubic meters of sand are mined annually from six beaches by commercial sand miners between Elmina and Moree. Unfortunately, people continue to mine

for sand from reclaimed areas. Enforcing existing environmental laws, enacting and enforcing relevant bye laws at the district level would protect and forestall further degradation of the coastal environment and minimize beach erosion

Some generic approaches to coastal erosion management have their challenges. For example:

- Hard engineering measures sometimes fail due to overtopping of these structures by storm surges.
- Beach nourishment and other soft engineering measures such as construction setbacks help accommodate coastal processes, but only effective when coastal communities/ settlements are consciously planned
- The planting of dune vegetation also helps to protect vulnerable areas of the coastline due to stabilization.


Daily Graphic

Ghana's biggest selling newspaper since 1950

60 Million-dollar Sakumono Sea Defence Project completed

VACANCY

Figure 13: Newspaper Clip of government efforts to provide sea defense structures

Hard engineering solutions are useful but expensive. Local knowledge and the support of soft measures should be encouraged. Early warning systems and concerted efforts by all stakeholders will help address coastal erosion problems in Ghana.

Discussion

- Need for measures to addressed sand winning and policies on setbacks in infrastructure siting along the coast.
- Education of both consumers and sand winners on the harmful effects of sand mining.
- Institutional collaboration to ensure that data generated from coastal studies is well archived for public access and use.
- UCC was in the start-up phase of FishCom, a database, which will serve as a nationwide online repository of scientific data for use by students and staff of public universities and research agencies.
- Immediate curtailment of sand mining along the shoreline and vigilance of the coastal district assemblies and EPA to address this menace.
- Consider alternatives available in place of beach sand and the pros and cons of using such technologies.

3.4. Current approaches to disaster planning, preparedness and response

Gavivina Yao Tamakloe -National Disaster Management Organization (NADMO)

Mr. Tamakloe presented a brief on NADMO and its operations.

- NADMO undertakes social mobilization and poverty reduction

- Plan for and prevent disasters as well as also take care of the poor and vulnerable in affected communities.

The five basic steps NADMO employs are:

- Identifying and documenting and profile and map hazards from the community to a national level. Various hazard maps have been produce with the support donors (Norwegian and US governments, World Bank and UNDP.)
- Setting up of pilot emergency response centres help with response efforts.
- Reducing the impacts of natural disasters, e.g. dredging of the Odaw river in Accra.
- Helping to develop resilience of vulnerable communities and managing environmental risks.
- Preparation of emergency and mitigation plans and apportioning roles to the agencies needed to implement such measures. Simulation exercises are also carried out to help agencies work together using pooled resources to help reduce impacts and prevent a duplication of effort.

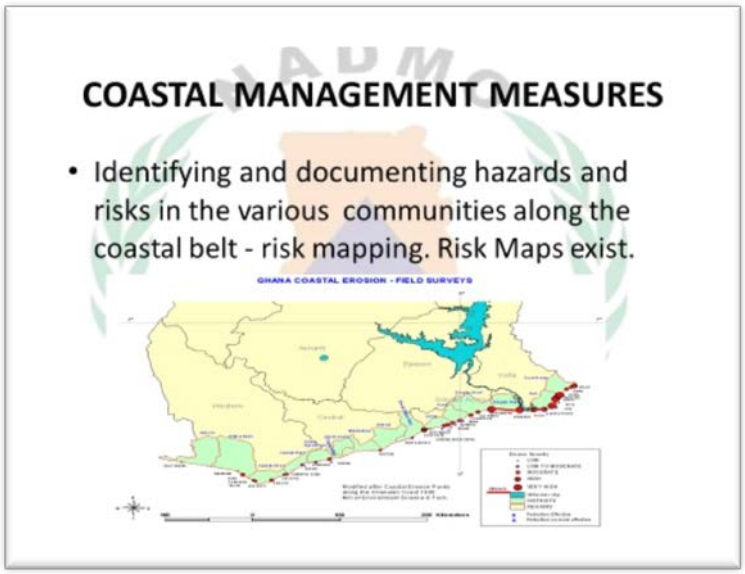

Figure 14: Coastal hazard map by NADMO

Challenges

- Hydrometeorological technical committee has focused on flash flooding to the detriment of other ecological processes.
- Need for a holistic approach to the management of issues impacting the coastal environment using the five steps NADMO employs.
- Stakeholder collaboration to identify, assess and plan for vulnerable areas and develop emergency responses and mitigation measures.

