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Ahanta West

Integrated Coastal and Fisheries Governance Initiative

Integrated Coastal Management Toolkit

Hɛn Mpoano

THE UNIVERSITY OF RHODE ISLAND GRADUATE SCHOOL OF OCEANOGRAPHY
COASTAL RESOURCES CENTER
Friends of the Nation
sustainaMetrix
WorldFish

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Cover photo: Aerial image of Akwidaa, Ahanta West District
Photo credit: Alexander Poncet

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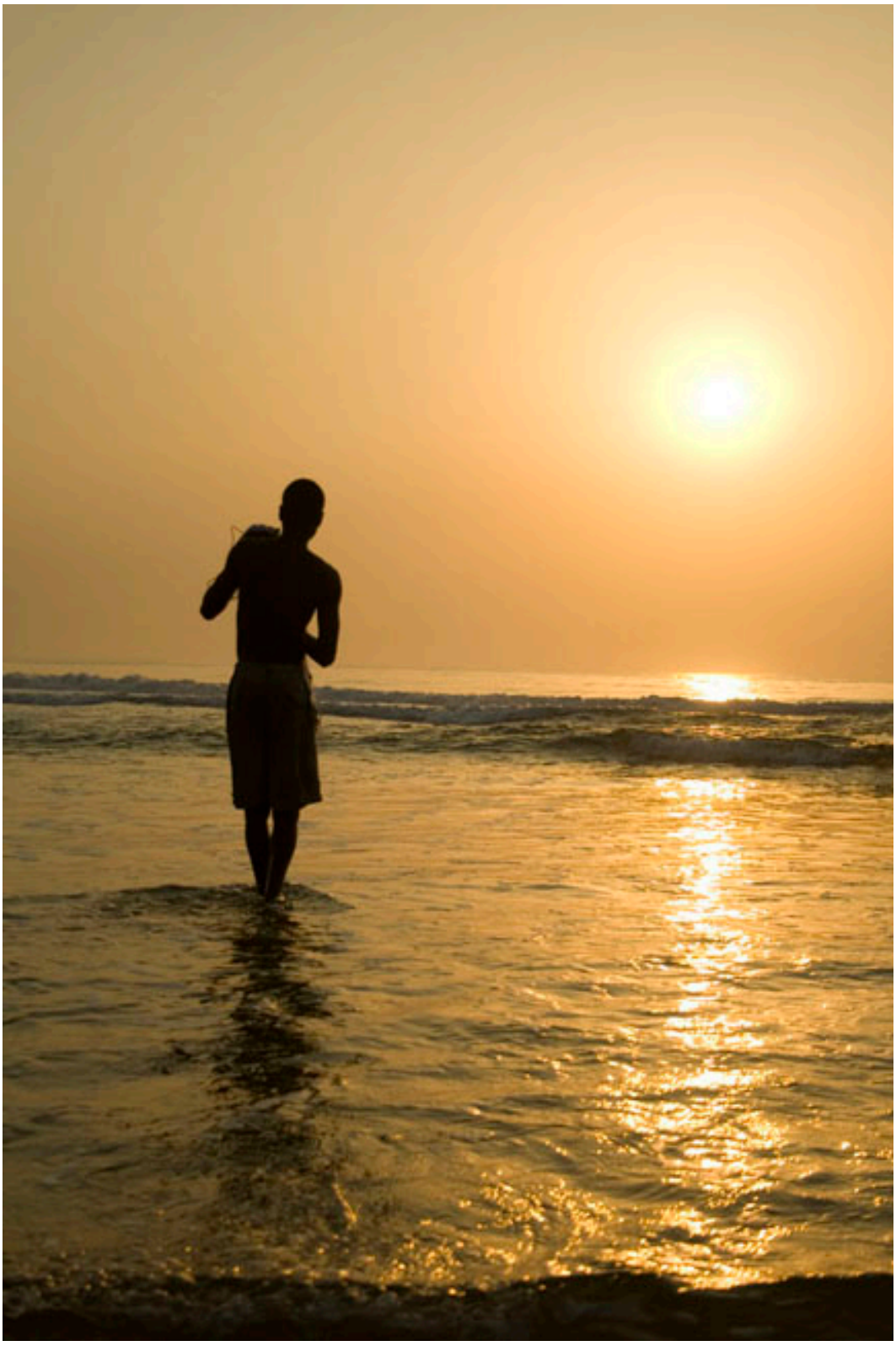
Finally, we would like to acknowledge the fruitful collaboration developed with key officials and institutions, without which this toolkit will not have been possible. At the regional level the partnership developed with the Members, Chief Executives, Directors and Officers of the District Assemblies, Regional Coordinating Council and private companies is appreciated. At the national level, our collaboration with the National Development Planning Commission, Fisheries Commission, Town and Country Planning Department, Ministry of Environment, Science, Technology and Innovation is acknowledged. It is our hope that this toolkit and the legacy of the Hen Mpoano Initiative will inspire further work in coastal and marine management in Ghana.



Statement from Honourable Joseph Dofoyenah, District Chief Executive of the Ahanta West District Assembly

I have to give the sincerest thanks to the Coastal Resources Centre for the huge amount of effort that has gone into the making of this toolkit for our District.

Since their beginning in 2009, CRC Ghana and their partners, whose initiative has become known as "Hen Mpoano", have transformed the way in which we, and others, have come to regard our coast and our coastal communities. Now, apart from changing views of what the coast is all about, and giving voice to those living and working there, CRC has helped us to make some serious inroads into the policies and structures of government regarding the coast.

This Toolkit has put together their findings and evidence gathered from 2009-2013, summarises the tools that have been developed during that time for all of us to tackle the problems and grasp the opportunities that exist. It tells us how to counter and avoid all the potentially destructive and harmful challenges which are being faced, and shows how the coast may become a place of pride, or harmony, of abundance based on the rich resources that have been enjoyed by its peoples for centuries past, while welcoming the incredible technologies of the 21st century which are now well among us.

I strongly recommend this toolkit to all who are living, working and those who are investing in our coast.

DISTRICT CHIEF EXECUTIVE,
AHANTA WEST DISTRICT

Definitions

Adaptive Capacity: capacity of a community to adapt itself to the threats and hazards such as climate change, coastal erosion, loss of livelihoods and inappropriate development.

Artisanal Fishing fleet: traditional canoe-based fishing vessels.

Barrier spit or beach: sandy beaches built up by ocean wave energy and backed by wetlands or river outflows. These systems are in constant movement in response to the energy of the surrounding system.

Built Areas Highly Exposed to Flood Damage: are settlements, businesses, residences and public buildings which are routinely submerged by flood waters, erosion or damage from high velocity stream and drainage flow.

Carbon Sequestration: the absorption of carbon dioxide (a "greenhouse gas" which is responsible for global warming) by vegetation.

Catchment Area The area receiving the waters feeding a part or the totality of a watercourse or watershed.

Climate Change: the changes in climate which are being experienced, including extremes of weather (storms, flood and drought), causing sea levels also to rise.

Community Resourced Management Areas (CREMA): creates a win-win situation by creating a financial incentive for farmers to use and manage natural resources on sustainable basis by devolving management rights and responsibilities to them.

Development: is any man-made alteration to the landscape including grading, filling, dredging, extraction, storage, subdivision of land, or construction of structures, stormwater collection, drainage and discharge works, flood protection works.

Ecosystem: a complex set of relationships among the living resources, habitats and residents of an area. It includes plants, trees, animals, birds, fish, micro-organisms, water, soil and people. Everything that lives in an ecosystem is dependent on the other species and elements that are part of that ecological community.

Eco Tourism: is a a form of tourism involving visiting fragile, pristine, and relatively undisturbed natural areas, intended as a low-impact and often small scale alternative to standard commercial (mass) tourism. Its purpose may be to educate the traveler, to provide funds for ecological conservation, to directly benefit the economic development and political empowerment of local communities, or to foster respect for different cultures and for human rights.

Ecological goods and services: are the benefits provided by wetlands e.g., water purification, supplies of portable water, fishes, plants, building materials and water for livestock, outdoor recreation and education.

Environmental Assessment: is the process of identifying, predicting, evaluating and mitigating the biophysical, social, and other relevant effects of development proposals prior to major decisions being taken and commitments made.

Erosion: is the removal and transportation of soil particles by the action of water, wind, gravity or other geographical agents, whether naturally occurring or acting in conjunction with or promoted by man - made activities or effects.

Estuary: means a body of surface water a) that is part of a water course that permanently or periodically opens to the sea b) in which the salinity is measurably

higher as a result of the influence of the sea.

Flood: an overflow of rain water or other sources along the normal confines of a river, stream, drainage way or other water body that causes or threatens damage to property, infrastructure, people, or natural resources

Flood proofing or protection: means any combination of structural and non-structural additions, changes, or adjustments to existing or new structures which reduce or eliminate flood damage to residential and non-residential buildings and their contents. These can include protective walls and drainage systems to redirect water away from existing buildings, rebuilding structures to make them more resistant to the intrusion of flood waters or the physical force of high velocity water. It also includes special design and construction techniques including piers and elevating the lowest usable floor of a building above the level of water experienced in events.

Floodplain: a level or nearly level land along a stream or river flooded only when the stream flow exceeds the water carrying capacity of the channel. flat or nearly flat land adjacent to a stream or river that experiences occasional or periodic flooding.

Green Belt: an area which has been designated around a settlement for no development in order to provide access to green and open spaces and to encourage more dense urbanization.

High tide line: is the highest point on the shore that is covered by water at high tide. Ghana has two high tides and two low tides each day. The mean tidal range (distance between high and low tides) is 1 meter, and the spring tidal range (time of new or full moon) is 1.3m. For purposes of coastal development, this is the line which development is set back from.

Lagoon: closed or open, a shallow body of water separated from the ocean by a barrier island or spit. It may be open to the ocean occasionally during seasonal flooding or high seas.

Pair Trawling: the joining of nets to two boats in order to increase catches.

Pocket beach: a short sandy shoreline between rocky headlands that prevent long shore transport of sediment.

Restoration: is a broad process of reversing physical, economic and social decline in a coastal area.

Set back: is an area left free of any physical development or modification, commonly used to setback structures from a coastal feature, or from a road in an urban area.

Shoreline protection structures, or sea defense structures: include breakwaters, groins, bulkheads, jetties, and other structures, the purpose or effect of which is to control or prevent the erosion of coastal features.

Traditional Authorities: the traditional governance system of chieftaincy in Ghana.

Watershed: area of land where all of the water that is under it or drains off of it goes into the same place, such as a river or a wetland.

Water dependent uses: are uses that can only be conducted on, in, over, or adjacent to the water; each involves, as an integral part of the use, direct access to and use of the water. These uses cannot physically function without direct access to the body of water along which it is proposed.

Examples of water dependent uses include: docks, piers, fish processing facilities, canoe/ boat repairs, port activities requiring the loading and unloading of vessels. Water dependent uses exclude housing, hotels, motels, restaurants, warehouses, manufacturing facilities (except for those which receive and quickly process raw materials by ship) etc.

Wetland: means land which is transitional between terrestrial and aquatic systems where the water table is usually at or near the surface, or the land is periodically covered with shallow water and which land in normal circumstances supports or would support vegetation typically adapted to life in saturated soil. Functions within the natural ecosystem include flood attenuation and control, maintenance of underground and surface water supplies, sediment trapping, erosion control, pollution abatement and provision of habitats for flora and fauna.

INTRODUCTION

Hen Mpoano and Ahanta West District Collaboration

This Toolkit is the final output, for Ahanta West District, of the Integrated Coastal and Fisheries Governance (ICFG) initiative, which has become locally referred to as HɛN MPOANO (Our Coast). It is a four-year project carried out by the University of Rhode Island Coastal Resources Centre and partners (see acknowledgments),and funded by the United States Agency for International Development (USAID).

The Overall Goal of the Hen Mpoano Initiative

Overall Goal: to support the Government of Ghana in achieving its development objectives of poverty reduction, food security, sustainable fisheries management and biodiversity conservation.

The initiative's vision is that:

Ghana's coastal and marine ecosystems are sustainably managed to provide goods and services that generate long term socio-economic benefits to communities while sustaining biodiversity.

The purpose of the Integrated Coastal Management Toolkit for Ahanta West District and how to use it

- It is a catalogue which summarizes the marine and coastal information which has been gathered by Hen Mpoano. It is for use by all of those who are actively involved in carrying out Integrated Coastal Management in Ahanta West District including the Coastal and Marine Management Committee.
- It provides easy-to-follow links to the source material, more detailed technical information.
- To suggest "Projects" for incorporating Integrated Coastal Management in the planning processes and practices of the District Assembly.

Contents of the Toolkit

Section

Reference

Bibliography listed in section five.

Project

Project proposed to be implemented. Refer to pages 42-44 for more information.

Case study

Examples of Best Management Practices in coastal communities

Legend

- Ecotourism
- Fish landing site
- Fort/castle
- Lighthouse at Cape Three Points
- Accomodation facility
- Sandy beaches
- Coastal lagoon inlet
- Rocky shores
- N1/Highway
- Major road
- Proposed roads
- Buffer
- Perception of shoreline 30 years ago
- Perception of shoreline 60 years ago
- Shoreline extend within community
- Drains
- 100 year shoreline
- Green belt
- Gas pipeline

- District boundary
- Water body
- River
- Mangroves / Wetland
- 1974 shoreline
- Natural vegetation
- Tidal influence (yet to be determined)
- Coastal Zone
- Town
- Community Resources Management Areas (CREMAs)
- Coastal zone (1000 m buffer)
- Birds
- Crocodiles
- Turtles / nursery

Section one:

The Coastal Zone and Development Context


PROPERTY PRO'S

Figure 3:
Detail of coastal zone showing typical features
Source: CRC Ghana

Coastal features:

- Beaches, Dunes and Barrier Spits, Rocky Bluffs, Rock Outcrops and some Steep Slopes
- River Estuaries, Drainage Outflows, Mangroves, Wetlands Marshlands and Coastal Lagoons
- Flora, tropical foliage forests, fauna, birds, small invertebrates, sea turtles

Dynamics:

Sandy shorelines are highly dynamic features that evolve in response to waves, currents, tides and wind. In many cases sandy beaches are built up by ocean wave energy and backed by wetlands or river outflows, and are referred to as barrier beaches. These systems are in constant movement in response to the energy of the surrounding system, and as a result are not advisable building sites.

Section two:

Integrated Coastal Management - why, what and how?

2.1 Why?

The coast of Ahanta West District surely represents its most distinctive feature, and the one which gives its greatest competitive advantage. But the development opportunities need to respect the right of communities, which have lived here for centuries past, to also continue to enjoy a prosperous and harmonious life. All will have to meet the ongoing socio-economic challenges exacerbated by climate change and coastal erosion. Those inland, within the District, are also highly dependent on the health and well-being of the coast.

R1: Our Coast, Our Future: Western Region of Ghana

This is a major product of the Hen Mpoano initiative. It makes the case that a fresh approach to the governance of the coast and fisheries will take root only when it addresses issues that are perceived by the people of the place as important. It covers the major coastal and fisheries issues and concludes with a discussion of the actions that Hɛn Mpoano proposed to take over a three year period to establish and formalize a governance program for the Western Region that can serve as a model for the nation.

2.2 The Most Urgent Issues

The coastal zone of Ahanta West District is undergoing rapid transformation due to activities of a fast growing oil and gas industry. A balance must be found between development and the flow of coastal ecological goods and services. There is a need to confine oil and gas-related development to certain "hot spots" (as identified, for example by the Western Regional Spatial Development Framework), to maintain sustainable livelihoods, protect the environment and the areas of high landscape value ("green belt areas") which have been identified, while encouraging economic development.

The Rapid Assessment of Communities in Ahanta West showed the following key points:

- Land Use pressures: the discovery of oil and gas has created a rush for land by prospective investors and speculators in industrial and other related development as well as pressure on the coastline for development of residential, leisure and hospitality. This is coupled with the long established use of large tracts of land for plantation agriculture, notably oil palm and rubber. These factors have impacted adversely on the space available for fishing and for subsistence agriculture.
- Fisheries decline: declining fish catches, (mostly attributed to increased canoe numbers due to increasing population) and unsustainable fishing methods has led to poor fish quality and consequently poor life span of processed fish. Other factors are conflicts between artisanal and semi-industrial fishers/boats and non-existent/ weak local institutions for managing the fishery.
- Coastal Eco-Systems threatened: Incidence of sand winning and sea erosion, destruction of mangroves, wetlands and drainage systems
- Other concerns: community perception of inadequate government representation and attention; chieftaincy disputes; poor road access/infrastructure; inadequate Primary and Junior High school educational infrastructure, electricity, pipe-borne water, toilets, health posts and refuse containers.

2.3 What? The Core Elements of Integrated Coastal Management

The response to pressures of development could in fact generate long term benefits for coastal ecosystems and their dependent communities. With this in mind, the District Assembly has inaugurated a Coastal and Marine Management Committee to drive Management Strategy, of which the core elements are:

- Preservation and restoration of important coastal habitat and features that are critical to sustaining the fishing industry

- Expanding Community Resource Management Areas (CREMAs) in existing conservation management clusters to cover other important coastal wetland areas including improving conservation and management systems for the Cape Three Points Forest.
- Creating Land Use and Environmental Policies that balance competing interests of industrial, tourism, food and livelihood security, leisure, commercial and residential activities while protecting the vital ecological functioning of the land and seascape.
- Supporting traditional and finding new livelihoods for coastal communities through agriculture, fisheries and aquaculture, as well as providing the access to fully partake in the new forms of development.
- Reducing vulnerability and building adaptive capacity of coastal communities to threats from hazards and climate change including extreme weather, rising sea levels and coastal erosion.
- Sustained stakeholder enagement and moves to build co-operation with neighboring districts through a Joint Coastal Development Planning Area; and creating effective links to the regional and national levels of government.

2.4 How? Systems for implementing Integrated Coastal Management

Integrated Coastal Management is a participatory process that engages communities, private sector, traditional authorities and civil society. The mechanisms for implementing at the district level are:

1. The District's Medium Term Development Plan (MTDP), and Community Action Plans which address settlement growth, economic development and the provision of schools, clinics, other services, roads and infrastructure.
2. The District's Spatial Development Framework (SDF), Structure Plans (SPs and Local Plans (LPs), which show what can go where, and resolve potentially conflicting demands on land use in the coastal zone.
3. Strategic Environmental Assessment which ensures that the necessary environmental protection measures are taken.

