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

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Citation: Kankam, S., Robadue, D., Stevens, H., Inkoom, J., Adupong, R., Fenn, M. (2013) Adaptive Capacity for Resilient Coastal Communities: Climate Change and Natural Hazards Issues in Coastal Districts of Ghana's Western Region. Coastal Resources Center, University of Rhode Island. USAID Integrated Coastal and Fisheries Governance Program for the Western Region of Ghana. 73 pp.

Disclaimer: This publication is made possible by the generous support of the American people through the United States Agency for International Development (USAID/Ghana). The contents of this report are the responsibility of the Integrated Coastal and Fisheries Governance (ICFG) Program and do not necessarily reflect the views of the United States Government. Associate Cooperative Agreement No. 641-A-00-09-00036-00 for "Integrated Coastal and Fisheries Governance (ICFG) Program for the Western Region of Ghana," under the Leader with Associates Award No. EPP-A-00-04-00014-00.

Cover photo: Bridge over estuary at Akwidaa, Ghana

Photo credit: Ali Issah

Acknowledgements

This assessment was made possible through diverse contributions from many individuals including personnel of the district assemblies and representatives of the coastal communities which were the focus of the assessment. We appreciate the coordinating role played by Justice Inkoom in support of the Ahanta West field team and the participation of Anita Boateng Ameyaw, Fred Krah, Hibba Abaidoo, Patricia Aba Mensah, Nathan Asamoah and Theophilus Boachie-Yiadom in the district's data collection exercises. The supervisory role of Kyei Kwadwo Yamoah for the Nzema East team is also acknowledged as well as the participation of Frederick Eduful, Nana Efua Ewur, Felix Nani, Abigail Mensah, Kwabena Aseidu-Bediako, Agatha Mensah and Charles Ebeleku in the district's data collection exercises. We also express our sincere gratitude to Balertey Gormey and Kwesi Johnson for coordinating the Ellembelle District field team and to the team which comprised John Blay, Jacinta Erzuah, Patrick Takyi, Keti Doe Lawson, George Yeboah, Miah Blay, Maxwell Essien and Reverend Donkor for dedicating time to the data collection exercises. The coordinating role played by Richard Adupong for the Jomoro District team and the data collection exercises conducted by the team which comprised George Somiah, Jemima Adorsu, William Adongo, Abdallah Sualih, John Ekobo and Ebenezer Ackah are acknowledged.

Our gratitude also goes to Dr. Donald Robadue and Hilary Stevens for developing the initial instruments for field data collection and to Mark Fenn and Stephen Kankam for revising and adapting the instruments to suit the local context. Our last and strongest acknowledgement go to the people of the coastal communities – youth, parents, men, women, fishermen, fishmongers, traders and others - who took time off their busy schedules to participate in group discussions, mapping exercises and contribute local knowledge to this process.

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PART I: OVERVIEW AND SUMMARY OF CLIMATE THREATS AND ADAPTIVE CAPACITY IN WESTERN REGION'S COAST

Recently available climate change scenarios for Ghana show a compounding of the impacts of existing hazards on coastal districts and communities in the Western Region. Moderate sea level rise is accelerating shoreline erosion, increasing coastal flooding, threatening the functioning of piers, docks and seawalls, shifting estuaries to ocean salinity levels, contaminating coastal fresh water wells, and intruding on coastal river water supply intakes. Changes in air and water temperature, change in rainfall intensity and frequency, and the patterns of rainfall and storm runoff are also affecting public safety, economic well-being and food availability. Increased pressure on marine fisheries since the 1970s, is placing the resources under greater strain, and making the entire supply chain, which involves thousands of fishers in dozens of coastal fish landing sites in the Western Region, increasingly vulnerable. According to recent research in the upwelling area, "changes in sea temperature could affect primary (phytoplankton) and secondary (zooplankton) production which in turn could dramatically increase or decrease the abundance of pelagic fishes and their predators" (Stanturf et al., 2011). Coastal settlements and landscapes in the region also face multiple natural hazards that are being influenced and worsened by climate change either through sea level rise or flooding.

Given the foregoing impacts, Ghana has already begun to educate and raise the level of public discussion through the formulation of a national strategy and the Ministry of Environment, Science and Technology's Policy Advice series on climate change and adaptation. Ghana still needs better, downscaled scenarios for hazards and climate change planning to help it examine full range of impacts on places and sectors. Better science funding is needed for monitoring trends.

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.

The work of integrating climate change considerations and the best available climate information into development planning and decision making procedures fall largely on district governments. To do this, districts need to assess their climate vulnerability using participatory techniques enhanced with technical information and studies where possible. This means understanding climate impacts and non-climate reasons for stress on livelihoods, public safety and environmental quality, determining how sensitive communities are to being exposed to all this stress, and taking stock of the capacity of each community and district to adapt. Development and implementation of district-wide policies, strategies and good practices will generate widespread benefits even in the face of uncertainty on the degree of climate change impacts on the coast. Implementation of such measures should ensure that

funding and technical assistance are prioritized to support the most vulnerable sectors, social groups and ecosystems. For instance, policies can be adopted to enhance the management of coastal resources and build resilient local economies against climate impacts. Districts can also formulate regulations that recognize dynamic and ecologically sensitive coastal and shoreline features and incorporate restrictions for construction in shoreline areas. Such regulations can control development and encourage a strategic retreat from low-lying coastal floodplains and high hazard areas within the vicinity of shorelines. Districts can prepare local plans for selected communities to generate additional understanding and appropriate responses to the physical impacts of erosion, flooding and physical hazards which will be increased due to climate change impacts. This should include using low cost, low technology and participatory methodologies to undertake community-based vulnerability assessments and develop adaptation strategies.

Certain policies to address climate impacts and coastal hazards are more effective when adopted and applied through regional mechanisms. For instance, all of the coastal districts might want to use the same policy, such as riparian and floodplain buffer policies that would also be incorporated into the regional development framework as well as district structure plans. This would discourage investors from 'shopping around' to find a more lenient district. Flood plain mapping and general setbacks from high hazard areas are needed for each district. This should also follow a common approach across the region to make rules and local decisions more predictable, acceptable and responsive to climate impacts. In addition, the current Environmental Impact Assessment (EIA) review process which involves case by case decisions on facilities of regional significance need to take into account an understanding of the larger system, as well as impacts beyond the boundaries of a particular project.

To ensure success of regional and district level measures to address climate change impacts, clear guidance provided by national level institutions as well as technical and financial support will be required at the lower levels.

PART I CLIMATE CHANGE IMPACTS, VULNERABILITY AND ADAPTIVE CAPACITY

IN GHANA'S COASTAL ZONE

1.1 Current and Expected Climate Changes

Climate change vulnerability in coastal communities varies from place to place. Coastal areas and settlements exposed to the climate impacts threatening Ghana are sensitive to them in differing degrees, for example some settlements are built in dangerous low-lying areas while others are setback from eroding shorelines and flood-prone wetlands. In addition, each community has a different ability to adapt to the stresses it faces from climate and non-climate stresses on its well-being.

Since the 1990s a number of studies and plans have been prepared for Ghana to help it understand climate impacts including air and sea temperature changes, sea level rise, precipitation amount, seasonal distribution and storm frequency and intensity. These include the Netherlands Climate Assistance Programme (Agyemang-Bonsu, W. K.,2008), the World Bank's Economics of Adaptation to Climate Change (2010), USAID's recent Ghana Climate Change Vulnerability And Adaptation Assessment (Stanturf, 2011), Ghana's National Climate Change Adaptation Strategy (2010) and the ongoing Policy Advice series on climate change by Ghana's Ministry of Environment, Science and Technology (Environmental Protection Agency, 2012). All of these reports acknowledge the uncertainty associated with projections of temperature, rainfall patterns, storm frequency and intensity and sea level rise, trying to clarify and address the climate impacts that will affect coastal districts in the absence of detailed agreed-upon scenarios for the different regions of Ghana.

A helpful recent summary and explanation of climate scenarios for Ghana has been prepared by Stanturf et al. (2011). In the simplest terms, mean annual temperature is expected to increase 1.0 to 3.0 C by the 2060s, with differences among regions of Ghana. For the coastal savannah zone, "wet season temperatures would range from 1.68 ± 0.38°C by 2050 and 2.54 ± 0.75°C by 2080; dry season, 1.74 ± 0.60°C by 2050 and 2.71 ± 0.91°C by 2080 during the dry season." Sea surface temperatures are also expected to increase. A report from EPA-NCAP projects "sea-surface temperatures to rise from the annual base mean of 26.2 to median model estimates of 26.6, 27.6, and 28.9°C for the years 2020, 2050, and 2080. Upper boundary estimates were 26.8, 28.1, and 30.0°C for the respective 30-year periods."

Consistent projections of precipitation amounts and patterns in the different regions of Ghana have unfortunately remained elusive. Stanturf et al. point out that "forecasted changes in precipitation ranged from 52 percent decreases to 44 percent increases in wet season rainfall by 2080. The overall ensemble prediction across emission scenarios gives a slight increase in wet season rainfall of 2.65 ± 13.96 percent by 2050 and 3.88 ± 19.41 percent by 2080. The variability among the models' precipitation changes is not very different from the inter-annual variability currently experienced in the region."

Sea Level Rise effects on the shore and built coast

Sea level rise in the Western Region can have a number of impacts, accelerating erosion, coastal flooding, threatening the functioning of piers, docks and seawalls, shifting estuaries to ocean salinity levels, contaminating coastal fresh water wells, and intruding on coastal river water supply intakes. Working with global data and best-available local estimates, McSweeney et al. (2008) have predicted that sea level along the coast of Ghana would rise by

0.1-0.5 meters by 2090, relative to 1990 levels. Minia (2008) projects a similar result, estimating an 0.036 m increase between 1990 and 2010, and 0.345 m by 2080 (the increase could be as low as 0.16 m higher or as high as 0.58 m by 2080, given the variation in climate forecasts). Recent low and high scenarios by the World Bank fall also within these ranges.

Table 1 Projections of Sea Level Rise in Ghana

		Projected increase over base year			
PROJECTION	**Base Year**	**2010**	**2050**	**2080**	**2090**
McSweeny	1990				+0.1 to +0.5 m
Minia	1990	+0.036 m		+0.345 m	
Minia (range)	1990			+0.16-+0.58 m	
World Bank DIVA low	1990	+0.04 m	+0.156 m		
World Bank DIVA high	1990	+0.071 m	+0.378 m		

The World Bank estimated that 170 km2 of the Western Region coast (defined as the area up to 30m in elevation) will be exposed to sea level rise impacts, affecting an existing population of 16,830. Hen Mpoano's assessment of 77 Western Region coastal communities in Jomoro, Ellembelle, Nzema East and Ahanta West indicates that these communities already face from 1 to 9 significant physical hazards, most of which will be intensified by sea level and other climate related changes. Infrastructure threatened by sea level rise includes ports, oil and gas infrastructure, salt production facilities and countless village-scale fish landing and processing sites. (Armah, 2005)

Recent assessments of the situation for Ghana coast-wide look at the benefits and costs of adaptation measures to fight erosion and protect coastal infrastructure using an extensive system of seawalls, dikes as well as replenishing sand lost on highly eroding beaches. The World Bank concluded that the annual costs of such a program, ranging from $47 to $155 million per year, far outweighed the value of damage that would be avoided. A more balanced approach for the Western Region involves applying sound coastal management principles and is described here as well as in the Shoreline Management Issue Brief as part of this series.

In addition to the potential economic effects of sea level rise and accelerated erosion, extensive coastal wetlands in the Western Region will be impacted by sea level rise. As the rising ocean erodes the shoreline, these wetlands will be transformed from closed to open lagoons, with a loss of vital habitat and biodiversity in the process. Similarly, mangrove areas such as the Amanzule, which serve as habitat for birds, fish and shellfish, will be adversely impacted by sea level rise. Sea turtles, already under numerous threats to their survival, nest on sandy beaches that are highly susceptible to erosion with sea level rise (Armah, 2005).

Salt water intrusion from sea level rise

Many coastal communities are reporting that their wells are being contaminated by salt water. This problem can result from the intrusion of salt water as a result of coastal erosion as well as overdrawing the wells. The situation is worsened by longer dry seasons when less freshwater replenishes the fresh groundwater supply. Population growth and expansion of industries that rely on freshwater increase the demand on the water supply and exacerbate this problem. The water supply issues facing the Western Region coastal districts are discussed in more depth in Hen Mpoano's Freshwater Supply Issue Brief.

Coastal fisheries

Marine fisheries depend to a large extent upon the Central West African Upwelling, which has a seasonality tied to atmospheric and ocean circulation, making its productivity variable and difficult to predict but favoring small pelagic species. However, marine fishing has increased dramatically since the 1970s, placing the resources under greater strain, and making the entire supply chain, which involves thousands of fishers in dozens of coastal fish landing sites in the Western Region, increasingly vulnerable. Nearshore pressures on fish habitat include water pollution, and nursery area destruction. Coastal and lagoon habitats, also affected by sea surface temperature, play a smaller but important role in providing income and protein. According to recent research in the upwelling area "Changes in sea temperature could affect primary (phytoplankton) and secondary (zooplankton) production which in turn could dramatically increase or decrease the abundance of pelagic fishes and their predators" (Stanturf et al., 2011)

Coastal landscapes and livelihoods

Climate impacts on agriculture and the landscapes of the coastal districts of the Western Region are expected to change in the next decades as a result of temperature and precipitation in addition to other factors that are fragmenting the mosaic of land cover. For example, cocoa is expected to largely disappear as a cash crop in the coastal districts (Läderach, 2011). According to Stanturf et al. (p. 74) "Cocoa is highly susceptible to drought and the pattern of cropping of cocoa is related to rainfall distribution. Climate change could affect vigor of the cocoa plant as well as alter stages and rates of development of cocoa pests and pathogens".

Coastal settlements

The coastal communities of the Western Region face multiple natural hazards that all will be influenced and made worse by climate change either through sea level rise or flooding. An assessment by the Hen Mpoano initiative of 77 communities in the districts of Jomoro, Ellembelle, Nzema East and Ahanta West identified nine different types of hazards of local concern:

- presence or proximity to a river source,
- proximity to an estuary,
- high water mark visible in settlement,
- presence and or functionality of sea defense walls,
- condition of coastal bridge,
- flood risks,
- coastal erosion,
- community backed by a wetland and
- presence of dynamic coastal features along the beach

Almost all communities have 2 or more of these issues to cope with, with the average coast-wide being 4 (See Figures 2 and 3 below). Ahanta West and Ellembelle communities average 3, Jomoro's settlements average 4 and Nzema East's coastal communities typically

face 5 different hazards. The district of Shama, not part of this assessment, with its much more heavily developed shoreline, has examples of all 9 issues, made clear during the past two years when it conducted an extensive analysis of its coastal hazard and climate change issues. Shama is already beginning to develop climate adaptation and hazard mitigation policies as part of its spatial development framework. Issue briefs prepared on coastal erosion and wetlands in the Western Region (Coastal Hazards and Flooding Risk in Ghana's Western Region) have more information on how Western Region communities are affected by natural and human-caused impacts on the shoreline and wetland ecosystems.

An example of one of the most stressed locations is the fishing community of Akwidaa, along the Cape 3 Points coast in Ahanta West. It is located on a low-lying sand spit at the mouth of the Nyan River, which drains a large sub-basin including the district capital Agona. The settlement is covered with flood waters from upstream river flow during rainy periods, its beach facing and estuary facing shores are being steadily eroded. The access road is periodically over-washed and the footings of the heavily traveled pedestrian bridge are constantly undermined. Its adaptive capacity score (explained in the next section) is among the lowest coast-wide, making it especially vulnerable to impacts of climate change.

Figure 1 An aerial view of hazards and stresses faced by Akwidaa

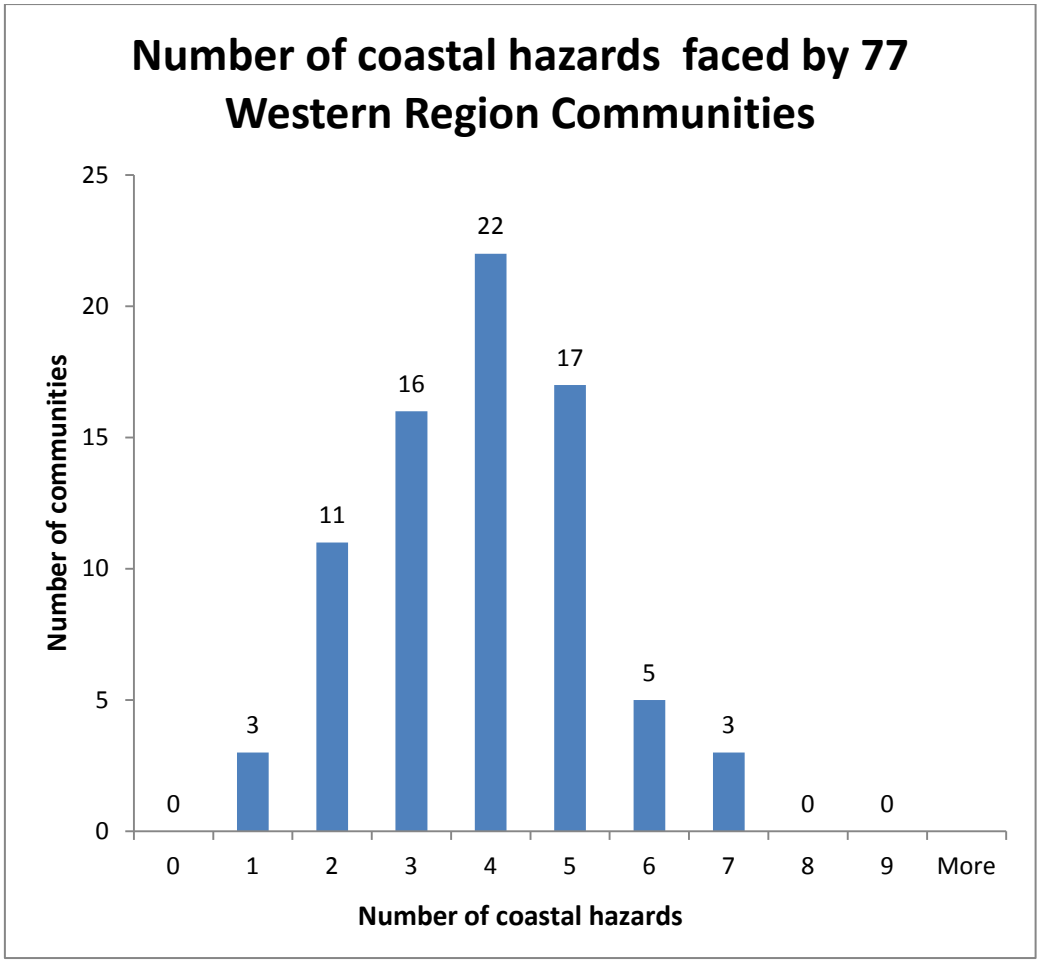

Figure 2 Number of communities with a given count of climate related coastal hazards