Discussion

- Political interference and influences affect how NADMO works.
- NADMO should be seen as coordinating agency to lead and coordinate relevant stakeholders during disaster events.
- Sharing of data by other agency with NADMO is not structured hence relevant institutions and data they hold is not available to NADMO for planning and response.
- Need for NADMO to work with community based organizations/NGOs.

3.5 Lessons from Coastal Engineering Works in Ghana

Ernest Kusi Menkah - Hydrological Services Department (HSD)

HSD is mandated to:

- Design and establish river gauges, collect information and disseminate same to the general public.
- Provide technical support services in hydrology.
- Provide technical information on the planning and construction of coastal works, fish landing sites and harbours, drainage and sewer systems.

Take Home Messages

- The coastline of Ghana is divided into three major sections, namely the Western, Central and Eastern Coastal areas for hydrological reasons.
- Interventions are needed to help maintain the ecological balance of the system which must be fed by sound scientific knowledge to help mitigate any adverse environmental processes.
- Wave action and human factors such as land ownership have led to the current situation.
- Soft engineering processes to mitigate coastal erosion last for a while but is ultimately taken by the sea.
- A mixture of hard and soft engineering methods is very good in helping reclaim land from the sea.
- A typical success story is the Keta Sea defence complex, a result of well implemented design.
- It is important for some interventions do be carried out in vulnerable coastal communities instead of waiting for those areas to be at serious threat before any interventions are undertaken

3.6 West Africa Coastal Areas Management (WACA) Project

Jose de la Maza - InfraPPP (World Bank Consultant)

Mr. de la Maza presented aspects of the West African Coastal Areas Erosion and Adaptation Program under the World Bank. He stressed the importance of the coastlines to coastal economies.

Take Home Messages

- The WACA project aims to strengthen capacity building in coastal management for four selected West African countries - Benin, Togo, Ghana and Cote D'Ivoire.
- Need for integrated systems to collect and share data regionally on coastal areas and marine conditions, land use, climate patterns and natural hazards.
- Under the WACA, political economy analysis of the participating countries were being conducted to strengthen development work at the country level

- Stakeholder mapping for Stakeholder Political Economy Analysis (SPEA). Aggregate SPEA information from various countries will be widely disseminated in the four countries.

Day 2

Four presentations were made followed by 2 group discussions of pre-set workshop questions.

3.7 Local Climate Adaptive Living (LoCAL) Facility

Mrs. Angela Yayra Amoah, LoCAL/UNCDF

Mrs. Amoah of the United Nations Capital Development Fund (UNCDF) presented some details of a pilot project on climate change adaptation and resilience at the local government level called Local Climate Adaptive Living (LoCAL) Facility. The project was being piloted in 2 coastal districts (Ada East and Efutu Municipality) and 1 forest district (Fanteakwa District).

Details of the Funds

- The LoCAL project is designed to solve problems of access to climate financing for Local Governments (LGs) or district assemblies.
- The funding directly to LGs provides incentives to mainstream climate-adaptive thinking into everyday planning and investment.
- UNCDF funding is an agreement with the Government of Ghana LoCAL is linked to the District Development Fund (DDF) which is financed by Development Partners LoCAL is using the mechanism established for District Development Funds in 2009.
- The goal is to improve the resilience of Metropolitan, Municipal and District Assemblies (MMDAs) to climate change as a result of increased access to climate change adaptation financing through Performance Based Climate Resilience Grants (PBCRGs).
- Capacity-building activities for the MMDAs are undertaken at various stages according to identified needs.
- It is targeted at the policy, institutional and individual levels with the assistance of expert institutions and hired consultants to provide the needed support in terms of vulnerability and adaptation assessments, adaptation planning and mainstreaming.

Figure 15: Extent of daily double flooding at the Ankobra estuary

Discussion

DDF started in 2009 and it has undergone auditing and assessment since its inception. It is expected that, an audit of the DDF using the FOAT tool will be done in 2016. The first year assessment of LoCAL will serve as a baseline for tracking.

It was suggested that the Centre of Coastal Management has a training program on coastal adaptation which is run every year and which LoCAL practitioners can take advantage of. The program gives a practical adaptation approach based on needs assessment.

It was suggested that LoCAL could link with the Centre to discuss who can benefit from such training programs and reports on such training programs should be circulated among regional and national level heads of stakeholder institutions. Also NADMO should be made aware of such activities as LoCAL in the districts so NADMO can follow up on it relative to disaster management.

