



Dealing with extreme weather


An assessment of policy options from Cameroon

Abstract

This CEEPA study from Cameroon finds that extreme weather events such as storms, tidal surges and floods have a significant negative impact on people living along the country's coast, especially the poor. It shows that the most cost-effective way of dealing with these problems is to take pre-emptive measure to protect and strengthen homes against extreme weather damage. The study therefore recommends ways in which the government can help people cope with extreme weather events and concludes that disaster warning and preparedness must become a key part of Cameroon's response to climate related threats.



The atlantic coast of the Cameroon.

The study is the work of Ernest L. Molua from the Department of Economics and Management, University of Buea, Cameroon. Its findings are of particular interest because the problems that coastal areas face from extreme weather events are likely to get worse due to the predicted effects of global warming and climate change. This makes Molua's study extremely important as a tool to help policy makers work out the most cost effective way of responding to this global challenge. He hopes that the lessons learnt may inform and guide policy measures for coastal regions in Cameroon and many other African countries. 

A summary of CEEPA Discussion Paper No. 46: 'Climate And Location Vulnerability In Southwestern Cameroon: Assessing The Options And Cost Of Protection To Property In Coastal Areas', by Ernest L. Molua, Department of Economics and Management, University of Buea, Cameroon.

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Report Summary

The Atlantic coast of Cameroon, like many coastal areas in Africa, is often battered by storms, tidal surges and floods. Such problems likely to get worse due to the predicted effects of global warming and climate change. A new CEEPA study from the country has looked at this challenge to see how best to respond. It finds that extreme weather events have a significant negative impact on people living along Cameroon's coast, especially the poor. It shows that the most cost-effective way of dealing with this challenge is to take pre-emptive measure to protect and strengthen homes and other structures against storms, floods and other weather damage.

The study therefore recommends ways in which the government can help people cope with extreme weather events and concludes that disaster warning and preparedness must become a key part of Cameroon's response to climate related threats. The study is the work of Ernest L. Molua from the Department of Economics and Management, University of Buea, Cameroon. He hopes that the lessons learnt may inform and guide policy measures for coastal regions in Cameroon and many other African countries.

Coastal Cameroon Under Threat

About 30% of Cameroon's population lives along its coastal zone. Many of these coastal residents are affected by seawater inundation, river floods, storm surges, accelerated wave activity, land subsidence, erosion and mud slides. In particular, the West Coast area has been denoted as a Risk Zone (RZ) for storm surges. Obviously, any increase in surge heights due to climate change will lead to an increase in the danger faced by people living along the coast. This enhances the significance of the predictions made by the Intergovernmental Panel on Climate Change that the mean annual global surface temperature will increase by 1-3.5oC by the end of the 21st century and that there will be a global mean sea level rise of between 15 and 95 cm. Cameroon is particularly threatened by the potential impact of climate change because its population's mobility is low, the country has inadequate health facilities and its society is characterized by low incomes and high population growth rates. All of these issues make people more vulnerable to extreme weather events and highlight the need for protection and adaptation projects to help them.

To look at how best to respond to the extreme weather challenge, the study focuses on the steps that are currently being taken to protect the homes of people living along Cameroon's coast. These protective efforts will be the starting point for any long-term adaptation to climate change. They also give an indication of how much different protection strategies will cost. To get the information they needed, the researchers undertook a survey of homeowners. This survey looked at the damage that storms and floods have caused to people's homes. It also assessed the costs of the protection measures that people have put in place and the value of the benefits that these measures have produced. Finally it assessed the factors that influenced people's decisions about how to respond to extreme weather.

The Study Area

The study area for this survey was the coastal region of Fako Division in Cameroon's Southwest province. In this area there are a 230 km modern tarred road, 24 schools, five health centres, four banks, a botanic garden, a wildlife sanctuary and the headquarters of the second largest non-governmental employer in Cameroon. For the survey, about 2,000 homes were randomly selected from the coastal towns in this region. These towns had been affected by floods in 1999, 2001 and 2005. From this large group of homes, a representative sub-sample of 400 households was chosen. Half of this sub-sample was made up of households located close to the coast and half of households located 30 km inland.

To assess how much households had paid to protect their properties from floods, storms and other climate-related problems they were asked about the cost of preparing their homes for each identified storm or flood event. For example, householders were asked what renovations and modifications they had made to make their homes withstand storm surges and floods. They were also asked about the repair and maintenance costs they had had to bear after their homes had been battered by the weather. Unobtrusive observation and discussion with community heads was also used to assess the impact of extreme weather events on community infrastructure in the study area. In addition, secondary data on the vulnerability of public infrastructure was obtained from the Southwest Regional Delegation of the Ministries of Lands, Town Planning, Housing and Urban Affairs.