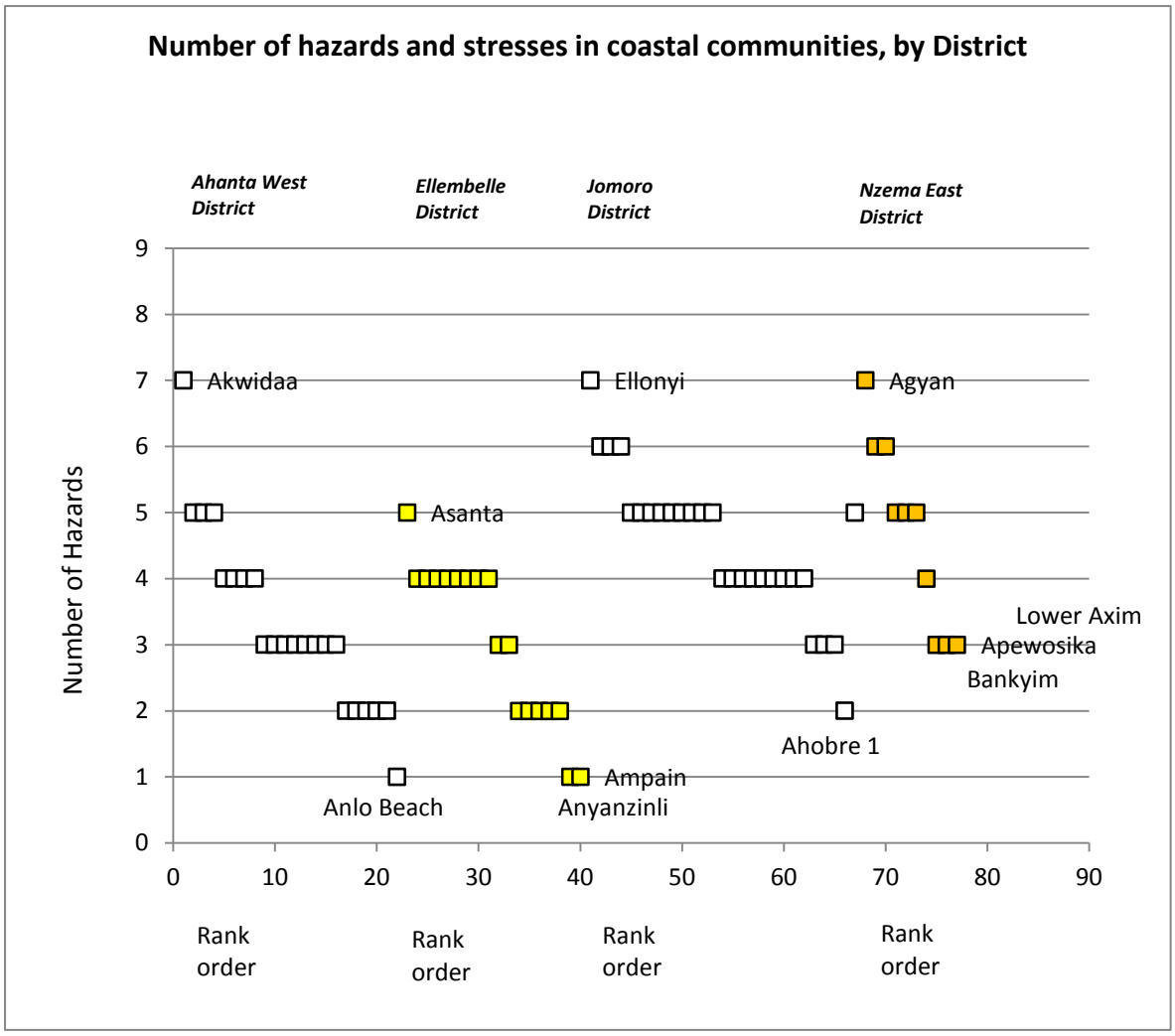

Figure 3 Rank order of communities with a given level of climate related coastal hazards

1.2 Climate Change Vulnerability and Adaptive Capacity

The climate change vulnerability of a community is comprised of four main elements:

- the climate impacts it is exposed to.
- the non-climate physical stresses facing the community.
- the sensitivity of the physical, social and economic systems in the location to those impacts.
- the adaptive capacity of the environment and especially the people to deal with those impacts it is sensitive to.

There is no exact mathematical formula that would allow us combine the available information on all these factors to produce individual community vulnerability score. However, Hen Mpoano's assessment and work with coastal communities has generated some important insights that allows for assessment of the various factors of vulnerability and comparison of adaptive capacity in a way that is relevant to the context of the coastal communities surveyed.

Hen Mpoano's assessment of 77 communities assessed 8 dimensions of adaptive capacity. As the table indicates, the communities overall scored themselves highest in questions of security, law and order, and weakest in emergency preparedness, livelihoods, managing their coastal resources and ability to attend to the needs of marginalized groups.

Community Capacity to Adapt to Natural Hazards and Climate Change is generally low

Overall, Western Region coastal communities have disappointingly limited adaptive capacity. A few locations are faring better than others within their District for some dimensions of adaptive capacity, for example Pumpuni in Ahanta West, Atuabo in Ellembelle, Old Edobo in Jomoro and Akyenim in Nzema East. But overall, coastal communities have a low ability to respond to emergencies generated by natural hazards, suffer social and economic development challenges that will only be worsened, and have a relatively low ability to manage coastal areas and resources in a way that will assure sustained productivity and environmental quality.

Table 2 Average adaptive capacity scores in the coastal settlements in four Western Region districts

ADAPTIVE CAPACITY FACTOR (Possible score range 0-4)	**AVERAGE SCORE, all Locations (77)**	**Jomoro (27)**	**Ellembelle (18)**	**Nzema East (10)**	**Ahanta West (22)**
Security, Law and Order	2.36	3.26	2.67	1.52	1.38
Leadership and local organization	1.96	2.37	2.33	1.60	1.32
Public awareness of local conditions such as erosion, shifting or river course/delta	1.87	2.15	1.89	2.10	1.45
Land Use Decision Making and Planning	1.32	0.96	1.50	1.40	1.55
Condition of coastal resources	1.17	0.89	1.22	0.70	1.64
Attention to the needs marginalized groups	1.08	1.56	1.11	0.50	0.77
Livelihoods and rural economy	0.51	0.52	0.17	0.40	0.86
Emergency Preparedness	0.47	0.15	0.56	0.90	0.59

The communities in the westernmost district of Jomoro, for example, have above average leadership, with fairly few communities having either notably strong or weak governance structures in place. While nearly all of those communities have a relatively good situation in terms of law and order, very few have any emergency preparedness systems in place. The economic data from Jomoro indicates that nearly all communities face declining incomes and constricting employment opportunities. The heavy dependence on fishing and farming, both of which are natural resource-dependent and therefore susceptible to climate change, constitutes a real economic weakness and adds to the overall vulnerability in this District.

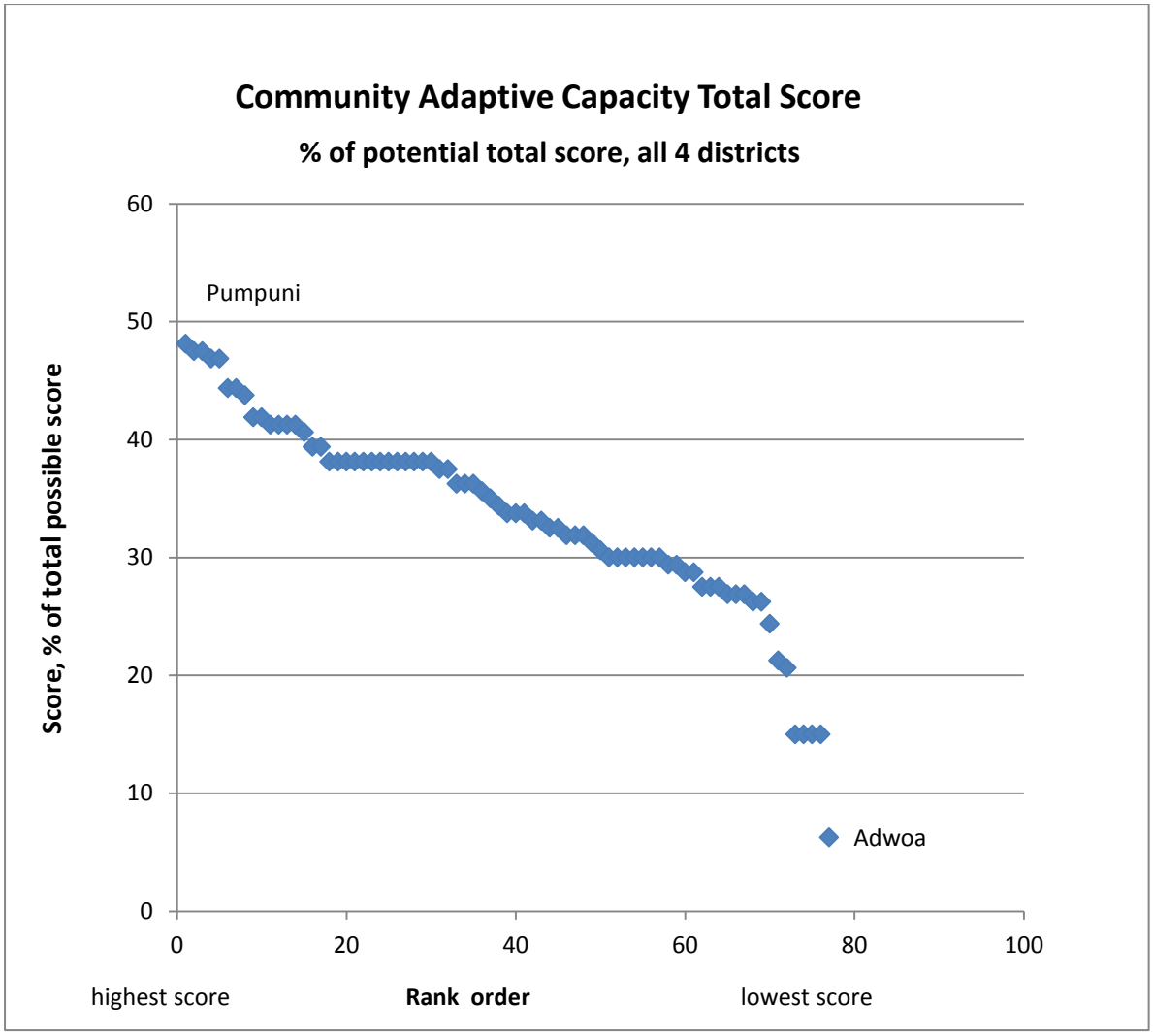

Figure 4 Distribution of adaptive capacity scores in 77 coastal settlements, in rank order

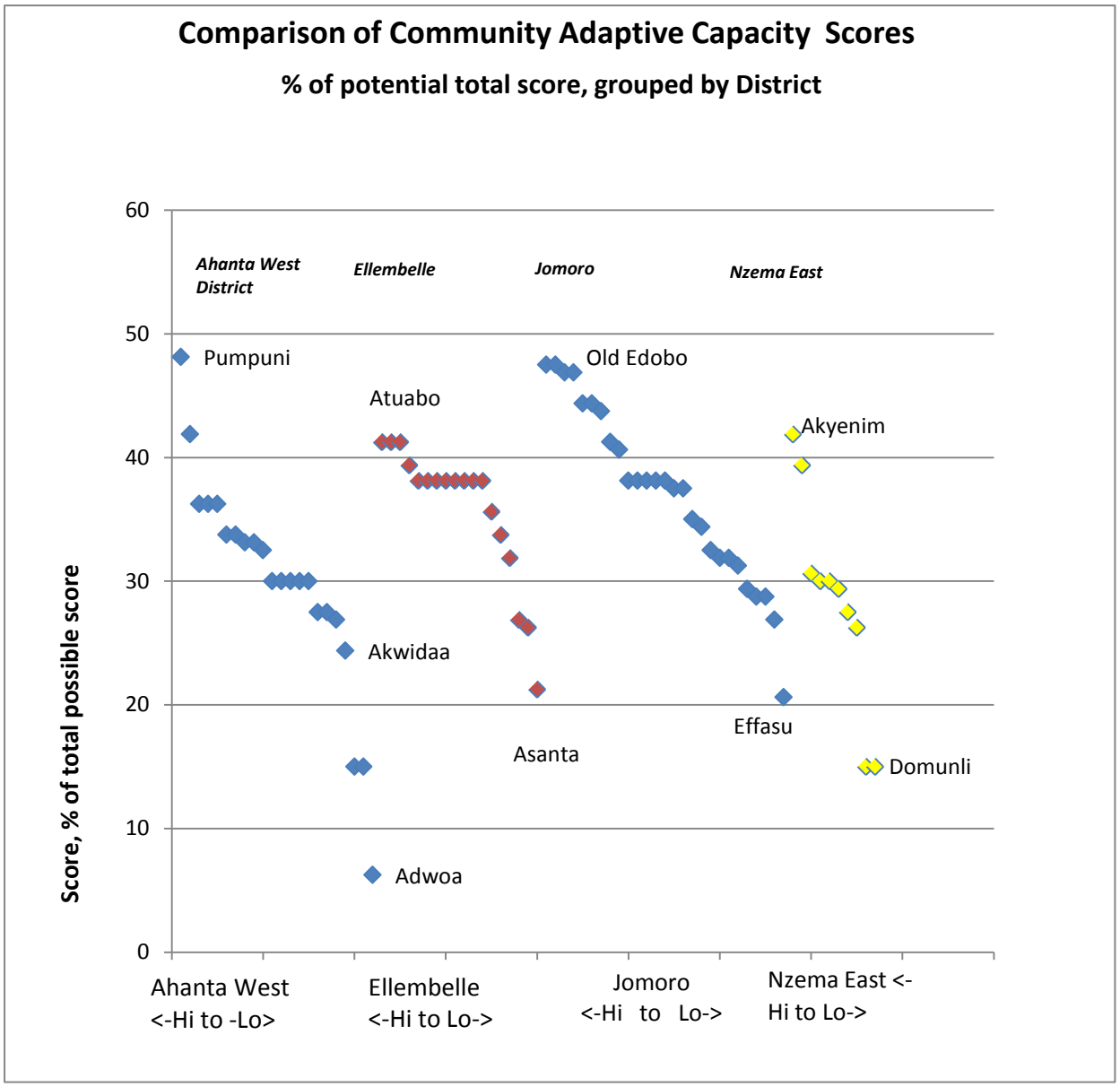

Figure 5 The distribution of adaptive capacity scores in 77 coastal settlements, in rank order by District

The adaptive capacity assessment found that the number of hazards facing a community and its level of adaptive capacity are not correlated. In essence every coastal community in the region faces a unique combination of circumstances in terms of potential for impact and ability to cope. It is clear that for some factors, including emergency preparedness, livelihoods/ economy and the situation of marginalized groups, districts across the board are in bad shape and need to take actions that will benefit all the coastal settlements. For others, such as public security, quality of leadership, and public awareness, the situation differs place to place.

1.3 Way Forward in the Western Region: Approaches for Improving Climate Change Adaptation

Coastal climate change adaptation strategy for the Western Region

The scale and scope of climate change impacts on coastal districts and communities in Ghana's Western Region are becoming increasingly clear, and they cut across many of the social, economic and environmental concerns of residents and businesses. It is important to get ahead of natural hazard and climate problems to make good choices before developments are built in hazardous areas using unwise construction practices. It is essential to see the workings of the shore, watershed systems whole, improve the quality of information on existing situation, and using scenarios to highlight likely future hazards and risks.

Important international donors interested in climate change adaptation such as the World Bank have already made it clear in Ghana that large scale engineering solutions such as networks of dikes and sea defenses or beach sand replenishment are simply not cost-effective. Districts need to rely more on identifying and retreating from high hazard zones, and accommodating settlements and projects to likely future conditions through safer construction practices and keeping natural buffers such as dunes, mangroves and coastal vegetation intact. Protection and shore defenses should be utilized only when necessary: Retrofitting "hard" solutions such as sea walls and rock riprap is very expensive and may not produce lasting protection.

It is time to help coastal communities already at risk address both physical development issues as well as social and economic problems that will prevent them from coping successfully with climate change and other stresses. Resilience and increased adaptive capacity is the goal, looking out for most vulnerable groups; support economic and social development goals in addition to emergency response and public safety since adaptive capacity is reduced by economic stress, over reliance on a single, resource dependent livelihood, and weak education and training. For example, a number of coastal communities in the Western Region have the potential to shift from over-reliance on marine fisheries to including small to medium scale tourism. Investing in infrastructure, training and tourism facilities should take into account the physical risks to those investments, the impacts of poor development choices on the quality of the environment and tourism attractions, the ability of the communities to participate in and obtain material and social benefits from new development.

Priorities for improving climate change adaptive capacity

This section addresses making progress to improve the dimensions of adaptive capacity examined in the coastal communities of Jomoro, Ellembelle, Nzema East and Ahanta West, but they apply equally to Shama District as well. Most of the ideas being discussed by Hen Mpoano at the district and local levels will generate a benefit even in the face of uncertainty about the degree of climate impacts in the Western Region, an approach often called "no-regrets".

Emergency Preparedness

The Western Region's coastal communities are uniformly in very poor shape in terms of their ability to learn about, organize and effectively respond to emergencies and disasters, which is a fundamental ability that would pay big dividends in improving local resilience. Districts need to work with NADMO and other authorities to put together a comprehensive approach at the local level which would include:

- Communications
- Local organization
- Education and awareness
- Training
- Equipment
- Supplies

Livelihoods and rural economy

This dimension of adaptive capacity is equally low in most coastal communities, and a far greater challenge, and somewhat hard to understand given that a number of economic sectors in coastal districts, such as oil & gas, mining, agro-industry and urban development are booming.

- Incorporate climate and hazards elements into economic development programs.
- Assess economic sector and infrastructure vulnerability.
- Increase attention to addressing the natural hazard and economic issues in fish landing sites.
- Early actions to increase economic resilience in livelihoods to improve traditional livelihoods as well as pursue promising areas such as small to medium scale tourism.

Attention to the needs of marginalized groups -

Coastal communities rated themselves low in terms of their ability to deal with the needs of elderly, sick, disabled and extremely poor people. This is an important concern during emergencies as well as the longer term issue of resettlement and even relocation where it is needed. Since marginalized groups are more likely to be living in hazardous locations, they are the least able to accommodate their living situations to deal with worsening physical hazards, and will most feel the impacts as the overall resilience of their community diminishes.

- Prepare and implement effective early warning messages that reach marginalized groups.
- Identify and support women's contribution to informal early warning systems.
- Develop and implement evacuation and recovery plans that meet the needs of children, elderly and the sick.
- Early actions to increase economic resilience of poor people through diversified livelihood opportunities, especially for women, elderly people, people with disabilities, ethnic minorities, people living with HIV/AIDS and tenant farmers.

Condition of coastal resources

Many coastal communities see that their once abundant coastal resources that could be relied upon for food and income are in a substantially degraded state. This series of issue briefs is focused on improving the quality of coastal resources management in districts and communities. An overarching proposal is to create a nested approach to governance that generates a harmonized network of policies and mechanisms for effective implementation, including at the local level. [See issue brief, ''A Nested Coastal and Marine Governance System'' (Coastal Resources Center, 2012)]

- Communities need to adopt policies that recognize coastal features and discourage construction in hazardous zones.
- Communities must be engaged in setting priority uses matched to sensitivity of coastal areas in their local plans, backed up by the District spatial development framework and mid-term development plans.
- Assess effectiveness of existing shore defenses.
- Identify areas where setbacks, retreat, restoration and protection are preferred.
- Incorporate refugia, which are protected areas where wetlands, flood plains and landscape habitats can move to in response to sea level rise and climate change.