3.8 Spatial planning policies and processes in Ghana

Need for coastal zone specific spatial plans and tools for assessing coastal vulnerability, risks, hazards and options to protect vulnerable areas

Peter Owusu Donkor - Spatial Solutions

The presentation focused on coastal management and planning activities at Axim and Sanwoma. The hazard associated with Axim was coastal erosion with major economic activities and resources located in high risk areas. There are no options to move inhabitants from these risk areas and also no available space for relocation of land uses. The presenter recognized the need to look beyond fish replenishment measures for fisherfolk and consider

other environmental and sanitation issues along the beach front. He looked at coastal hazards in Sanwoma where flooding was the major issue with 12% of the community within the 200m of the shorefront experiencing flooding every day. Almost the whole town of Sanwoma is within high risk area.

Interventions

- Identification of coastal hotspots was made in the National Spatial Development Framework (NSDF). These are mainly the areas where the river meets the sea. E.g. Keta (Volta Estuary), Sanwoma (Ankobra), Shama (Pra), Ada (Volta River), etc. The interventions to handle issues at these hotspots are scattered in different policies. The realization was that there was no central agency to address the issues stipulated in the NSDF.
- The Medium Term Development Plan (policy) offers a broad policy on climate change and environmental sustainability which are generic and broad with no coastal implications. However, all districts are not the same as they have different dynamics and geographies.
- NADMO is stuck on aftermath reactions whiles the EPA offers a broad approach to coastal management. No specific agency is assigned to carry out coastal management.

Figure 16: Environmental conditions at the Axim fish landing site

Way Forward

- Need for additional guidelines on coastal districts in the Ghana Shared Growth and Development Agenda (GSGDA) and the Medium Term Development Plans (MTDP).
- TCPD manual on preparation of SDF should include coastal planning.
- Government should set up a national department solely responsible for management of the coast.