Houses and Households at Risk

Forty-five percent of the homes in the survey are close to flood plains, with 26% on average having borne the brunt of very severe storms. About 55% of residents reported that their homes have been flooded due to flash floods; this had occurred on average three times in the last five years. Fifty-four percent of the homes had been hit strong winds, on an average of twice in the last five years. Meanwhile, 29% of houses have been hit by storm surge or heavy waves from the sea. For these homes, this had occurred on average 2.2 times in the last five years. About 68% of residents thought that their houses had been exposed to floods and windstorm destruction.

Residents make various preparations if they expect a flood or windstorm. These preparations include: elevating and reinforcing their homes, and elevating any furnaces, water heaters and electric panels that were susceptible to flooding. They also construct barriers such as levees, beams and floodwalls to stop floodwater from entering buildings. About 26% of residents said that they had been given help to protect their homes by the government. The various protective measures used by the local or national government in the last five years included: building reservoirs, building levees and walls, flood or storm warnings and temporary evacuations.

For coastal residents the cost of preparing homes to withstand floods or windstorms amounted to 145,500 FCFA over the last five years (this translates to about US\$ 346 at 2008 exchange rates). Despite these efforts, floods or windstorms had destroyed trees, fences, house walls, sea walls and house furniture. Residents reported that this destruction has required them to spend, on average, 243,000 FCFA (US\$ 579) on repairs. The costs for repairs therefore exceeded protection costs. This was true for both private and rented properties.

Ex ante average Costs (Reinforcement) and Ex post average Costs (Repair) of Homes and Courtyard

Property	Ex ante Cost		Ex post Cost	
	Flood	Windstorm		
Part of House				
Roof	7,300	22,900	13,500	52,000
Windows	18,000	12,500	23,000	38,000
Doors	10,300	28,500	15,200	28,500
Garage door	4,700	11,600	5,400	11,600
House furniture	10,600	40,700	34,900	40,700
<i>Sub-total (A)</i>	<i>50,900</i>	<i>116,200</i>	<i>34,900</i>	<i>40,700</i>
Part of Compound				
Fence	28,200	39,300	41,000	72,000
Wall of house	17,400	75,700	29,300	127,000
Sea wall	45,700	56,300	75,800	84,000
Trees	3,300	8,900	4,900	19,500
<i>Sub-total (B)</i>	<i>94,600</i>	<i>180,200</i>	<i>151,000</i>	<i>302,500</i>
Total	145,500	296,400	243,000	470,300

Source: Author's computation from Survey data, 2008

To Protect or Repair?

As expected, the proximity of a home to the coast significantly increases the cost of protecting it from the impact of storms and floods. If a home is located in a flood plain, this also significantly adds to protection costs. Overall, a 10% increase in distance from the sea decreases the cost of protection by between 3.2 and 5.5%. Household income is also linked to protection costs. A 10% increase in income levels significantly increases protection cost by up to 7.71%. This could be due to a number of factors. Higher income residents tend to construct houses of superior quality or use expensive materials and designs - hence protection costs for these houses will be higher. It could also be that low-income households typically allocate less money to protecting their homes because most of their income is spent on the basic necessities of life. That said, it is clear that higher income households can meet the cost of protecting their homes more easily than their poorer neighbours.

Three lessons can be drawn from these results. First, it is clear that floods and storms have a significant negative impact on coastal households and cost residents a significant amount of money. This points to the importance of avoiding development in areas that are vulnerable to extreme weather events. The second lesson is that household income levels affect the ability of people to protect themselves. It is clear that governmental (and non-governmental) assistance for the less well off is vital.

Perhaps the most significant of the study's findings, is the difference between the costs associated with pre-empting the impacts of floods and storms and the costs associated with recovering from the effects of floods and storms. Since the former costs are lower, it would be rational for government policy to emphasise and support properly designed protection rather than simply dealing with the after effects of floods and storms. In other words, the most cost effective way to deal with anticipated increases in floods and storms is to enhance protection. This will not only lower overall costs, but will also feed adaptation and resilience amongst Cameroon's coastal population.

Future Action Necessary

Among the steps that should be taken to protect coastal households are: providing storm-surge protection, erecting sea walls, constructing dykes and relocating vulnerable human settlements. The high costs of public works will mean that it will be cost-effective to enhance non-structural natural protective features such as beaches, sand dunes and mangroves. This approach will also maintain biological diversity, aesthetic values and recreational facilities. To help all sections of society, the study recommends that disaster warning and preparedness must become a key part of Cameroon's response to climate related threats. It also recommends that further research is required to examine the nature and role of the public works and public protection measures that should be taken.

The study concludes that Cameroon's climate policy will have to take into consideration the full impact of climatic extremes and their human consequences, especially in key issues such as social vulnerability and sustainable development. It is hoped that the bonus of such a pro-active climate policy will be the development of a holistic approach that empowers homeowners and coastal dwellers and helps communities to employ resilient coping strategies. 🌍

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