The establishment of a District Coastal and Marine Committee is a great step forward for implementing Integrated Coastal Management. It provides a necessary forum for stakeholders involved in such sectors as fisheries, oil and gas, land use planning and fresh water supply. It brings the concerns of coastal communities to the attention of the assembly for translation into plans and procedures. The Committee can identify and assess issues, suggest and shape policies, prioritize actions and evaluate outcomes as the Coastal Zone is developed.

At the regional and national scales, many of the objectives of coastal management may only be achieved through joint planning and implementation, involving adjoining coastal districts. For this reason, initiatives such as the Data Hub which has been established at the Western Regional Coordinating Council by Hen Mpoano for technical support, the fledgling Joint Development Planning Area for the Coastal Districts of the Western Region, and Western Corridor Development Authority must be supported by all.

This joint approach to planning and decision-making can involve:

- Adoption of region-wide policies for preventing and mitigating flood hazards;.
- Information sharing on techniques for assessing hazards and adaptive capacity of coastal places (eg those used in vulnerability assessment and adaptive planning exercises at Dixcove and Akwidaa).
- Collaboration between agencies at regional and national levels on coastal issues.
- Effective mechanisms for conflict resolution and dialogue with parties affected by development decisions

- Joint initiatives on protection/restoration of critical habitats, forests and wetlands of regional significance by programs such as Community Resourced Management Areas (CREMAs).
- Decision making on large facility siting and management of alterations of the coastal zone.

All of these will become more evident in the coming years if detailed planning and decision-making can be done at community level and linked to regional and sub-regional co-ordination of national and international investments.

Project

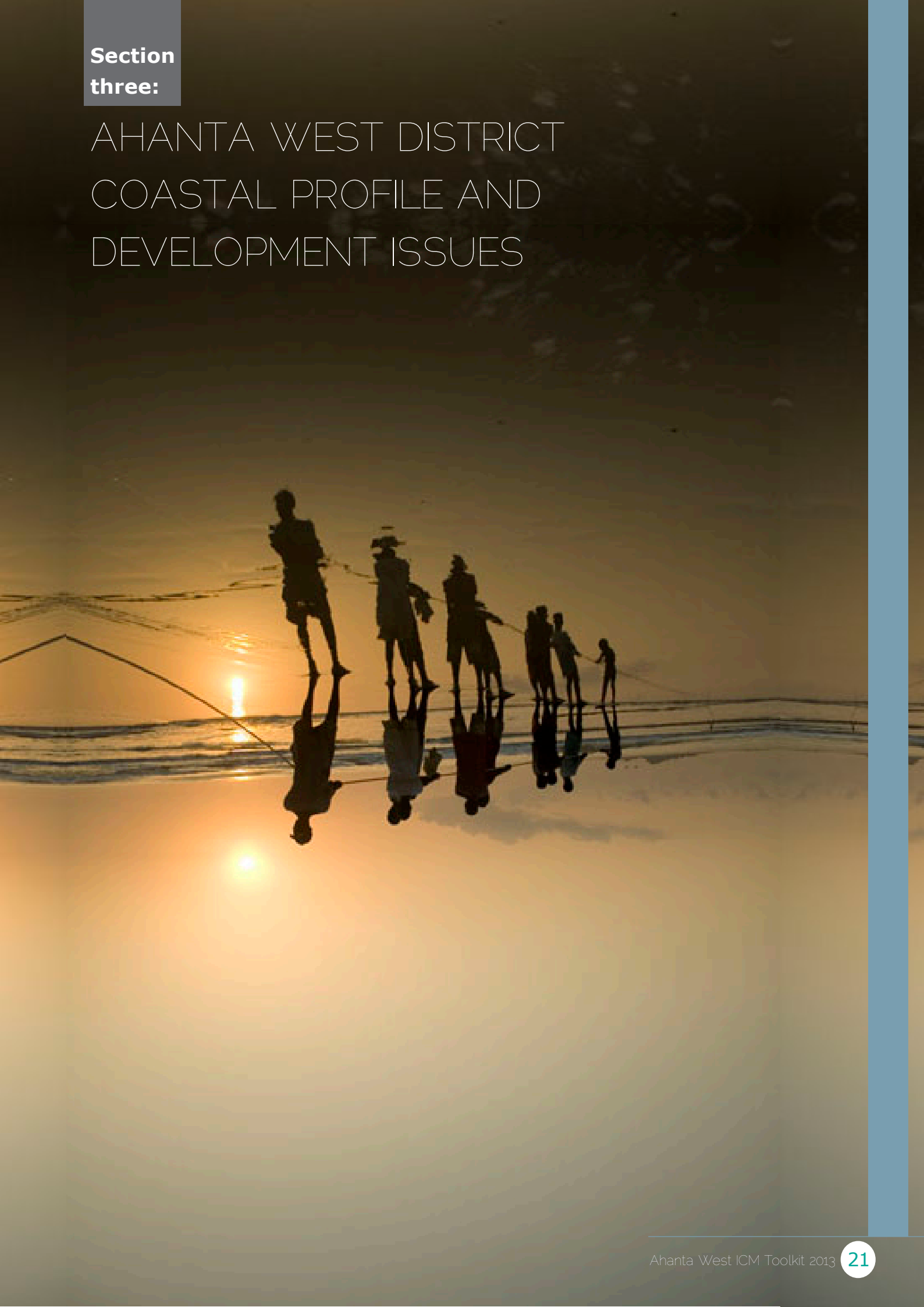
P1: Form Working Groups to deal with specific coastal issues, for example the Cape Three Points Working Group

2.5 Opportunities to Implement Integrated Coastal Management

Use of the above physical and spatial planning processes and environmental assessment provides the foundation for Integrated Coastal Management. District Assemblies suffer from chronic underfunding, but many development partners (governments of the United States, Norway, France, Germany, Korea, Belgium, United Kingdom and others) are funding projects which provide essential parts of the process, including community linkages. The establishment of the Marine and Coastal Committee at Ahanta West District is a great step forward. These need to be made sustainable in the long term by improved mechanisms such as Assembly's Internally Generated Funds (eg from property rate, betterment and value capture in new projects), Corporate Responsibility funds of major private investors, and national and international funds for infrastructure and investment.

Section three:

AHANTA WEST DISTRICT COASTAL PROFILE AND DEVELOPMENT ISSUES



3.1 Characteristics of the Coastal Zone: overview

The Ahanta West District shoreline is relatively rural with a mix of land and water uses which underpin local cultures and livelihoods. It includes rocky outcrops of hills that protrude between sandy beaches, or sometimes extending into the sea forming rocky sea bed. There are capes and bays, most notably "Cape Three Points". The beaches are gently sloped to generally flat and patched with sandy mounds and boulders. The coast line is dotted with hospitality facilities, dense human (fishing) settlements with fish landing and processing areas, river estuaries and ecologically significant wetlands that are habitats for diverse flora and fauna. In the uplands there are patches of forest and rich agricultural lands.

The shoreline from the western district boundary not far from Axim, to the Butre estuary, which includes the famous Cape Three Points, the southernmost tip of Ghana, is arguably the section of the Ghana coastline with the highest landscape value and natural beauty. Spectacular barrier beaches and sand spits have formed at its major river estuaries (Nyan and Ezile) creating natural harbours for the fishing communities along the coast at Princes Town, Akwidaa, Dixcove, Busua and Butre. European traders also built their now historic forts close to these natural harbours on rocky islands and outcrops. The extraordinary combination of beaches and rocky outcrops, estuaries, fishing villages, and historic forts combine to give this section of coast its unique qualities.

The coast between the Butre and Hwin Estuaries (forming the eastern boundary with Sekondi Takoradi Metropolitan Assembly) houses several highly impoverished fishing communities but has less landscape value. It is becoming subjected to intense pressures from industrial development as Sekondi Takoradi expands westwards towards the oil and gas and mining areas.

Reference

R2: Adaptive Capacity for Resilient Coastal Communities: Climate Change and Natural Hazards Issues in Coastal Districts of Ghana's Western Region

In 2011 and 2012, Hen Mpoano assessed 77 Western Region coastal communities in the Districts of Jomoro, Ellembelle, Nzema East and Ahanta West to gain an understanding of their concerns and capacity. The findings indicated that adaptive capacity is limited in coastal communities. Some locations are faring better than others, but overall, coastal communities have weak ability to respond to emergencies generated by natural hazards, they suffer social and economic development challenges that are worsening, and they have a relatively low ability to manage coastal resources in a way that will ensure sustained productivity and environmental quality.

3.2 Characteristics of Coastal Zone: off-shore marine areas and fisheries:

The off-shore areas of the coastal zone are actively used by the artisanal (traditional) fishing fleets. Fishing is also the province of larger, Ghana-based semi-industrial fishing vessels and industrial, intercontinental vessels. There are locally breeding fish, those inhabiting the Guinean current across West Africa and those that migrate across larger distances. Surveys have been carried out to determine the location and type of marine life including juvenile fish and their breeding, and Marine Protected Areas are being proposed to protect fisheries and improve food security.

Marine areas experience many other uses such as for a local, national and international highway, for

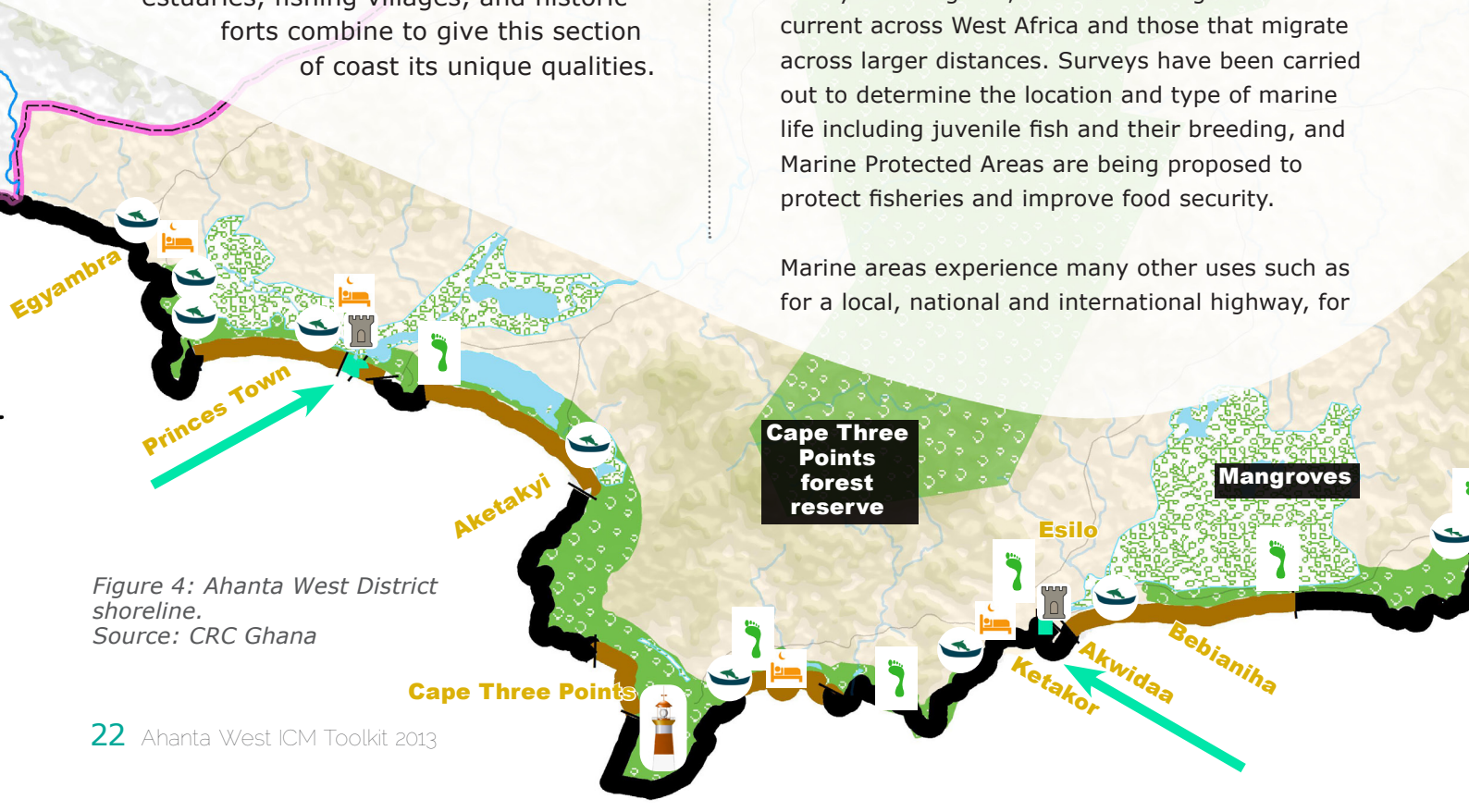


Figure 4: Ahanta West District shoreline.
Source: CRC Ghana

R3: Nearshore Rocky Reefs of Western Ghana, West Africa: Baseline ecological research surveys. Ateweberhan,M.,Gough,C., Fennelly L. and Frejaville, Y. 1.

Ecological information on the near shore rocky reef habitats (NSRH) of Ghana is very limited. The present study fills this knowledge gap, by investigating the general status of the NSRH and fisheries of western Ghana, and providing baseline information on the fish, invertebrate and benthic communities.

R4: Assessment of Fishing Grounds in the Nzema East and the Ahanta West Districts

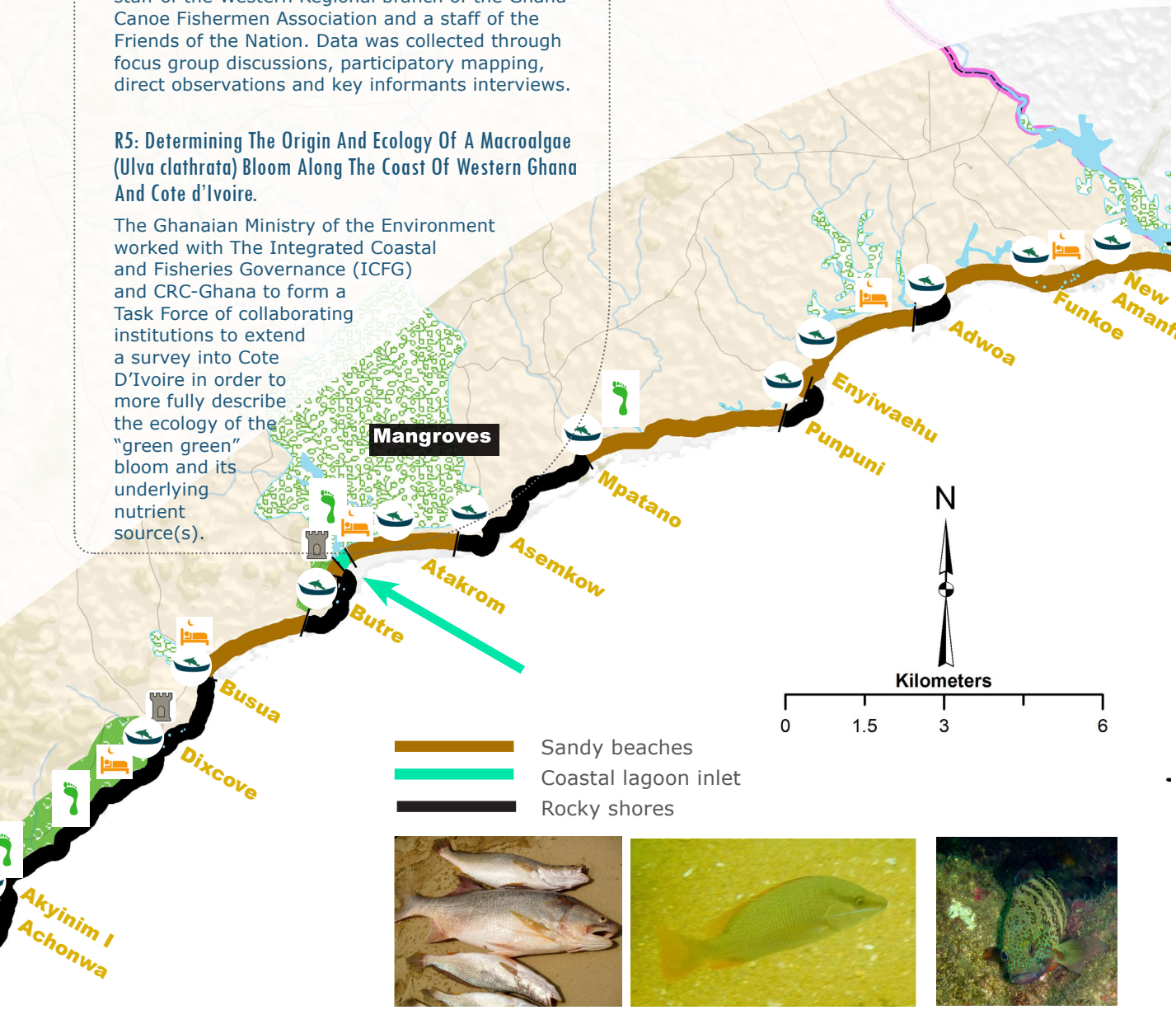
A rapid appraisal conducted in nine (9) main landing sites in the Nzema East and Ahanta West districts between 14th and 21st September 2010. The communities visited were, Ankobra (Sanwoma), Apewosika (suburb of Axim), Miamia, Princes Akatakyi, Cape Three Points, Akwidaa, Dixcove, Busua and Butre. The purpose of this assessment was to ascertain primary information of the spawning and fishing grounds among others. The research team was made up of two persons; a staff of the Western Regional branch of the Ghana Canoe Fishermen Association and a staff of the Friends of the Nation. Data was collected through focus group discussions, participatory mapping, direct observations and key informants interviews.

R5: Determining The Origin And Ecology Of A Macroalgae (Ulva clathrata) Bloom Along The Coast Of Western Ghana And Cote d'Ivoire.