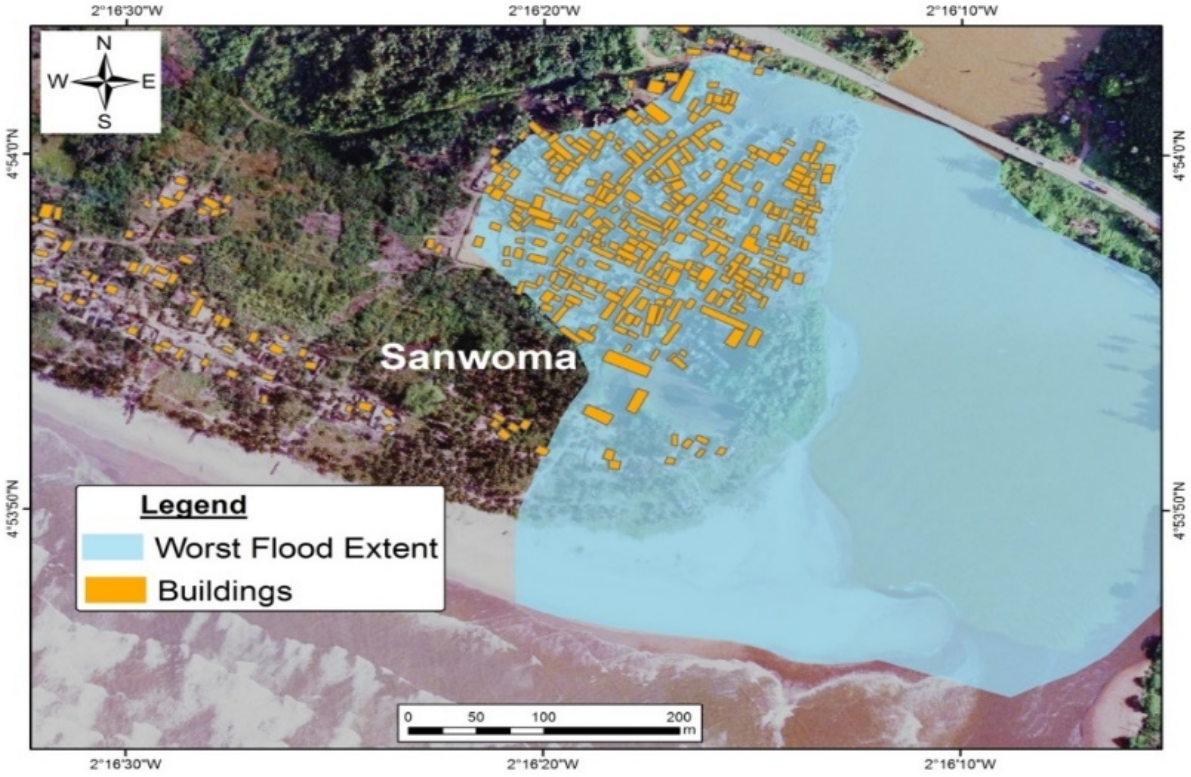

Figure 17: Flood simulation at the Ankobra estuary

Discussions

- The NADMO representative informed the workshop that as an institution NADMO is not only for response and should be involved in planning.
- The need for the national working group to be set up was reiterated.
- The EPA representative suggested the need to build the capacity at the MMDA level to be able to take up these coastal issues.
- There is high attrition of human capacity built on coastal issues at district level and wherever such personnel are posted, they should continue to be relevant and their expertise tapped for coastal management.
- Has there been a study on the overall impact of interventions (engineering structures) on unintended coastal erosion? The HSD answer pointed out that engineering processes try to mitigate the impacts of such structures along the coast.

Figure 18: Coastal management toolkits developed for the six coastal districts in the Western Region

3.9 Coastal and Marine Planning Experiences - Lessons from the Western Region

Stephen Kankam - Hen Mpoano

The presentation discussed how the discovery of oil offshore Western Region and related activities (Atuabo, gas plant and pipeline, and other investments) have changed the landscape of coastal Western Region. These developments could lead to multiple coastal hazard situations as most are constructed close to the shore or offshore. Also there could be loss of ecosystem goods and services in the face of weak capacity for coastal planning. Within coastal Western Region, there were successes (under the ICFG project) at integrating spatial and coastal issues into the MTDP. Capacity for coastal planners were built and toolkits developed as part of the project.

Lessons from the ICFG Project

- Mainstreaming coastal climate adaptation and management issues in the MTDP and Spatial plans can address some of the critical coastal issues.
- Coastal development and management require regional and national level mechanisms to address:
    - Coastal erosion
    - Large oil and gas facility siting.
    - Conservation of shared natural resources.
    - Conflict among user groups.
- Data for decision making should be well institutionalized.

Way forward

- Need a government, traditional authorities, CSO's and private sector representation on a central agency working on coastal management.
- For coastal management and planning to be effective in Ghana it requires high level mandate and authority. A presidential mandate is required for the establishment of a joint development planning area action according to the Act 462 and 480 with authority and funding to implement the plan.

