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RAISING RISK AWARENESS: USING CLIMATE SCIENCE FOR DISASTER RISK MANAGEMENT

ICHA | International Center for Humanitarian Affairs
At the Kenya Red Cross Society

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BACKGROUND

In Kenya, the frequency and impact of disasters associated with extreme weather and climate events has provided fertile ground for exploring the link between climate and disasters. Many other climate vulnerable countries and regions across the globe have also had a similar experience. In many areas and across many communities, climate change is responsible for exacerbating existing development challenges, such as poverty and marginalization. Extreme weather events associated with climate variability and change also create the potential for increasing risks facing communities through the destruction of existing assets, infrastructure and capacities that support resilience and adaptation. As such, it is commonly accepted that impacts of climate change negatively affect the resilience of already vulnerable communities in developing countries such as Kenya.

However, climate science can be utilized to save lives and livelihoods. Climate services and information can be utilized by communities, public authorities and disaster risk management institutions for early warning and mitigation strategies. Therefore, the development of scientific knowledge and capacities to monitor, predict and provide early warning information provides an opportunity for reducing risks and exposure to weather related hazards. The Kenya Metrological Department (KMD) provides hydro-met services that are utilized for weather monitoring, forecasting and climate prediction. Despite this potential, uptake of climate information for early warning in disaster risk management has been hampered by complex methods of presenting climate information, poor public awareness, gaps in understanding between science and policy and resource limitations.

ATTRIBUTION SCIENCE

Extreme weather events can increasingly be attributed to climate change. The connection between climate change and extreme weather events ranges from the general trends of more frequent and more intense events in many locations - to specific weather events attributed to climate change. In the attribution narrative, extreme temperatures (hot and cold) as well as extreme rainfall and drought are the events that are able to be most rigorously assessed. Methodologically, the most robust assessment approaches are ones that include at least three independent reviews, using varied methods. There can be greater confidence in results when multiple independent methods come to consensus statements. Statements can range between an event is “more likely” as a result of climate change; or ‘less likely’, ‘unchanged’ or ‘unable to be determined’.

Findings of such analysis do not only have a scientific nuance, but also political, economic and social narratives, which are critical to inform planning and decision making processes. While some attempts are made to attribute the impacts of extreme weather events to climate change, methodologies in this area are not objectively robust. It is however important to consider the vulnerability and exposure context of any event when determining how to incorporate the findings of an attribution analysis into planning. For example, if the likelihood of an extreme rainfall event has increased, considering how populations near a flood prone area are increasing or decreasing can provide insight regarding how exposed the population is to this more frequent, extreme rainfall event. Similarly, considering how strong the economic and social wellbeing among the population is can provide an indication of their ability to recover from a disaster, indicating how vulnerable they are to this more frequent, intense rainfall event.

It is this complexity that informs scientists and decision makers when considering how to use the results of an attribution study in planning and decision making. Attribution science therefore explores the connections between greenhouse gas emissions and extreme weather events, such as heavy rainfalls, heat waves and droughts – providing insights into how particular events are influenced by climate change. In order to utilize these results, consideration of the broader exposure and vulnerability sphere is also critical. Considering both aspects together provides decision makers with tools for informing policy options.

The 2016/2017 Drought in Kenya: Attribution Science Case Study

The Case The Kenya case study was focused on two areas, North Western Kenya (Turkana and Marsabit) and South East Kenya (Kwale, Kilifi, Mombasa and Lamu). Three independent methods were used for the attribution analysis. These include historical observational data sets, analysis of data from global climate models and a large ensemble of simulations of regional models.

The Findings Trends in rainfall indicate that the signal from human induced climate change is not strong. All methods except from EC-Earth in South East Kenya show no trend or a decrease in likelihood of the drought. However, ocean surface water temperature (sea surface temperature) patterns such as La Nina, had a clear impact by reducing rainfall in Kenya. It is also evident that hotter temperatures than normal were experienced during this time, and this is likely influenced by climate change.The two factors together led to the current, ongoing drought in Kenya.

Interestingly, La Nina is predictable and most seasonal forecasts issued in September had already indicated a slightly increased chance of below normal rainfall for the October - November - December (OND) season. Noteworthy, the hotter temperatures experienced are consistent with what is expected to happen in the future in Kenya due to climate change.