The Ghanaian Ministry of the Environment worked with The Integrated Coastal and Fisheries Governance (ICFG) and CRC-Ghana to form a Task Force of collaborating institutions to extend a survey into Cote D'Ivoire in order to more fully describe the ecology of the "green green" bloom and its underlying nutrient source(s).

leisure, cables, pipelines, oil and gas exploitation. The Marine areas are subject to increasing kinds of pollution from the wastes of marine and non-marine activities (dumping of waste). As capacity for coastal management increases, spatial planning for the seascape will be necessary to ensure harmony between traditional uses of the sea for fishing and oil and gas production activities. Marine Spatial Plans are now being used throughout the world to cope with the increasing pressures.

P2: Prepare Marine Spatial Plan
P3: Continue with research on Algae Bloom leading to proposals for its management.



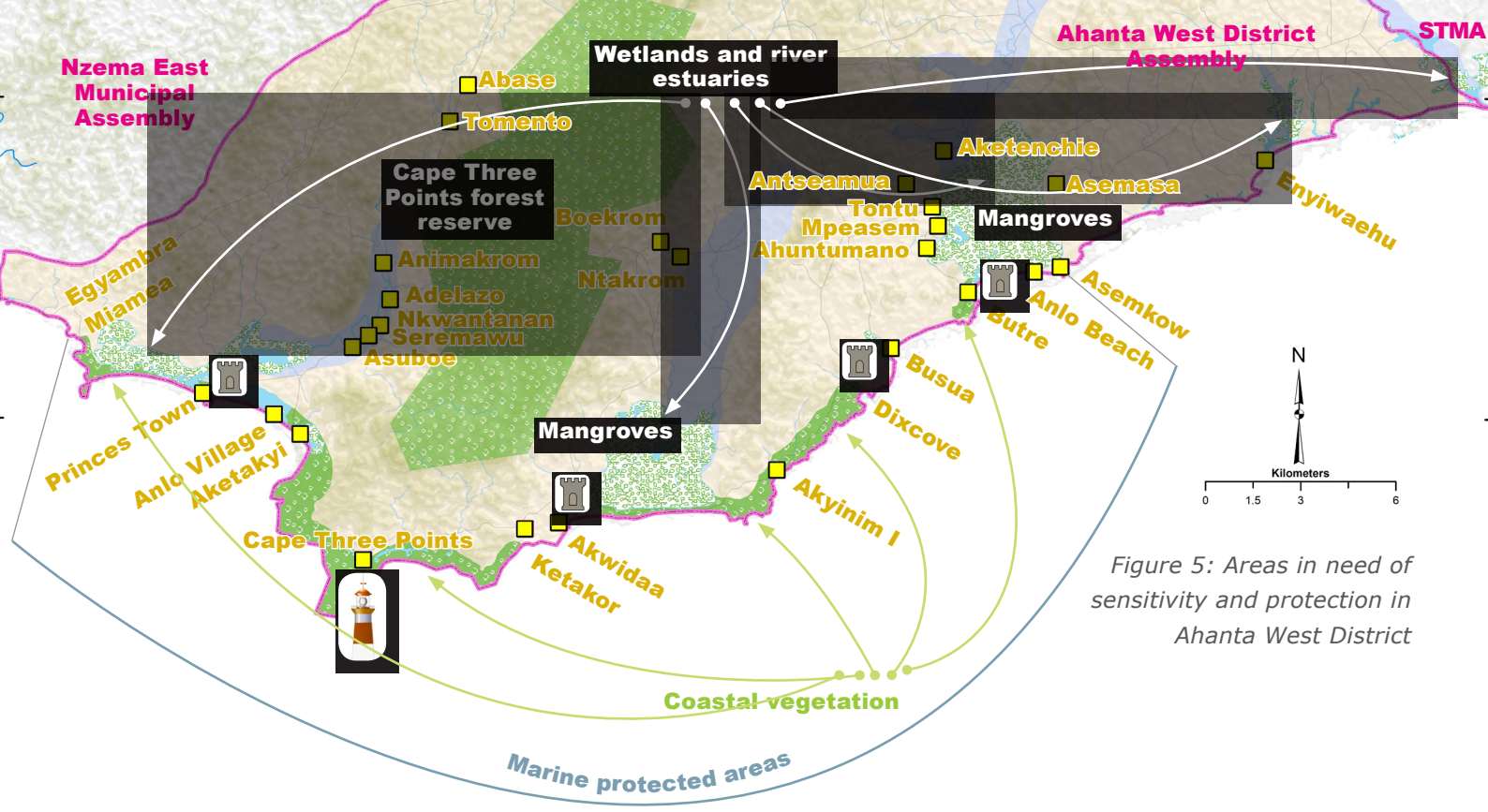


Figure 5: Areas in need of sensitivity and protection in Ahanta West District

3.3 Characteristics of the Coastal Zone: areas of restoration and preservation

Wetlands, mangroves, lagoons, rivers and estuaries, provide essential ecosystem services and are also critical for maintaining a healthy fishery (see section 3.4.2 below). In Ahanta West, most of these resources are found on the coastal segment lying between Butre and Egyambra, forming a network of natural areas, which are a priority for conservation.

Ultimately, conservation of these resources could be extended to include nearshore areas to form a network of marine protected areas.

Project

P4: Undertake public education on the benefits of conservation of coastal ecosystems.
P5: Work with Marine Protected Areas Inter ministerial Committee over designation of marine protected areas.

3.4 Relief, Drainage and Climate: Coastal Dynamics, Human Uses and Implications

3.4.1 Shoreline Beaches, Dunes and Barrier Spits: human and natural hazards

Due to rising sea level in recent decades, most barrier beaches in Ghana are retreating at a rate of about 1m per year and in the Western region, are estimated to be retreating at 2m per year on the average (2). Erosion, sea level rise, and sand winning from the beach can all result in land loss and the inland movement of the shoreline.

Sections of the shoreline in the district are noted to have eroded considerably over the past 50 years, causing the disappearance of buildings, farm lands and other properties. This phenomenon still continues due to high sea wave energy and sea level rise, exacerbated by Climate Change. In Busua for example, the whole shore line experienced massive erosion in 2007 due to heavy seas and storms, which exposed flaws in the sea defense mechanism and destroyed properties of the beach resorts and hotels. In other communities, settlements, farm lands and fish landing sites have been destroyed.

In Akwidaa, the whole settlement at the Old Town has been under threat from coastal erosion and sea level rise for many years. Twice a year the community is flooded for several weeks by sea water destroying properties and

obstructing economic activities. Similar incidences of coastal flooding are noted in all the coastal communities with varying impacts based on the elevations above sea level.

Stakeholders in the district have demonstrated varied knowledge of coastal erosion. In Funko, most women perceive that coconut trees are a driver for coastal erosion and argued that uprooting of the trees by tidal waves accelerates the erosion process; as such, they deliberately cut down coconut trees along the beach in their attempt to stop the erosion. Again, fisher folks in Funko dump old nets and other waste at the shore in an attempt to stop or delay the erosion process. The situation can be made worse by improper planning and design.

Coastal erosion and perennial flooding has characterized communities where there has also been intense winning of beach sand and stone boulders. The construction sector relies heavily on coastal sand and pebbles. Over the period, a cartel of sand winners has evolved to supply construction materials to meet the high demand. In Adwoa and Funko, residents have identified sand winning as a driver for the degrading shoreline but acknowledged the difficulty in controlling the practice.

Several methods are being used by the Hydrological Services Division of the Ministry of Water Resources, Works and Housing to control shoreline erosion including the use of gabions and boulders. However, high energy waves, strong currents and periodic storms expose the weakness of these defense mechanisms. In many cases relocation is the only real alternative, but accepting this is difficult, and therefore attempts to reserve lands for relocation of settlements are inadequate.

Case study

Good Management Practices
Support Urbanization, Sanitation and Wastewater Management in the Coastal Zone:
Dixcove Case Study

Project

P6: Increase collaboration with the Ministry of Water Resources, Works and Housing for regulating private development and installing publicly funded defenses.
P7: Where acceptance of land loss is agreed as the best option long term, plan re-settlement schemes and incorporate as objective in Structure Plans.
P8: Develop a public education programme on coastal hazards and climate change
P9: End destructive sand winning practices by use of bye laws and community sensitisation
P10: Prepare coherent shoreline management plans to regulate coastal land use.

Reference

R6: Report on Characterization of coastal communities and shoreline environments in the Western Region of Ghana.

This report provides information on the conditions and environmental, social and economic issues faced by 89 coastal communities in the six coastal districts of Ghana's Western Region. Rapid appraisals of coastal communities, district level validation workshops and secondary literature review were undertaken to provide additional information that will ultimately contribute to assembling the baseline. While rapid appraisals gleaned community scale information, it also provided the opportunity to socialize the initiative among coastal communities visited. The purpose of district scale workshops was to solicit inputs from local people as well as reactions to findings of the rapid appraisals and to incorporate local perceptions of changes into a district level synthesis of coastal and fisheries governance issues.

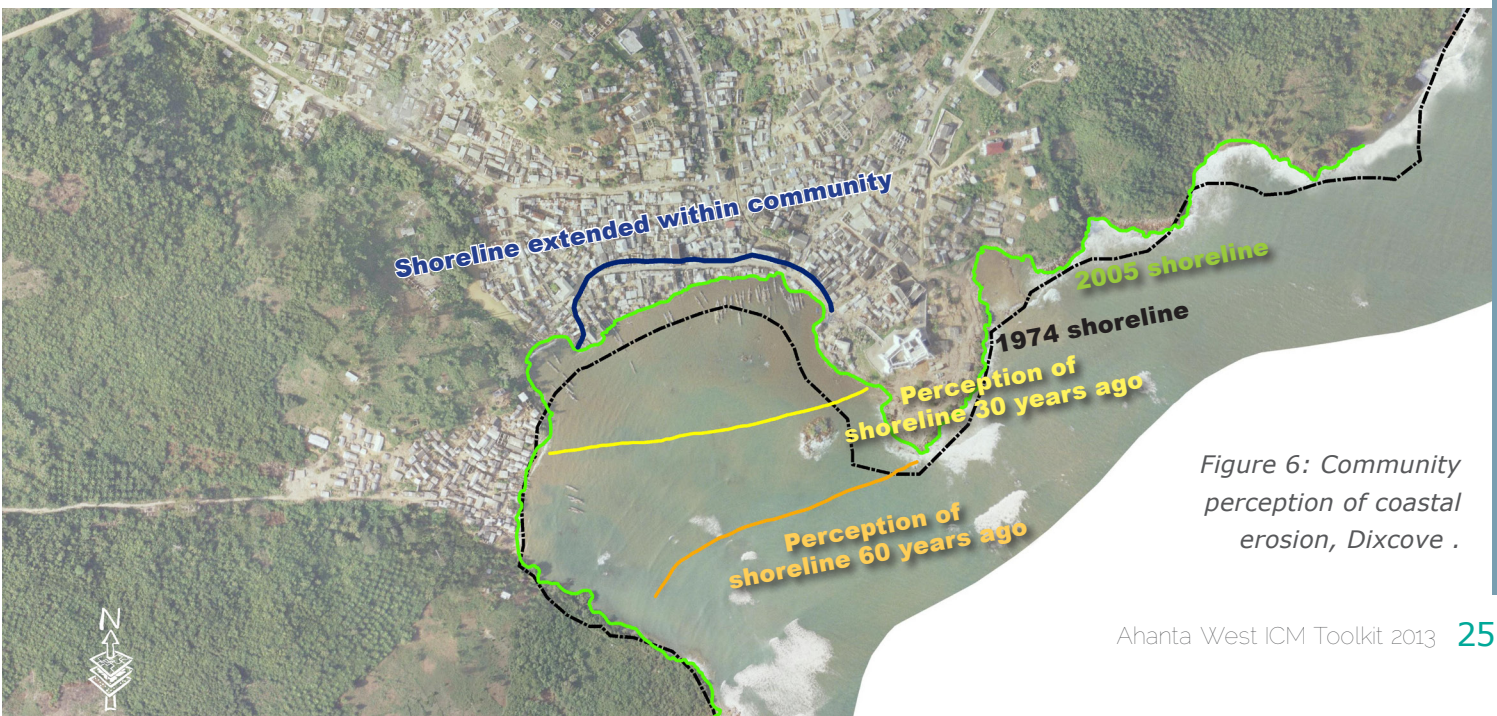


Figure 6: Community perception of coastal erosion, Dixcove .

3.4.2 River Estuaries, Drainage Outflows, Mangroves, Wetlands, Marshlands and Coastal Lagoons

Wetlands and coastal water resources serve vital functions in the environment. They provide habitat for many plants and animals, including migratory birds and many types of fish. Mangrove areas, in particular, are important to the overall health of the marine fisheries, because they provide habitats for shellfish as well as nursery grounds to juvenile fish. Mangrove wood is harvested for a variety of purposes, but this practice should be limited due to the damage to wetlands that overharvesting causes.

From a hydrologic perspective, wetlands serve to dampen the effects of changing water levels, thereby providing protection from flooding. In the process of slowing floodwaters, wetlands trap and store sediments, limiting erosion and in some cases actually building up soil. Through this process, they protect coastal waters from excessive runoff and sedimentation. Coastal communities often rely on these areas for their drinking supply, so maintaining the flow levels and cleanliness of the water is vital to community health.

Wetlands are easy targets for dumping of waste and infilling because they lack existing users or owners. They are also under threat from indiscriminate cutting of mangroves for fire wood for cooking and fish smoking. The practice is very common, partly due to low level of awareness of their ecological functions and services.

For example, mangroves are regarded as free 'gifts from God', and therefore should be exploited without conservation. In Busia and Dixcove frequent cutting of the mangroves for fish smoking, has drastically degraded the wetland. Comparatively, in Butre and Akwidaa, the mangroves are in fairly good conditions due to interventions by NGOs like Ricerca and Cooperazione and Conservation Foundation, among others. In the communities where the wetlands are degraded from intense mangrove cutting, residents claim fish landings are rapidly dwindling.

Flooding not only results from storm surges, waves, increased rainfall, and damaged wetlands, but also from other human activities throughout the drainage area and shorefront. These include dams, creation of impervious surfaces (roads, car parks) where rain used to soak away, blockage of water courses. These activities are also carried out by growing populations whose space is being reduced even further by coastal erosion.

Good Management Practices Reduce Impacts from Flooding and Erosion: Akwidaa Case Study

R7: Rapid assessment of mangrove status and conditions for use to assess potential for marine payment for ecosystem services in Amanzule and surrounding areas in the western coastal region of Ghana, West Africa

Ghana's mangrove ecosystems are tremendously valuable, providing ecosystem services like carbon sequestration, protection from storms, floods, and erosion, provision of timber and non-timber forest products, processing of waste and nutrient pollution, aquaculture and agriculture support, and habitat for aquatic and terrestrial species. Yet, as in many other parts of the world, short-term development needs are undermining long-term mangrove health and survival. Fortunately, economic mechanisms have the potential to tip the balance toward restoration, maintenance, and protection of mangrove forests. The need for proper valuation of mangrove ecosystem services underpins such mechanisms towards the establishment of any realistic payment for ecosystem services scheme in any given mangrove or wetland habitat.

R8: Coastal Hazards and Flooding Risk in Ghana's Western Region

This issue brief highlights the key issues facing Ghana's Western Region in terms of coastal flooding in low-lying areas as well as shoreline erosion, and recommends policy options to improve public safety and reduce environmental impacts.

R9: Carbon Stocks And Soil Nutrient Dynamics In The Swamp Forests Of The Amanzule Wetlands & Ankobra River Basin

The peat swamp forests of the Amanzule Wetlands and Ankobra River basin is a truly unique landscape. Threats to the swamp forest, while still minimal, may be mounting, particularly in the form of small-scale artisanal logging, firewood harvesting, and conversion to food crops like maize and cassava. As demonstrated by this study, these anthropogenic activities have a detrimental impact on the ecosystem's ability to store and sequester carbon, as well as on biodiversity and nutrient dynamics. Therefore, conservation of this intriguing and rare landscape is crucial. While more research is required, it is possible that carbon finance, in the form of REDD+, soil carbon, or climate smart agriculture could form part of a dynamic conservation and livelihood strategy.

R10: Mapping and Modelling Mangrove and Peat Forests Dynamics in the Great Amanzule Wetlands, Ghana

Ghana's mangroves continue to reduce in health and coverage, especially in areas outside the five Ramsar designated sites in the country. Moreover, the use of compensatory mechanisms in addressing the exploitation of coastal ecosystems and climate change mitigation is in its nascent stages in Ghana because of the uncertainties in their carbon stock estimates due to uncertainties in their real extent. The main objective of this study was to apply remote sensing technology to map the past and present areal extent of mangroves in the Ellembelle

Busua Beach

district in the western region of Ghana, especially in the face of limited data. Three main remotely sensed data were used in the study: a true color orthorectified digital aerial photo (AP); and two satellite data sources - RapidEye and Landsat Thematic Mapper (TM) imagery. Additional data were acquired through a participatory mapping exercise and a GPS survey. Other ancillary data like an existing land use/ land cover map of the area was used for the mapping.

R11: Biodiversity Threats Assessment for the Western Region of Ghana.

This review of biodiversity threats in the coastal zone of the Western Region of Ghana covers both terrestrial and marine systems and includes maps and descriptions of important wetlands and habitats.

R12: Rapid Biodiversity Assessment on the Essei and Butuah Lagoons and the Whin River Estuary in the Sekondi-Takoradi metropolis of the Western Region of Ghana

This rapid Biodiversity Assessment on the Essei and Butuah Lagoons and the Whin River Estuary in the Sekondi-Takoradi metropolis of the Western Region of Ghana concludes that deplorable management, ignorance or conflict of interest on the part of users has led the wetlands onto a path of potentially irreversible destruction. A new type of coastal management thinking and practice are needed that takes into account Ghanaian economic, socio-cultural and environmental perspectives.

R13: Approved byelaws for wetland conservation in 4 areas (Butre, Busua, Akwidaa, and Princes Town)

Cape Three Points – Princes Town CREMA Constitution and Resource Management Bye-law was amended to include provisions that call for the development of management plans for CREMA wetlands. The revised bye-law was approved by the Assembly.