Land Use Decision Making and Planning

The coastal districts in the Western Region are just now, in 2012, beginning to put into place the tiered set of land use and development plans. Up to now, communities themselves have had relatively little role in setting out land use policies except by the decisions made to allocate stool lands and individual behavior in deciding where to build businesses, houses and community facilities. Fortunately national guidelines now require districts to look at natural hazards and climate change impacts as part of their development planning.

- Conduct cross-cutting vulnerability assessment for coastal region as part of 2014 Mid-Term Development Plans.
- Set priorities for coastal development based on dependence of water location and allocate suitable lands for relocation of infrastructure and settlements.
- Designate flood-prone areas and set limits on allowable uses.
- Improve the flood and climate resilience of existing & new housing and business structures in terms of construction and placement.
- Minimize development or investments requiring shore, river bank or other major flood control.
- Conduct engineering studies of settlement and river drainage systems to remediate recurrent problems, flood plain management and retention areas.
- Introduce low-impact settlement planning, transportation system approaches.
- Carefully planned and implemented resettlement, requires identification of a safer area that meets the needs of residents, including proximity to the fish landing site, agricultural lands, and existing infrastructure such as transportation corridors and water supply facilities.

Public awareness of local conditions such as erosion, shifting or river course/delta

Many community members are able to recall and discuss the physical changes occurring in their settlements. There has been relatively little effort to bring together and convey the bits of scientific research and characterization of hazards and climate change to the community level. Part of the challenge is the complex path from global computer models used to estimate impacts and absence of specific local information. Better regional forecasts and insight are needed. Additional steps involve:

- District wide awareness and education coupled with settlement or ecosystem specific vulnerability assessments and adaptation plans.
- Training for engineers, architects, planners and contractors on hazardous sites and best planning, design and construction practices.
- Vulnerability assessments and adaption plans for selected communities.

Leadership and local organization

The credibility of a community's leadership, degree to which decision-making is participatory, effectiveness of local government functionaries, presence and functionality of community organizations, have far reaching implications for the conditions that give rise to vulnerability and adaptive capacity. The following actions will enhance the process of building local leadership and strengthening community organization:

- Develop community cohesion.
- Create dialogue platforms to facilitate engagement between community folks and their leaders on issues of common interest.
- Create a transparent process for decision making on disposal of communal lands and other community assets.
- Build leadership skills among the youth in preparation for future roles.

Security, Law and Order

The coastal settlements are relatively peaceful with no major incidents of arson, attacks, thefts and conflicts recorded in the past decades. This is indicative of peace and stability in most of the coastal communities. Overall, people feel safe to live in their communities and comply with laws and norms. It is crucial to maintain this relative peace and stability in the coastal communities, especially at a time of influx of migrants into the region to participate in the new oil economy.

- Support peace campaigns and other programs that build upon the relative peace in coastal communities.
- Develop and implement programs to build trust, improve communications and relationships between oil and gas companies and frontline communities.
- Create dialogue and consensus building platforms for deciding development options in coastal communities.

Orientations for future planning and vulnerability assessment for coastal districts

On average, coastal communities rank relatively low in important areas of adaptive capacity including emergency preparedness, the availability of livelihoods and strength of the rural economy, decision making on coastal and land resources and public awareness of local hazards. Immediate improvements could be made district-wide to address the major areas of weakness such as emergency preparedness, community awareness and land use planning that prevents further building in high hazard zones and allocates areas for resettlement where necessary. These concerns can be addressed at the district level with policies and actions that apply coast wide. Available tools and procedures that can facilitate the implementation of these policies and actions are the mid-term development and spatial plans, development permitting decision making procedures, bye-laws, flood early warning systems and capacity building of the assembly's technical personnel.

Medium-Term Development and Spatial Plans

District-wide policies can be established on coastal resources, wetlands and river protection and development in hazardous areas in the next round of structure plan and mid-term development plans. The district can also prepare local plans for selected communities that generate additional understanding and appropriate responses to the physical impacts of erosion, flooding and physical hazards which will be increased due to climate change impacts as well as address ways to increase resilience, using participatory techniques enhanced with technical information and studies where possible. In addition, the rapid vulnerability assessment presented in this document can be refined following the guidelines for addressing cross-sectoral issues in the Medium-Term Development Plan.

Regulations and bye-laws

District bye-laws can recognize dynamic and ecologically sensitive coastal and shoreline features and incorporate restrictions for construction in shoreline areas. Regulations that control development should encourage a strategic retreat from development and infrastructures in low-lying coastal floodplains and high hazard areas within the vicinity of shorelines; planning and development should be based on retreat plans, where new structures are located on setback lines behind these areas. Bye-laws should recognize protection and sustainable use of wetlands and mangroves to ensure that ecological buffers are protected. The filling of wetlands and mining of beach should be prohibited in order to preserve the natural storm abatement functions of these areas.

Flood early warning

The district National Disaster Management Organization (NADMO) can collaborate with the Meteorological Services Agency to gather information on rainfall forecast for the area and in conjunction with local radio stations, disseminate flood warning information in advance to communities vulnerable to flood risks. Districts can develop and implement flood risk plans in conjunction with the delivery of early warning systems.

Community level vulnerability assessment

Community level vulnerability assessment and adaptation strategy can be prepared to demonstrate low cost, low technology methods for vulnerability assessment and adaptation planning; share experiences and best practices across communities with district government and find local champions for hazard and climate change adaptation actions. If a local physical development plan already exists, the vulnerability assessment can provide the opportunity to revisit it to see how well it takes into account physical impacts of hazards and anticipated climate change and make recommendations for updating. Where there is no local plan, the vulnerability assessment can serve as a starting point for the community to take a systematic, forward-looking approach to its physical, economic and social development. The aim is to understand the potential impact of climate change and climate variability and develop an initial list of response options (planned adaptation measures).

Part II: RAPID ADAPTIVE CAPACITY ASSESSMENT FOR CLIMATE CHANGE AND NATURAL HAZARDS IN FOUR COASTAL DISTRICTS OF THE WESTERN REGION

Introduction

Coastal communities and associated ecosystems in the Western region are exposed and sensitive to multiple hazards and climate related stressors, including extreme rainfall events that lead to flooding, highly eroding shorelines that is displacing settlements, sedimentation of rivers, incidence of algal bloom, poor infrastructure and other changes in the ecosystem. Moreover, pressure from the growing coastal population and the increasing demand for development on coastlines is generating concerns for effective land use and spatial planning that takes into account existing vulnerability and supports actions for enhancing adaptive capacity. This has led to the need to understand and characterize the vulnerability of coastal populations and settlements in the Western region.

In view of the above, in November 2011, a rapid vulnerability assessment was conducted in the Ahanta West, Ellembelle, Jomoro and Nzema East districts of the Western region. The assessment, which covered 77 shorefront communities, was undertaken for the following reasons; a) to raise awareness by communicating to the districts, a clear sense of the relative vulnerability of coastal communities to natural hazards and climate change and incorporate ideas of exposure, sensitivity and adaptive capacity as part of district spatial planning b) to identify priority communities for follow-up local level vulnerability work and c) to make recommendations to district authorities on priorities for hazard mitigation and adaptation planning, as well as to communicate to the regional and national levels the gritty reality of coastal community vulnerability.

The assessment gathered mostly qualitative information through scoring eight indicators along four thematic areas: Governance and Leadership; Coastal Resources Management; Risk Awareness and Emergency Response; and Economy and Society. This information was collected using a triangulated approach of group discussions, key informant interviews and direct observations. Closely related information on physical vulnerability and exposure to hazards was also gathered through participatory mapping with the aid of orthophotos. The process of data gathering and analysis was participatory and involved officials of the district governments, including National Disaster Management Organization (NADMO) officers, representatives of traditional authorities, representatives of the coastal communities and programme officers on the Hen Mpoano Initiative.

2.1 Jomoro District Summary

Physical impacts of hazards and climate change

Coastal settlements, infrastructure, habitats and population are vulnerable and exposed to varying degrees of hazards and climate-related risks. These include presence or proximity to a river, proximity to estuary, high water mark in settlement, presence and or functionality of sea defense walls, condition of coastal bridge, flood risks, a history of coastal erosion, community backed by a wetland and presence of dynamic coastal features along the beach. It is worthy to note that the combined effect of these hazards and human activities pose significant threat to key assets such as artisanal fishing settlements, fish landing sites, critical habitats, and recreational and cultural sites. Out of the 28 coastal settlements in the district, 22 are directly exposed to four or more of the above mentioned hazards and climate related risks (Figure 6). In all of the coastal communities, sea erosion is posing significant threat to turtle nesting beaches and landing sites, and displacing the coconut plantations that underpin

the agro-industry in the district. With the exception of Ahobre No. 1 and Ezilibo, flooding is a major issue in the remaining 26 coastal communities in the district.

While sea erosion results from high wave energy and is aggravated by sand winning along the shoreline, flooding is mainly caused by increased filling of wetland and floodplains for housing construction and establishment of artisanal fishing settlements, thereby reducing the potential of the landscape to absorb water during intense rainfall events. Another major cause of flooding results from overflow of rivers and streams into adjacent communities. The combination of flooding and coastal erosion has raised concerns for relocating people away from hazard prone areas. For instance, some 50 years ago, residents of Old Kabenlansuazo, took steps to acquire a new site - New Kabenlansuazo due to impact of flooding and erosion. Residents of Egbazo on the other hand have similar concerns, however, they are yet to secure site for relocation. Communities such as Metika, Twenen, Allengenzule, Ezinlibo, Egbazo and Agyeza are also threatened by coastal erosion.

The district assembly has attempted the use of bye-laws to control beach sand winning. But enforcement of this bye-law is deficient, although some violators have been arrested at Half Assini in recent times. Stakeholders at the community level ascribed this deficiency in the application of the laws to political interference.

Average scores obtained by aggregating across the eight indicators of adaptive capacity reveal low relative resilience of these communities (Table 3). These communities should benefit from detailed vulnerability assessments and adaptation planning processes that identifies forward looking actions and builds local capacity for improving livelihoods, building local leadership, facilitating emergency preparedness and ensuring sustainable management of coastal resources.

Table 3 Adjusted Rank order of community resilience (fraction of total possible score on the 8 adaptive capacity areas)

Old Edobo	47.50
Ezinlibo	47.50
Metika	46.88
Atwebanso	46.88
Ezimimaintu	44.38
Twenen	44.38
Ngelekazo	43.75
Kengen	41.25
Allengenzule	40.63
Half-Assini	38.13
New Edobo	38.13
Ahobre 1	38.13
Ahobre 2	38.13
Egbazo	38.13
Mangyea	37.50
Jaway	37.50
Ellonyi	35.00
Buakwah	34.38
Ekpu	32.50
Mpeasem	31.88
Number 4	31.88
New Town	31.25
Old Kabenlansuazo	29.38
Anlomatuope	28.75
Agyeza	28.75
Bonyere	26.88
Effasu	20.63

Figure 6 also shows marked variation in adaptive capacity and exposure to hazards across the coastal communities assessed. Elonyin is the community with the highest number of physical exposures while Ahobre No.1 has the lowest. The remaining communities are intermediate between these extremes, with total number of exposures ranging between 3 and 6. It is worthy to note that there is similarity in physical exposures across almost all the communities in the district. And this is attributed to sea erosion and flood hazards. Other climate and non-climate stressors combine with these threats to impact infrastructure, lives and livelihoods. The severity of impact from a potential hazard, is however, not dependent on the number of

hazards a community is exposed to. Thus a community exposed to only one stress factor can be devastated by that hazard within a short period. Nonetheless, where the number of physical exposures appears to be relatively high and adaptive capacity remains weak, practical steps need to be taken to improve capability to plan for and respond to change at the community level. This is exemplified by the case of Effasu, Old Kabulensuazo, Bonyere, Ekpu, Anlomatoupe and Elonyin as shown in Figure 6.

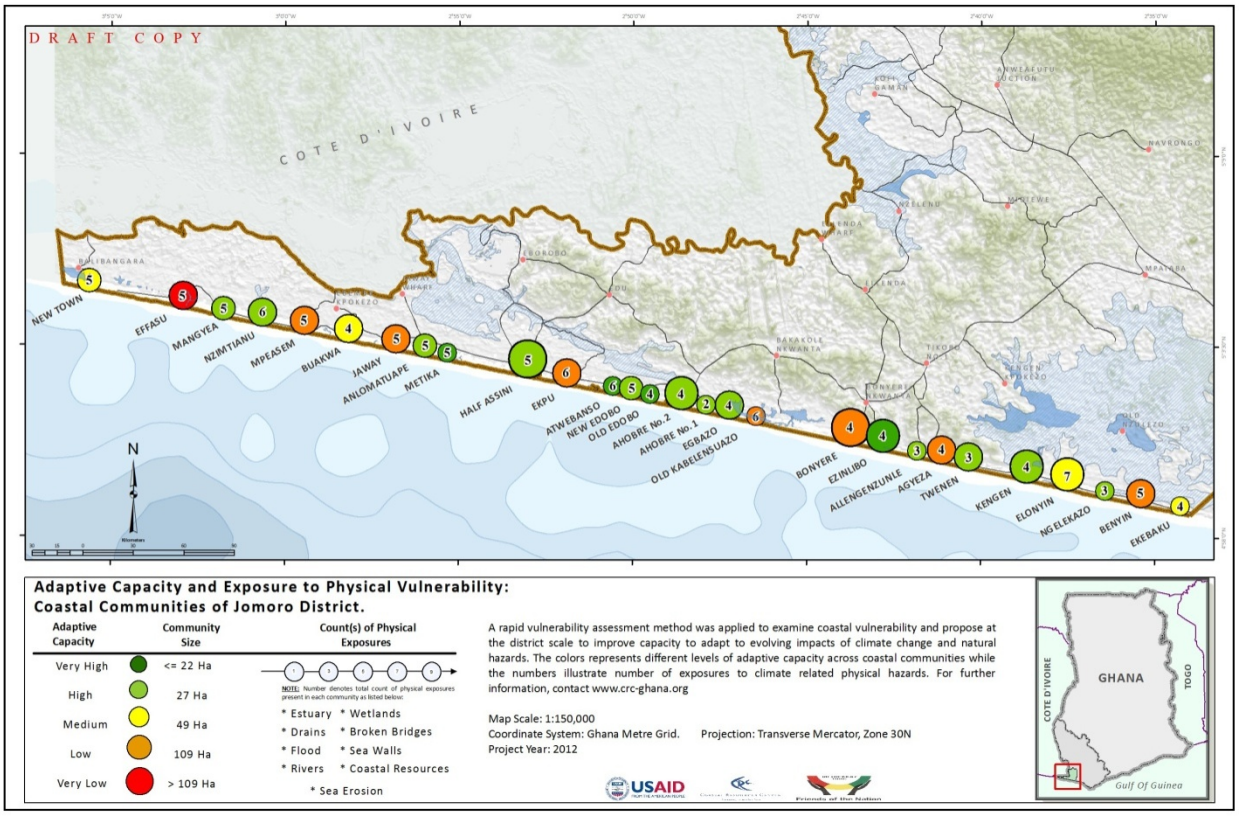

Figure 6 Community level adaptive capacity and exposure to hazards, Jomoro District

