Food and Agriculture Organization of the United Nations

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Innovative communities: leveraging technology and innovation to build sustainable and resilient societies

Brief outline of the paper

I. Introduction

The Predictive Livestock Early Warning System tool (PLEWS) was initially developed at the request of the National Drought Management Agency (NDMA) of the Government of Kenya in order to support the development of accurate triggers for drought response. Following the development of the tool, however, it became apparent that the use of a Forage Condition Index (FCI) as a baseline against which other indicators (such as malnutrition, livestock price and predominant source of income) could be compared, provided an exceptionally useful insight into the relationship between available feed for livestock, predominant source of income and malnutrition. The potential for this to be used in enabling timely and informed decisions in the future is significant.

II. Resilience in the context of the 2030 Agenda

To date, PLEWS has been used in the arid and semi-arid lands (ASALs) of Kenya. In these areas, livelihoods are predominantly dependent on livestock and the dynamics of resilience are strongly tied to two key factors: access to land and access to markets. This means that more resilient households have good access to both land and markets, where access to land enables the ownership of large herds, and proximity to markets both increases the ability of households to sell livestock products and increases their ability to find alternative sources of income. Poorer or less resilient households, however, have limited access to land (hence their livestock holdings are much smaller) and limited access to markets, which means their dependence on livestock is much greater.

The increasing frequency of drought within the region has had a disproportionate impact on the less resilient households, leading to a significant increase on the numbers of people dependent upon food aid and unacceptably high levels of malnutrition. This is despite years of both development and humanitarian programmes which have focused on increasing resilience to and mitigating the impact of drought. The primary reasons for this limited impact revolves around two key factors: the failure to provide timely and targeted support (tailored to different wealth categories), and the lack of focus of past programmes on the link between livestock, malnutrition and food price.

III. Approaches to leveraging technology and innovation to build resilience for sustainable development

a. National examples

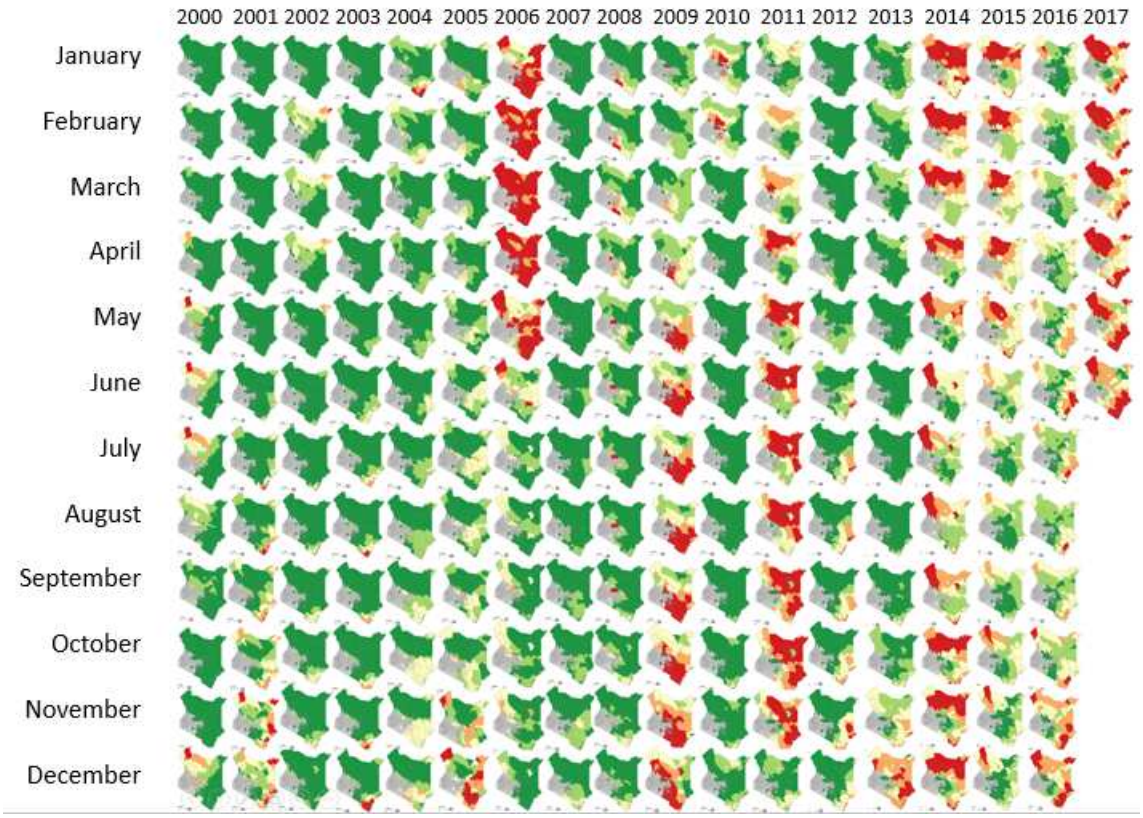
PLEWS uses data from a GeoEye satellite and excludes values for inedible species to produce an FCI. This is then modelled against past monthly data (from the year 2000) in order to build an element

of predictability into the tool. At the most simple level, FCI gives an average reading of forage condition per subcounty across the vast majority of Kenya's ASALs. These data are updated on a monthly basis per subcounty from the year 2000. By analysing seasonal trends in forage condition, the tool builds on a six-month prediction of forage condition which then enables timely and accurate drought response.

