

Briefing Paper

Early Warning System: A Critical Aspect in Promoting Agricultural Productivity in the Face of Climate Change

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Summary

The briefing paper suggests a number of good practices that Kenya could learn from in improving its early warning system. In spite of strides in the Meteorological service, Kenya still has inadequate systems to warn farmers on climate changes. As a result, farmers are exposed to extreme weather conditions i.e. drought/floods which undermines farming.

Introduction

Climate change is seen as a great livelihood and ultimately development challenge, not only in Africa but globally. Africa however faces greater challenges due to both location and capacity constraints to mitigate and adapt to climate change. In Kenya, extreme weather conditions in the name of drought and floods have affected agricultural productivity, which directly affects the livelihoods of farmers and enhancing early warning system has been identified as critical in addressing the challenge. However, a study conducted by CUTS International under the project Promoting Agriculture, Climate and Trade Linkages in the East African Community (PACT EAC)¹ identifies challenges in early warning system as one of the key factors undermining agricultural

1 Otieno. G., Mungai, O., Ogalo, V. (2013) Climate, Food, Trade: Where is the Policy Nexus?, CUTS International

productivity and enhanced livelihoods of farmers. In spite of strides in the Meteorological service, there are inadequate systems to warn farmers on climate/ weather changes. As a result, farmers are exposed to extreme weather conditions i.e. drought/floods which undermine farming. In 2011 for example, the country witnessed the worst food insecurity crisis which saw over four million people put on food aid.

Early warning system

Early warning system can be broadly defined as the provision of information, predicting an emergency situation and how that information can be used to respond to such a situation to minimise or adapt to its impacts. According to the 2009 United Nations International Strategy for Disaster Reduction (UNISDR) Terminology on Disaster



Risk Management, it is the set of capacities needed to generate and disseminate timely and meaningful warning information to enable individuals, communities and organizations threatened by a hazard to prepare and to act appropriately and in sufficient time to reduce the possibility of harm or loss.²

In the agricultural sector, where this brief puts in to perspective the early warning system, it refers to the prediction of weather information, under the Kenya Meteorological Services (KMS), circulating this information to users, which in this case are farmers, and preparing them to face the expected extreme weather conditions i.e. drought and floods. Agricultural sector is very important in the Kenyan economy, employing more than 75 percent of the workforce and accounting for around half of the country's Gross Domestic Product (GDP).³ Climate change is directly affecting productivity in the sector, posing a threat to the livelihoods of millions. This enforces the need for an efficient and effective early warning system to shield not only farmers but the entire population from extreme weather conditions by providing them with accurate and timely information such that appropriate measures can be taken.

Farmers have had huge losses as a result of poor prediction/dissemination of weather information, especially the onset and cessation of rains together with predictions on intensity of rains. Inadequate information sharing by the Ministry of Environment, Water and Natural Resources through KMS has undermined effective dissemination of weather information to enable farmers take appropriate measures in case of expected extreme weather conditions. Besides, weather information is complex and farmers find it hard to interpret.

Agriculture was affected in areas vulnerable to drought, especially in Turkana that was hardest hit. According to National Drought Management Authority (NDMA)⁴, the County received very poor or no rainfall in the first week and proceeding weeks of January 2014. Only Lokichoggio, Lomelo, Kibish and Kerio recorded traces during the month. As a result, there was a reduction in milk production at the household level from 29.01% in December 2013 to 19.68% in January 2014. The livestock sales rate also increased from 0.97% in December 2013 to 1.43% in January 2014, with highest rate of 1.40% in pure pastoral. This indicates a desperate attempt by farmers to salvage some income from the dying animals as a copying mechanism. There is need to strengthen mechanisms for predicting such a scenario and passing the information to farmers. The weather information should be simplified and packaged in a way that can easily be understood by farmers.

Agro-meteorological services and early warning system

Agro-meteorological services in Kenya, still provided under KMS observe data on crops at the Agro-meteorological stations across the country. These includes variety of the grown crop, stage of development attained by the crop, general assessment of crop performance, damage by pests, diseases and adverse weather, state of weeding in the farm as well as plant density and soil moisture. KMS makes these forecasts on the different time scales i.e. daily, 5 days, 7 days, 10 days, monthly and seasonal. Early warning system however goes beyond agro meteorological services. It involves passing the acquired weather information to users through the different channels and a mechanism for responding to the predicted weather. This underscores the need for embracing Information and Communication Technology (ICT) and other methods easily adapted to local needs for information dissemination. Innovations like mobile phone applications can be useful in dissemination accurate and timely weather information to farmers.