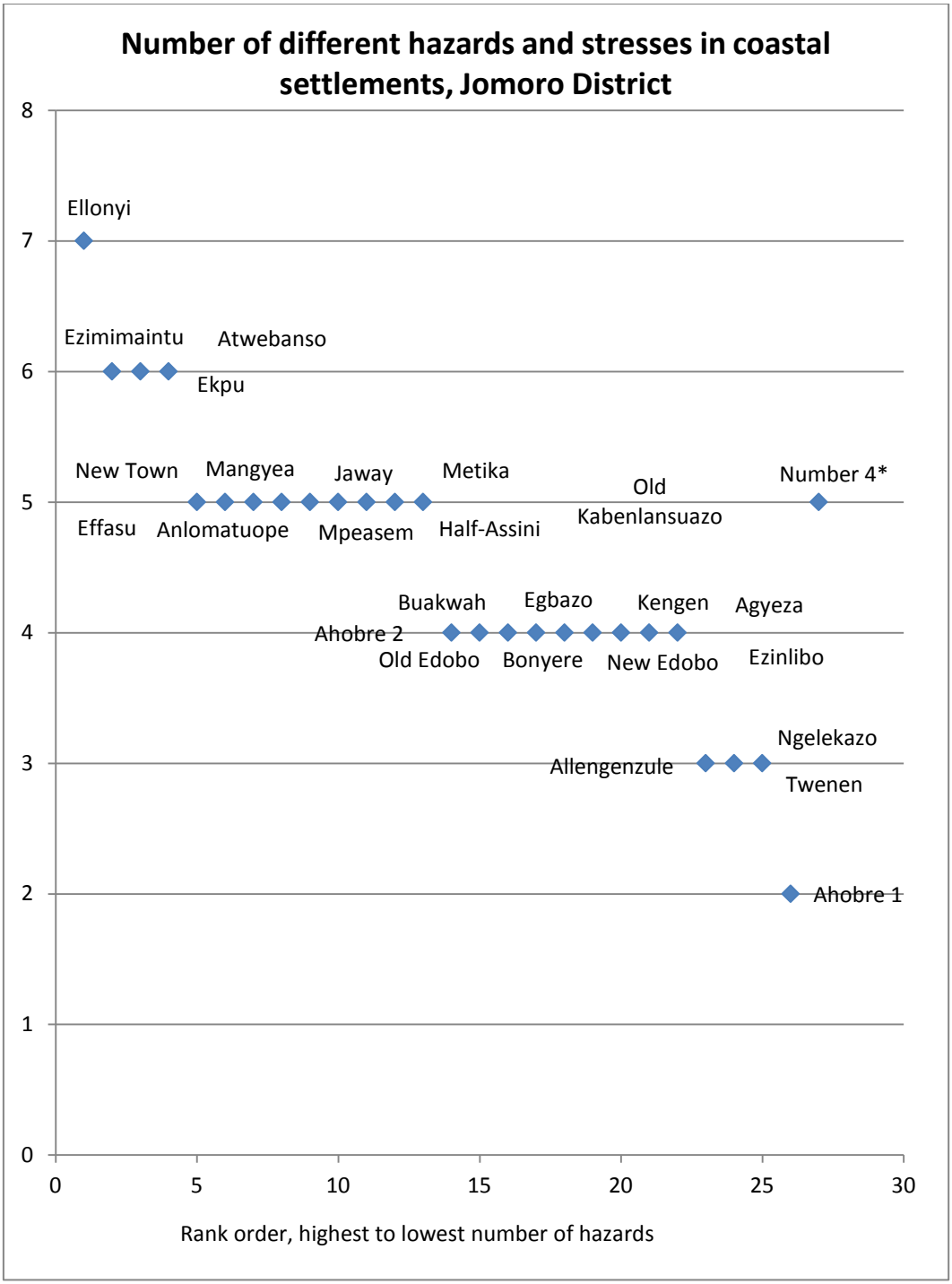

Figure 7 Number of hazards and stresses in Jomoro's coastal settlements

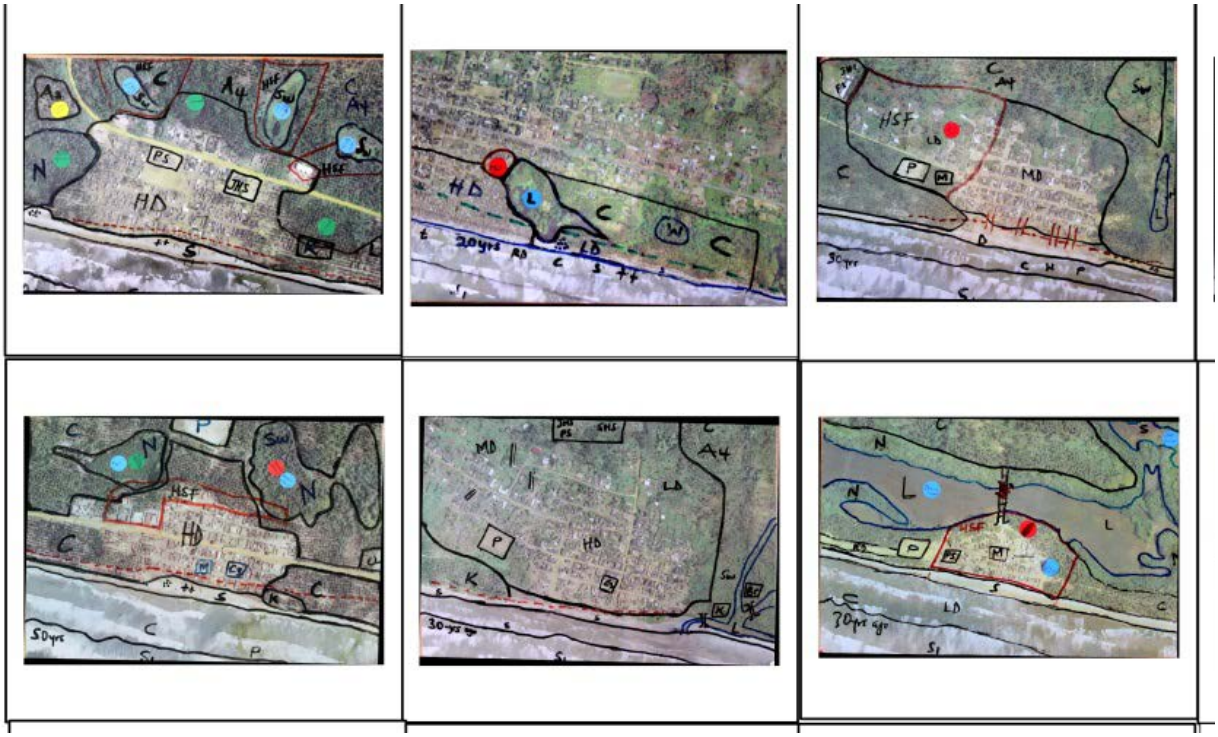

Figure 8 Example of exposure analysis for Jomoro coastal settlements

Dimensions of vulnerability and adaptive capacity

In vulnerable coastal communities, such as those in the Jomoro district, the capability to adapt to changes manifest in several forms. The key dimensions of adaptive capacity at the community level are governance and leadership; coastal resources management; risk awareness and emergency response; and economy and society.

Governance and leadership

In most coastal communities in the Jomoro district, local leadership exists but this is fairly strong. Particularly, the interaction between community folks and their local leaders needs some improvement since the level of trust for local leaders is declining and social cohesion at the community level is breaking down as a result. This is particularly pronounced in communities where the assembly persons are non-residents of the electoral area. Over the years, this lack of communication has negatively impacted the development of most of the coastal communities, since their needs are not adequately represented on the agenda of the district government. Moreover, in communities where conflicts prevail, other leaders from religious and youth groups are more trusted than the Chiefs or assemblymen.

Despite having challenges with leadership, the coastal settlements are relatively peaceful with no major incidents of arson, attacks, thefts and conflicts. On the average, the district attained a rank of 4, on security, law and order (Table 4). And this is indicative of peace and stability in most of the coastal communities.

Coastal resources management

As shown in Table 4, management of coastal resources in the Jomoro district is poor. In most communities, wetlands, fishery, beaches, rivers and estuaries are in poor conditions. This is due to the absence of clear rules for managing these coastal resources at the community level. On the other hand, where rules exist, their enforcement is weak. During the appraisal, one assembly person was quoted as saying ‘‘*we the assembly members are not paid hence*

enforcing regulations which will earn us more enemies is not a priority to us''. This is illustrative of how rules for managing coastal resources are blatantly neglected and not applied. Utilization of the shoreline has been of concern to inhabitants in the coastal communities. Due to the high demand for shoreline space for siting facilities, there is a renewed interest in leasing and allocating portions of the shoreline to potential investors. This will likely displace traditional users of the shoreline for fishing and fish processing. Besides, there are no management plans that inform how the predominantly sandy and fast eroding shoreline in the Jomoro district should be utilized. Set back regulations are not clearly defined, hence facilities are usually sited in the way of hazards which in turn impairs the dynamic functions of the shoreline. Over the past decades, sand winning along the beaches has been a predominant practice on large and small scale basis. Several years of large scale sand winning to supply construction sand has contributed to forced relocation of some communities. This is particularly the case of new Kabenlansuazo which was created some 50 years ago after resettlement of people from Old Kabenlansuazo.

Risk awareness and emergency response

While the level of public awareness of climate related risk and hazards is fairly low in the coastal communities, systematic response to climate related emergency and natural hazards is starkly non-existent as illustrated by an overall score of 0.15 in Table 4. By virtue of the flat topography of the coastal settlements which are backed by large swaths of wetland areas and fronted by the sea, flooding and coastal erosion are predominant risks that impact fishing infrastructure, habitats and populations in the coastal communities. Access to climate related information for planning emergency response is negligible in the coastal areas. There are no practical sources of emergency information to draw upon at the community level to facilitate response to rapid onset events and or gradual changes in climate variables. For instance, there are no early warning systems that signal potential flooding, resulting in the displacement of coastal populations during major flood events. Often times, the approach of NADMO have been the provision of post-emergency relief items which are mostly insufficient to address the cause and consequence of climate related impacts and hazards such as floods.

Economy and society

Fishing and farming constitute the key drivers of the local economy and are the major livelihood options practiced in the Jomoro district. However, destructive fishing practices coupled with the regular incidence of algal bloom in the marine environment are resulting in dwindling fish catch and displacing fishery-based livelihoods while threatening food security in the Jomoro district. This problem is aggravated by the prevailing low agricultural productivity in the district. As shown in Table 4, the coastal communities recorded an average score of 1 relative to livelihoods and the rural economy. This is due in part, to the periodic incidence of algal bloom in the marine environment which has been of much concern, due to its contribution to decline in fish catch. Harmful fishing methods, such as light fishing and use of chemicals have also negatively impacted the fishery. The coconut industry on the other hand, has been deteriorated by the incidence of Cape Saint Paul's Wilt disease and also due to over-age crop. Meanwhile, the characteristic sandy soils of the district have over the years, failed to adequately support food crop production.

It also emerged during the appraisal that poor access to educational infrastructure and lack of trained teaching personnel at the basic education level is resulting in high school drop-out rate, poor pupil performance and spurring entry of prospective students into the fishery in the Jomoro district. This problem is resulting in low standard of education and driving increased fishing effort. Several factors account for the falling standard of basic education in the coastal communities, notable among them are inadequate teaching and learning materials, inadequate professional teachers, teacher indiscipline, weak English language skills, failure to complete curriculum, lack of parental support towards pupils' education, inadequate external and internal teacher supervision and low interest of pupils' towards education. In a nutshell, declining livelihoods and high illiteracy levels in the coastal communities is indicative of high vulnerability of the coastal populations to external shocks and stresses that are both climate related and or non-climatic.

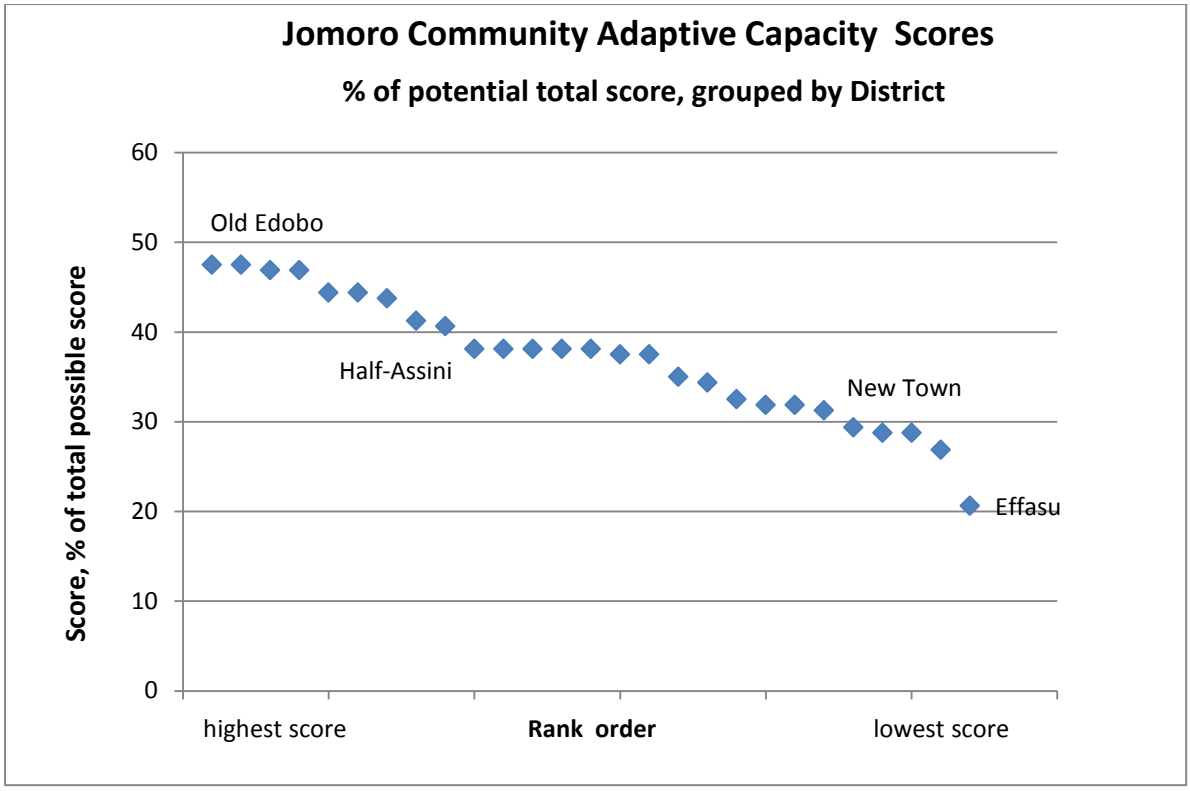

Figure 9 Jomoro Community Adaptive Capacity Scores

Priority actions for improving adaptive capacity at community and district scales

Table 4 reveals that, the district is fairly strong in certain aspects of adaptive capacity such as leadership and local organization, security, law and order, awareness of hazards and attention to the needs of marginalized groups. However, the district demonstrates significant weakness in other areas of adaptive capacity, notably preparedness for emergency, status of livelihoods and economy, ability to manage coastal resources as well as land use planning and decision making. These areas of weakness require more attention and should be the priority for future district scale actions (along the lines recommended in Table 4) to build adaptive capacity against climate and non-climate stressors.

Also, Table 4 reveals the variations existing across communities relative to adaptive capacity. It shows that while some communities are more able to adapt to change, others need urgent assistance in the short term to address their peculiar grim circumstances. This implies that while district-wide actions are necessary to facilitate widespread improvement in adaptive capacity for all coastal communities, priority should also be given some communities and segments of the population that find themselves in particularly worse situations and show relative unpreparedness to adapt to climate and non-climate stressors. Examples of such communities include Old Kabenlensuazo, Anlomatuope, Agyeza, Bonyere and Effasu.

Table 4 Summary of community level adaptive capacity across eight variables and Jomoro improvement actions

Dimension of adaptive capacity	Adjusted score (possible 5)	Jomoro District-wide actions to improve adaptive capacity
Emergency Preparedness	0.15	• Communications • Local organization • Education and awareness • Training • Equipment • Supplies
Livelihoods and rural economy	0.52	• Incorporate climate and hazards elements into economic development programs; • Assess sector and infrastructure vulnerability, • Early actions to increase economic resilience in livelihoods; • Assess critical infrastructure (roads, bridges, utilities) • Prevent ad hoc coastal defenses, favor non-structural solutions and only where properly designed and justified utilize engineered shoreline stabilization
Condition of coastal resources	0.89	• Adopt policies that recognize coastal features and discourage construction in hazardous zones; • Set priority uses matched to sensitivity of coastal areas; • Assess effectiveness of existing shore defenses; and • Identify areas where setbacks, retreat, restoration and protection are preferred. • Incorporate refugia, which are protected areas where wetlands, flood plains and landscape habitats can move to in response to sea level rise and climate change
Land Use Decision Making and Planning	0.96	• Conduct cross-cutting vulnerability assessment for coastal region as part of 2014 Mid-Term Development Plan; • Set priorities for coastal development based on dependence of water location and allocate suitable lands for relocation of infrastructure and settlements. • Designate flood-prone areas and set limits on allowable uses. • Improve the flood and climate resilience of existing & new housing and business structures in terms of construction and placement. • Minimize development or investments requiring shore, river bank or other major flood control; • Conduct engineering studies of settlement and river drainage systems to remediate recurrent problems,

Dimension of adaptive capacity	Adjusted score (possible 5)	Jomoro District-wide actions to improve adaptive capacity
		flood plain management and retention areas • Introduce low-impact settlement planning, transportation system approaches. • Carefully planned and implemented resettlement, requires identification of a safer area that meets the needs of residents, including proximity to the fish landing site, agricultural lands, and existing infrastructure such as transportation corridors and water supply facilities.
Attention to the needs of marginalized groups	1.56	• Prepare and implement effective early warning messages that reach marginalized groups. • Identify and support women's contribution to informal early warning systems. • Develop and implement evacuation and recovery plans that meet the needs of children, elderly and the sick. • Early actions to increase economic resilience of poor people through diversified livelihood opportunities, especially for women, elderly people, people with disabilities, ethnic minorities, people living with HIV/AIDS and tenant farmers.
Public awareness of local conditions such as erosion, shifting or river course/delta	2.15	• District wide awareness and education coupled with settlement or ecosystem specific vulnerability assessments and adaptation plans; • Training for engineers, architects, planners and contractors on hazardous sites and best planning, design and construction practices • Vulnerability assessments and adaption plans for selected communities
Leadership and local organization	2.37	• Develop community cohesion • Create dialogue platforms to facilitate engagement between community folks and their leaders on issues of common interest. • Create a transparent process for decision making on disposal of communal lands and other community assets. • Build leadership skills among the youth in preparation for future roles
Security, Law and Order	3.26	• Support peace campaigns and other programs that build upon the relative peace in coastal communities. • Develop and implement programs to build trust, improve communications and relationships between oil and gas companies and frontline communities. • Create dialogue and consensus building platforms for deciding development options in coastal communities.

2.2 Ellembelle District Summary

Physical impacts of hazards and climate change

The physical hazards facing coastal communities in the Ellembelle district are similar to those observed in other coastal districts in the Western region. These hazards comprise the following 9 broad categories: presence or proximity to a river; proximity to an estuary; high water mark in settlement; presence and or functionality of sea defense walls; condition of coastal bridge; flood risks; a history of coastal erosion; community backed by a wetland and presence of dynamic coastal features along the beach. Each community is exposed to at least, one kind of hazard which is not only a source of physical vulnerability but also a potential threat to livelihoods and well-being of community inhabitants. As shown in Figure 11, overall, the physical hazards facing communities in this district range between 1 and 5. While 7 out of the total 18 communities are exposed to less than 3 physical hazards, the remaining 11 communities are confronted with a minimum of 3 and maximum of 5 physical hazards and climate-related risks (Figure 10).

In these communities, key assets that are exposed and also sensitive to hazards include artisanal fishing settlements and associated landing sites as well as fish habitats. Other livelihood assets and community infrastructure exposed to hazards are hotels and recreational beaches. The risks of flooding and coastal erosion pre-dominate the hazards faced by these communities. Whereas sea erosion results from high wave energy and is aggravated by sand winning along the shoreline, flooding is mainly caused by increased filling of wetland and floodplains for settlement expansion. In addition to other threats, sea erosion is resulting in the displacement of the coconut plantations that underpin the agro-industry in the district. It is worthy of note that the combination of flooding and coastal erosion has raised concerns for relocating people away from hazard prone areas. For instance, inhabitants of Kikam and Anyanzinli had to relocate from their former settlements to their current locations due to impact of flooding and erosion. Similarly, Akonu-Bakanta, Sanzule, Krisan, Eikwe and Atuabo are also threatened by tidal waves and flood. In 2007, tidal waves destroyed over 20 houses and a church building in Akonu-Bakanta; whilst in Krisan and Eikwe, tidal waves intrude wells used by residents as major source of water for domestic purposes.