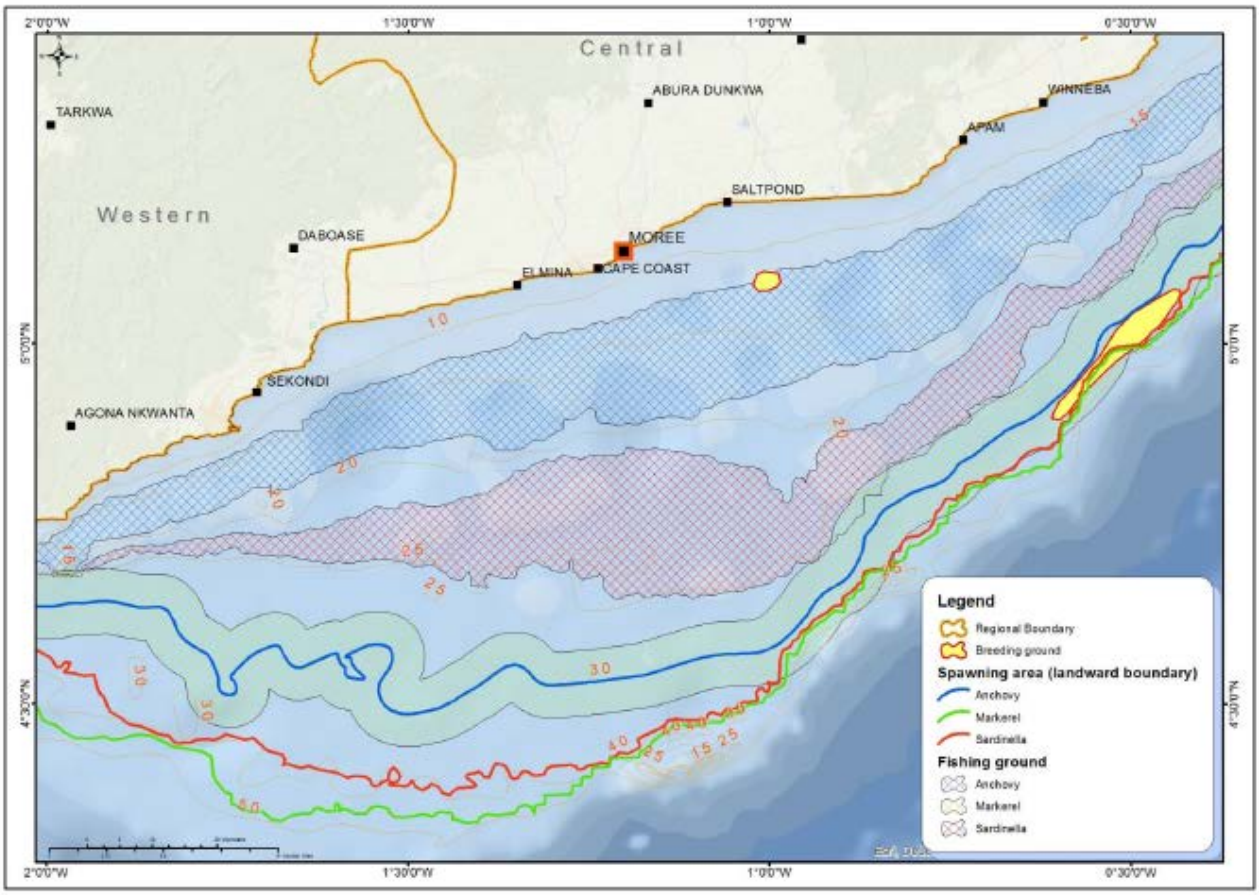

Figure 19: Map showing spawning areas for small pelagic fish

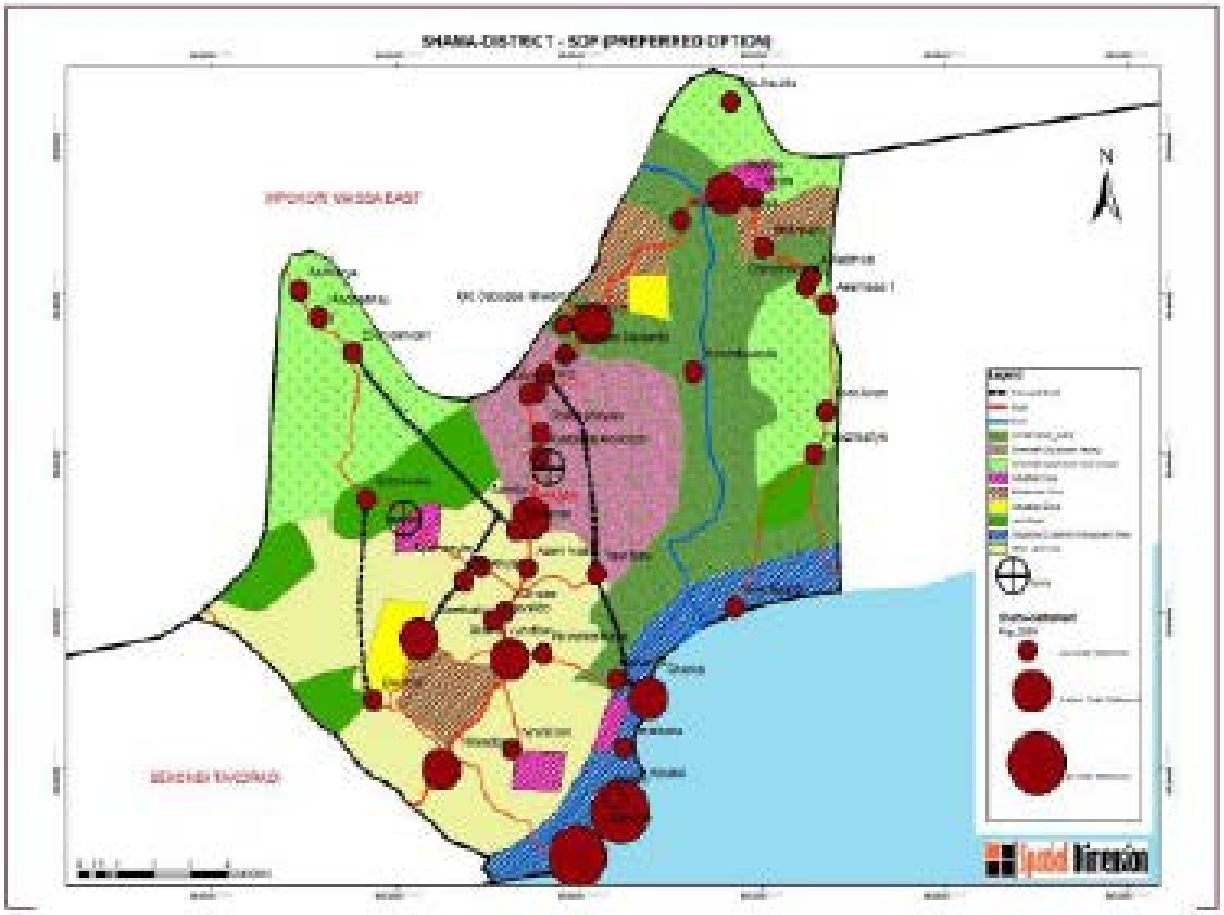

Figure 20: Preferred development options for the Shama District developed through a district wide participatory mechanism

Discussions

- Why a Joint Area Development Authority?