R14: Model Bye-laws for Coastal Management in Ghana: Experiences from Shama District

Through Hen Mpoano-facilitated technical assessments, stakeholder engagements and participatory mapping exercises, model bye-laws and policy statements for flood hazard mitigation, shoreline and wetland management were formulated and approved by the district assembly.

R15: Assessment of Critical Coastal Habitats of the Western Region, Ghana

This assessment of critical coastal habitats of the Western Region, Ghana ranks 20 coastal ecosystems and describes 10 of these in detail.

Project

P11: Establish new and support existing Community Resource Management Areas (CREMAs) to protect and enhance wetlands
P12: Designate both on shore, including wetlands and mangroves, and maritime preservation areas in Structure Plans and Local Plans
P13: Incorporate policies in plans and bye laws to reduce impact of dams, creation of impervious surfaces in development and blockage of water courses
P32: Undertake public education on values and importance of wetland ecosystems

Figure 7: Satellite image of western part of Region, showing capacity of land cover to sequestrate carbon. Source: University of Rhode Island

3.5 Vegetation, Flora, Tropical Foliage Forests, Wildlife

3.5.1 Coastal Vegetation, farming, forest reserves.

The current majority land use in Ahanta West District is by subsistence farms, trees and forest, palm oil and rubber plantations. Carbon sequestration capacities in Figure 7 illustrate the extent of different types of use because they broadly equate with urban areas (crimson); farm crop areas (yellow); tree cover including oil palm (light green), rubber and forest (dark green). The Cape Three Points Forest Reserve is the only major Forest Reserve in the District, and is one of the largest designated for 'protection' rather than 'production' in Ghana. It has the potential for development as a visitor attraction, but is currently being degraded by charcoal production, illegal small scale mining, illegal logging, expansion of the adjacent rubber plantations and of farming by communities located around it. The mapping of rural land uses and slope analysis will enable decisions to be made about the most efficient balance of uses. This designation of land for agriculture, added to protected areas/corridors for wildlife will enable the best decisions to be taken about areas for urbanisation, tourism, leisure and industrial development.

In this context, it has been proposed (3) that, considering that even large areas of green resources may be permanently destroyed through unplanned development, the concept of a "Green Network" will be a useful development planning tool for the District.

The "Green Network" concept "connects forest and mountains to urban parks, farms and wetlands and down to small garden plots and street trees". It will create unbroken "eco-corridors" with the following objectives:

- Agricultural Lands: given that most of residents are engaging in agriculture, the areas that are not new development sites are designated as greenbelt usable for agriculture, referring to the balance within that, above.
- Areas for protection of wildlife and biodiversity will also be included.
- Coast and Forest: the west-east greenbelt follows the coastline so that a "Trekking Route" can be developed to create value and recreational activity in a way that it causes minimal impact on the environment.
- Protection and Extension of Cape Three Points: it is proposed to extend the natural forested southerly green belt at Cape Three Points all the way to coastal areas, while extending the northerly end to Agona-Nkwanta.

The Community Action Plan at Dixcove exemplifies how this issue is being ignored during urbanisation, but that there are still opportunities to designate green corridors (see Figure 9). This should be done now before it is too late.

The need to promote and provide visitor access to forest and subsistence lands in order to win over public perception of the need to protect them is also vital.

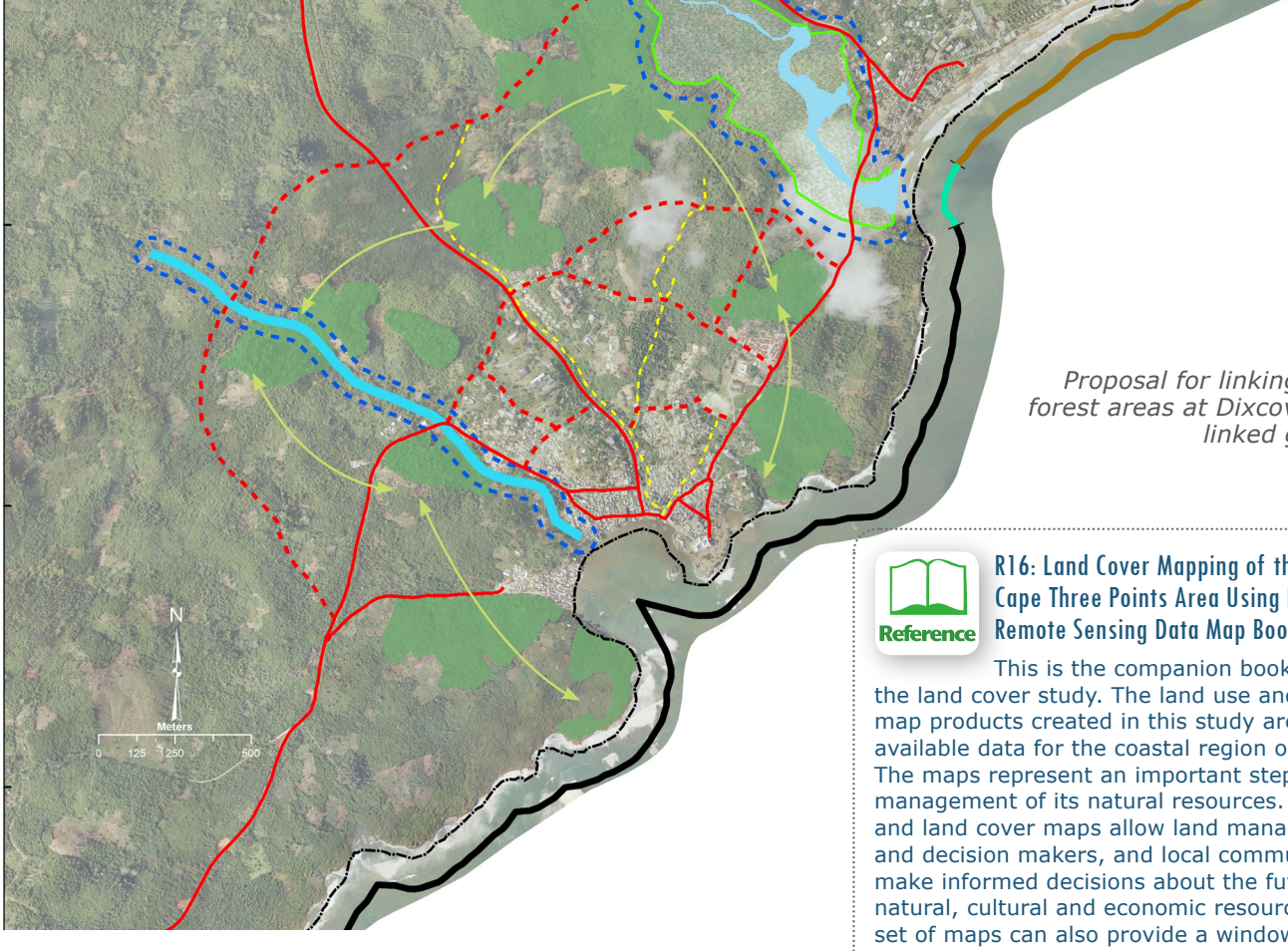


Figure 9:
Proposal for linking remaining forest areas at Dixcove to create linked green areas

Project

P14: Map and plan rural land uses areas. Develop strategy for balance of agricultural land uses and set buffers for food crop production as well as conserve ecosystem functions and services.

P15: Develop the eco-tourism potential of Cape Three Points Forest.

P16: Establish green networks in District Spatial Development Framework and to protect wildlife, agricultural and forest areas. Include green corridors in Structure Plans and Local Plans.

Reference

R16: Land Cover Mapping of the Greater Cape Three Points Area Using Landsat Remote Sensing Data Map Book

This is the companion book of maps for the land cover study. The land use and land cover map products created in this study are the first available data for the coastal region of Ghana. The maps represent an important step in the management of its natural resources. Land use and land cover maps allow land managers, policy and decision makers, and local communities to make informed decisions about the future of their natural, cultural and economic resources. This set of maps can also provide a window into how the landscape has changed as the baseline data for possible future work. With the baseline data ready, the next step of change analysis will be possible. The choice to use the U.N. Land Cover Classification System also provided the flexibility to meet classification needs in the future while still maintaining continuity with past work.

R17: Report from Community Conservation on Primates in the Western Region.

Field notes from Horwich's site visit and recommendations for improved management of the forest reserves and alternative livelihoods for the adjacent communities. Horwich made two additional visits in 2012 which are also included in this report.

Figure 8:
Concept for a Green Network in Ahanta West District. Source: Korean International Cooperation Agency

3.6 Settlements, Spatial Analysis, Siting of Infrastructure

3.6.1 Growth of the Coastal and Fishing Settlements

The population of coastal settlements continues to increase strongly through natural growth from uncontrolled births, teenage pregnancy and high immigration of fisher folks (4). The coastal communities experience an influx of itinerant boats and fishermen, particularly during the high fishing seasons between July and September.

The natural growth of populations in existing impoverished coastal communities, which is substantial, will be met by in-migration of those more wealthy individuals who are seeing the potential of the coast for residential, leisure and new industrial development. Examples of the scale of urbanization can be seen in the scale of development which is emerging in Dixcove as shown in Figure 10 below.

3.6.2 Cultural context and traditions in Coastal Communities

Artisanal fishing communities represent a unique and distinct culture which arises from the activity. Fishermen are at sea in canoes for three to four days at a stretch, while others are mending and making oats, nets and fishing gear. Women prepare, smoke and sell the fish. These communities are predominantly of the Fante ethnic group. In population terms, Ahanta is the main ethnic group as well as the major language spoken in the district. Other languages spoken are Nzema, Evalue Nzema dialect and Fanti.

The paramount Chief of Ahanta traditional area is seated at Busua. Other key traditional rulers are seated at Upper and Lower Dixcove. The main festival in the District is Kundum, which is a major unifying force because it brings together families and people from within and outside the District. As noted above, chieftaincy disputes are a source of dis-unity and disorganization which hampers development in coastal communities.

Project

P33: Support local festivals and educate/ promote on retention of cultural identity of coastal and fishing communities.

Reference

R19: 'Faith In Action' Faith Based Action For Creation Care In Coastal Communities Of Western Region.

This report details engagement with religious leaders in six coastal districts in the Western Region of Ghana from the 12th of December 2011 to the 9th of February 2012. In all, over 123 religious leaders were trained in reference theology on environmental stewardship and creation care. The programme led to the establishments of six interfaith eco-networks in six coastal districts in the western region of Ghana. The programme was a big success and both participants and organisers benefitted immensely from the exchanges and experiences shared. The main recommendations for keeping the fire burning is ensuring that the eco-networks which have been established live beyond the lifespan of the initiative to perform the functions of mobilising religious organisations and advocating for responsible coastal resource use.

3.6.3 Land ownership

Traditionally, land was in the "customary ownership" of chiefs, who dispensed and allocated it on behalf of their people. Subsequently the colonial authorities negotiated treaties under Romano-British law, which led to individual land titles and leases being granted, and substantial land being taken into government ownership. Where most land is not registered, there are frequent conflicts over its ownership. Families who have subsisted on the land for generations are summarily evicted without compensation, and incoming investors are caught up in land disputes so that nothing materializes.

All of this requires that the land agencies should work more closely with local communities; that land transfers by chiefs should be transparent; and that adequate compensation systems are in place where families are dispossessed of their land by development. The land agencies currently operate in a very separate institution. By resolving this element, the implementation of integrated coastal management will become easier.

Project

P34: Work with Lands Commission at local level on land security and compensation

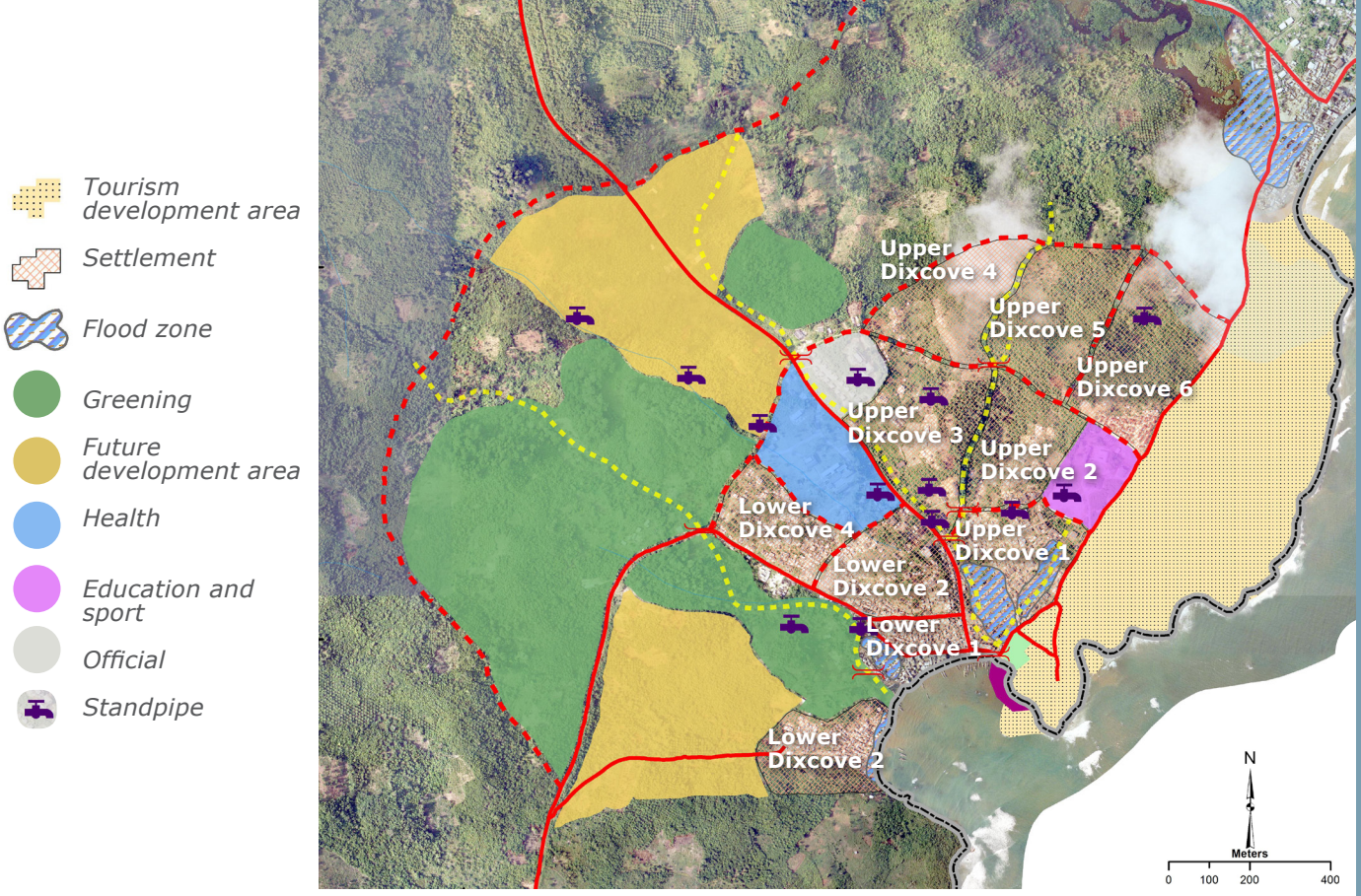


Figure 10: Sketch draft Structure Plan for Dixcove | Source: CRC Ghana 2013

3.6.4 Spatial Analysis: Coastal Settlements in Ahanta West

There are 123 communities in the district and out of which 22 are on the coast. The most populated areas in the District are on the N1 highway leading west out of Takoradi, and Dixcove, which was a former colonial settlement. The principle coastal settlements are, from east to west: New Amanful, Funko, Pumpuni, Adwoa, Enyiwaehu, Mpatano, Asemkow, Anlo Beach, Atakrom, Butre, Busua, Dixcove, Akinim, Akyonwa, Bebianiha, Akwidaa, Ketakor, Cape Three Points, Aketaku, Anlo Village, Princes Town, Miamea and Egyambra. As noted above, the first nine up to Atakrom, are becoming part of the urbanization west of Takoradi. Butre, Busia and Dixcove comprise a growing tourism destination. From Dixcove to Princes Town through Akwidaa, and Cape Three Points up to Anlo Village are isolated and less likely to develop until the coastal road is built. Improved road links to the NI are planned, based on substantial leisure investments which are planned for the last two, Princes Town and Egyambra, which are more likely to become developed in the near future.

The area west of Takoradi is developing rapidly without any structure plan or local plans for the coastal zone yet being prepared. These are urgently needed.

Working with the community at Dixcove, it quickly became apparent that the area of displacement and resettlement that had to be resolved with the existing fishing and farming community was only a small part of the area which is becoming earmarked for development. Dixcove and Busua are likely to become merged with Butre in the foreseeable future in one large conurbation.

In order for this to happen in a way which creates an orderly, modern town in which the existing community and incomers both benefit from a high quality environment, investment in social amenities, water, power, connecting roads, water courses needs to be made for the larger urban area which includes the existing area. This should be able to be financed by new investors if the planning and permitting process aims for high quality, high values and negotiates sharing of improved land values.