The tool can also be used to analyse trends in forage condition over time (Figure 1) and to get a clearer picture of the impact of a drought on key grazing areas.

A review of Figure 1 clearly shows the significant drought incidents in 2006, 2009, 2011 and 2014. The figure also shows forage recovery following these droughts and highlights the fact that there has been very little forage recovery since the 2014 drought. Whether this is due to climate change or range degradation (or a combination of both) requires further analysis, but this gives a good indication as to why livelihoods in Kenya's ASALs are becoming less resilient to climatic shocks.

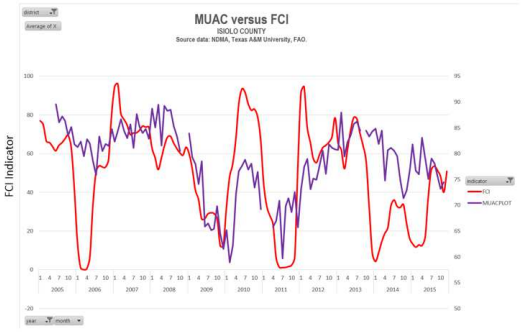
Figure 1: Forage accessibility over time (predicted from December 2016 data).



Comparison of FCI data against data on malnutrition and predominant forms of income (which is collected monthly by NDMA) shows a clear correlation between forage condition and malnutrition in counties where livelihoods are predominantly dependent on livestock (such as Isiolo in Figure 2), but very little correlation in areas where income sources are much more diversified (such as Kitui in Figure 2).

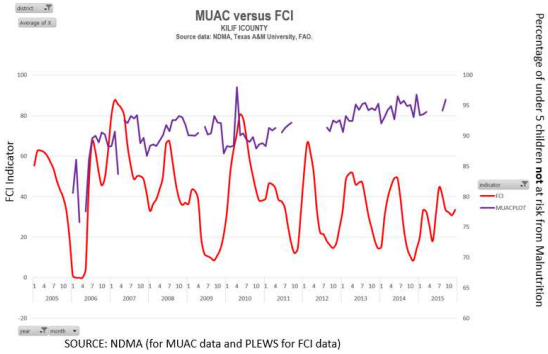
Figure 2: FCI values plotted against the percentage of under-fives not at risk of malnutrition in Isiolo and Kilifi counties.

Isiolo



SOURCE: NDMA (for MUAC data and PLEWS for FCI data)

Kilifi



SOURCE: NDMA (for MUAC data and PLEWS for FCI data)

This information has been used to assist the Government of Kenya to better target its response. For example in the 2017 drought, Kilifi was one of the hardest hit areas and therefore was initially the focus of the majority of government support. Review of the above information, however, enabled the Government to target its scarce resources towards areas where the drought had a much greater impact on nutrition.

b. Cross-border and regional initiatives

As dry season grazing lands of pastoralists often lie across international borders, FAO is currently in the process of extending the tool to cover a broader area. This will give FAO an ability to predict conflict in areas where large numbers of animals are likely to congregate and to predict the likely impact of the drought.

c. Global initiatives

The ability of PLEWS to provide an estimation of forage condition within the coming six months, gives the tool the possibility to be integrated into the IPC and should reduce some of the subjectivity currently inherent in its use.

IV. Policy instruments and mechanisms to support risk management and risk reduction

In Kenya, PLEWS is used in conjunction with a vegetation condition index and monthly data collection to trigger government-led drought response. The predictive component of the tool was pivotal in demonstrating to the Government the likely severity of the 2017 drought and was used to justify the declaration of a national emergency.

V. Recommendations

Further studies are needed on the predictive element of the tool in order to give a declining scale of confidence in predictions between one and six months.

Further analysis between FCI data and other data that is regularly collected by NDMA (such as livestock price, maize price, malnutrition and source of income) will help to inform timely, market-based drought interventions.

Given the inherent value in the correlation between FCI and nutrition data, the use of the tool should be adopted into the IPC system and should be scaled up to help inform drought response throughout the Intergovernmental Authority on Development (IGAD) region.