Extreme weather conditions leads to huge losses by farmers, almost on an annual basis for instance by every end of January, a herds of cattle are lost to droughts and farmers are forced to sell off their livestock, which not only deprives them of their livelihoods but also undermines the livestock industry from realising its potentials. It is therefore important for an efficient early warning system to be instituted through more engagement of organisations that have close contact with farmers as well as

² http://www.unisdr.org/files/7817_UNISDRTerminologyEnglish.pdf

³ http://www.feedthefuture.gov/country/kenya

⁴ Drought Monitoring and Early Warning System Bulletin, January 2014



the youth. This will improve information flow on weather predictions such that appropriate measures like pasture storage and better market opportunities for the animals can be sourced, in preparation for the expected droughts. Unfortunately, these systems are not adequately strengthened. The month of January saw a decrease in the average price of livestock in Turkana i.e. bulls, goats, sheep and camels. Households also reduced their consumption of milk due to the scarcity created by droughts. A close examination of these dynamics indicates that the county is not adequately prepared to deal with the challenges posed by drought on their livelihoods. Reduction in livestock prices undermines farmers' livelihoods and livestock traders take advantage of this to gain more from the low prices, without any direct benefit to consumers in terms of reduced prices for animal products.

In Makueni County, the month of January experienced dry weather conditions, with no rainfall, as opposed to high rainfall received in December 2013. This is expected to worsen food security situation as maize production, which is the main staple for communities across the country is undermined by the drought. Tana River County on the other hand has experienced worsening water conditions across all livelihood zones with most of the catchment areas residing and therefore currently holding inadequate amounts of water. This has got a direct effect on the livestock as well as irrigation efforts.

Some pastoralist communities are however moving to crop production. This calls for better advisory services on suitable investment on crop and livestock and it goes hand in hand with strengthening information flow especially putting in place a feedback mechanism which KMS can use to improve service delivery.

Accuracy in weather information dissemination and interpretation is an important component for early warning system. For farmers to effectively use weather information in making farming decisions, they should be confident of its accuracy. For instance, the year 2013 saw rain failure in some parts of the country and these were not expected which subsequently confused farmers on the reliability of weather information. As a result, farmers are losing confidence in KMS because sometimes the information disseminated is inconsistent. However, some areas like Makueni have a slightly different rainfall pattern, which needs better interpretation of weather information to farmers.

Downscaling weather information is important in promoting accuracy. This should go alongside reviving meteorological centres at district levels. At times the information given out is too general, there is need to downscale such information which falls within the mandate of KMS County Directors. There is however need for more sensitisation of county leadership to allocate more resources to enable KMS County Directors effectively carry out their work. The most important focus should be the 5-10 days forecast for timing of operations. Accurate information within these days (and not seasonal forecast) would greatly help farmers to plan especially on when to plant. The County Directors should also use this as an opportunity to enhance behaviour change among farmers. This is because farmers on a number of occasions ignore the warnings issued especially in regard to expected droughts. In such scenarios, they find themselves facing the wrath of climate change without adequate preparation, losing on the farms as well as through low prices for their commodities.

There is need for coherence in early warning system initiatives across the country as a critical mechanism of enhancing early warning system. There have been a number of efforts at national and local levels by both government and other interest groups to improve early warning system. It is a good idea for these efforts to be synergized such that responses are coherent in order to maximize the benefits of each initiative.

Stakeholders need to explore modalities of enhancing media engagement in climate change early warning system. This should go beyond print and electronic media utilisation to include Corporate Social Responsibility (CSR). Although media houses rely on advertisements for revenue generation, they still have a responsibility to communities, which stakeholders can negotiate with them through CSR to promote awareness raising and use of art to strengthen information dissemination. Baringo County is already experiencing Scarcity of food



especially in the areas of Katikit, Kinyach, Mondi division, Orus, Akoret, Ngaina and Yatya. CSR can address such a scarcity like it did in the "Kenyans for Kenya" initiative. However, its needs a well thought and executed arrangement to go beyond emergency assistance to support structures for food production which take into consideration the extreme weather conditions and its response mechanisms.

Best practices in early warning system

To enhance early warning system, it is important for Kenya to learn from best practices elsewhere. East African region generally lack strong systems for detecting extreme weather conditions and supporting farmers to respond to it. Much as the Kenyan system has challenges, the Meteorological services of the country is still the best in the region, right from colonial times and it still continues to act as a regional centre of excellence in meteorology. The fact that the best in the region has failed to adequately address the challenges posed by climate change on agriculture means the region still has a lot of work to undertake, if early warning system is to be more effective.