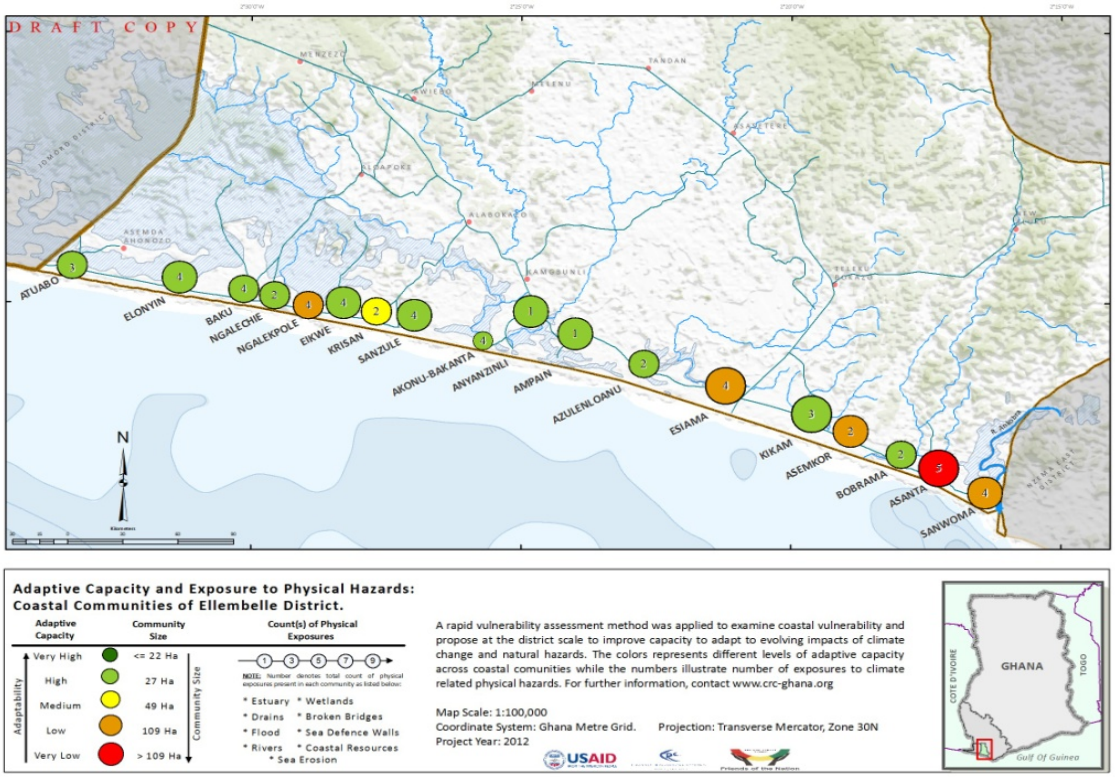

Figure 10 Community Level adaptive capacity and exposure to hazards, Ellembelle District

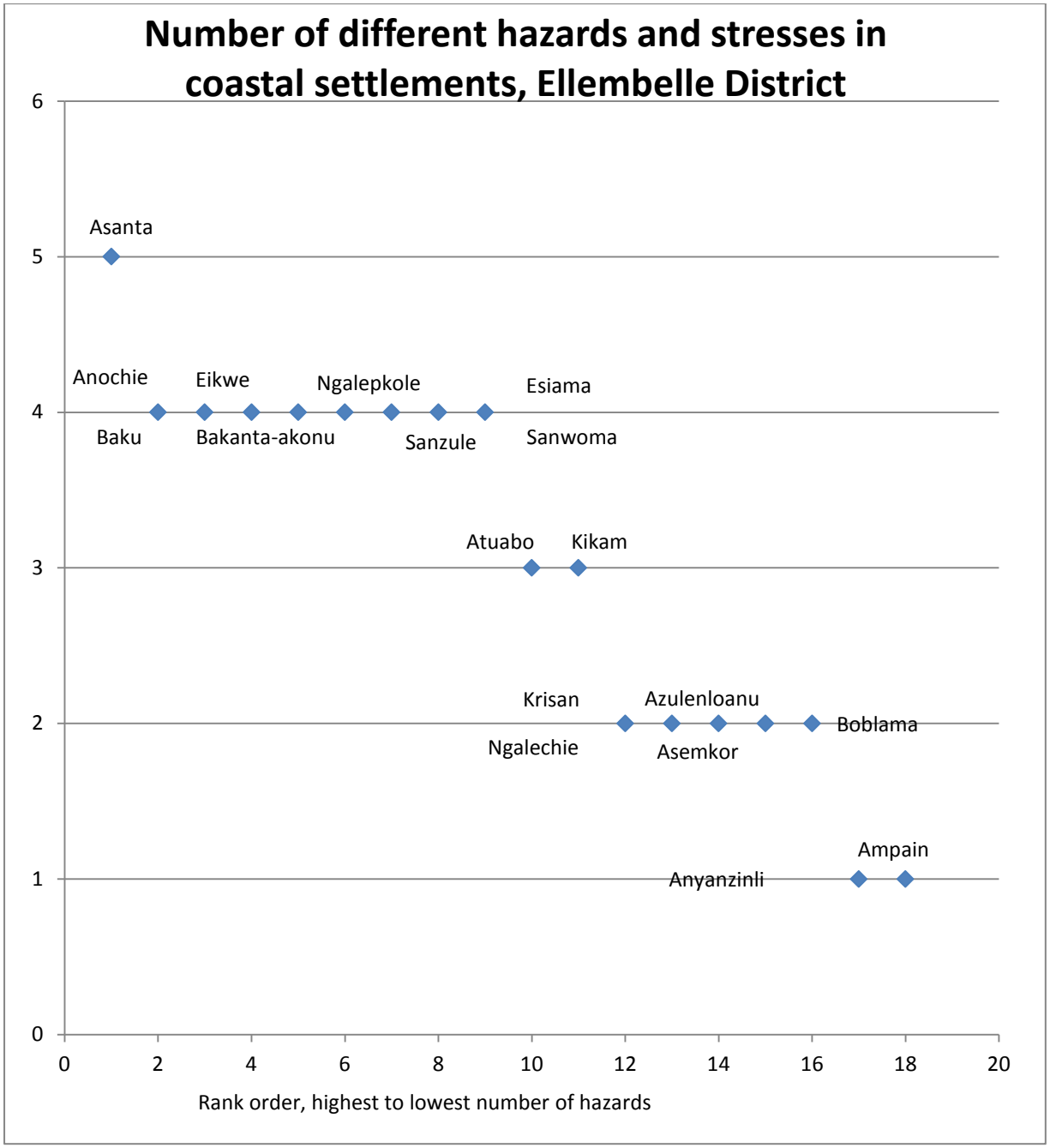

Figure 11 Number of hazards and stresses in Ellembelle's coastal settlements

Figure 12 Severe flooding in a coastal settlement in Ellembelle attests to the high level of exposure to hazards

Dimensions of vulnerability and adaptive capacity

The conditions that give rise to vulnerability in the coastal communities in Ellembelle District are not only bio-physical but also socio-economic and cultural. The interactions between these drivers of vulnerability undermine the resilience of coastal communities and the natural resources upon which they depend. The extent to which communities are able to respond, adapt to, and recover from climate and non-climate related shocks is a function of their adaptive capacity. In Ellembelle district, adaptive capacity at the coastal community level is expressed in 4 key dimensions - governance and leadership; coastal resources management; risk awareness and emergency response; and the attributes of the economy and society.

Average scores obtained by aggregating across the eight indicators of adaptive capacity reveal low relative resilience of these communities (Table 5). These communities should benefit from detailed vulnerability assessments and adaptation planning processes that identifies forward looking actions and builds local capacity for improving livelihoods, building local leadership, facilitating emergency preparedness and ensuring sustainable management of coastal resources.

Governance and leadership

Governance in Ellembelle's coastal communities is influenced by multiple factors. However, the credibility of a community's leadership, degree to which decision-making is participatory, effectiveness of local government functionaries, presence and functionality of community organizations, have far reaching implications for the conditions that give rise to vulnerability and adaptive capacity.

Leadership exists in all the coastal communities and it is fairly strong as indicated in Table 6 (2.33 out of possible score of 5). It is expressed through the traditional chieftaincy system, the religious establishments, organized youth groups and the local government system. In majority of the communities, the chieftaincy system is highly influential in decision-making and also well respected. In such communities, decision-making is participatory and often involve those who will be affected by those decisions. At the same time, such communities adhere to local norms, laws and taboos because their actions are shaped by existing belief systems. In few instances however, the local chiefs have lost prominence and the youth in particular, adhere to instructions from the communities' local government representatives but not the former. A classical case is Sanzule, where the youth perceive the local government representative as more supportive and representative of their interest and welfare than all other segments of community leadership. As a result, they cooperate better with the local government representative in matters involving community mobilization and collective action.

Table 5 Adjusted Rank order of community resilience (fraction of total possible score on the 8 adaptive capacity areas) Ellembelle District

Settlement in Ellembelle District	Overall adjusted score (higher is better)
Atuabo	41.25
Azulenloanu	41.25
Sanzule	41.25
Ngalechie	39.38
Anochie	38.13
Baku	38.13
Eikwe	38.13
Bakanta-Akonu	38.13
Anyanzinli	38.13
Ampain	38.13
Kikam	38.13
Boblama	38.13
Krisan	35.63
Esiama	33.75
Ngalepkole	31.88
Sanwoma	26.88
Asemkor	26.25
Asanta	21.25

Coastal communities in Ellembelle district also manifest relative peace and calm as indicated in Table 6 (2.67 out of possible score of 5). No major incidences of conflicts, attacks, arson and thefts have been recorded in majority of the communities in the past decades. Overall, people feel safe to live in their communities and comply with laws and norms. It is important to note that, in relatively small communities, people generally tend to comply with laws and social norms out of fear of being noticed when they engage in socially deviant behaviors.

Coastal resources management

There is disproportionately high dependence on coastal resources by coastal inhabitants in the Ellembelle district. Majority derive their sources of livelihoods from fishing in marine, riverine and estuarine waters, fish processing in shorefront areas, mangrove harvesting and farming. Consequently, the condition of these resources and their utilization patterns strongly influence the communities' ability to respond and their capacity to adapt to stressors. There is however, widespread perception at the community level that these resources are in poor condition (1.22 out of possible score of 5 as shown in Table 6). This is due in large part, to either poor coastal resource management practices or a lack thereof, at the community level. For instance, while social norms are generally respected and adhered to in the coastal communities, such practices are not extended to the management of coastal resources. Also, in instances where clear traditional norms existed for managing coastal resources, such as the *Amanzule* wetlands, such norms were found to be fast eroding and not being enforced, because they were perceived to be subservient to statutory laws. Meanwhile, non-conformance with statutory laws is widespread and is manifest in practices including fishing

with unauthorized gears, beach sand wining and mangrove exploitation. An illustrative case is Esiama, where huge quantities of sand are mined on daily bases for construction purposes, leading to the loss of fish landing site.

The poor management of coastal resources ties in with prevailing land use planning and decision-making processes at both the community and district levels. Planning and land use decision-making requires significant improvement as shown in Table 6 (1.55 out of possible score of 5). In most cases, land use planning and decision-making at the district level fail to respond to the need to maintain coastal ecosystem goods and services and their functions. Infrastructure to ensure sustainable utilization of, and value addition to, coastal resources is generally lacking. Management plans for coastal resources are non-existent. Spatial planning is at its nascent stages and remains weak as regards ensuring broad stakeholder participation and implementation.

Risk awareness and emergency response

In Ellembelle's coastal communities, awareness of physical hazards and climate-related stressors remain at an average level, as shown in Table 6 (1.86 out of a possible score of 5). These communities are also unprepared to handle local emergency situations as evidenced in Table 6 (0.56 out of a possible score of 5). Except Bobrama, Asemkor and Kikam, the concentration of settlements along the coast - between the sea and large swathes of wetland areas - contributes to the communities' exposure. This exposure creates high risk of coastal erosion and flooding. Sanwoma for instance, is regularly inundated by tidal waves and impacted by river flooding during storm events, thereby increasing the risk of displacement of people and livelihoods. Generally, the strategies employed to cope with these risks and the mechanisms for responding to hazards include salvaging flood-damaged assets, self-constructed drainage ways and temporal retreat. These strategies are only piecemeal and insufficient to accommodate the increasingly compounding changes in exposure and accelerating risks. Some residents have acquired land on higher ground for relocation; however, they lack the financial means to construct their own houses.

No formal or informal education programs exist in the various communities to promote risk knowledge and help with adaptation. Neither are there any programs to support the communities to reduce the potential impacts of the risk they currently face, such as providing access to climate related information for planning and reaction to local emergencies. The National Disaster Management Organization's (NADMO) approach for helping out during emergency situations is mainly reactive, as evidenced by the provision of post-emergency relief items which are mostly insufficient to address the cause and consequence of climate related impacts and hazards. The Organization does not systematically anticipate and proactively plan to address risks. Past attempts at establishing and training volunteers in communities to assist in emergency situations has also not succeeded due to low motivation among the youth, coupled with resource constraints within NADMO.

Economy and society

The coastal economy and livelihoods in Ellembelle district are directly dependent on coastal ecosystems, whose productivity are known to be influenced by shocks and extreme events. This condition of vulnerability account for a relatively low rating (0.17 out of a possible score of 5) on the dimension of livelihoods and economy, as illustrated in Table 6. The coastal economy thrives mainly on farming and artisanal fishing activities. To a large extent, farming in the coastal belt revolves around the cultivation of food crops for household consumption and of tree crops, notably coconut, for commercial oil production. While the coconut oil processing industry served as the backbone of the coastal economy by contributing significantly to employment and wealth generation for many decades, this trend reversed in

the 1960s, as a result of the devastation of coconut plantations on the coast caused by the incidence of Cape Saint Paul's Wilt disease. The decline of the coconut industry since this period, had ripple effects on pig husbandry which heavily rely on the availability of coconut chaff for feed.

Fishery on the other hand, is also on the decline, as fish catch has reduced progressively over the past decade. The seasonal proliferation of algal blooms in the coastal waters has also resulted in further displacement of fishery-based livelihoods. Current strategies employed to adapt to these changes are varied; majority of the youth for instance, often migrate to, and from nearby towns bordering Ivory Coast to explore the opportunities for trading in general goods and services. The decision to migrate is heavily influenced by the relationships and networks created by potential migrants in the border town. Others have resorted to illegal small scale mining as a coping response. Land owners and family heads are increasingly leasing land, including shorefront areas, in response to the burgeoning demand for housing development and establishment of industrial facilities associated with the emerging oil and gas industry. Overall, these coping mechanisms seem insufficient to facilitate movement out of poverty, especially for the marginalized, who are disproportionately impacted by the stressors.

Priority actions for improving adaptive capacity at Community and District Scales

Table 6 reveals that, the Ellembelle district is fairly strong in certain aspects of adaptive capacity such as leadership and local organization, security, law and order and awareness of hazards. Yet on other aspects such as attention to the needs of marginalized groups, preparedness for emergency, status of livelihoods and economy, ability to manage coastal resources as well as land use planning and decision making, the district expresses significant weaknesses. These areas of weakness require more attention and should be the basis for future district scale actions (along the lines recommended in Table 6) to build adaptive capacity against climate and non-climate stressors.

Also, Table 6 reveals the variations existing across communities relative to adaptive capacity. It shows that while some communities are more able to adapt to change, others need urgent assistance in the short term to address their peculiar grim circumstances. This implies that while district-wide actions are necessary to facilitate widespread improvement in adaptive capacity for all coastal communities, priority should also be given some communities and segments of the population that find themselves in particularly worse situations and show relative unpreparedness to adapt to climate and non-climate stressors. Examples of such coastal communities in Ellembelle include Asanta, Sanwoma and Asemkor.

Adjusted Rank order of community resilience (fraction of total possible score on the 8 adaptive capacity areas) Ellembelle District

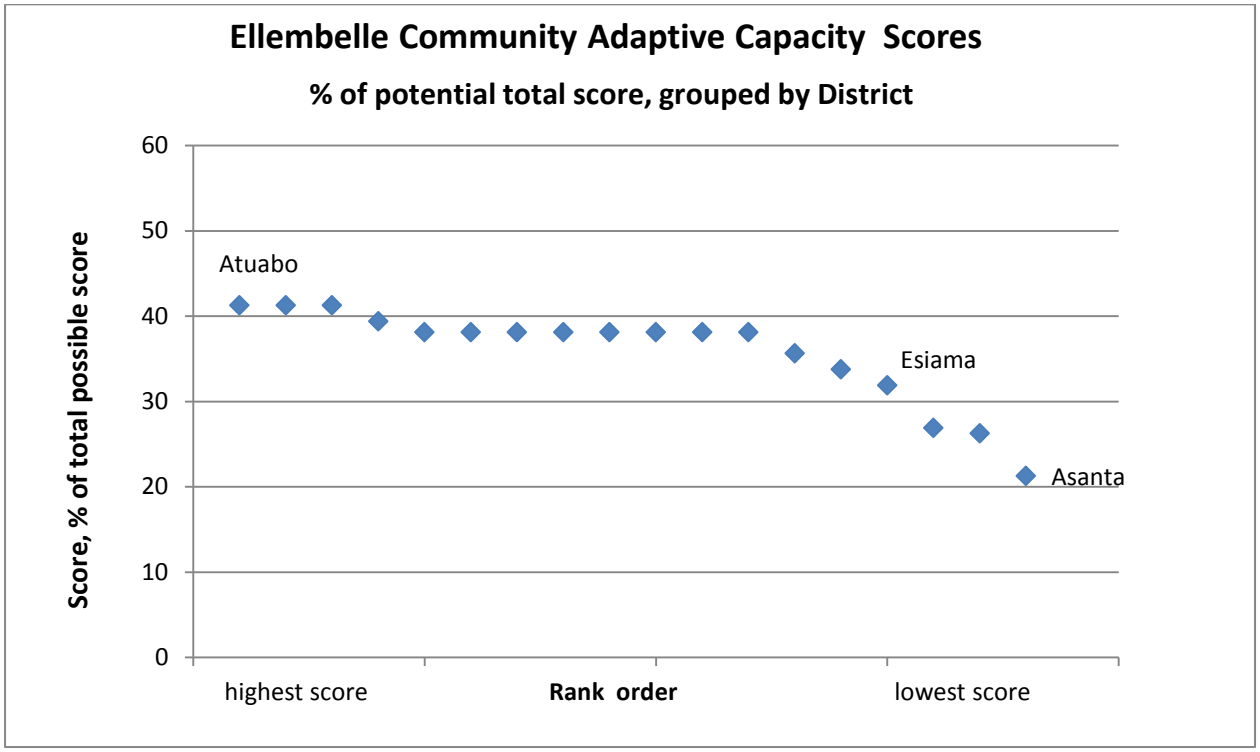

Figure 13 Ellembelle's Community Adaptive Capacity Scores

Table 6 Summary of community level adaptive capacity across eight variables and Ellembelle improvement actions

Dimension of adaptive capacity	Average score out of possible 5	Ellembelle District-wide actions to improve adaptive capacity
Livelihoods and rural economy	0.17	• Incorporate climate and hazards elements into economic development programs; • Assess sector and infrastructure vulnerability, • Early actions to increase economic resilience in livelihoods; • Assess critical infrastructure (roads, bridges, utilities) • Prevent ad hoc coastal defenses, favor non-structural solutions and only where properly designed and justified utilize engineered shoreline stabilization
Emergency Preparedness	0.56	• Communications; • Local organization; • Education and awareness; • Training; • Equipment and • Supplies
Attention to the needs of marginalized groups	1.11	• Prepare and implement effective early warning messages that reach marginalized groups. • Identify and support women's contribution to informal early warning systems. • Develop and implement evacuation and recovery plans that meet the needs of children, elderly and the sick. • Early actions to increase economic resilience of poor people through diversified livelihood opportunities, especially for women, elderly people, people with disabilities, ethnic minorities, people living with HIV/AIDS and tenant farmers.
Condition of coastal resources	1.22	• Adopt policies that recognize coastal features and discourage construction in hazardous zones; • Set priority uses matched to sensitivity of coastal areas; • Assess effectiveness of existing shore defenses; and • Identify areas where setbacks, retreat, restoration and protection are preferred. • Incorporate refugia, which are protected areas where wetlands, flood plains and landscape habitats can move to in response to sea level rise and climate change
Land Use Decision Making and	1.50	• Conduct cross-cutting vulnerability assessment for coastal region as part of 2014 Mid-Term Development Plan;

Dimension of adaptive capacity	Average score out of possible 5	Ellembelle District-wide actions to improve adaptive capacity
Planning		• Set priorities for coastal development based on dependence of water location and allocate suitable lands for relocation of infrastructure and settlements. • Designate flood-prone areas and set limits on allowable uses. • Improve the flood and climate resilience of existing & new housing and business structures in terms of construction and placement. • Minimize development or investments requiring shore, river bank or other major flood control; • Conduct engineering studies of settlement and river drainage systems to remediate recurrent problems, flood plain management and retention areas • Introduce low-impact settlement planning, transportation system approaches. • Carefully planned and implemented resettlement, requires identification of a safer area that meets the needs of residents, including proximity to the fish landing site, agricultural lands, and existing infrastructure such as transportation corridors and water supply facilities.
Public awareness of local conditions such as erosion, shifting or river course/delta	1.89	• District wide awareness and education coupled with settlement or ecosystem specific vulnerability assessments and adaptation plans; • Training for engineers, architects, planners and contractors on hazardous sites and best planning, design and construction practices • Vulnerability assessments and adaption plans for selected communities
Leadership and local organization	2.33	• Develop community cohesion • Create dialogue platforms to facilitate engagement between community folks and their leaders on issues of common interest. • Create a transparent process for decision making on disposal of communal lands and other assets. • Build leadership skills among the youth in preparation for future roles
Security, Law and Order	2.67	• Support peace campaigns and other programs that build upon the relative peace in coastal communities. • Develop and implement programs to build trust, improve communications and relationships between oil and gas companies and frontline communities. • Create dialogue and consensus building platforms for deciding development options in coastal communities.