The coastal communities from west of Dixcove to Cape Three Points and Anlo Village are less likely to receive capital investment until their infrastructure is improved, but measures can be taken to improve services and capacity for resilience. This stretch of coast is the location for a unique cluster of nine low-capital "eco-tourism"

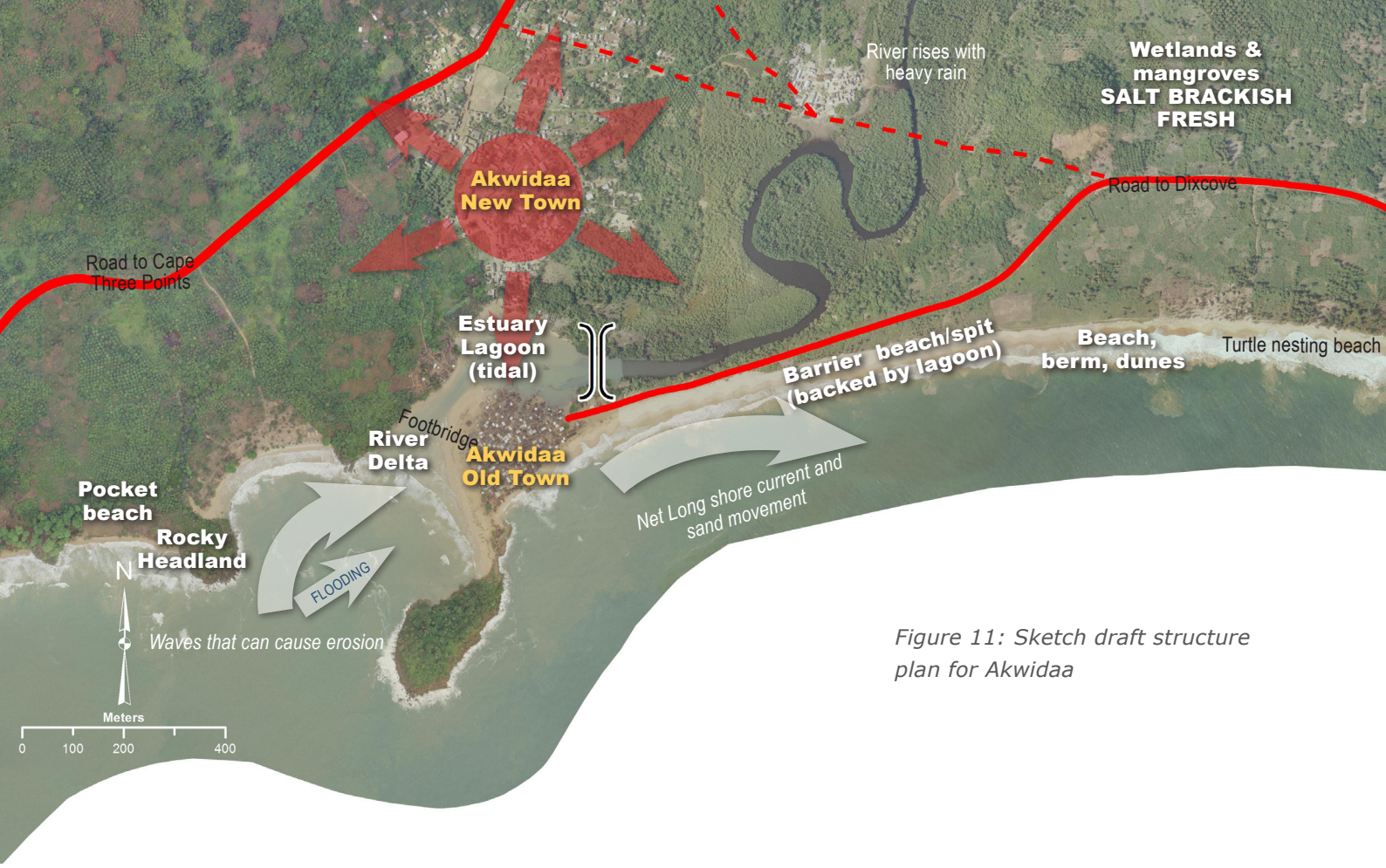


Figure 11: Sketch draft structure plan for Akwidaa

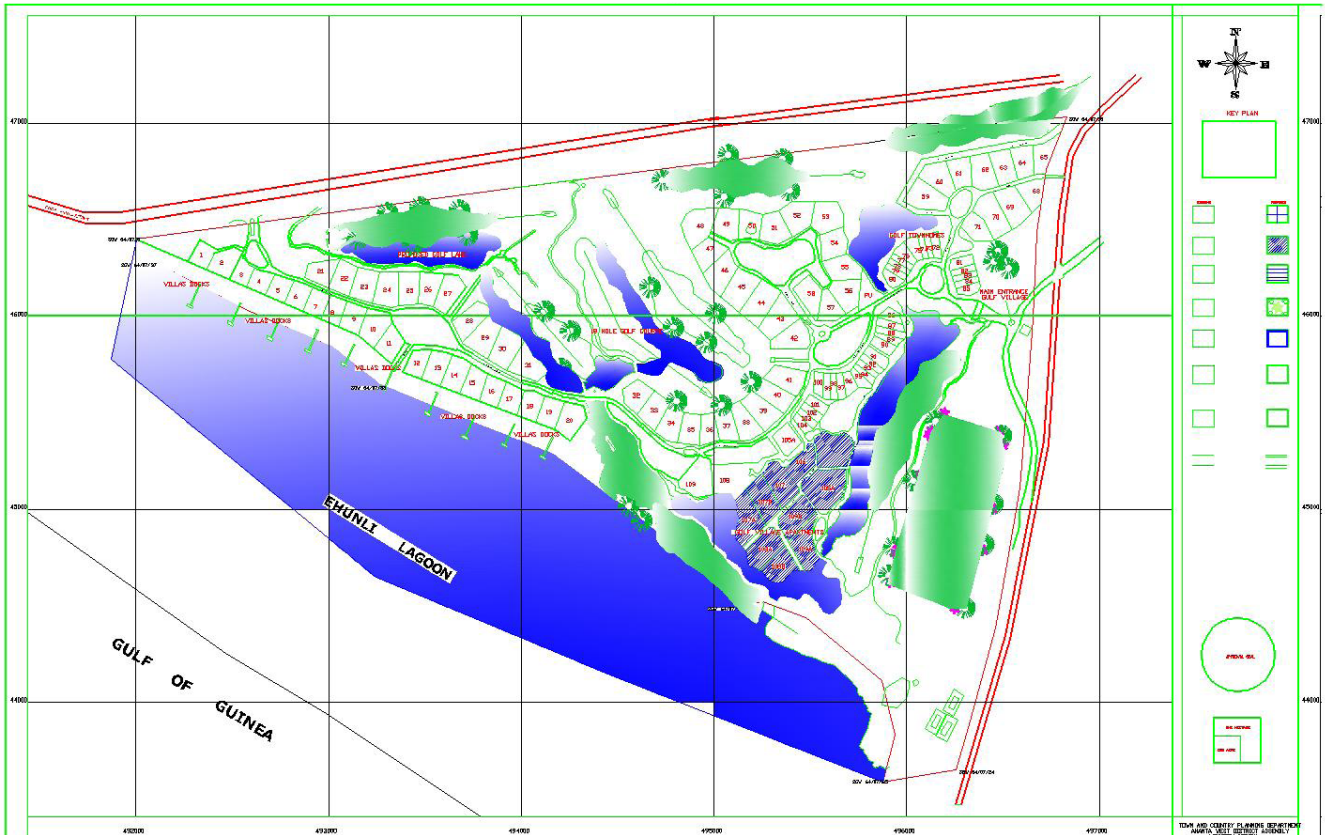


Figure 12: Masterplan proposals for Princes Town.

resorts (5), which can be seen in a positive light, and protected, as the seeds of eco-friendly development on the coast.

The input of major capital investment into leisure and other activities is exemplified by proposals for Princes Town involving a high quality hotel, residential and golf course development around the lagoon (6) and adjacent to the historic fort and fishing community. The issues arising from this are typical of any regeneration/investment project on this scale in the coastal zone.

Good Management Practices to Support Manage Large-Scale Leisure Development to Benefit the Community, the Private Investor and the Ecosystem: Princes Town Case Study

R20: A Climate Change and Natural Hazards Vulnerability Assessment and Adaptation Plan for Dixcove, Ahanta West District.

This is an initial Coastal Resilience Plan for Dixcove which aims to make the coastal community more resilient (less vulnerable) in the short, medium and long term. It provides an overview of the planning context and describes the key coastal features and their physical characteristics. A vulnerability assessment based on this information, focusing on the adaptive capacity in key facets including economic, social, governance and physical. A set of short and longer term actions are identified in conjunction with the community to improve its adaptive capacity and strengthen overall resilience.

R21: A Climate Change and Natural Hazards Vulnerability Assessment and Adaptation Plan for Akwidaa and Ezile Bay, Ahanta West District.

This is an initial Coastal Resilience Plan for Akwidaa and Ezile Bay which aims to make the coastal community more resilient (less vulnerable) in the short, medium and long term. It provides an overview of the planning context and describes the key coastal features and their physical characteristics. It is a vulnerability assessment based on this information, focusing on the adaptive capacity in key facets including economic, social, governance and physical. A set of short and longer term actions are identified in conjunction with the community to improve its adaptive capacity and strengthen overall resilience.

P16: Prepare Structure Plans and Local Plans for areas west of Takoradi up to Butre estuary and Agona; also Butre/Busia/Dixcove area.
P17: Prepare Community Action Plans to address vulnerability and improve resilience for all coastal communities by building on Dixcove and Akwidaa vulnerability assessments
P18: Apply good coastal management practice in major leisure developments such as Princes Town.

3.6.5 Siting of Infrastructure/ Settlements

It is essential that water dependent and water enhanced uses with resulting value returns are used to maximize value in areas of the coastal zone and that their siting prevents erosion and further damage to the coast (see, for example, location of proposed tourism development zone in Figure 10 above). To achieve this it will be necessary that the ground rules for shoreline development are included in the Structure Plan, Local Plans and through Assembly Bye-Laws.

3.6.6 Social issues, water, waste, and sanitation

Coastal communities are experiencing a severe decline in their traditional livelihoods through both natural and man-made causes. Poverty levels are increasing, educational levels are declining rather than improving, population continues to rise through high birth rates including teenage pregnancies and declining parenting standards. These factors are evident in the Medium Term Development Plan for the District.

The improvement of water supply, collection and final disposal of waste are matters that affect the health and quality of life of all coastal residents in the district. Streams and small rivers which serve many communities are the traditional sources of water for drinking and domestic use. Most communities also rely on boreholes and wells for their water. As these become polluted and demands on them increase, the need for investment in protection and new supplies arises. Added to community needs are those of the major industrial and tourism and leisure projects. These consume water on a much larger scale, yet the Water Resources planning for the region indicates the likelihood of a growing crisis gap between supply and demand. This is made worse by the pollution from mining of the region's major rivers and water courses.

Shoreline sanitation, especially at the densely populated fishing communities, requires more attention due to the implications on hygienic handling and processing of fish. It is common to find disposed fecal matter

washed ashore directly to the fish landing sites and the beaches, contaminating the fish that is harvested. Efforts made by Zoomlion and Zoil have produced no significant change in the sanitation condition. Improving sanitary services in the coastal communities is necessary for the following reasons:

1. Eliminate the causative agents of those water and excreta-related diseases; convert waste into readily re-usable resources and so conserve both water and nutrients; prevent the pollution of any body of water (ground water or surface water) to which the effluent escapes or into which it is discharged; to reduce organic pollution of water for drinking and other domestic purposes; safeguard aquatic life and maintain a healthy ecology of surrounding communities,
2. increase tourist visitation to the coastlines.

Project

P19: Map critical watersheds shared by adjoining districts and subject to collaborative management
P20: Continue and extend coastal and shoreline waste management schemes
P21: Reinstatement of wells and boreholes to be conditions of new developments and take account of salination threats

Reference

R22: Opportunities for integrating family planning, health and nutrition interventions into coastal-fisheries governance agendas in Western Region, Ghana

Opportunities for integrating family planning, health and nutrition interventions into coastal-fisheries governance agendas are identified for the coastal districts of Ghana's Western Region.

R23: Facilitating Integrated Population Health and Environment in Five Communities in the Shama District and Two Communities in the Ahanta West District: Achievements and Lessons Learned

This report outlines the accomplishments and lessons learned through the implementation of integrated Population, Health and Environment (PHE) initiatives by the Central and Western Fishmongers Improvement Association (CEWEFIA) in seven coastal communities in Ghana's Western Region. The report elaborates on the socio-environmental context in the communities before the piloted interventions and the relevance of PHE as an approach for addressing the issues faced by the target communities and associated ecosystems. The way forward for improving PHE programmes in such communities is suggested to inform similar actions in other parts of the country and elsewhere in the world.

R24: Freshwater supply and distribution: a developing crisis in the Western Region

This issue brief highlights the key issues facing Ghana's Western Region in terms of fresh water supply and distribution and recommends policy options to protect water resources and insure equity in their use and distribution.

R25: Improving Livelihoods through Plastic Waste Management in Coastal Communities of the Western Region of Ghana: Achievements and Lessons Learned

This report outlines the accomplishments and lessons learned through piloting integrated sanitation and livelihood improvement interventions in four coastal communities in the Western Region of Ghana by Daasgift Quality Foundation. It highlights the issues of plastic waste management in coastal communities and describes the business model applied to facilitate household income generation through plastic waste management in the target communities. The way forward for improving plastic waste management in coastal communities is suggested to inform similar and future initiatives in other parts of the country.

3.7 Economy and Livelihoods

3.7.1 Overview

It is estimated that over 65% of the people in the district engage in Agriculture whilst about 60% of the people in the coastal communities engage in fishing. Industry and associated services, incoming residential, tourism, and leisure and services developments will increasingly be the basis of the economy and employment. Coastal communities can benefit from these new economic opportunities through improving fish and agricultural value chains and development of associated small and medium scale enterprises that attract youth into agriculture. Human Resource capacity development through improving the educational system as well as adult training for coastal communities will be essential if they are not to become more marginalized slums.

Project

P23: Create links between local communities, tertiary/ vocational education and incoming developments in oil and gas, supply industries, tourism and hospitality, new residential developments, and construction.

Declining community livelihoods over the years, contributing to slow economic growth and rising poverty, is a major issue in the Ahanta West District. The youth are showing interest in illegal small scale gold mining (at Butre, Asemkor, Akwidaa, Princes Town and the Cape 3 Points Forest Reserve), sand winning, stone quarry and charcoal production which will deepen the decline in farming livelihoods. There is also out migration of the youth for menial jobs in bigger towns like Agona Nkwanta, Takoradi, Sekondi, Tarkwa and others, which weakens communities over the long term.

Reference

R26: Livelihoods and poverty reduction in coastal communities in the Western Region of Ghana: analysis of livelihoods baseline data of the ICFG program

This report is the result of the livelihoods baseline survey as part of the USAID-funded Integrated Coastal and Fisheries Governance (ICFG) Program for the Western Region of Ghana (Hen Mpoano). The survey aims to provide a baseline for interventions to be implemented as part of the Hen Mpoano by:

1. Establishing a baseline of the status of livelihoods of households in target communities (assess income levels and sources, seasonality issues, assets, vulnerability)
2. Establishing a simplified nutritional baseline of households in target communities and fish species consumed
3. Identifying opportunities for livelihood diversification in the target opportunities

Income diversification is a means to cope with risks and seasonality related to agriculture and fisheries. Poverty is multi-dimensional as it not only relates to income and consumption levels, but also to a lack of basic needs (access to shelter, health, and sanitation) and the ability to cope with shocks. Understanding poverty therefore requires the analysis to go beyond measuring income, to include factors such as education levels, health status, ownership and control over capital, financial and natural assets and access to social networks. The livelihoods survey conducted for the Hen Mpoano project aimed to encompass all these dimensions.

R27: Livelihood Diversification and fishing communities in Ghana's Western Region

Livelihood diversification in the fishing communities in Ghana's Western Region requires a focused effort to develop oil or tourism in a way that creates local employment and encourage people to exit fishing, leaving a less-crowded sector, more amenable to gradual change, with a more educated younger generation shifting into other sectors and places.

3.7.2 Agriculture

Fishing and farming livelihoods are interlinked. In the farming season (raining seasons) income from fishing are used to purchase farming inputs whilst investments shift back to fishing during the fishing seasons. Farming consists of subsistence, cash crops and plantations. Coconut was one of the main cash crops until the Cape Saint Paul Wilt disease gradually destroyed most of them from the 1930s onwards.

Rubber plantations are managed and developed by Ghana Rubber Estate Limited (GREL) which is engaged in a program of replanting very extensive worked-out areas, and expansion through an out-grower scheme. On the coast this is evident near Egyambra, Miemia, Akwidaa, Cape Three Points, Princes Town and other communities. Rubber is not inter-planted with other crops, which decreases food security. However GREL has recently introduced a policy of setting aside plantation land for subsistence. Norwegian Palm Limited (NORPALM) is another major agro-base industry in the district and also buys substantial quantities from local farmers. There are other local palm oil presses.

The result is that fisher folks are now unable to exchange their fish for cassava, plantain or other

food stuffs through a barter trade system which use to be a common practice in the communities. Social service and other government staff are also affected because they are unable to purchase cheap food items from farmers but have to depend on the expensive Agona Nkwanta Market.

3.7.3 Fishing

Active fishing activities occur in about 20 fish landing sites dotting the coast of Ahanta West district. Fish landings have declined over the last 15-20years, mostly attributed to increasing use of illegal fishing practices such as light fishing, use of monofilament nets, dynamite, carbide, pair trawling and fishing with obnoxious substances. Illegal practices result in poor fish quality, with fishmongers and processors in particular expressing greater worry about the short shelf-life of processed fish. Added to this is the arrival of algae bloom which adversely affects artisanal marine fishing, and damage to breeding grounds by infilling and pollution. The dramatic decline in fisheries can be reversed through significant reductions in fishing effort, best decided by co-management institutions including community-based. Management of pelagic, demersal and those small scale fish stocks found in estuaries, lagoons, rivers, lakes and nearshore marine areas will require different co-management approaches with expressions at the national, regional and community scales respectively.

Reference

R28: Smoked marine fish from Western Region, Ghana: a value chain assessment

The assessment of the smoked marine fish value chain assessment in the Western Region, Ghana concludes that there does not seem to be any significant market at present for a premium smoked product. It discusses possible risks with any change to the status quo and makes suggestions for pilot scale interventions.

R29: Ghana Coastal Fisheries Governance Dialogue.

The second national Fisheries Governance Dialogue aimed to help stakeholders in the fisheries sector generate a shared understanding of critical lessons and pathways for fisheries co-management success in Ghana. The dialogue was held in direct response to the call from both fisheries communities and the government of Ghana for a radical change from the way fisheries resources are currently being managed.