Conclusion Conclusion: From the climate science perspective, results indicate that the 2016-17 drought is less severe than the 2010-11drought in Lamu, while in Marsabit they are comparable. In general, the return time of the event over the regions analyzed was low, meaning that this kind of drought is a relatively common event. It is important to note however that the 2016-17 drought is still ongoing. Kenya Meteorological Department is currently forecasting the potential for depressed rains in many of the drought effected areas of Kenya. If the 2017 long rains are ultimately depressed and the drought continues, the findings of this study will need to be updated.

OPPORTUNITIES IN CLIMATE SCIENCE AND ATTRIBUTION

Climate science provides a number of opportunities for linking disaster risk management strategies with science, including:

1. Improved risk awareness

Attribution science and enhanced climate information services are an opportunity to determine the influence of climate change on an extreme event and better forecast future extremes. This in turn can lead to the development and deployment of more effective tools and programs seeking to understand and reduce the vulnerability of communities to impacts of climate variability and change. Such information would be the basis of positive coping strategies, risk reduction approaches and mitigation measures.

2. Better preparedness

The ability to anticipate and respond to disasters before they occur can be strengthened through a better understanding of climate patterns, causes and consequences. Climate information services and evidence from attribution science can provide data to inform preparedness strategies and tools in the short and longer term.

3. Evidence based Policy

Work on attribution and climate science has more than a scientific purpose. It can inform policy paths relating to climate adaptation by improving design, planning and justification for programs that support people impacted by climate variability and change. Attribution science, along with projected trends, can therefore provide an opportunity for the generation of evidence based climate adaptation policies and by extension improved decision-making. This however requires bridging the gap between science and policy by translating scientific information into practical policy options.

4. Resource allocation

Climate science provides an opportunity to link decisions on resource allocation supporting adaptation and risk reduction with evidence. As the mechanisms for adaptation funding both internationally and at country levels increases, work on attribution, along with climate change projections, can assist in identifying overlaps between the most vulnerable people and areas most at risk of being impacted by climate change. More specifically, evidence from attribution science can be used to inform priorities in the allocation of resources for adaptation and risk reduction programs.

5. Understanding impacts of climate

Whilst the impacts of climate change can increase the vulnerability of communities, evidence linking specific vulnerability and experiences of communities to climate change is scarce. Attribution science provides an opportunity to reduce the "invisibility" of climate change by exploring the link with real events experienced by the ordinary people, due to weather phenomena.

LESSONS LEARNED AND RECOMMENDATIONS

1 There is a need to increase the investment in the national and subnational capacity to generate, interpret and disseminate climate information services - especially those focused on prediction of extreme weather and climate events. This calls for increased resource allocation to the national and county weather services agency to improve national capacity of weather monitoring, forecasting and prediction – as well as attribution science. This capacity will enhance the gathering and dissemination of risk information for raising risk awareness, preparedness and mitigation.

2 Investments should be made that facilitate careful planning and coordination between agencies and institutions engaged in climate services, academia, risk reduction, policy-making and resource allocation. This requires breaking down institutional silos, enhancing collaboration across sector and consequently creating a reliable community-centered system for information sharing and service provision.

3 Climate information provides opportunities for risk reduction, only if scientific early warning information is aligned with and supported by forecast based early action. As early warning systems are strengthened, a coordinated framework for linking it to early action should be championed under the leadership of the government.

CONCLUSION

If appropriately embedded in policy and decision-making processes, climate science can be utilized to inform risk reduction and adaptation strategies and approaches. This however requires collaboration between institutions and across sectors to create an interplay between science, policy and practice.

About the Raising Risk Awareness Project

The Raising Risk Awareness Project seeks to assess the contribution of climate change to the occurrence of extreme weather events in developing countries in South Asia and East Africa; and identify how such information could help to bridge the science-communications-policy gap. The partners in the Kenya project are Climate Central, Oxford University, Melbourne University, University of Nairobi, the Red Cross Red Crescent Climate Centre, Kenya Red Cross Society, Kenya Metrological Department and the Climate and Development Knowledge Network.

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About ICHA

ICHA is an independent center for research, learning and advocacy based at the Kenya Red Cross Society. ICHA seeks to facilitate learning and knowledge management in the humanitarian sector, through evidence generation, policy dialogues and trainings with a view to supporting humanitarian action and improving community resilience.

Disclaimer

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ICHA International Center for Humanitarian Affairs
Inquire • Understand • Influence

International Center for Humanitarian Affairs
P. O. Box 40712-00100, Nairobi
info@icha.net

Kenya Red Cross

Kenya Red Cross Society
P. O. Box 40712 00100-GPO, Nairobi
info@redcross.or.ke

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