2.3 Nzema East District Summary

Physical impacts of hazards and climate change

Coastal communities in the Nzema East district are exposed to physical hazards that can be grouped under the following 9 broad categories: presence or proximity to a river; proximity to an estuary; high water mark in settlement; presence and or functionality of sea defense walls; condition of coastal bridge; flood risks; a history of coastal erosion; community backed by a wetland and presence of dynamic coastal features along the beach. As shown in Figure 14, the coastal communities are exposed to a minimum of 3 counts of physical hazards and a maximum of 7. Figure 14 also indicates that out of the 10 shorefront communities, 6 are exposed to more than 4 physical hazards. Two communities – Amanfukuma and Domunli - appear to be highly sensitive to these hazards, since they are particularly noted to exhibit a very low capacity to respond and adapt to stressors (Figure 14).

During consultations with community stakeholders, it was established that coastal erosion is extensive and has depleted approximately 60 yards of beach area, eroded many hectares of coconut plantations, heritage sites and public infrastructure between the past 4 to 6 decades. The same period was marked by the submergence of fish landing sites for Anto and Apewosika and the erosion of the coastal road linking Lower Axim and Apewosika as well as the one connecting Amanfukuma to Akyenim. Settlements below 10 meter elevation such as those in Agyan, Akonu and Domunli are exposed to frequent tidal waves which usually cause inundation, especially at high tides. These tides often obstruct the Domunli lagoon, pushing it backwards as they spill over and flood the community. The impact of sea erosion is exacerbated by intense sand wining activities, especially around Akyenim, Apewosika, Brawire and Domunli. The cumulative impacts of inundation and coastal erosion on settlement and livelihoods has catalyzed public debate on future resettlement programmes for the most impacted communities, notable being Amanfukuma, Agyan, Akonu and Domunli. However, it is unclear how future resettlement will be operational, because available upland is largely private-owned and also not earmarked for residential development.

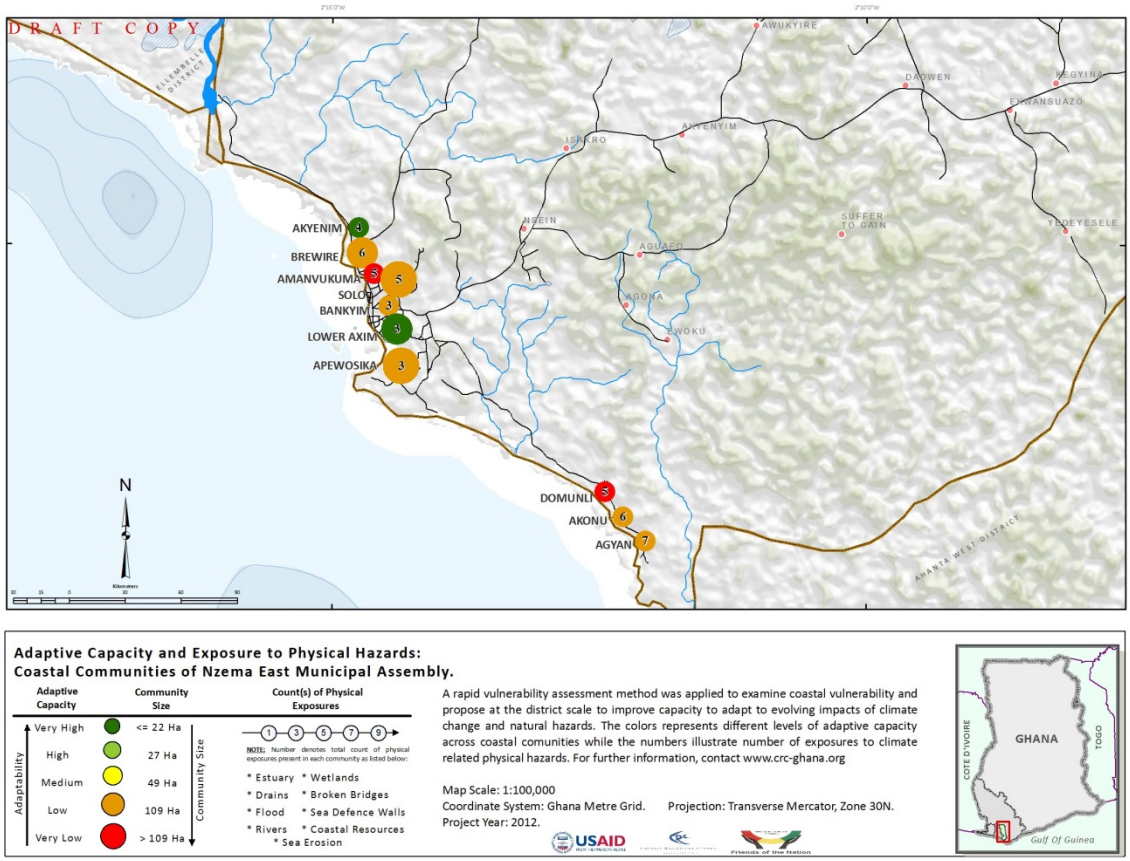

Figure 14 Community Level adaptive capacity and exposure to hazards, Nzema East Municipal Assembly

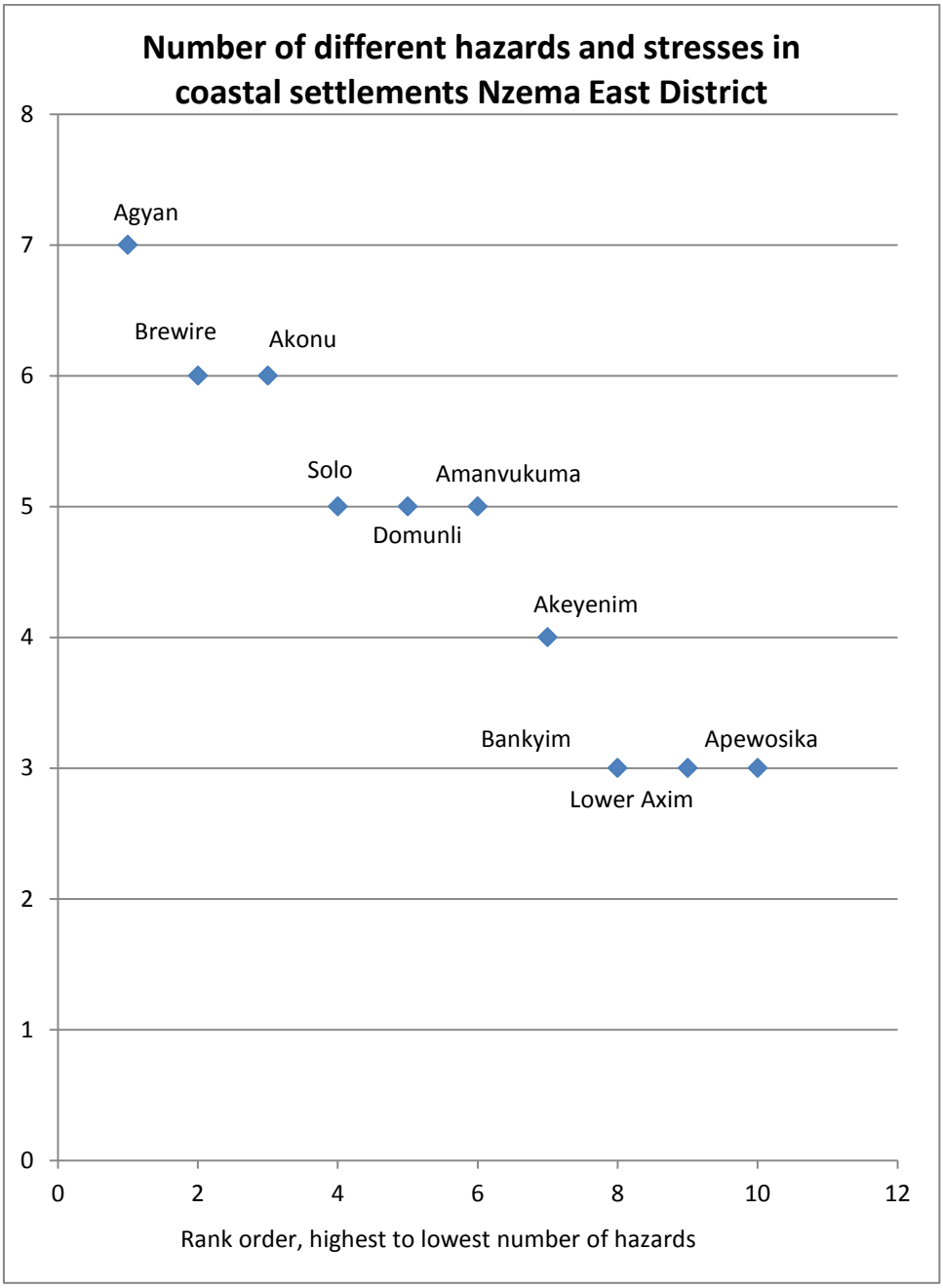

Figure 15 Number of different hazards and stresses in coastal settlements Nzema East District

Figure 16 Damage to coastal infrastructure in a coastal settlement in Nzema East indicates ongoing problems from erosion and flooding

Dimensions of vulnerability and adaptive capacity

The capacity of coastal communities in the Nzema East municipal assembly to adapt to climate and non-climate stressors were evaluated along 4 key dimensions - governance and leadership; coastal resources management; risk awareness and emergency response; and the attributes of the economy and society.

Table 7 reveals the variations existing across communities relative to adaptive capacity. It shows that while some communities are more able to adapt to change, others need urgent assistance in the short term to address their peculiar grim circumstances. This implies that while district-wide actions are necessary to facilitate widespread improvement in adaptive capacity for all coastal communities, priority should also be given some communities and segments of the population that find themselves in particularly worse situations and show relative unpreparedness to adapt to climate and non-climate stressors. Examples of such coastal communities in Nzema East include Domunli and Amanvukuma. These communities should benefit from detailed vulnerability assessments and adaptation planning processes that identifies forward looking actions and builds local capacity for improving livelihoods, building local leadership, facilitating emergency preparedness and ensuring sustainable management of coastal resources.

Table 7 Adjusted rank order of community resilience (fraction of total possible score on the 8 adaptive capacity areas) Nzema East District

Settlement in Nzema East District	Overall adjusted score (higher is better)
Akyenim	41.88
Lower Axim	39.38
Bankyim	30.63
Brewire	30.00
Apewosika	30.00
Agyan	29.38
Solo	27.50
Akonu	26.25
Amanvukuma	15.00
Domunli	15.00

Governance and leadership

Governance and leadership in the coastal communities was evaluated on the basis of the following indicators: the credibility of a community's leadership, degree to which decision-making is participatory, effectiveness of local government functionaries, presence and functionality of community organizations. These indicators are central to adaptive capacity in coastal communities and influence the dynamics of power and resource allocation for building resilience and reducing vulnerability.

Leadership expressed in the coastal communities of Nzema East is relatively weak, as shown in Table 8 (1.60 out of possible score of 5). However, the key features of the governance and leadership set-up and associated mechanisms for promoting compliance with laws and local norms are similar to what pertains in other coastal districts. The main sources of leadership in the communities' are the chieftaincy institution, religious establishment, community associations including youth, socio-economic organizations and the local government system. Despite the strong influence of traditional leadership and local government in the coastal communities, poor communications and increasingly strained relations between these sources of leadership is undermining the overall governance of the coastal communities. It was expressed that there is an evolving trend whereby powers exercised by traditional leaders appear to overlap with that of local government functionaries. For instance, in asserting their powers, traditional authorities are increasingly handling issues such as rape, theft, stray animals and negotiations with project proponents; these are perceived to be the domains of the security agencies and the municipal authority. On the other hand, social norms such as ban on fighting, spell casting and quarreling, which are perceived to be the domains of traditional leaders are weakly enforced. The consequence has been a gradual breakdown of social cohesion.

Information flow between assembly persons and community folks is also very weak and has generated issues of poor accountability in the utilization of revenue for community development. There are issues of mistrust at the community level for law enforcement agencies because of perceived bias in enforcement of the law. This is creating an emerging trend whereby people deliver instant justice on suspected criminals. Although the perception of safety in these communities is high, the prevailing flagrant violation of local norms and laws are potential threats to this apparent safety. The relatively low attainment of security and

compliance with law in the coastal communities is illustrated by a score of 1.52 out of possible score of 5 (Table 8).

Coastal resources management

Fisheries, wetlands, beaches and lagoons are central to the livelihoods and well-being of the burgeoning coastal population in Nzema East Municipal Assembly. Despite this, the utilization patterns of these resources are unsustainable and the management practices very weak. The general perception among coastal stakeholders is that, coastal ecosystems are in a relatively poor condition. This is illustrated in Table 8 (0.70 out of possible score of 5). For instance, over 50 acres of wetlands have been drained for food crop farming, as observed in Anto, Apewosika, Brawire, Amanfukuma and Bankyim. More wetland areas have also been filled to pave way for residential development. In communities like Amanfukuma, Brawire and Agyan, lagoons have been converted into waste disposal sites.

The poor condition of coastal resources is due in large part, to the prevailing weak coastal land use planning and development controls. The fishing settlements are largely unplanned and characterized by high building and population density. The alleys and lanes between buildings are increasingly being developed, creating further congestion. This has stifled vehicular access to the settlements and denied the communities' of the municipality's solid waste collection services. In communities like Domunli, the practice of sand wining is accelerating the loss fish landing beach. The score attained (1.40 out of possible score of 5), indicates that planning and land use decision making requires improvement in the coastal communities.

Risk awareness and emergency response

There is relatively high perception among coastal stakeholders of the sources of vulnerabilities and risks posed by physical hazards and climate-related stressors to household and community assets in the Nzema East Municipal assembly. This is illustrated in Table 8 with an overall score of 2.40 out of a possible score of 5 for risk awareness. However, like in other coastal districts, coastal communities in the Nzema East district are poorly prepared to address these risks and handle local emergency situations effectively as shown in Table 8 (0.90 out of a possible score of 5). Generally, coping strategies against hazards are often times reactive and insufficient to reduce vulnerabilities. Coastal inhabitants' coping responses to tidal inundation usually involve ''temporal retreat'' from the settled areas and return after the tides have subsided. There is general unwillingness to retreat permanently from high hazard areas due to the permanent nature of physical assets owned by most inhabitants. In Akyenim, issuance of inundation threat via megaphones with limited community coverage further illustrates the ineffectiveness of adopted coping measures. There is an emerging practice of designing buildings with concrete foundation as a measure to prevent entry of flood waters. During flooding events, breach ways are created and drains are desilted through communal labor. While some community inhabitants have received training from the National Fire Service on ways of fighting fires, work remains to be done on improving local capacity for response to multi-hazard threats.

Economy and society

Fishing is the mainstay of Nzema East's coastal economy; it provides employment and serves as source of livelihoods for majority of the coastal population. The high dependence of fisher folk families' livelihoods and the municipality's economy on fisheries, suggests high vulnerability of the coastal economy to the prevailing rapid decline in fish catch. Measures are increasingly employed by coastal inhabitants in response to these economic vulnerabilities. However, these are less robust and insufficient to reduce vulnerability to

extant economic stressors, as evidenced by a score of 0.40 out of possible score of 5 (Table 8). Besides, these measures offer only partial adaptation solutions, since they fail to systematically address the underlying vulnerability posed by the socio-economic and biophysical context in which the communities are embedded. Some of these coping measures are diversification away from fish mongering and processing to trading in food stuffs brought from the Northern part of the Western Region. Other livelihood options that have attracted the interest of men include carpentry, construction, auto mechanics and driving. Food crop farming is limited to only few areas and predominantly subsistence based. Increasingly, the cultivation of rubber through the out-grower scheme is also gaining attention, particularly among land owners and some tenant farmers.

Priority actions for improving adaptive capacity at Community and District Scales

Table 8 shows that Nzema East municipal assembly seems to perform better on the level of awareness of hazards but shows significant weaknesses in other dimensions of adaptive capacity such as leadership and local organization, security, law and order, attention to the needs of marginalized groups, level of preparedness for emergency situations, status of livelihoods and economy, ability to manage coastal resources as well as land use planning and decision making. These areas of weakness require more attention and should be the basis for future district scale actions (along the lines recommended in Table 8) to build adaptive capacity against climate and non-climate stressors.