R30: Ghana Coastal Fisheries Governance Dialogue: Developing Options for a Legal Framework for Fisheries Co-management in Ghana

The Dialogue was a direct follow up on the Second Dialogue held in Elmina in April 2012. The two-day meeting was attended by 79 fisheries stakeholders representing government, donor agencies, research institutes, fisher folks, non-governmental organisations and civil society organizations.
It was generally agreed that there was need for three key structures:

1. National-level management for pelagic fisheries. Laws will be developed to manage pelagic fish at the national level since they are highly migratory and cross regional and national boundaries. Management will also need to involve enforcement agencies (e.g. Marine Police and Navy).
2. Regional-level management of near shore demersal species and the Volta Lake. Management authority should be devolved to the regions with full authority to approve management plans for fisheries resources in their areas.
3. Local management of lagoons and estuaries and small freshwater lakes. Management and rule making powers devolved to local communities – and the rules made to be passed as by-laws by district assemblies.

R31: Marine Police Training Workshop Proceedings, September 25 – October 4. Fresh Approaches for promoting compliance and enforcement.

The Hen Mpoano Initiative discussed with the Fisheries Commission and the Ghana Police Service (GPS) on ways to support aspects of the training of the newly assembled officers of the MPU on the ecological justifications of the Fisheries Regulations. Approval was sought from USAID to organize short training modules for the unit. A curriculum for the training was approved by the GPS, FC and USAID which paved the way for the training workshop. It consisted of series of lectures, group assignments, presentations and discussions, role plays, and field visits to fish landing sites and fishing communities. The visits were important for the Marine Police Officers (MPOs) as that inducted them into the communities.

R32: Joining Forces to Collaboratively Manage Ghana's Fisheries Resources: the role of a Fisheries Working Group

In order to sustain the socio-economic benefits from coastal resources and biodiversity, there was the need for a collaborative approach to management rather than leaving the Fisheries Commission to single-handedly manage the fisheries and coastal resources. A Fisheries Working Group (FWG) was therefore catalyzed by the ICFG Initiative. Its members were carefully selected to comprise representatives of Fishers and State Regulators of the fishing industry, to play an advisory role among others to the Fisheries Commission relative to policy and management issues. In addition to this, the FWG sought to address ineffective communications among fishers and stakeholders including the Petroleum industry.

R33: Region Fisheries Sector Review

This report concludes that any attempt to promote fisheries development and fisheries management reform in Ghana's Western Region must address a wide range of issues, including an understanding of the dynamics of the fishery, solutions for improved management, promoting pro-poor livelihood opportunities, and building a stronger constituency to tackle these issues in transparent and equitable ways.

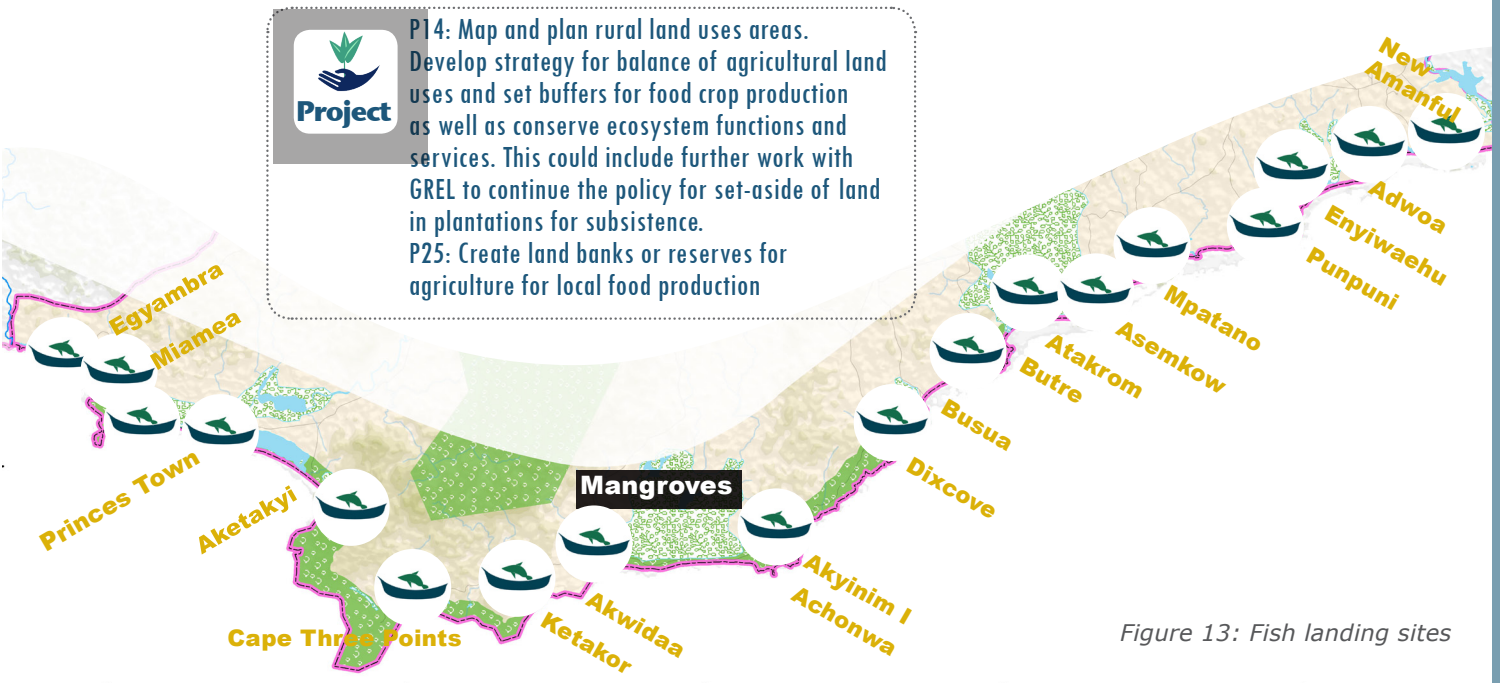


Figure 13: Fish landing sites

3.7.4 Industry and related services

No major industrial investments have as yet materialized in the coastal zone, but some major developments are being planned, the largest being the proposed $12bn Oil Refinery at Pumpuni (which has been proposed since before the discovery of Oil and Gas locally), others including Bulk Oil Storage Terminals at Pumpuni and Edgyambra.

The oil and gas exploitation fields are further west and off shore, having therefore only secondary impact on the Ahanta West District, but stakeholders feared that fisheries and farming will suffer from impacts of the oil production including land speculation for hospitality and oil related facilities. Community folks also fear that the whole shoreline in Busua including the present fish landing site has been sold out for hospitality investors.

The key points that need to be considered in major facility siting include:

- Potential for employment and attraction of funds to deal with some of the endemic and long term problems which are being faced by coastal communities;
- Relationship to existing communities: connectivity to existing road and infrastructure networks; security, pollution (noise, air, land and water-based)
- Relationship to existing coastal and marine eco-systems: preventing damage to water resources, below ground aquifers, drainage, coastal and marine systems and bio-diversity as noted above. Care in understanding impacts of any incursions into coastal features and remedial measures to solve any existing long term problems and counter any new damage which might be a consequence of the new facility.
- During construction phase and operating phases of already overstretched services such as health, education, water, power etc. Provision of properly planned and constructed settlements for the above as opposed to allowing temporary structures which evolve long term into slums. Respect for existing cultures and lifestyles and measures to effect good relationships between incomers and existing populations.
- Planning a process in which existing settlements, livelihoods, landscapes and eco-systems come out as improved as opposed to damaged or destroyed by new facilities
- All of the above will be considered in an Environmental Impact Assessment for any major project, but it is necessary to use the Integrated Coastal Management mechanisms to ensure that this is full, comprehensive and understood and supported by local communities.

It should be noted that as soon as any major new facility comes into being, there is a major impact on surrounding areas in the form of those wanting to take advantage of supply chain opportunities – housing, shops, commercial services, warehousing, industrial services. The mechanism for ensuring that these unfold in an orderly manner is the Structure Plan and Local Plan. But in the case of very large projects such as the Gas Plant, Oil Refinery or proposed Oil and Gas Specialist Harbour, the impact can only be fully understood and planned for at a sub-regional and even regional level, hence the need for joint planning across districts such as has been mentioned above.

3.7.5 Tourism and Leisure

The key tourism sites in the coastal zone of Ahanta West District are at Butre Estuary, Busua, from Dixcove to Cape Three Points and Princes Town. Butre/Busua/Dixcove has been identified as a tourism area, and there is a stretch of low capital intensity/eco-tourism resorts from Busia to Cape Three Points. There is the potential for another Forest Park similar to Kakum at Cape Three Points and a major hotel and leisure project at Princes Town, where a big site has been bought by Soroma Capital, to create a tourist town with investments of up to USD$100 m. The beautiful sandy beaches, coastal landscapes, traditional settlements, wildlife, historic and cultural sites, opportunities for surfing, for canoe paddling, turtle and whale watching and hiking make this one of the best leisure areas in Ghana.

These opportunities are yet to be taken up on any scale by holiday visitors, and the majority use of facilities is still for business and development projects. To get onto the mass/global tourism market requires a regional/sub-regional initiative to provide access and infrastructure on a scale which could be an objective of sub-regional or sub-national bodies such as the proposed Joint Coastal Development Planning Area and the Western Corridor Accelerated Development Authority.

Many of the measures which have described in above sections and other measures recommended in a recent report on Tourism (7) are pre-requisites for the tourism industry to take off and to become a desirable use of the coast in balance with other activities.

Project

P24: Prepare Structure Plans and Local Plans for areas west of Takoradi up to Butre estuary and Agona; also Butre/Busia/Dixcove area.
P27: Ensure local monitoring/input to Environmental Impact Assessment process by the Coastal and Marine Committee

Project

P14: support local festivals and educate/ promote on retention of cultural identity of coastal and fishing communities
P28: Continue and extend waste management schemes to keep beaches clean to more remote beaches, and expand to include security measures for visitors
P29: Tourism supply chain: involve local communities in the delivery of the product such as local food, fish/fishing and other products:
P30: Promote tourism and leisure investment through establishment of investors forums.
P31: Work with Ghana Museums and Monuments Board, Ghana Wildlife Society and others to extend the tourism product range – eg Historic Forts, Cape Three Points, whale watching, wildlife conservation - and develop a sustainable eco-tourism development plan for the coastal zone

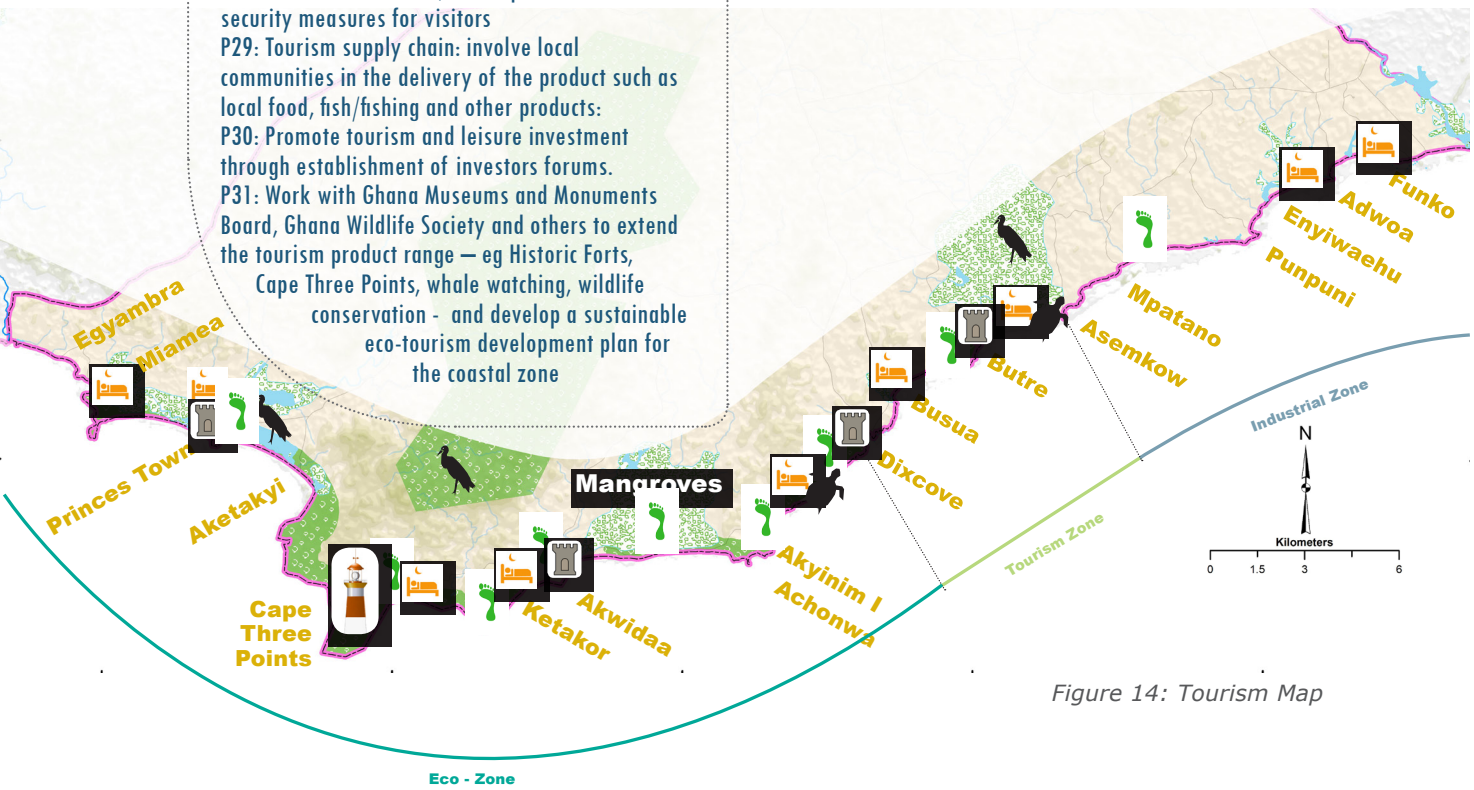


Figure 14: Tourism Map

Section four:

INTEGRATED COASTAL MANAGEMENT INSTITUTIONS AND PROCESSES: Development Goals, Projects and Priorities

4.1 Governance: management institutions and processes

Institutional frameworks for effective implementation of ICM are yet to be fully developed at all levels - district, regional and national. To be successful, such mechanisms should recognize and institutionalize the roles of private sector, civil society and traditional authorities in addition to government. In Ahanta West District, a pilot institutional mechanism was developed under the collaborative program with Hen Mpoano through the formation of, and the general assembly's endorsement of a special committee of the assembly known as the Marine and Coastal Management Committee (MCMC). This Committee has representation of Civil Society, Traditional Authorities, the Private Sector, and coastal communities. The committee is a good example of how to link and integrate issues at the coastal community scale with planning and decision making processes at the district level.

On the other hand, coastal issues that find expression at the sub-regional and regional levels (alteration of the coastal zone, coastal erosion, conflicts arising from siting large scale infrastructure) will require mechanisms that allow for negotiation, coordination and better communication between national and regional level institutions since the district level mechanisms for planning and decision making will not provide the most effective responses to these bigger scale issues. The Legal Instrument (LI)

Reference

R34: A Fresh Approach to the Governance of the Western Region's Coastal Zone

The fundamental purpose of designating the six coastal districts of the Western Region as a Joint Development Planing Area is to provide for sustained planning and management that addresses the issues that affect the Western Region's coastal zone as a whole and cannot be effectively addressed by the coastal districts individually. It provides the districts with an explicit high-level mandate and an additional source of funding to work collaboratively on specified issues posed by development in the Western region's coastal zone. The joint development planning and management process is to manage, preserve, protect, develop, and where possible restore, for this and succeeding generations, the resources of the coastal zone of the Western Region. This would be accomplished through comprehensive and coordinated long range planning and management designed to produce the maximum long-term benefit for society. The sustainable use of socio-ecological systems would be the primary guiding principle upon which alterations and new uses in the coastal zone would be measured, judged and regulated.

R35: A nested coastal and marine governance system

This brief puts forward options for a nested coastal governance system. These ideas will be refined and augmented by ideas introduced by other papers in the series. The papers focus on coastal and fisheries issues in the western region to identify their causes, social, economic and environmental implications and how they might be addressed by a strengthened governance system. These briefs draw upon Hen Mpoano's "learning by doing" process as it works with communities, districts, governmental agencies and other stakeholders to practically address problems and specific opportunities along the coast and within the fishery. The process and proposal is supported by the advisory council of the Hen Mpoano initiative.

R36: Managing our coastal wetlands: lessons from the Western Region

Though the government of Ghana has made clear commitments for wetlands management and protection, there remain significant challenges in the implementation of conservation strategies and encroachment and degradation continues to evolve. The Western Region is home to some of the richest and most diverse coastal wetlands areas in Ghana and yet there are no formal mechanisms for their management and protection. These wetlands provide a host of critical functions and services but they are increasingly under threat for accelerated development resulting from the rapidly evolving oil and gas sector and record high commodity prices for a host of products exported from the region. This paper proposes a "way forward" that calls not only for commitment within agencies of government but also the active involvement of civil society and a change in the attitude of the traditional authorities and private sector interests that are fueling, directly or indirectly, the threats to the coastal wetlands of the Western Region. It also suggests mechanisms for managing and protecting vital wetlands resources in the western region.

for Joint Development Planning Area and associated Executive Instrument provides adequate institutional and legal framework for addressing specific challenges which faces two or more coastal districts as a whole and for which each individual district will be unable to tackle.

The table below illustrates the current system of governance as applied to the coastal zone. It shows that the system is working in part, but there are serious deficiencies, not least those arising from lack of resources. Listing these from the bottom up:

Table 1: Current system of coastal governance and its limitations.