The concept of community based early warning system (CBEWS)⁵, well articulated in a handbook developed by Mercy Corps and Practical Action presents a comprehensive approach to early warning system using a community based approach. It is based on a "people-centred" approach that empowers individuals and communities facing threats of hazards (extreme weather conditions) to act in sufficient time and in an appropriate manner in a bid to reduce the possibility of personal injury, loss of life, damage to property, environment and loss of livelihood. Community based early warning system is summarized in five features as highlighted below:

Involvement of all community members

The different sections of a community, especially the vulnerable groups should all be involved in all stages

of the CBEWS. This includes designing, operating the systems, receiving the warning messages and responding to the warning.

Special consideration of community needs

Community needs analysis should take into consideration of the needs of every member of a given community. This is especially true with the most vulnerable segments of the community like women, elderly and the disabled.

Community ownership

he community members will own the process and system, right from design to implementation. This draws from the concept of participatory development where communities own up a development initiative, translating into better results. Since the early warning system is all about protection of community livelihoods, a community based early warning system strengthens and promotes local ownership, which is likely to lead to the community's willingness to act in accordance to the warnings issued.

Local capacity development

The capacity of local community members are built by CBEWS to respond to emergency situations in the most appropriate way. Through their involvement in the process, trainings, uptake of weather information, community members learn of effective mechanisms of dealing with extreme weather conditions like floods and draught.

Effective and efficient community participation

Through CBEWS promotes a more effective and efficient participation in the decision-making process of early warning system. Through the institutionalized approach it takes, local community's participation becomes more meaningful.

In the execution of community based early warning system, traditional mechanisms of early warning system needs to be enhanced by improved mechanisms to strengthen capacity for dealing with

⁵ Mercy Corps and Practical Action (2010) Establishing community based early warning system: Practitioners handbook



extreme weather conditions. Traditional mechanism of early warning system is community knowledge on a disaster, based on their experience over generations. It ranges from weather patterns to conditions of pasture, water and livestock to behaviours of birds and other animals and this can be used to predict the onset and cessation of rains. With climate change however, there is need to move beyond traditional knowledge to improved mechanisms, which uses science and technology, while not completely ignoring traditional mechanism. In other words, improved early warning system should apply science and technology to enhance local knowledge, that way, communities can easily identify with the process.

In practice, traditional early warning system is comprised on three phases i.e. i) monitoring of risk (measurement of precursors) ii) forecast indicates sudden disaster event (catastrophic) and iii) notification of a warning or alert, should an event of probable disaster/event take place. In Western Nepal for instance, communities used to observe the behaviours of chicken to get early warning messages, although this was not reliable. The improved early warning system uses the three phases in traditional early warning system but introduces the fourth phase i.e. preparedness and response for an emergency situation. Preparation and response to an extreme weather condition require better mechanisms for detecting and predicting such conditions (in this case effective and efficient Agro-meteorological services, wider engagement of all the agencies involved in the early warning system and ultimately a community based approach.

For community based early warning system to work, there is need for consideration of four major aspects. These include; effectiveness, efficiency, equity and legitimacy. Effectiveness means early warning information reach the last and most vulnerable, helps in reducing disaster risks, saves community resources and is well managed, both in operationalisation and appropriate use of financial resources. Efficiency on the other hand emphasises on effective policies, positive perception on the immediate danger, timely information, and the appropriateness of early warning facilities. Equity looks at addressing the needs of all community members, including the vulnerable and those with special needs. Finally, legitimacy means the early warning message is authentic and properly interpreted and that communities accept since it is legitimate.

Conclusion

In conclusion, enhancing early warning system is an important means of promoting agricultural productivity in light of the challenges posed by climate change. The losses farmers have incurred, both livestock and crops although attributed to many other factors are mainly due to extreme weather conditions. It is important for government, Kenya Meteorological Services and other stakeholders to collaborate, acquire and disseminate accurate and location specific weather information to farmers in a timely manner such that measures can be taken to mitigate and adapt to these challenges.

As stakeholders intensify efforts to enhance early warning system, community based early warning system should be at the core of all interventions. This is because it considers traditional knowledge and uses modern methods to improve on these methods. CBEWS is also critical because it promotes participatory approaches in development and it takes into consideration the unique needs of different communities, which is so evident in Kenya in terms of pastoralist communities and crop cultivating communities. The uniqueness goes beyond this to include upstream and low stream communities, areas prone to droughts and those vulnerable to floods. All these require special measures which can only be provided by a community based approach.



Endnotes

- 1. Otieno. G., Mungai, O., Ogalo, V. (2013) Climate, Food, Trade: Where is the Policy Nexus?, CUTS International
- 2. http://www.unisdr.org/files/7817_UNISDRTerminologyEnglish.pdf
- 3. http://www.feedthefuture.gov/country/kenya
- 4. Drought Monitoring and Early Warning System Bulletin, January 2014
- 5. Mercy Corps and Practical Action (2010) Establishing community based early warning system: Practitioners handbook

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