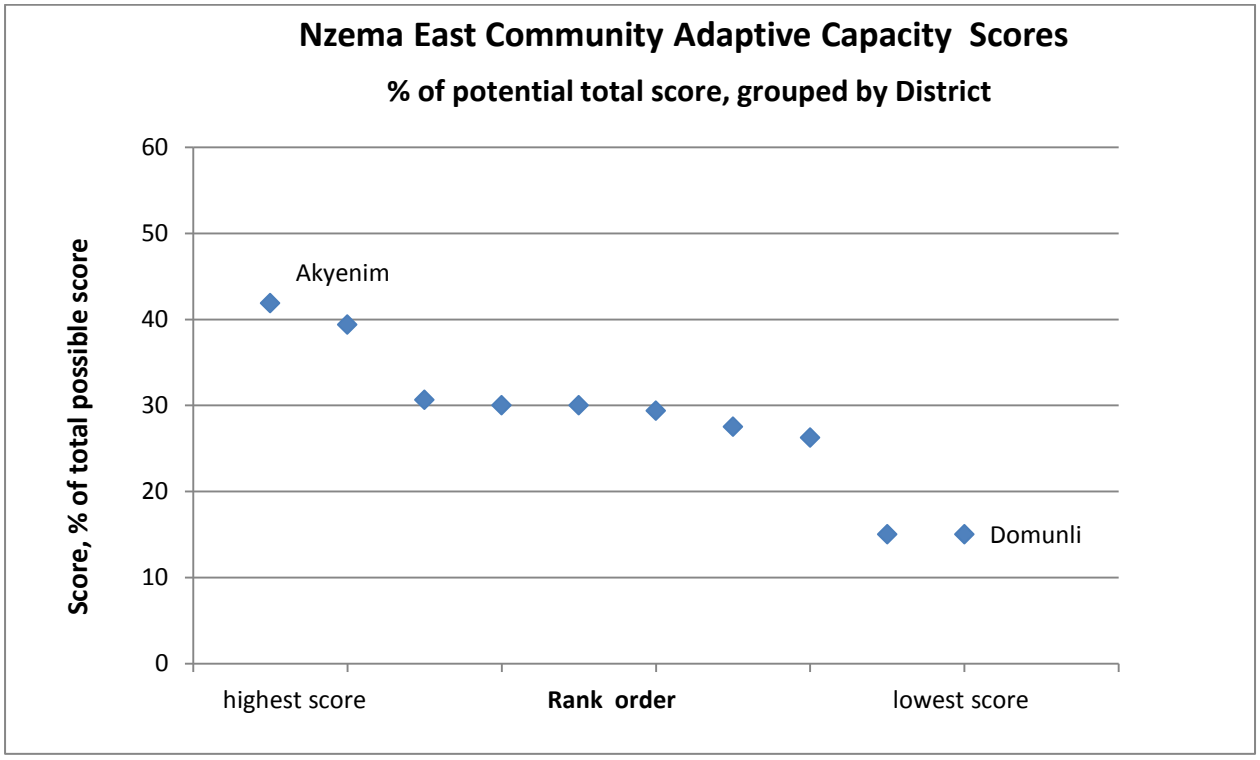

Figure 17 Nzema East Community Adaptive Capacity Scores

Table 8 Summary of community level adaptive capacity across eight variables and Nzema East improvement actions

Dimension of adaptive capacity	Adjusted Average score out of possible 5	Nzema East District-wide actions to improve adaptive capacity
Livelihoods and rural economy	0.40	• Incorporate climate and hazards elements into economic development programs; • Assess sector and infrastructure vulnerability, • Early actions to increase economic resilience in livelihoods; • Assess critical infrastructure (roads, bridges, utilities) • Prevent ad hoc coastal defenses, favor non-structural solutions and only where properly designed and justified utilize engineered shoreline stabilization
Attention to the needs of marginalized groups	0.50	• Prepare and implement effective early warning messages that reach marginalized groups. • Identify and support women's contribution to informal early warning systems. • Develop and implement evacuation and recovery plans that meet the needs of children, elderly and the sick. • Early actions to increase economic resilience of poor people through diversified livelihood opportunities, especially for women, elderly people, people with disabilities, ethnic minorities, people living with HIV/AIDS and tenant farmers.
Condition of coastal resources	0.70	• Adopt policies that recognize coastal features and discourage construction in hazardous zones; • Set priority uses matched to sensitivity of coastal areas; • Assess effectiveness of existing shore defenses; and • Identify areas where setbacks, retreat, restoration and protection are preferred. • Incorporate refugia, which are protected areas where wetlands, flood plains and landscape habitats can move to in response to sea level rise and climate change
Emergency Preparedness	0.90	• Communications; • Local organization; • Education and awareness; • Training; • Equipment and Supplies
Land Use Decision Making and	1.40	• Conduct cross-cutting vulnerability assessment for coastal region as part of 2014 Mid-Term Development Plan;

Dimension of adaptive capacity	Adjusted Average score out of possible 5	Nzema East District-wide actions to improve adaptive capacity
Planning		• Set priorities for coastal development based on dependence of water location and allocate suitable lands for relocation of infrastructure and settlements. • Designate flood-prone areas and set limits on allowable uses. • Improve the flood and climate resilience of existing & new housing and business structures in terms of construction and placement. • Minimize development or investments requiring shore, river bank or other major flood control; • Conduct engineering studies of settlement and river drainage systems to remediate recurrent problems, flood plain management and retention areas • Introduce low-impact settlement planning, transportation system approaches. • Carefully planned and implemented resettlement, requires identification of a safer area that meets the needs of residents, including proximity to the fish landing site, agricultural lands, and existing infrastructure such as transportation corridors and water supply facilities.
Security, Law and Order	1.52	• Support peace campaigns and other programs that build upon the relative peace in coastal communities. • Develop and implement programs to build trust, improve communications and relationships between oil and gas companies and frontline communities. • Create dialogue and consensus building platforms for deciding development options in coastal communities.
Leadership and local organization	1.60	• Develop community cohesion • Create dialogue platforms to facilitate engagement between community folks and their leaders on issues of common interest. • Create a transparent process for decision making on disposal of communal lands and other assets. • Build leadership skills among the youth in preparation for future roles
Public awareness of local conditions	2.10	• District wide awareness and education coupled with settlement or ecosystem specific vulnerability assessments and adaptation plans; • Training for engineers, architects, planners and contractors on hazardous sites and best planning, design and construction practices • Vulnerability assessments and adaption plans for selected communities

2.4 Ahanta West District Summary

Physical impacts of hazards and climate change

Coastal hazards in Ahanta West district were characterized on the basis of 9 broad categories: presence or proximity to a river; proximity to an estuary; high water mark in settlement; presence and or functionality of sea defense walls; condition of coastal bridge; flood risks; a history of coastal erosion; community backed by a wetland and presence of dynamic coastal features along the beach. As shown in Figure 18, all the coastal communities in the district are exposed to at least one physical hazard with a maximum exposure of 7. Four communities – Akwidaa, Asemkow, Adwoa and Mpatano are noted to be highly sensitive to these hazards since they are noted for their low adaptive capacity (Figure 18). The district's shoreline was 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 evolving sea level rise. In Busua for example, the whole shore line experienced massive erosion in February 2012, 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 by erosion. In Akwidaa the whole settlement at the Old Town is under threat from coastal erosion and sea level rise; twice a year the community is flooded for several weeks by sea water destroying properties and obstructing economic activities. Similar incidence of coastal flooding was noted in all the coastal communities with varying impacts based on the elevations above sea level.

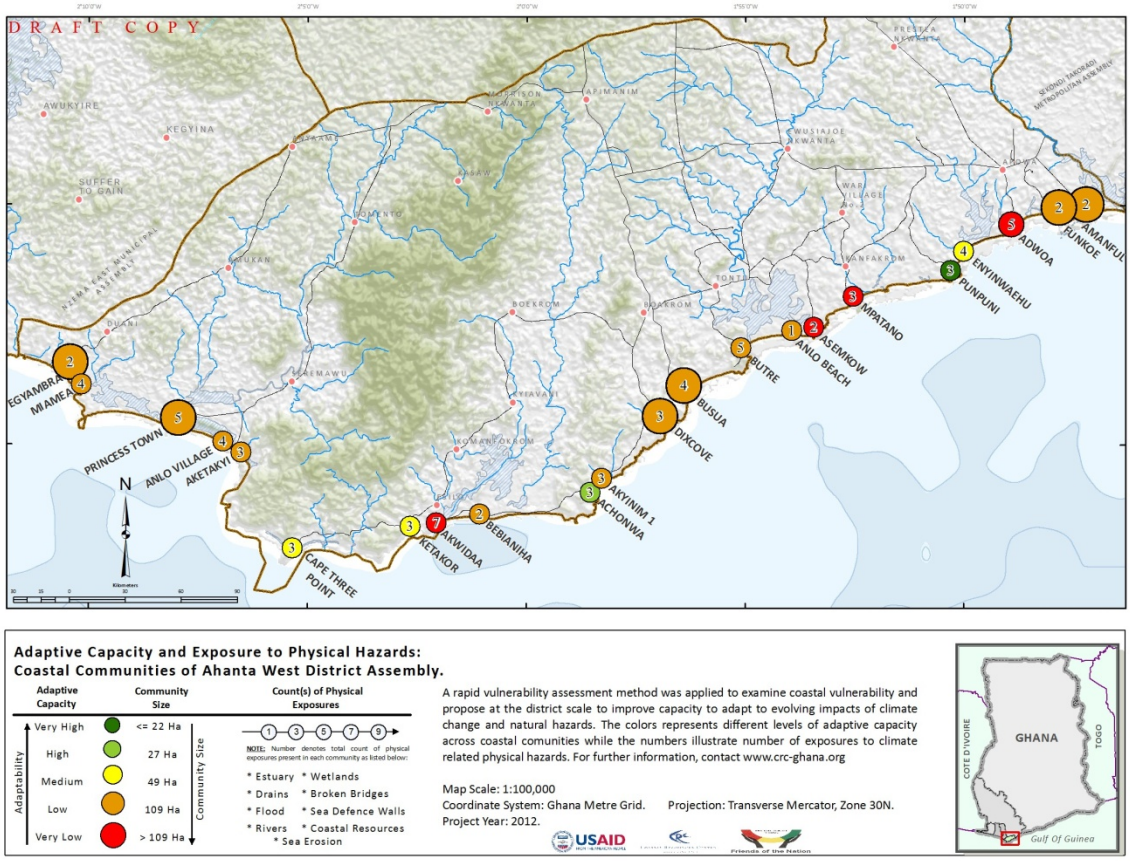

Figure 18 Community Level adaptive capacity and exposure to hazards, Ellembelle District

Figure 19 Number of different hazards and stresses in coastal settlements, Ahanta West District

Figure 20 Incomplete and damaged harbor defense system in Ahanta West is evidence of past attempts to protect the harbor and ongoing damage from high wave energy

Dimensions of vulnerability and adaptive capacity

Average scores obtained by aggregating across the eight indicators of adaptive capacity reveal low relative resilience of these communities (Table 9). These communities should benefit from detailed vulnerability assessments and adaptation planning processes that identifies forward looking actions and builds local capacity for improving livelihoods, building local leadership, facilitating emergency preparedness and ensuring sustainable management of coastal resources.

Table 9 reveals the variations existing across communities relative to adaptive capacity. It shows that while some communities are more able to adapt to change, others need urgent assistance in the short term to address their peculiar grim circumstances. This implies that while district-wide actions are necessary to facilitate widespread improvement in adaptive capacity for all coastal communities, priority should also be given some communities and segments of the population that find themselves in particularly worse situations and show relative unpreparedness to adapt to climate and non-climate stressors. Examples of such communities in Ahanta West include Akwidaa, Asemkor, Ampatano and Adwoa.

Governance and leadership

Among the coastal districts assessed, leadership is probably the weakest in the coastal communities of Ahanta West district. This is shown in Table 10 with the score of 1.32 out of possible score of 5 and is due in large part, to the numerous and protracted chieftaincy disputes and conflicts in these communities. Increasingly, this has created mistrust and raised barriers for cooperation between not only among the chiefs but also between the Chiefs and local government authorities. Strong perceptions exist among district stakeholders that community leaders do not portray leadership qualities that is transparent, selfless and legitimate. Most residents claim that chiefs do not account for monies accrued from disposal of land, development donations and levies. Such concerns are emerging in Cape Three Points, Ampatano and Adwoa. The claims of lack of transparency are also driven by the rising spate of land disposal for prospective investors in the oil and gas industry. Most women in the district also acknowledged not being involved in decision making processes and raised issues of their constrained access to land. In Funko for example, women expressed that they cannot access land without the involvement of a male companion. In Asemkor and Akwidaa women rarely attend community meetings because they claim their inputs are not regarded and respected.

Table 9 Adjusted rank order of community resilience (fraction of total possible score on the 8 adaptive capacity areas) Ahanta West District

Coastal settlement in Ahanta West District	Adjusted Total Adaptive Capacity Score % of potential total
Pumpuni	48.13
Achonwa	41.88
Cape Three Point	36.25
Ketakor	36.25
Anyiwa Ehu	36.25
Busua	33.75
Miemia	33.75
Anlo Village	33.13
Funko	33.13
New Amanful	32.50
Dixcove	30.00
Achinim	30.00
Akatakyi	30.00
Butre	30.00
Bibianeha	30.00
Princess Town	27.50
Egyambra	27.50
Anlo Beach	26.88
Akwidaa	24.38
Asemkor	15.00
Ampatano	15.00
Adwoa	6.25

Coastal resources management

The coastal areas in Ahanta West district are widely known for their scenic beaches, mangroves, coastal forest, rivers, lagoons, estuaries, forts and heritage sites. As shown in Table 10 (1.64 out of possible score of 5), the practices and systems for managing these resources are weak, thereby threatening the constant flow of goods and services generated from these ecosystems. The coastal wetlands are under threat from indiscriminate cutting of mangroves. This practice which is common in most wetland communities is due in large part, to low level of awareness of the ecological functions and services of wetlands among community folks. For instance, consultations with stakeholders in Butre revealed the perception that mangroves were free *'gifts from God'*, and therefore should be exploited without conservation. While there are significant efforts by civil society organizations operating in the district in support of conservation of coastal ecosystems, more work is required to ensure that these efforts respond to the emerging conservation and development challenges. There are also Community Resource Management Areas (CREMA) and Community Biodiversity Advisory Group (CBAG) models for managing coastal resources. These resource use and management models require ongoing review and improvement to ensure effective implementation.

Risk awareness and emergency response

Stakeholders in the district demonstrated varied knowledge of the sources of vulnerabilities and risks posed by hazards to livelihoods and assets in the coastal communities. Most community members are anticipating an accelerating trend of current erosion patterns with associated loss of community assets. It became evident however, that majority of coastal inhabitants were poorly prepared to handle risks and address local emergency situations as indicated in Table 10 (.59 out of possible score of 5). Communities have adopted several mechanisms to control shoreline erosion including the use of gabions and other improvised shoreline defenses. However, high energy waves, strong currents and periodic storms exposes the weakness of these defense mechanisms. In many cases relocation is the only real alternative.

During the assessment, NADMO officials articulated that, although there are evidences of coastal erosion and flooding in the district, there are inadequate attempts and planning to reserve lands for possible relocation of settlements. Also most communities do not have lands allocated for development projects and social amenities; in some communities, inappropriate sitting of new residential and other facilities in flood zones and other areas aggravated coastal erosion. Some traditional leaders expressed that land disputes, oil palm and rubber plantations have further limited the options for relocation.

Economy and society

The coastal population in the Ahanta West district thrives mainly on fishing and farming. Fishing and farming livelihoods are interlinked with most community folks engaged in the two livelihoods simultaneously; during farming seasons (raining seasons), incomes generated from fishing are invested in farming inputs whilst investments shift back to fishing during the fishing seasons. These livelihoods have experienced substantial decline over the years, thereby slowing economic activities and increasing poverty. Several factors account for declining fish landings over the last 20-15 years, including unsustainable fishing practices. Fishing efforts is increasing with population increase; there is also wide spread practices of light fishing, use of monofilament nets, dynamite and fishing with obnoxious substances.

Farming on the other hand, is threatened by land use change from food crop farming to perennial tree crop cultivation. Ghana Rubber Estate Limited (GREL) is engaged in a rapid expansion program through an out-grower scheme that attracts land owners and farmers to use their lands for rubber plantation. In Egyambra, Miemia, Akwidaa, Cape 3 Points, Princess Town and other communities rubber plantation is quickly taking over farm lands due to the incentives of the out grower scheme. It was expressed that this is contributing to net increase in cost of staple food.

The Norwegian Palm Limited (NORPALM) is also a major agro-base industry in the district producing edible and industrial oil palm. NORPALM aside its own plantation provides ready market for oil palm farmers; this scheme is also enticing food crop farmers into oil palm plantation. Already, oil palm plantation has taken over crop farms in Asemkor, Ampatano, Butre and other communities.

Other factors such as changing rainfall patterns and soil infertility are also constraining farm-based livelihoods. The emerging new oil industry is fueling competing land use in the district; more lands are been acquired and speculated by investors. For instance, huge tracks of land have been acquired in Cape 3 Points and other communities for oil related infrastructure, also the whole community of Pumpuni is to be relocated for an oil and gas project. More lands are also being acquired for the development of residential and hospitality facilities relative to the oil industry.

Some responses to declining livelihoods include the youth venturing into illegal small scale gold mining, sand winning, stone quarry and charcoal production. The sand winning is common in most of the coastal communities whilst the illegal gold mining is common in Butre, Asemkor, Akwidaa, Princes Town and in the Cape 3 points forest. As shown in Table 10, livelihoods and the economy attained a score of 0.86 out of a possible 5.

Priority actions for improving adaptive capacity at Community and District Scales

Ahanta West district as a whole rated poorly on all the aspects of adaptive capacity - leadership and local organization, security, law and order, awareness of hazards, attention to the needs of marginalized groups, preparedness for emergency, status of livelihoods and economy, ability to manage coastal resources as well as land use planning and decision making. These areas of weakness require more attention and should be the priority for future district scale actions along the lines recommended in Table 10 to build adaptive capacity against climate and non-climate stressors.

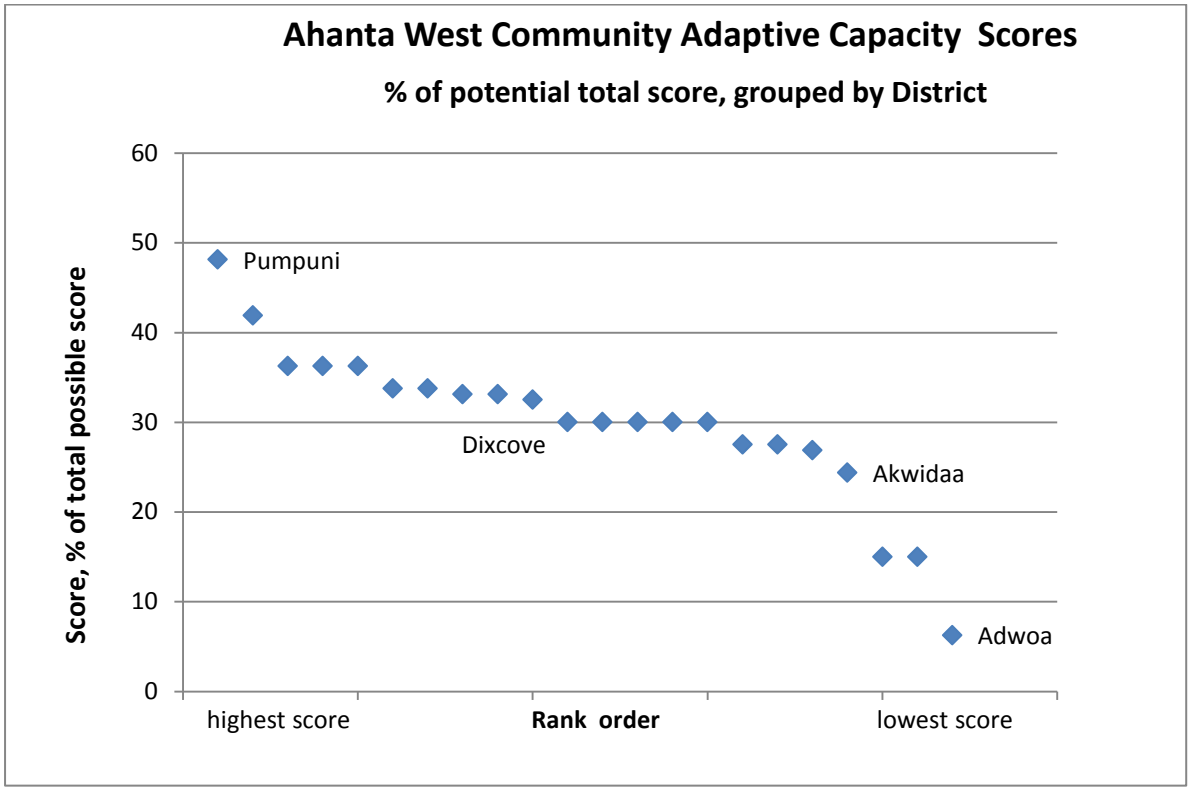

Figure 21 Ahanta West Community Adaptive Capacity Scores

Table 10 Summary of community level adaptive capacity across eight variables and Ahanta West improvement actions

Dimension of adaptive capacity	Adjusted Average score out of possible 5	Ahanta West District-wide actions to improve adaptive capacity
Emergency Preparedness	0.59	• Communications; • Local organization; • Education and awareness; • Training; • Equipment and Supplies
Attention to the needs of marginalized groups	0.77	• Prepare and implement effective early warning messages that reach marginalized groups. • Identify and support women's contribution to informal early warning systems. • Develop and implement evacuation and recovery plans that meet the needs of children, elderly and the sick. • Early actions to increase economic resilience of poor people through diversified livelihood opportunities, especially for women, elderly people, people with disabilities, ethnic minorities, people living with HIV/AIDS and tenant farmers.
Livelihoods and rural economy	0.86	• Incorporate climate and hazards elements into economic development programs; • Assess sector and infrastructure vulnerability, • Early actions to increase economic resilience in livelihoods; • Assess critical infrastructure (roads, bridges, utilities) • Prevent ad hoc coastal defenses, favor non-structural solutions and only where properly designed and justified utilize engineered shoreline stabilization
Leadership and local organization	1.32	• Develop community cohesion • Create dialogue platforms to facilitate engagement between community folks and their leaders on issues of common interest. • Create a transparent process for decision making on disposal of communal lands and other assets. • Build leadership skills among the youth in preparation for future roles
Security, Law and Order	1.38	• Support peace campaigns and other programs that build upon the relative peace in coastal communities. • Develop and implement programs to build trust, improve communications and relationships between oil and gas companies and frontline communities.