The JDP is a legal construct in Ghanaian law which could be a successful way in dealing with coastal issues that are transcend the jurisdiction of one district or address the issues of large facility. There was a missed opportunity for testing a functional JPDA by 2014. The JDPA is enshrined in law and the processes and ingredients for its operationalization were established for coastal Western Region and only needed the appropriate signatures before presentation to the NDPC and the Office of the President for its institutionalization. There is a need to experiment with the joint planning approach before looking at the bigger corridor (Western Corridor[1]) approach as lessons would have been learnt to inform how the corridor would

[1] The Western Corridor Development Concept is plan to orchestrate development and investments in infrastructure in a area that includes portions of both the Western and Central Regions

function in order not to repeat the difficulties SADA faced. Unfortunately, this is not a priority for the new Coastal Foundation Project, funded by DFiD.

- Participants called for a roadmap where all the institutions assembled at the workshop will look at mainstreaming the ideas suggested into national and district level activities.
- Since harbor construction have been noted to trigger coastal erosion on the eastern shores of such harbor facilities, participants demanded to understand the shoreline erosion impacts of the Atuabo harbor when it is eventually constructed.
- It was explained that the Lonrho is the proponent of the Atuabo Oil Services Terminal (Atuabo Port). They have prepared the engineering designs and conducted an EIA for the project. What is important is for relevant national institutions to work with and monitor closely the shoreline erosion impacts of the harbor and ensure mitigation measures are strictly enforced. Monitoring mechanisms in place along the eastern coastal stretches from Atuabo to the Ankobra estuary to gather baseline and operational impacts.
- What have been the lessons, impacts or consequences of the ICFG Project on the Shama District coastal zone or shoreline? The bye law on shoreline was supposed to be passed, local plans were prepared where 80m of buffer was left. But there are issues with the integration of actions from the SDF into the MTDP.

3.10 Group Work

At the end of the presentations, participants were divided into two groups to discuss some pre-set questions on the agenda – community and national issues.

For the community issues, the following guiding questions were discussed.

- What do the hazard situations in the two areas have in common?
- What is unique about each of them?
- What can be learned about past efforts to deal with hazards in each location?
- How has population growth and shore development made finding solutions more difficult?
- What situation would each community like to be in. one month, one year, three years from now? Are there locations that participants know of that seem to be better able to cope, seem more resilient in the face of similar problems?
- What information is needed; what process should be followed; what options should be evaluated, what decisions should be taken, what resources are required to increase resilience and reduce exposure to hazards?
- What role can each participant in this meeting play? What is the first step each can take?

***Community Group Report* (*Fuveme, Axim, Sanwoma*)**

What do the hazard situations have in common in the two areas?

- Coastal erosion, Biodiversity loss, Storm surges, Loss of property, Coastal flooding. Increasing intensity. Sea weeds proliferation.

What is unique about them?

- Axim: primarily sea flooding and collapsing sea walls.
- Sanwoma is mainly affected by riverine flooding.
- Keta still has most lagoons intact.
- Keta has a new sea defence wall.

What can be learned about past efforts to deal with the hazards?

- Failing sea walls at Axim and initial attempt at Keta.
- Lack of community involvement in the planning and construction of sea defence walls.

Population

- Declining population at Keta.
- Building fishing facilities close to shore at Axim and Sanwoma due to space limitations.

Development

- Currently no new developments along the coast in these communities.
- The shore is moving closer to the existing development, so the buffer keeps changing.

Expectations

- Keta will want sea defence, coastal road and plan development (where development is further in land), Erosion control is urgent.
- Re-afforestation.
- Axim dredging of the river and lagoon system.

Coping Strategies

- None.

Reducing exposure

- Discourage sand winning. Encourage tree planting. Enforcement of existing plans and by-laws.
- Architecture that will withstand flooding and erosion (rust free materials).
- Use of surface models for developing plans.
- Equipment of planners, early warning systems.

Roles

- Education of the people (children-school curricular, local people) - sensitization, creation of awareness.
- Planning ahead of disaster.
- Building the capacity of the planners to be effective.
- Providing green spaces.
- Development of early warning systems.

Initial steps

- Call a community meeting and brief them.
- Participatory mapping.