Institution	Description	Linkages and effectiveness
Unit Committees and Area Councils	Unit Committees exist at Settlement level and can prepare Community Action Plans which should be incorporated in District level planning. They report to the 6 Area Councils into which the District is sub-divided, which in turn report to the District Assembly.	There is a community level perception of inadequate government representation and attention. They complain of a big gap between the community and the District Assembly. Even communities with Assembly Members who reside in the communities claim they hardly pay visits and only see them during general elections. Unit Committees which are supposed to fulfill this function lack the resources; to effectively represent communities or carry out Community Action Plans. Such Plans (for examples see Akwidaa and Dixcove) could promote community resilience, improve wellbeing and livelihoods. Representation can be thwarted by chieftaincy disputes.
District Assemblies	District Assembly is the main institution of decentralized government. Assembly members are elected while District Chief Executives and Presiding Members are appointed by the President. Integrated Coastal Management can be applied through the Development Planning and Physical Planning systems. The Assembly has created a Marine and Coastal Management Committee with representation by Civil Society, Traditional Authorities, the Private Sector, and Coastal Communities. This can be the vehicle for driving a strategy which can implement many of the proposals contained in this toolkit	The Development Planning system suffers from weak finance for implementation and frequent over-riding from the centre. There is also a lack of integration of Physical plans with Development Plans. The Coastal and Marine Committee has just been inaugurated and requires ongoing support to become effective. The Projects that have been identified which fit within the remit of this committee are noted in Table 2 below
Joint Coastal Development Planning Area	The LI for Joint Development Planning Area and Executive Instrument for designating areas as such, enables adjoining Districts to act jointly on projects which run across their boundaries. Certain aspects of Integrated Coastal Management fall into this category and steps are being taken to set up such a body for the six coastal districts of the Western region	The Joint Development Planning Area is at a formative stage and negotiations are underway to pilot such a mechanism in the six coastal districts of the Western region. The Projects that have been identified which fit within the remit of this are noted in Table 2 below. In addition working across districts will assist with maintaining consistent policies for coastal management.
The Regional Co-ordinating Council	The Regional Coordinating Council has been set up to co-ordinate and harmonise district level planning within the region. Apart from harmonization of Development Plans, it has also recently prepared and approved a Regional Spatial Development Framework. The Physical Planning Department also houses a Geographical Information System (GIS) training and development hub which has trained physical planning officers in five of the six coastal districts.	Monitoring of projects in development plans is the main role at present. The physical planning hub has been active and may play an ongoing role in servicing any Joint Coastal Management Planning Area

4.1.1 Projects for the Medium Term Development Plan and the National Medium Term Development Framework

The Projects which have been identified in SECTION 3 above are here listed and numbered as under the main relevant section of the Government of Ghana's forthcoming Medium Term Development Framework 2014-17. Most of them fall under Sub theme: Sustainable natural resources management (which includes marine and coastal resources).

Table 2: Projects listed under National Development Planning Guidelines.

Sustainable natural resources management	MTDP	JDPA
1.1 Sustainable use of coastal forests and wetlands		
P4: Undertake public education on the benefits of conservation of coastal ecosystems	X	X
P9: End destructive sand winning practices by use of bye laws and community sensitisation	X	X
P11: Establish new and support existing Community Resource Management Areas (CREMAs) to protect and enhance wetlands	X	
P12: Designate both on shore, including wetlands and mangroves, and maritime preservation areas in Structure Plans and Local Plans	X	
P13: Incorporate policies in plans and bye laws to reduce impact of dams, creation of impervious surfaces in development and blockage of water courses	X	
P14: Map and plan rural land uses areas. Develop strategy for balance of agricultural land uses and set buffers for food crop production as well as conserve ecosystem functions and services.	X	X
P15: Develop the eco-tourism potential of Cape 3 points Forest.	X	
P16: Establish green networks in District Spatial Development Framework and to protect wildlife, agricultural and forest areas. Include green corridors in Structure Plans and Local Plans.	X	
2.1 Develop a co-management framework for fisheries with explicit mandate for MMDAs and communities		
P26: Develop co-management committees and management plans for small scale fish stocks in Cape Three Points and adjacent nearshore marine areas.	X	X
2.2 Promote fisheries development for food and livelihood security		
P2: Prepare Marine Spatial Plan.	X	X
P5: Work with Marine Protected Areas Inter ministerial Committee over designation of marine protected areas	X	X
P3: Continue with research on Algae Bloom leading to proposals for its eradication		X
2.3 Improve access to coastal land for food crop farming		
P14: Map and plan rural land uses areas. Develop strategy for balance of agricultural land uses and set buffers for food crop production as well as conserve ecosystem functions and services. This could include further work with GREL to continue the policy for set-aside of land in plantations for subsistence.	X	
P25: Create land banks or reserves for agriculture for local food production.	X	X
P29: Tourism supply chain: involve local communities in the delivery of the product such as local food, fish/fishing and other products.	X	X
2.4 Create opportunities for generating wealth, jobs and diversified livelihoods from the oil and gas sector		
P23: Create links between local communities, tertiary/ vocational education and incoming developments in oil and gas, supply industries, tourism and hospitality, new residential developments, and construction.	X	X

Sustainable natural resources management	MTDP	JDPA
3.1 Designate areas for large facility siting in the coastal zone		
P24: Prepare Structure Plans and Local Plans for areas west of Takoradi up to Butre estuary and Agona; also Butre/Busia/Dixcove area.	X	
P27: Ensure local monitoring/input to Environmental Impact Assessment process by the Coastal and Marine Committee.	X	X
3.2 Develop tourism and leisure potential of coastal areas		
P33: Support local festivals and educate/promote on retention of cultural identity of coastal and fishing communities.	X	
P15: Develop the eco-tourism potential of Cape 3 Points Forest.	X	X
P28: Continue and extend scheme to keep beaches clean to more remote beaches, and expand to include security measures for visitors.	X	
P29: Tourism supply chain: involve local communities in the delivery of the product such as local food, fish/fishing and other products:	X	X
P30: Promote tourism and leisure investment through establishment of investors' forums.	X	X
P31: Work with Ghana Museums and Monuments Board, Ghana Wildlife Society and others to extend the tourism product range – eg Historic Forts, Cape Three Points, whale watching, wildlife conservation and develop a sustainable eco-tourism development plan for the coastal zone.	X	X
4.1 Develop partnerships for waste management involving shorefront communities.		
P20: Continue and extend coastal and shoreline waste management schemes	X	
4.2 Improve access to water and sanitation facilities		
P19: Map critical watersheds shared by adjoining districts and subject to collaborative management		X
P21: Reinstatement of wells and boreholes to be conditions of new developments and take account of salination threats	X	
5.1 Reduce vulnerability of people, property and infrastructure to coastal hazards		
P6: Increase collaboration with the Ministry of Water Resources, Works and Housing for regulating private development and installing publicly funded defenses.	X	X
P7: Where acceptance of land loss is agreed as the best option long term, plan re-settlement schemes and incorporate as objective in Structure Plans.	X	
P8: Develop a public education programme on coastal hazards and climate change.	X	
P32: Undertake public education on values and importance of wetland ecosystems.	X	
P10: Prepare coherent shoreline management plans to regulate coastal land use.	X	X
P16: Prepare Structure Plans and Local Plans for areas west of Takoradi up to Butre estuary and Agona; also Butre/Busia/Dixcove area.	X	
P17: Prepare Community Action Plans to addwress vulnerability and improve resilience for all coastal communities by building on Dixcove and Akwidaa vulnerability assessments.	X	
P18: Apply good coastal management practice in major leisure developments such as Princes Town	X	
Other Sections of the MTDF		
P1: Form Working Groups to deal with specific coastal issues, for example the Cape Three Points Working Group	X	X
P14: Support local festivals and educate/promote retention of cultural identity of coastal and fishing communities	X	
P34: Work with Lands Commission at local level on land security and compensation	X	X

4.3 Regulation

The district's permitting and regulating processes are crucial for implementing certain aspects of coastal planning and management. These processes can rely on best management practices for addressing urbanization and shoreline sanitation issues (example Dixcove), flood hazard management (example Akwidaa) and large scale tourism facility siting (Princes Town). The district also has the power to formulate bye-laws to regulate different activities in its coastal zone. Example is the Community Resourced Management Areas bye-laws that has been adopted and provided for expansion of these areas to include coastal wetlands. Ahanta West can also draw on examples from Shama District to formulate bye-laws for floodplain and shorefront management.

4.4 Priorities and Actions

The above projects emerge from the participative working with coastal communities and other stakeholders, the evidence that has been gathered and analyzed. The list does not take account of priorities or the capacity of stakeholders to carry out the projects. Some will align with Government of Ghana national priorities, others may fit well within the objectives of foreign aid or corporate responsibility. The Coastal and Marine Mangagement Committee will be a point of discussing and setting priorities, which will be reflected in the Medium Term Development Plan and Spatial Plans, and coordinating joint action by stakeholders.

Priorities that are highlighted here include the urgent approval of bye laws, designation of protected areas, along with continuing to develop community resourced management of them. Public education initiatives in the list of projects are a pre-cursor to action. Some of the projects listed should be routine functions of the District Assembly, but it is proposed that they become "projectised" as a way of ensuring that they maintain a high priority in local administration and action with stakeholders. The table also indicates which projects are purely within the province of the Assembly, and those which need to be shared in a Joint Planning Area.

4.5 Funding

The Medium Term Development Plan is the document which ties together local needs, national policies, projects and action plans with funding sources. Yet the funding systems remain weak compared to the task. In order to achieve the objective of "goods and services that generate long term socio-economic benefits to communities while sustaining biodiversity" multiple funding streams will need to be co-ordinated. These will have to include central government and donor support, internally generated funds, especially from a share of the increased land values that are being created (betterment and land value capture) which has to be negotiated on each development proposal; from local property taxes which if well established can be used to underpin bond issues for funding infrastructure; and from CSR policies of major investors, including setting up of a Coastal Foundation.

Notes to text

(1) See also Ghana's Riparian Buffer Zone Policy for Managing Freshwater Bodies in Ghana, 2011. Ministry of Water Resources, Works and Housing. Government of Ghana. The following are relevant detailed definitions:

Flood Hazard Boundary Map is a map upon which the boundaries of the flood hazard zone has been delineated. It is periodically updated as new information becomes available.

Flood Hazard Zones: Zone B is the additional land and wetlands which lie within and form part of the boundaries of the flood zone as illustrated in the Flood Hazard Boundary Map. This area has a probability of 1 in 5 or 20% in a given year to be covered by floodwater during a period of intense rainfall, as well as have temporary extensive areas of standing water, and also includes permanent and seasonal wetlands and normal river flow. **Flood Hazard Zone C** is an expanse of relatively flat land that spans from the main stem of a river or stream, possessing wet soils that include sediment carried and dropped by the stream, and is susceptible to being inundated by periodic flood waters from any source with a probability of 1 in 25 in a given year. This zone incorporates the river buffer zone A and the High Flood Hazard Zone B.

Floodplain Is a level or nearly level land along a stream or river flooded only when the streamflow exceeds the water carrying capacity of the channel. flat or nearly flat land adjacent to a stream or river that experiences occasional or periodic flooding.

Riparian Buffer Zone is A riparian buffer zone strictly defined, comprises only the vegetation in a stream channel and along riverbanks; However, the term has recently been used more broadly to include adjacent landscape that exerts direct influence on a water bodies and associated aquatic ecosystems. It generally encompasses undisturbed native strip of vegetation either original or established that borders streams and rivers, ponds, lakes and wetlands and is therefore the interface between terrestrial and aquatic ecosystems. It may include trees, shrubs, herbaceous plants and grasses extending from the defined edge of a stream, river or shoreline. To conserve these resources requires that buffer zones are designated to the maximum extent practicable and include best management practices that will ensure the maintenance and integrity of the waterway, biota, and habitats and reduce pollution that would result in water quality improvement and fresh water supply at low cost from well conserved water bodies.

River Buffer Zone A is a land area on or contiguous to the main river channel or wetland that shall be retained in its natural or undisturbed condition. This includes vegetation, wet soils, slopes and vegetative cover within. Buffer width varies for major rivers/streams (10 - 60m), minor streams (10 – 20m), and seasonal streams (10 – 15m). See Riparian Buffer.

(2) Based on Boateng Isaac (2012) An Application of GIS and coastal geomorphology for large scale assessment of coastal erosion and management: a case study of Ghana.

(3) Korean International Cooperation Agency, (KOICA) Strategic Development Planning, Ahanta West District, Final Report 2012, 'Green Networks' concept p.112

(4) Based on Rapid Assessments of Coastal Communities, 2010

(5) The group of eco-tourism resorts is prominent in their joint initiative, as apparent at http://www.ghanawestcoast.com/gwc/

(6) See http://www.soromacapital.com/Business+Activities/Advisory/Princes+Town+Resort and http://www.adjaye.com/projects/retail-commercial/princes-town-resort/

(7) The key points which have been identified for this are:

- Constructions at beach destinations should be

behind the tree line and lower than the tree height so that from the beach the view is dominated by the trees and the building are hidden. This means repair existing/stopping new undesirable structures from being built.

- Add tourism investment to the justification for infrastructure investment in coastal communities, and seek partnership with tourism facility investors in providing them (electricity water, sanitation, waste).
- Support to farming should seek to link locally sourced food with tourism development.
- Protect and secure beaches: prevent further erosion and damage sand and stone winning. Keep beaches and the sea clean. Ban driving beach buggies or motor bikes on popular beaches, publicise the dangers of being in fish landing areas, establish life guards and security.
- Involve local communities in the delivery of the product: increasingly poor local communities are well aware of the opportunities which tourists provide, but there are many ways in which these linkages could be developed as a source of business. For example, fishermen who could introduce and show visitors their industry, tours of settlements, cultural tours, farm visits, supplies of food and fish among others. All of these happen informally but could be scaled up if training and other essentials could be provided.
- As a strong complementary asset to beach tourism, other sites must be strengthened further developed. The Marine and Coastal Committee can work with the relevant authorities such as the Ghana Museums and Monuments Board, the Wildlife Division, Ghana Wildlife Society amongst others to:

    1. improve access to ecotourism areas as well as signage and facilities such as in Cape 3 Point Forest Reserve
    2. develop new attractions, for example sites like Cape Three Points Lighthouse should be developed as prime whale watching sites (8).
    3. Support and promote initiatives that are helping conservation and protection of marine and shore-based wildlife such as the efforts of certain beach resorts to offer turtle volunteer opportunities.
    4. Maintain and develop historic and cultural sites: there is huge scope for extending the current offer.

Section five:

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R25: Asmah, G.B., Owusu, A., Kankam, S. (2013). Improving Livelihoods through Cleanliness in the Coastal Communities of the Western Region of Ghana: Achievements and Lessons Learned.

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R27: Gordon, A., Pulis, A. (2010) "Livelihood Diversification and fishing communities in Ghana's Western Region", WorldFish Center. USAID Integrated Coastal and Fisheries Governance Initiative for the Western Region, Ghana. 69pp.

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5.2 List of data files

Theme	Feature	Description	Object	Source	Year
Coastal Resources	Coastal Vegetation	A stretch of vegetative cover along the coast of Ahanta West district interspersed by mangroves	Polygon	ICFG	2012
Coastal Resources	Birds	Bird diversity along the coastal stretch of Ahanta-West district	Point	EPA	2004
Coastal Resources	Coast Type	Representation of the district's coastline classified into sandy beaches, rocky shores and mouth at lagoon	Line	EPA	2004
Coastal Resources	Ecological Ranking	Sensitivity of Coastal ecosystems to potential oil spills.		EPA	2004
Coastal Resources	Fish and Shrimp	Distribution of nursery and spawning sites of fish species.	Point	EPA	2004
Coastal Resources	Fish Landing Sites	The location of fish landing sites, the number of beach seine activities, number of fishermen and the number of canoes.	Point Polygon	EPA	2004
Coastal Resources	Human Use Ranking	Classification of human use along the coast.	Line	EPA	2004
Boundary	Ahanta West District boundary	The boundary of Ahanta-West district including the coastline.	Polygon	ICFG	2012
Boundary	Ahanta West District boundary (TCPD)	The boundary of Ahanta-West district including the coastline.	Polygon	TCPD	2013
Boundary	Coastal Zone (1000m)	1000 meter buffer of the coastline which defines the landward boundary of the coastal zone.	Line	ICFG	2012
Boundary	Coastal Zone (30 meter Bathymetry)	30 meter bathymetry line indicating the seaward boundary of the coastal zone.	Line	ICFG	2012
Boundary	Coastal Zone (6 Nautical miles)	6 Nautical mile buffer of the coastline indicating the seaward boundary of the coastal zone.	Line	ICFG	2012
Boundary	Coastal Zone(Landscape and Seascape)	The coastal zone of Ahanta West district.	Polygon	ICFG	2013
Focal Area Zone	Greater Cape Three Points Focal Area	Boundary of the Greater Cape Three Points focal area.	Polygon	ICFG	2012
Hydrography	Coastal Wetlands	Water bodies, wetlands and adjourning ecosystems that promote aquatic life along the coastline of the district.	Polygon	EPA	2004
Hydrography	Rivers	River systems.	Line	ICFG	2010
Industrial	Industrial Development	Various industrial developments in the district.	Point	EPA	2004
Industrial	Mineral Deposits	Location of the different types of mineral exploration activities.	Point	EPA	2004
Industrial	Tourism	Tourism destinations in the district.	Point	ICFG	2013
Roads	Ahanta West Roads	Street center lines for the major transportation highways, roads, and streets.	Line	ICFG	2012
Settlement	Ahanta West Towns	Administrative names and the location of all the major settlements.	Point	ICFG	2012
Settlement	Ahanta West CREMA/CBAGs Communities	Location of all the settlements in the district that form part of the Community Resources Management Areas (CREMAs) and the Community based Advocacy Groups (CBAGs).	Point	ICFG	2012
Settlement	Ahanta West Coastal Towns	Names and locations of some selected coastal towns/ communities in the district that fall within the Greater Cape Three Points focal area.	Point	ICFG	2012
Vegetation	Forest Reserve	Forest Reserve.	Polygon	Forestry dpt.	
Vulnerability Assessment	Flood Zones	Flood zones or areas that were constantly flooded.	Polygon	ICFG	2013
Vulnerability Assessment	Previous Shoreline	The previous shoreline extent as mapped by community members.	Line	ICFG	2013
Vulnerability Assessment	Virtual Shoreline	The farthest extent of wave action as mapped by community members.	Line	ICFG	2013
Vulnerability Assessment	Community Assessment	Vulnerability assessment including socio-economic ranking and specific indicator values of all coastal communities.		ICFG	2013
Imagery	Orthophotos	Digital orthophotos of the coastal stretch of the district.	Raster	Survey dpt.	2005
Imagery	Toposheets	Scanned topographic sheets of the district.	Raster		1986
Elevation/Bathymetry	Contour (20 meters)	20 meter interval contour lines.	Line	ICFG	2011
Elevation/Bathymetry	Elevation and Bathymetry (20 meters)	20 meter interval elevation and bathymetry (sea depth).	Line	ICFG	2011
Elevation/Bathymetry	Aster 30meter Bathymetry	30 meter resolution Aster bathymetry (sea depth).	Raster	ICFG	2011
Elevation/Bathymetry	Aster 30meter Elevation	30 meter resolution Aster digital elevation model (DEM).	Raster	ICFG	2011