Dimension of adaptive capacity	Adjusted Average score out of possible 5	Ahanta West District-wide actions to improve adaptive capacity
		• Create dialogue and consensus building platforms for deciding development options in coastal communities.
Public awareness of local conditions such as erosion, shifting or river course/delta	1.45	• District wide awareness and education coupled with settlement or ecosystem specific vulnerability assessments and adaptation plans; • Training for engineers, architects, planners and contractors on hazardous sites and best planning, design and construction practices • Vulnerability assessments and adaption plans for selected communities
Land Use Decision Making and Planning	1.55	• Conduct cross-cutting vulnerability assessment for coastal region as part of 2014 Mid-Term Development Plan; • Set priorities for coastal development based on dependence of water location and allocate suitable lands for relocation of infrastructure and settlements. • Designate flood-prone areas and set limits on allowable uses. • Improve the flood and climate resilience of existing & new housing and business structures in terms of construction and placement. • Minimize development or investments requiring shore, river bank or other major flood control; • Conduct engineering studies of settlement and river drainage systems to remediate recurrent problems, flood plain management and retention areas • Introduce low-impact settlement planning, transportation system approaches. • Carefully planned and implemented resettlement, requires identification of a safer area that meets the needs of residents, including proximity to the fish landing site, agricultural lands, and existing infrastructure such as transportation corridors and water supply facilities.
Condition of coastal resources	1.64	• Adopt policies that recognize coastal features and discourage construction in hazardous zones; • Set priority uses matched to sensitivity of coastal areas; • Assess effectiveness of existing shore defenses; and • Identify areas where setbacks, retreat, restoration and protection are preferred. • Incorporate refugia, which are protected areas where wetlands, flood plains and landscape habitats can move to in response to sea level rise and climate change

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Appendix A Assessment Instrument: Rapid Assessment of Vulnerability and Resilience in Coastal Communities of the Western Region

Background Information on the Assessment

In the last two years, the Hen Mpoano initiative has extensively engaged coastal communities and district governments in the Western Region. Preliminary lessons emerging from these consultations point to the fact that, coastal communities are not only vulnerable to evolving impacts of climate change, particularly sea level rise, flooding, less frequent rainfall etc. but they are also prone to non-climate stressors like disease, famine, social conflicts, poor land use etc.

To enable us understand the vulnerabilities specific to your community, we invite you to participate in this rapid vulnerability and resilience assessment. The result of this assessment will be a document that will be communicated back to the community, district, regional and national governments in order to provide future planning orientations aimed at improving livelihood resilience and reducing vulnerability in your community to climate and non-climate stressors.

Thematic Areas:

- Governance and Leadership
- Coastal Resources Management
- Risk Awareness and Emergency Response
- Economy and Society

(An additional thematic area on "Exposure to Climate Change Impacts" has been incorporated into the above 4 thematic categories).

Theme 1: Governance and Leadership (GL)

Governance is a very broad indicator that measures a variety of characteristics that together indicate how process and decisions are made to serve the best interests of the community and stakeholders. We focus here on leadership and stakeholder participation in management and decision-making. (Source: Hoon, V., Sriskanthan,G. , Townsley, P. ,Cattermoul, B., Bunce L. Pomeroy, R. 2008))

Good governance is about achieving desired results and achieving them in the right way, in compliance with laws and policies and shaped by cultural norms and values of an institution, organization, or community. Governance provides the enabling conditions for coastal communities to absorb or resist perturbations, bounce back from disturbances, and adapt to change. (Source: U.S. Indian Ocean Tsunami Warning System Program. 2007.)

Leadership measures the presence of community leaders or government officials who can mobilize climate change responses and resources to support adaptation, and their effectiveness or credibility. This indicator is important because communities with strong, trustworthy, effective leaders will be more able to adapt. Stakeholder participation in management and decision-making is critical to buy-in of any new program related to climate change. (Source: Wongbusarakum, S. and Pomeroy, R., 2008)

The overall measure of governance and leadership is a combination of two themes of 1) leadership and local organization and 2) security and law and order. The score for each theme could be the aggregate of all of the indicators/questions under each theme. The overall score for this area could be the aggregate of the themes or a modification thereof justified by discussion notes.

Topic 1: Leadership and local organization

Absent (0); Exists but weak (1); Exists but fairly strong (2); Exists and strong (3); Exists and very strong (4)

Introductory Question: What major leadership problems do you have in the community? When there is a problem in the community, whom do you count on to charge and lead to find a solution? Who are the key leaders in your village?	
Notes and comments	
Question or indicator	Coding scheme for responses
GL -1 Is the chieftaincy respected? (This is a rating based upon how prominent the chieftaincy appears as a positive figure in the discussion)	No respect (0); very little respect (1); Somewhat respected (2); a respected chief (3); a well respected/above average chief (4)
GL -1 Notes and comments	
GL-2 Do the traditional authorities discuss issues with the entire community? (This is a rating based on direct questions as well as how the traditional authority is referred to in discussions)	Never (0); Very rarely (1); Sometimes(2); Many times (3); all of the time (4)
GL-2 Notes and comments	
GL-3 Do Assembly representatives communicate with the community? (***How does the Assembly representative communicate with the village?*** Open ended responses might be a range from—we never hear from him/her; only tells his/her friends; comes to meetings regularly; initiates meetings when something important is happening)	Never (0); Very rarely (1); Sometimes(2); Many times (3); all of the time (4) To note if communications is perceived to be one-way or two-way?
GL 3 Notes and comments	

Topic 2: Security, law and order

Unsafe and no compliance with laws/norms (0) somewhat safe but little compliance with laws/norms (1) safe but little compliance with laws/norms (2) very safe but little compliance with laws/norms (3) somewhat safe but average compliance with laws/norms (4) very safe and total compliance with laws/norms (5)

Introductory questions: 1) What are the security problems in the village? 2) What kinds of laws and local rules or norms are most frequently broken in the village?	
Notes and comments	
Question or indicator	Coding scheme for responses
GL-4 How safe do people feel who live in the village?	No security (0); Very unsafe (1); Somewhat safe (2) Most of the time feel safe (3); Always feel safe (4)
GL 4 Notes and comments	
GL-5 Is it true that most community members comply with local and national government laws? (needs to be couched to simpler conventional laws on resource use)	Never (0) , very little compliance – (1); average compliance (3) almost 100 % compliance (3); 100% compliance (4)
GL 5 Notes and comments	
GL-6 Is it true that most community members go along with social norms of the village? (simple social norms/customs/taboos on possible resource use)	Never (0) , very little compliance – (1); average compliance (3) almost 100 % compliance (3); 100% compliance (4)
GL 6 Notes and comments (list social norms)	
GL-7 Local leaders insure that there is good enforcement of laws (What usually happens when someone breaks a law? How often do you need outside help to deal with these problems?)	Never (0) less often (1); often (2) very often (3) Always (4)
GL 7 Notes and comments	
GL 8 Local chiefs and other leaders make sure that social norms are followed (What usually happens when someone is violating important norms?)	Never (0) less often (1); often (2) very often (3) Always (4)
GL 8 Notes and comments	

Introductory questions: 1) What are the security problems in the village? 2) What kinds of laws and local rules or norms are most frequently broken in the village?	
GL 9 How much reliance is made on outside sources of help for maintaining security (What usually happens when someone is violating important norms?)	No reliance (0) , very little reliance (1); average reliance (3) almost 100 % reliance (3); 100% reliance (4)
GL 9 Notes and comments	

Theme 2: Coastal Resource Management (CRM)

Topic 1: Condition of coastal resources

Poor (0); Fair (1); Good (2) Very Good (3) Excellent (4)

Question or indicator	
Introductory question: What are the main coastal resources that the community has? (map the coastal resources with community people)	
Notes and comments	

Question or indicator	Coding scheme for responses
CRM 1: Which coastal resources are in good shape, and which are badly degraded (List of ratings of each main resource)	Poor (0); Fair (1) Good (2) Very good (3) Excellent (4)
CRM 1 Notes and comments	
CRM 2: What are the ways in which coastal resources are kept in good shape so they can be available to your children? (List the ways that seem to work well to keep coastal resources in good shape. What are the traditional ways that the village has managed its resources? What are the new ways that villages can utilize to manage their resources?)	
CRM 2 Notes and comments	

Topic 2: Land Use Decision Making and Planning

Poor (0); Fair (1); Good (2); Very Good (3) Excellent (4)

Introductory Question What are the processes for land acquisition in this community? What is the land ownership regime?	
CRM 3: Is the way land is allocated for use deemed fair and adequate for community needs? Is there an equitable distribution of access to resources and opportunities?	Coding scheme for responses Unfair (0); Somewhat fair (1); Fair and adequate (2); Most of the time is adequate (3) All the time is adequate (4)
CRM 3 Notes and comments	
CRM 4: Is infrastructure development being done in a wise and thoughtful manner, using traditional understanding of	Never (0); Rarely projects seem to have many problems (1) sometimes projects have problems (2) most of the time projects are

Introductory Question What are the processes for land acquisition in this community? What is the land ownership regime?	
how coastal resources behave?	built and located correctly (3) All the time projects are built and located correctly (4)
CRM 4 Notes and comments	
CRM 5: Does the community get all of the infrastructure that it needs to insure the safety and well-being of its citizens?	Almost never (0); rarely projects seem to deliver benefits to village (1) sometimes projects deliver benefits to the village (2); most of the time we get the projects that we need (3) All the time we get projects we need (4)
CRM 5 Notes and comments	
CRM 6: To what extent has the community taken the initiative to address its coastal issues and to plan for future uses?	No initiative (0); initiated something but failed (1); there are a few good examples but no plan (2) the community is working on a plan (3) the community has adopted and is implementing a plan (4)
CRM 6 Notes and comments	
CRM 7: How well can the community mobilize to put a plan into action related to the use of its coastal resources? (What are some examples of how the village is dealing with any problems in using coastal resources?)	Never discussed (0); discussion but noting happens (1) discussion with limited action (2) discussion with more action (3) discussion with implementation (4)
CRM 7 Notes and comments	
CRM 8 What are the historical uses of the shoreline. How has the shoreline changed	Qualitative description of shoreline change
CRM 8 Notes and comments	

Theme 3: Risk Awareness and Emergency Response (RA)

Awareness of household vulnerability of climate hazards measures a household's knowledge of susceptibility to climate hazards and its ability to cope with, recover from, or adapt to those hazards. Climate hazards are climate-related events that have the potential to cause harm. Households may be at risk for different types. Some may be transient—characterized by rapid onset and identifiable termination (such as a storm, flood, or drought). Others may result from a longer-term change in climatic variables (such as temperature or precipitation), be gradual, or result in related events such as sea level rise, mass coral bleaching, or ocean acidification. It is important to keep in mind that different households in the same community may experience each of the factors at a different level, and thus have different levels of awareness about their vulnerability to the same types of hazard. Access to and use of climate-related knowledge measures household access to different sources of information related to climate change, climate variability, and its impacts, and how this information is used. It also includes access to any type of early warning system and can include past experience, traditional or local knowledge of climate patterns and events, as well as other sources of education, media, and communications. (Source: SocMon and SEM-Pasifika 2011)

The ability of a community to reorganize refers to the degree to which it is able collectively to learn, plan, and make necessary changes to cope with climate-related impacts in such a way that the main functions of the community are sustained. This may require restructuring organizations, changing plans, shifting priorities, adjusting roles, carrying out activities in a different way, or applying lessons from the past to better face a climate hazard. Degree of community reorganization is a critical indicator of resilience to changing climate. Level of community reorganization is a function of factors including cooperation and collaboration among community members, planning for climate change, level of collectivism in the culture, community leadership, shared goals and responsibilities, and access to and support from other sources in reorganization. (Source: SocMon and SEM-Pasifika 2011)

Topic 1: Public awareness of local conditions such as erosion, shifting or river course/delta

Unaware (0); low level of awareness (1) average level of awareness (2) high level of awareness (3) very high level of awareness (4)

Introductory question: What are the main natural and environmental threats that the community faces? Rainstorm; Storm surge; Sea level rise Coastal/beach erosion; Saltwater intrusion into gardens/fields/water sources; Changes in rainy and dry seasons, leading to changes in planting seasons, etc.; Drought; Flood; Climate-related land or mud slide; Brush fire caused by heat and dryness; Hotter climate; cholera; malaria; diarrhea outbreaks; agro- pests; soil fertility; famine
Notes and comments

Question or indicator	Coding scheme for responses
RA 1: What are the main causes of these problems?	No ideas (0); Causes named for a few threats (1); Causes named for several threats (2) good ideas about the causes of most threats (3) good ideas of listed threats (4)
RA 1 Notes and comments	
Question or indicator	Coding scheme for responses
RA 2 What formal or informal education programs exist in this community to promote risk knowledge and help with adaptation (List the educational programmes)	None (0) very few (1) several but informal (2) several and more formal (3) educational programmes for all risks (4)
RA 2 Notes and comments	
RA 3 What are some of the steps the community is taking to reduce the impacts of the risks (Recall a risk that was mentioned and ask whether some kind of action is being considered or has been taken)	We aren't doing anything (0) one or two projects (1) several actions with limited impacts(2) several actions with positive impacts (3) actions for all risks with positive impacts (4)
What is the level of involvement of the community in these projects? (Probe what exactly has been done? Who is doing the project? How is the community involved)?	Not involved (0); involved at few stages (1); involved at many stages (2) involved at most stages (3) involved at all stages of project (3)
RA 3 Notes and comments	
RA 4 What has been the weather changes over the years. What are the effects of those changes	Qualitative description of changes.
RA 5: Has the community had to alter its socio-economic activities due to weather changes?	Qualitative description of weather related changes to socio-economic activities.
RA 6: How much of the economy is weather dependent?	Qualitative description of dependence of livelihoods and market on weather.

Topic 2: Emergency Preparedness

Unprepared (0); somewhat prepared (1) prepared (2) well prepared (4) very well prepared

Introductory question: What kind of social or economic emergencies happen in the village? List the kinds of emergencies. How do community people get emergency information? List the ways people receive information. Try to rank order the most important sources.	
Notes and comments	
Question or indicator	Coding scheme for responses
RA 7 Do people get enough information in time to react to a local emergency?	No one tells us what is going on (0) Most of the time we don't hear anything (1) Once in a while we get an alert or warning (2) We usually know in advance what is happening (3) we are always informed in advance
RA 7 Notes and comments	
RA 8 As far as you can remember, how often has the community mobilized resources to address emergency situations?	Never (0); one time (1) a few times (2) most cases (3) all cases (4)
RA 8 Notes and comments	
RA 9 Are there any formal/informal groups that help out during emergency situations?	None (0) few but non-functional (1) several but semi-functional (2) several but functional (3) enough and functional (4)
RA 9 Notes and comments	
RA 10 When there are emergencies or problems that affect people and create sudden hardship, how well does the community do in taking care of these cases? (Example; family house burns down or destroyed by flood)	Nothing happens and no support (0) seek outside help – eg. from NADMO, church etc (1)sometimes we are able to respond effectively (2) there have been numerous times when we took care of things ourselves (3) we always handle things ourselves (4)
RA 10 Notes and comments	
RA 11 Is there enough training that help the community handle emergency situations?	No one has received any training (0) a few times someone attended a training (1) there have been several trainings but capacity remains low(2) several trainings and capacity is growing

Introductory question: What kind of social or economic emergencies happen in the village? List the kinds of emergencies. How do community people get emergency information? List the ways people receive information. Try to rank order the most important sources.	
	(3) we are well prepared (4)
RA 11 Notes and comments	
RA 12 Are there good plans that guide the community so it can handle emergency situations?	We don't have a plan (0); plans have been discussed (1) plan exist but not operational (2) plan exist but only somewhat operational (3) well operational plans (4)
RA 12 Notes and comments	

Theme 4: Economy and Society (ES)

Changes in the economy and people's quality of life are often the main criteria upon which a community's resilience is judged after a disaster. The strength of the economy and the diversity of livelihoods greatly influence the community's ability to prepare for disasters, quicken the recovery process, and adapt to changes that make them less vulnerable in the future. Despite changes in coastal ecology, health, laws, governance frameworks, or hazard response programs, it is the improvement or decline in a person's livelihood that directly affects resilience. (Source: Resilient Community Thailand 2007)

Topic 1: Livelihoods and rural economy

seriously declining (0) getting worse over time (1) about the same as a few years ago (2) improving (3) prosperous (4)

Introductory question: what are the main ways people in the village earn their livelihood?	
Notes and comments	
Question or indicator	Coding scheme for responses
ES 1 Do people earn their livelihood mainly doing the same thing all the time or does the community have a range of income sources and options, and individuals participate in several of these?	No livelihoods (0) one livelihood (1) up to three livelihoods (2) up to 5 livelihoods (3) over five livelihoods (4)
ES 1 Notes and comments	
ES 2 Are the main livelihoods in the village at risk from natural, social or economic hazards and change? (Note which ones are most at risk)	All (0) most (1) half (2) a few (3) none at risk (4)
ES 2 Notes and comments	
ES 3 How is the status of the village economy evolving?	Seriously declining (0) getting worse over time (1) about the same as a few years ago (2) improving (3) prosperous (4)
ES 3 Notes and comments	

ES 4 Does the community believe it has the capacity to move its economy forward in a positive direction?	We can do nothing to improve things (0); there are one or two things we can try (1); we are trying a few things but they are not working yet (2) we are trying a few things and there are positive signs (3) making progress and doing well (4)
ES 4 Notes and comments	
ES 5 Have supplementary or alternate livelihoods been identified that can make a difference for individuals or the community as a whole?	We don't have any options or ideas(0) there are one or two ideas but not yet being tested (1) one or two ideas are being tested but not yet proven (2) several livelihood options have shown positive results (3); we have options that are making a big difference (4)
ES 5 Notes and comments	
ES 6 Are livelihoods dependent on outside market forces in a given year?	Totally (0) to a certain extent (2) not at all (4)
ES 6 Notes and comments	
ES 7: Do the youth feel they can grow in the community or are they expecting to move to other places to make living?	Qualitative description of responses

Topic 2 Attention to the needs marginalized groups

Not at all (0); poorly (1) at times people get adequate help (2) most of the time (3) we do a good job (4)

Introductory question: Who are the most marginalized groups in the village? Marginalized people are those who do not benefit from the community's resources and or not involved in decision making processes at the community level.
Notes and comments

Question or indicator	Coding scheme for responses
ES 8 Does the community do a good job in taking care of the needs of disadvantaged groups?	Not at all (0); poorly (1) at times people get adequate help (2) most of the time (3) we do a good job (4)
ES 8 Notes and comments	

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