The way forward

- Need for information sharing.
- Interagency interaction and coordination.

National Group

- What role do national agencies play in mitigating coastal hazards and coastal planning to reduce potential for loss of human life and private property and public infrastructure and response to coastal disasters?
- What are the challenges to interagency coordination?
- In what ways can agencies coordinate better?
- Is there a need for a coastal program in Ghana? How would that work and what would the emphasis be? An interagency commission led by whom? Or a lead line agency in charge?

Town and Country Planning Department

Guidelines and procedures for planning along the coast to ensure there is harmony in the determination of land use

Challenges

- Data Standardization: difficulty in integrating data from other institutions.
- Turf protection: sharing data a problem (authorization).
- Inadequate staff.
- Inadequate logistics.

Environmental Protection Agency

Monitor and regulate issues relating to coastal environment (Aquaculture, wetlands, etc.). Also control toxic substances

Challenges

- Limited personnel capacity.
- Inadequate logistics.
- Budgetary constraints.

Way forward

- Strengthening the Statutory Planning Committees at the District to take responsibility for coastal management issues.
- NDPC – should lay emphasis/highlight coastal management issues and expand the spatial planning function.
- Establish a vision on coastal management.

Hydrological Services Department

Design and implement the construction of coastal protection infrastructure.

Challenges

- Limited personnel capacity.
- Inadequate logistics.
- Budgetary constraints.

Way forward

- Strategic coordination.

Universities

Human resource capacity building, research and development and community outreach programs. Also a repository of human capital and information.

NADMO

Manage disaster events through development of plans by mapping hazards. Also carry out simulation exercises to ensure there is preparedness. Regularly review plans to reflect changing dynamics.

Challenges

- Information sharing is a problem (critical cause information is necessary in real time to develop early warning systems).
- Data sharing and integration is problem because of different systems (systems depending on donors) also authorization.
- Competition for control over resources.

MESTI

Coordinating the efforts of institutions under the supervision of the Ministry.

4.0 Summary of Challenges and Way forward

4.1 Challenges

The following general challenges were identified

- Limited personnel capacity.
- Inadequate logistics.
- Budgetary constraints.
- Data Standardization: difficulty in integrating data from other institutions.
- Turf protection: sharing data a problem (authorization).

4.2 Way forward

- Strategic coordination between institutions relevant to coastal management.
- Strengthening the Statutory Planning Committees at the District to take responsibility for coastal management issues.
- NDPC – should lay emphasis/highlight coastal management issues and expand the spatial planning function to cater for coastal management.
- Establish a vision on coastal management.

5.0 Conclusion

Generally, participants hinted strongly at the need for an interagency group to focus on integrated coastal management as the issues confronting Ghana's coast are enormous and complicated than on single line agency could handle under the current legal and institutional arrangements. The setting up of such working should have the authority and mandate from the highest office of the land (the Presidency) and if possible housed under the office of the Vice President of the Republic of Ghana.

Participants were unequivocal in their submissions recognizing that, the most expensive investments of the country are within the coastal zone and most importantly, more than 30% of Ghanaians live on six percent of coastal lands where climate change stressors including flooding, sea level rise and coastal erosion wreak havoc with high frequency. It was noted that the time to take action is now however while details of such a program together with institutional and legal framework should be among the priorities of government.

Participants agreed that a communique from the workshop should be drafted as soon as possible and widely circulated to all relevant institutions

Appendix 1

Participants List

No	Name	Institution
1	Adams Osman	Dept. of Geography, University of Cape Coast
2	Emmanuel Mensah	Dept. of Geography, University of Cape Coast
3	Ben Asomani	Min. of Envir, Science. Technology & Innovation
4	Ebenezer Okine	Hydrological Services Department
5	Ernest Kusi-Minkah	Hydrological Services Department
6	Gustav Devjot-Dkokotoe	Hydrological Services Department
7	Eugene Nyansafo	Town and Country Planning Department
8	Raphael Fiave	Town &Country Planning Department – Axim
9	Isaac Morkeh Codjoe	Sanwoma Community representative
10	Frank Kofigah	Fuveme Community, Volta Region
11	Michael Nokoe	Axim Landing Beach
12	Gavivina Tamakloe	National Disaster Management Organisation (NADMO)
13	Frederick Jonah	Dept. of Fisheries and Aquatic Sciences/CCM, UCC
14	Jemimah Etornam Kassah	Dept. of Fisheries and Aquatic Sciences/CCM, UCC
15	Michelle Clottey	Dept. of Fisheries and Aquatic Sciences/CCM, UCC
16	Denis Aheto	Dept. of Fisheries and Aquatic Sciences/CCM, UCC
17	Rebecca Essamuah	Dept. of Fisheries and Aquatic Sciences/CCM, UCC
18	Richard Adade	Dept. of Fisheries and Aquatic Sciences/CCM, UCC
19	Success Sowah	Dept. of Fisheries and Aquatic Sciences/CCM, UCC
20	Glenn Ricci	University of Rhode Island, USA
21	Christopher Damon	University of Rhode Island, USA
22	Philip Neri Jayson-Quashigah	University of Ghana
23	Trinity Mensah-Senoo	University of Ghana
24	Peter Owusu Donkor	Spatial Solutions
25	Joseph Ansong	Hen Mpoano
26	Stephen Kankam	Hen Mpoano
27	Peter Ackon	Environmental Protection Agency
28	Angela Yayra Amoah	UNCDF
29	Jose de la Maza	INFRAPPP, Spain