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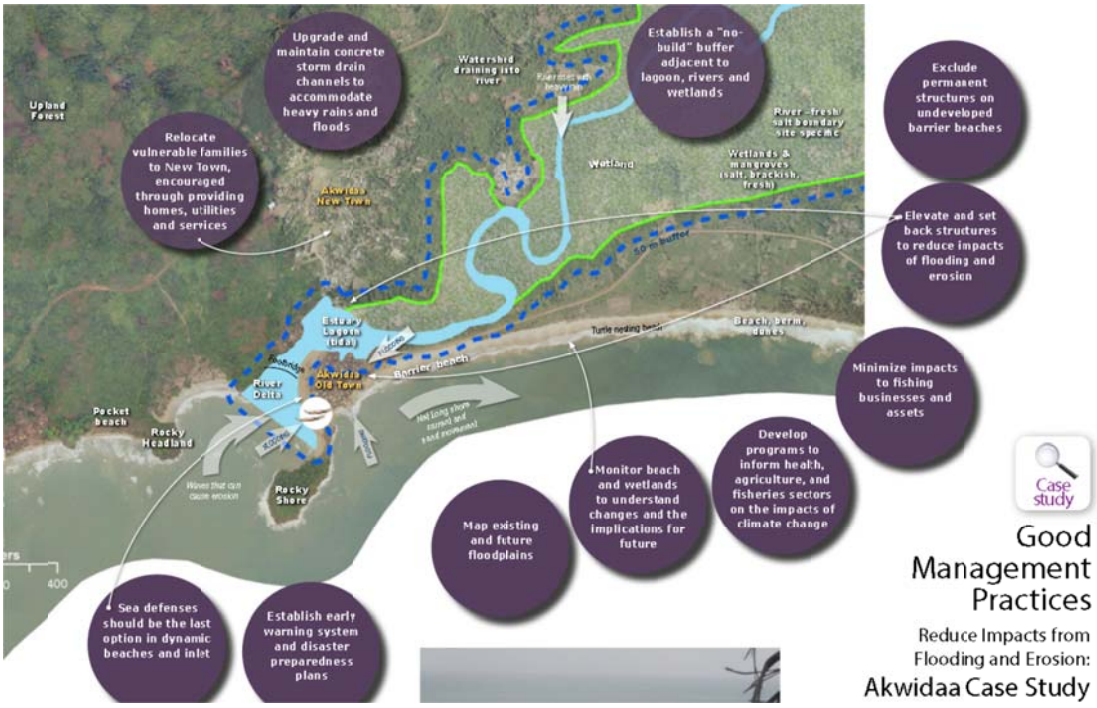
CASE STUDIES IN GOOD MANAGEMENT PRACTICES IN THE COAST OF AHANTA WEST DISTRICT, GHANA



Hɛn Mpoano

THE UNIVERSITY OF RHODE ISLAND GRADUATE SCHOOL OF OCEANOGRAPHY

COASTAL RESOURCES CENTER

DO THE RIGHT THING
Friends of the Nation

WorldFish

sustainaMETRIX

Case study

Good Management Practices

Reduce Impacts from Flooding and Erosion: Akwidaa Case Study

Good Management Practices

Reduce impacts from flooding and erosion.

Akwidaa Case Study

Objective 1 - Citizens, leaders and sectors are fully aware of vulnerabilities from natural flood hazards and options to reduce risk today and in the future.

1. **Develop programs to inform health, agriculture, and fisheries sectors on the impacts of climate change.** Changes in precipitation, temperature and weather patterns affect the health and wealth of the community. Work with government and non-government organizations and academia to share up-to-date information on impacts and actions that can be taken by different sectors of society to be more resilient.
2. **Establish early warning system and disaster preparedness plans.** Community-based programs should include participatory mapping of risk evacuation routes, drills to practice warning and evacuation, and information exchange. Early warning can include informing the community of extreme high tides, heavy rains, and wave activity. SMS and community networks have been successful at getting the word out.
3. **Monitor beach and wetlands to understand changes and the implications for future.** Work with NGO and university to establish a program to track changes, such as beach erosion and levels of flooding. Additionally, wetlands that provide habitat for fisheries will likely change as sea level rise results in higher salinity further upstream. Monitoring can be performed by members of the Community Resource Management Areas (CREMA) or students together with wetland curriculum that could support increased awareness.
4. **Map existing and future floodplains utilizing best available data, models, and results from vulnerability assessments.** The flood hazards map can become an overlay to the physical plan, showing river channels, watercourses, approximate extent of the flood waters, and expected flood elevations. Estimate historical flood elevations using local knowledge and other data and consider future changes in rain fall intensity.

Objective 2 – Changes are made to existing development that accepts the long-term impact of erosion and flooding in high hazard areas

5. **Relocate vulnerable families to New Town**, encouraged through providing homes, utilities and services. Relocate structures at high risk of flood, or those damaged by disaster. Pre-planned urban development with houses and associated services will provide an incentive for families to relocate.
6. **Elevate and set back structures to reduce impacts of flooding and erosion**. Consider the levels of historic storms, tides and anticipated sea level rise when elevating structures or moving them back from the shoreline.
7. **Minimize impacts to fishing businesses and assets.** Boats, gear, landing facilities depend on being waterside and should be set back or elevated to prevent future storm damage. Prepare long term plans for locating other associated activities, such as market, fisherman houses, and gear that do not require a waterfront location away from the shore and not in harm's way.
8. **Upgrade and maintain concrete storm drain channels to accommodate heavy rains and floods**. Use national design standards to reduce flooding of adjacent urban areas

Objective 3: New development is located safely away from high hazard areas

9. **Exclude permanent structures on undeveloped barrier beaches.** The dynamic processes of erosion and wave overwash keep the beach healthy. Temporary, low impact structures may be acceptable, but should be elevated to allow for beach movement. Sea defenses should be prohibited in these areas.
10. **Sea defenses should be the last option in dynamic beaches and inlet.** With the dynamic inlet to the Ehunli Lagoon, erosion control structures, seawalls and jetties will likely impact adjacent areas and increase erosion. Erosion control must be carefully designed to meet engineering standards for expected waves and river flow and precautions taken to reduce erosion potential adjacent to these structures.
11. **Establish a "no-build" buffer adjacent to lagoon, rivers and wetlands.** A vegetated and undisturbed strip of land will reduce pollution, erosion, flooding and habitat destruction. Maintain a "no-net loss" practice for wetlands. If there must be a wetlands alteration, mitigation actions are recommended to accommodate flood storage needs. This mitigation shall take place nearby so that flooding impacts downstream will not increase.

Case study

Good Management Practices

Manage Large-Scale Leisure Development to Benefit the Community, the Private Investor and the Ecosystem:

Princes Town Case Study

Capitalize on community strengths and resources

Establish mechanisms to ensure that the whole community benefits from services of electricity, solid waste, wastewater and potable water

Heavy Rains increases river flow, potential erosion at inlet

Design infrastructure with adequate drainage systems

Establish a "no-build" buffer adjacent to lagoon, rivers and wetlands

50 m buffer

50 m buffer

Identify key resources and design development to protect them

Manage the Ehunli lagoon for low intensity use

Wetlands (salt/fresh boundary varies)

1974 shoreline

Salt water intrusion to groundwater

Road to Axim

Rains cause runoff from roads, agriculture, and urban areas enters wetland and river

Net Long Shore sand transport

Barrier Beach

Lagoon inlet (permanent)

Inlet possition moves

Princes Town

Ehunli Lagoon (brackish)

Develop partnerships to restore and enhance cultural facilities

Target common space areas that foster a strong sense of community

Shoreline erosion

Rocky shores

Net Long Shore sand transport

Barrier Beach

Shoreline erosion

Barrier Beach

Lagoon inlet (sporadic)

Build upon local capacity for broad range of jobs

Utilize the District's Marine and Coastal Management Committee to facilitate participatory and transparent decision making processes

Provide housing accommodations and services for temporary and permanent workers and their families

Respect traditional use heritage and management of coastal resources

Exclude permanent structures on undeveloped barrier beaches

N

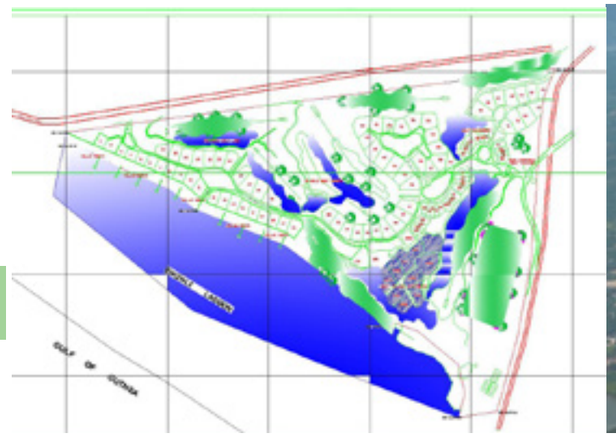
Meters

0 250 500 1,000

Good Management Practices

Manage Large-Scale Leisure Development to Benefit the Community, the Private Investor and the Ecosystem:

Princes Town Case Study



Objective 1 - Development is harmonized with conservation, increasing quality of life by designing with nature

1. **Respect traditional use, heritage and management of coastal resources.** Traditional knowledge for managing occasional opening of the Ehunli lagoon to the ocean helps maintain salinity for fisheries and reduce flooding of elevated lagoon water levels. Protecting mangroves are critical for bird and monkey habitat and respects local culture, where hurting monkeys is taboo. Maintaining existing public access to lagoon, forest, and coast is important for economic and cultural uses.
2. **Exclude permanent structures on undeveloped barrier beaches.** The dynamic processes of erosion and wave overwash keep the beach healthy. Temporary, low impact structures are allowable, but should be elevated to allow for beach movement. Sea defenses should be prohibited.
3. E**stablish a "no-build" buffer adjacent to lagoon, rivers and wetlands.** A vegetated and undisturbed strip of land will reduce pollution, erosion, flooding, and habitat destruction. Wetlands should not be filled, however, if there is over-riding public benefit for filling wetlands or waterway (i.e. a road access), consider other alternatives including relocation, bridge, or adequate culvert to reduce impacts and flooding. Maintain vegetated buffers for rivers, streams and lagoons (10 – 60m).
4. **Manage the Ehunli lagoon for low intensity use**. Identify areas for both traditional use and non-damaging new uses. Limit boating to vessels without motors. Minimize the number of piers and promote shared use of the water area to reduce disturbance of habitat.
5. I**dentify key resources and design development to protect them.** Map areas of high value habitat and resource value as a first step in locating new development. Undeveloped green spaces (forest, mangrove, wetlands) can be used for passive recreation and tourism. Connecting these areas provides a habitat corridor for wildlife. Grouping/clustering buildings away from key resources will minimize destruction of valuable habitat.

Objective 2 - Services and infrastructure are in place that improve the standard of living for existing and future residents and visitors

6. **Design infrastructure with adequate drainage systems.** Roads should include drains or vegetated buffers to reduce flooding and pollution to rivers and wetlands during rainfall. Building designs and grading should reduce impacts to nearby properties and waterbodies. Where feasible, include cisterns for rain water harvesting and storing drinking water.
7. **Establish mechanisms to ensure that the whole community benefits from services of electricity, solid waste, wastewater and potable water.** Identify approaches such as co-financing, co-management, partnership agreements or service contracts. Locate facilities for solid waste and sewage disposal in safe areas not prone to flooding and ensure proper design.
8. **Provide housing accommodations and services for temporary and permanent workers and their families.** Large tourist developments require additional workforce housing during construction and for continued operation of the expanded community.
9. **Develop partnerships to restore and enhance cultural facilities.** Build upon efforts to restore the facilities, such as Fort Gross Friedrichsburg and partner with Ghana West Coast Destination Management Organization to promote a cultural tourism corridor in Ahanta West.

Objective 3 - Sustained engagement among District, community and development sectors provides mutual benefits

10. **Utilize the District's Marine and Coastal Management Committee to facilitate participatory and transparent decision making processes**. The committee will help develop and implement formal mechanisms for decision making, negotiation, conflict resolution, and participation by stakeholders.
11. **Target common space areas that foster a strong sense of community.** Design spaces to support engagement between existing and new community members. Markets, parks, or buildings can provide opportunities to share experiences, including cultural exchange, outdoor activities and special events.
12. **Build upon local capacity for broad range of jobs**. Work with local and regional leaders, educators and businesses to build capacity of local residents to support new jobs in construction, management, tourism, and services. Business concepts can emerge from initial joint projects between the leisure operator and the community.
13. **Capitalize on community strengths and resources.** Identify ways for enhancing the value of resorts by including local fish and agriculture products, cultural amenities and other eco-tourism approaches as part of the package.

Case study

Good Management Practices

Support Urbanization, Sanitation and Wastewater Management in the Coastal Zone:

Dixcove Case Study

Set aside areas for future relocation of families and businesses

Upgrade and maintain concrete storm drain channels to accommodate heavy rains and floods

Establish and maintain "no-build" areas for river channels and river buffers.

Designate areas for landfill and establish waste management systems

Establish a tourism corridor

Map existing and future floodplains

Improve and extend road system to connect with adjoining communities

Manage and improve developed areas in flood prone areas to reduce damage to life and property

Design and manage sanitation for fishing activities to reduce pollution to the sea and improve product quality

Designate water-dependent areas in the coastal strip

Designate a limited man-made shoreline area, with adequate shoreline defenses

Create a green belt around the urban core

Busuua

Wetland

Busua river

Forest

Drains

50 m buffer

Sandy beaches

Coastal lagoon inlet

Rocky shores

Nfuma river

Dixcove

N

Meters

0 125 250 500

Good Management Practices

Support Urbanization, Sanitation and Wastewater Management in the Coastal Zone:



Dixcove Case Study

Objective 1. Planned and well-maintained urban areas that increase quality of life of the community

1. **Establish and maintain "no-build" areas for river channels and river buffers.** Enforce a no-build area adjacent to the river channel or watercourse. If there is over-riding public benefit (i.e. a road that cannot be located elsewhere) for developing or filling in the watercourse, ensure that flooding will not increase (i.e. raise height of road or install culverts of adequate size). Maintain vegetated buffers that support natural functions for rivers/streams (10 - 60m), minor streams (10 – 20m), seasonal streams (10 – 15m).*
2. **Create a green belt around the urban core**. Protect and manage healthy forests and wetlands in order to capture rainwater, reduce flooding, and support groundwater drinking supplies, while supporting sustainable livelihoods. Connected forests will provide a corridor for wildlife, defines a transition from urban to rural areas and benefits recreation and tourism.
3. **Map existing and future floodplains utilizing best available data, models, and results from vulnerability assessments.** The flood hazards map can become an overlay to the physical plan, showing river channels, watercourses, approximate extent of the flood waters, and expected flood elevations. Estimate historical flood elevations using local knowledge and other data and consider future changes in rain fall intensity and increased development of urban areas.
4. **Set aside areas for future relocation of families and businesses.** Relocate structures at high risk of flood, or those damaged by disaster. Pre-planned and pre-built urban development with houses and associated services provide an incentive for families to relocate.
5. **Establish a tourism corridor** to provide uniform promotion, signage and maintenance of communities, landscapes, cultural and heritage sites that have tourism value. Prepare plans for development and support services that support District goals to promote the tourism industry. Train local residents to work as guides for tourists, ensuring some local income and promoting interest in natural and cultural assets.
6. **Improve and extend road system to connect with adjoining communities.** The "ring road" approach would mark a clear transition from urban to rural where services, densities and land uses are different. Design adequate storm water drainage adjacent to the roads to reduce flooding.

Objective 2 - Shoreline protection that supports long term safety and security of waterfront activities

7. **Designate a limited man-made shoreline area, with adequate shoreline defenses.** Assess condition of current shoreline and defense systems to determine their level of effectiveness to reduce flooding and long term shoreline recession. Upgraded or new structures shall be designed and constructed with engineering standards; consider the need to maintain access for water dependent uses; and reduce impact (erosion, wave damage) to adjacent beaches and properties.
8. **Designate water-dependent areas in the coastal strip.** Prioritize and promote uses that must rely on the sea (water dependent uses) for the water front. These include fishing, swimming, and boat repair. Design of these areas ensures safety to humans and property and respects flood hazards from the land and the sea and long term shoreline erosion.
9. **Manage and improve developed areas in flood prone areas to reduce damage to life and property.** Upgrade or reconstruct structures so they are elevated above flood water levels. Safe heights can be established from local knowledge or maps. If existing structures are highly damaged by flood, encourage residents to relocate away from floodplain.

Objective 3 – Wastewater management and shoreline sanitation improvements that enhance health of residents and ecosystems

10. **Upgrade and maintain concrete storm drain channels to accommodate heavy rains and floods**. Use national design standards to construct drainage and reduce flooding of adjacent urban areas. Plan for maintenance of these channels, including programs to keep them free of solid waste. This could include sensitization of residents on how to identify and useother areas for solid waste disposal and household wastewater.
11. **Designate areas for landfill and establish waste management systems.** Locate disposal sites outside of areas which are vulnerable to floods, with a minimum 90 m buffer to water and streams.* Where feasible, locate outside the coastal zone. Support income generating programs for plastic recycling and collection.
12. **Design and manage sanitation for fishing activities** to reduce pollution to the sea and improve product quality. Identify and carry out programs to ensure that fish handling area and cleaning stations are sanitary. Identify options for clean potable water including piping in or installing water tanks (filled by rain water or tank truck). Explore fish waste disposal opportunities that benefit others, such as composting waste for fertilizer or using it as feed for animals.

** see National Riparian Buffer policy for more information*