No	Name	Institution
30	Atsu Bo Bensah	Radio Ghana
31	Philip Mensah	TV3
32	Justina Paaga	GNA
33	Nana Baudu Kingsley	GTV
34	Kofi Sakyiama	GTV

Appendix 2

Agenda

Workshop on Coastal Community Vulnerabilities, Hazards and the Need for Coastal Resilience, Hazard and Spatial Planning *Special focus on the recent "Tidal Wave" events along the coast from Keta to Axim and World Bank West Africa Coastal Areas Management Project* **Venue**: Pempamsie Hotel Cape Coast **Dates**: June 14-15	
	Day 1
	Facilitator – Kofi Agbogah, Hen Mpoano
9:30 AM	**Opening of the Workshop** Opening Remarks Chief of Party - SFMP Project Manager - UCC/CCM Consultant - World Bank National Focal Person - MESTI
9:40 AM	**Introductions** Overview of Meeting Objectives and Agenda
10:00 AM	**Testimonials by community representatives from Sanwoma, Axim and Keta** *What happened, challenges of immediate response, past ideas for addressing the community's flooding needs,* *Discussion of the what a successful approach to improving their community resilience would entail*
10:45 AM	**BREAK**
11:00 AM	**Damage assessments using UAV technologies** *Keta* - Philip Neri Jayson-Quashigah, DMFS/UG *Sanwoma & Axim* - Chris Damon, Univ. of Rhode Island
12:30 PM	**LUNCH**
1:30 PM	**Climate Change and Coasts** *What the science says about sea level rise and implications on severity and frequency of ongoing coastal processes and storm events generating erosion and increased vulnerability of critical infrastructure and settlements in Ghana* Dr. G. Wiafe - University of Ghana
2:30 PM	**Coastal Planning and mitigation options** to reduce hazard vulnerabilities, hard and soft options of erosion control and to mitigate storm damage Frederick Jonah - UCC/CCM
3:15 PM	**Current approaches to disaster planning** *Preparedness and response after an event, how coastal management could contribute to avoiding future incidents and disasters*

Workshop on Coastal Community Vulnerabilities, Hazards and the Need for Coastal Resilience, Hazard and Spatial Planning *Special focus on the recent "Tidal Wave" events along the coast from Keta to Axim and World Bank West Africa Coastal Areas Management Project* **Venue**: Pempamsie Hotel Cape Coast **Dates**: June 14-15	
	Gavivina Yaw Tamakloe - NADMO
3:45 PM	**Policies and strategies for shoreline engineering works in Ghana** Fredua Agyeman - MESTI
4:30 PM	**Lessons from Coastal Engineering** Ernest Kusi Menkah - HSD
5.00 PM	Adjourn
	Day 2
8:30 AM	**Spatial planning policies and processes in Ghana** The need for coastal zone specific spatial plans and tools for assessing coastal vulnerability and risk from hazards and options to protect vulnerable areas for rehabilitation, retreat, redesign or relocation of settlements and infrastructure Peter Owusu Donkor - SpS/TCPD
	Examples of coastal and marine spatial planning in the Western Region Stephen Kankam - Hen Mpoano
10.00 AM	**West Africa Coastal Areas Management Project** Jose de la Maza, InfraPPP (World Bank Consultant) **Local Climate Adaptive Living (LoCAL) Facility** Angela Yayra Amoah - UNCDF
11:30 PM	**Discussion in three break out groups** a. Keta/Ada Volta delta area b. Axim/Sanwoma area c. National policy and actions for coastal planning
12:30 PM	LUNCH
1:30 PM	**Plenary reports and discussion**
3:00 PM	Adjourn and depart