Strengthening food security assessments in Kenya through implementation of a National Crop Monitor System

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Abstract

Monitoring in season crop conditions is critical when assessing the food security situation and prompting action to mitigate adverse outcomes in largely rain-fed agricultural systems. The Group of Earth Observation for Global Agricultural Monitoring (GEOGLAM) has been supporting global assessments for partners in the Agricultural market information system (AMIS) and in countries that are at risk of food insecurity with the Crop Monitor for AMIS and Crop Monitor for Early Warning respectively. Africa, and specifically Kenya is dependent on rain-fed agricultural production and with climate variability and change, timely, relevant and accurate information on crop conditions is necessary to ensure appropriate and sometimes lifesaving responses. By implementation of national crop monitors countries can synthesize and customize information to suit their reporting metrics and provide detailed sub-regional assessments in a standardized format that can inform global and regional assessments. Successful implementation and publication of The Kenya Crop Monitor Bulletin by the Kenyan Ministry of Agriculture and Irrigation is already influencing agricultural decision making. The bulletin is being used to inform internal decision making in the ministry; and through dissemination on the ministry's website, as an important source of information for food security agencies. The report which combines earth observation data and field reports from county officers, is improving the way food security decisions are being made. Specifically, monitoring the spread of diseases and pests such as the Fall Army Worm, assessing the implications of extreme events such as floods and droughts on production, providing expected trends based on the prevailing conditions and the expected yield outlook at the end of the season. Through the bulletin, the government has also been able to assess the impact of subsidies on production and as an early warning report to prompt for mitigation and other responses.

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Agriculture and Food Security

SERVIR EASTERN & SOUTHERN AFRICA

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Problem Specification

Agriculture in Kenya accounts for approx. 26% of the GDP and provides approx. 80% of all employment opportunities in the country. With dependence on rainfed production systems, inadequate actionable information on in-season crop conditions create a challenge for food security decisions, especially in the face of emergencies such as drought.

Goals

- Combine field information and earth observations to develop bulletins that summarize crop specific conditions, seasonal trends and outlooks, and other critical information such as climate forecasts and market information.
- Customize and implement a National Crop Monitor in Kenya for improved agricultural decision making
- Provide the Ministry of Agriculture, Livestock, Fisheries and Irrigation (MOALFI) tools for synthesizing and customizing crop conditions information to suit their reporting metrics and provide detailed sub-regional assessments in a standardized format that can inform global and regional assessments.

Key stakeholders

Decision makers: State Department of Agriculture(Kenya) (SDA), IGAD Climate Prediction and Application Centre (ICPAC), Famine Early Warning Network (FEWSNET), Food and Agriculture Organization
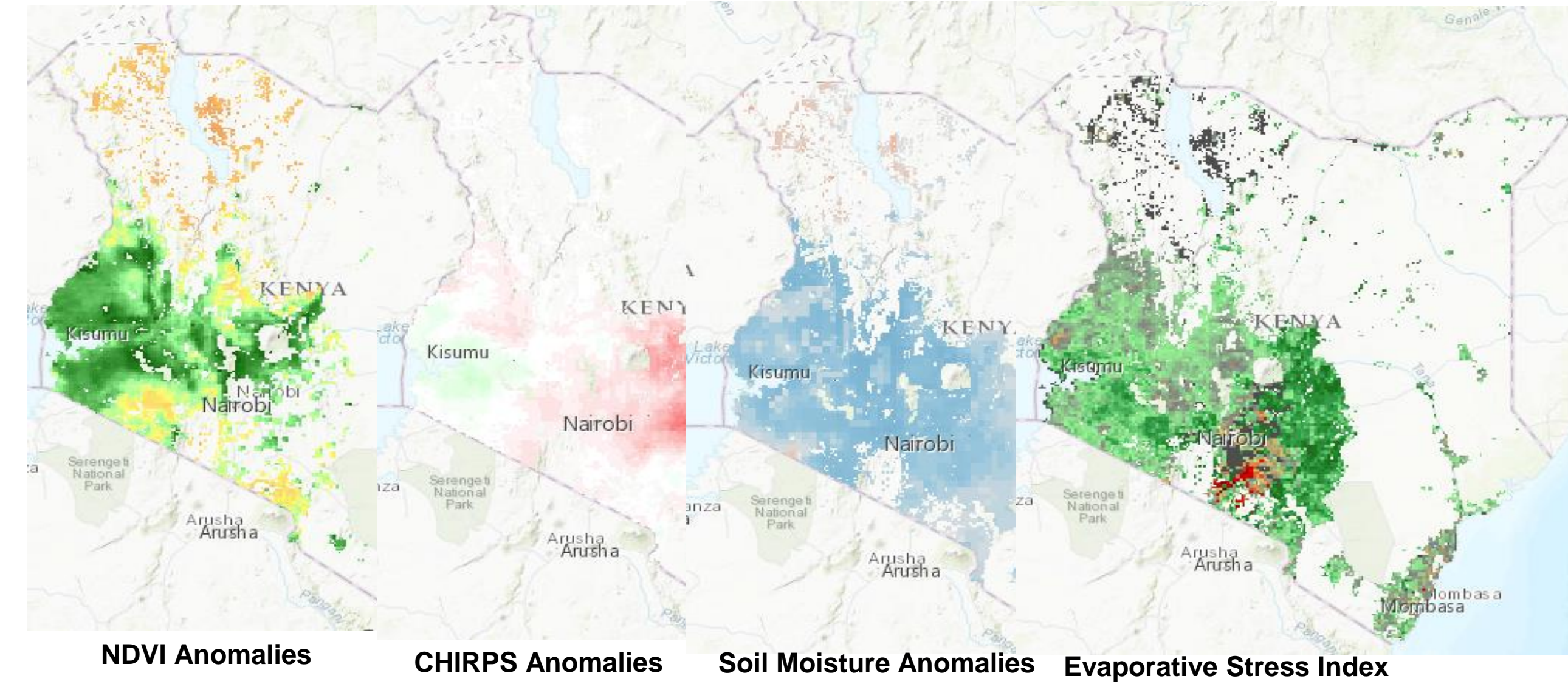
Users: SDA, FEWSNET, ICPAC, KNBS (Kenya National Bureau of Statistics), Extension officers and Field Agents

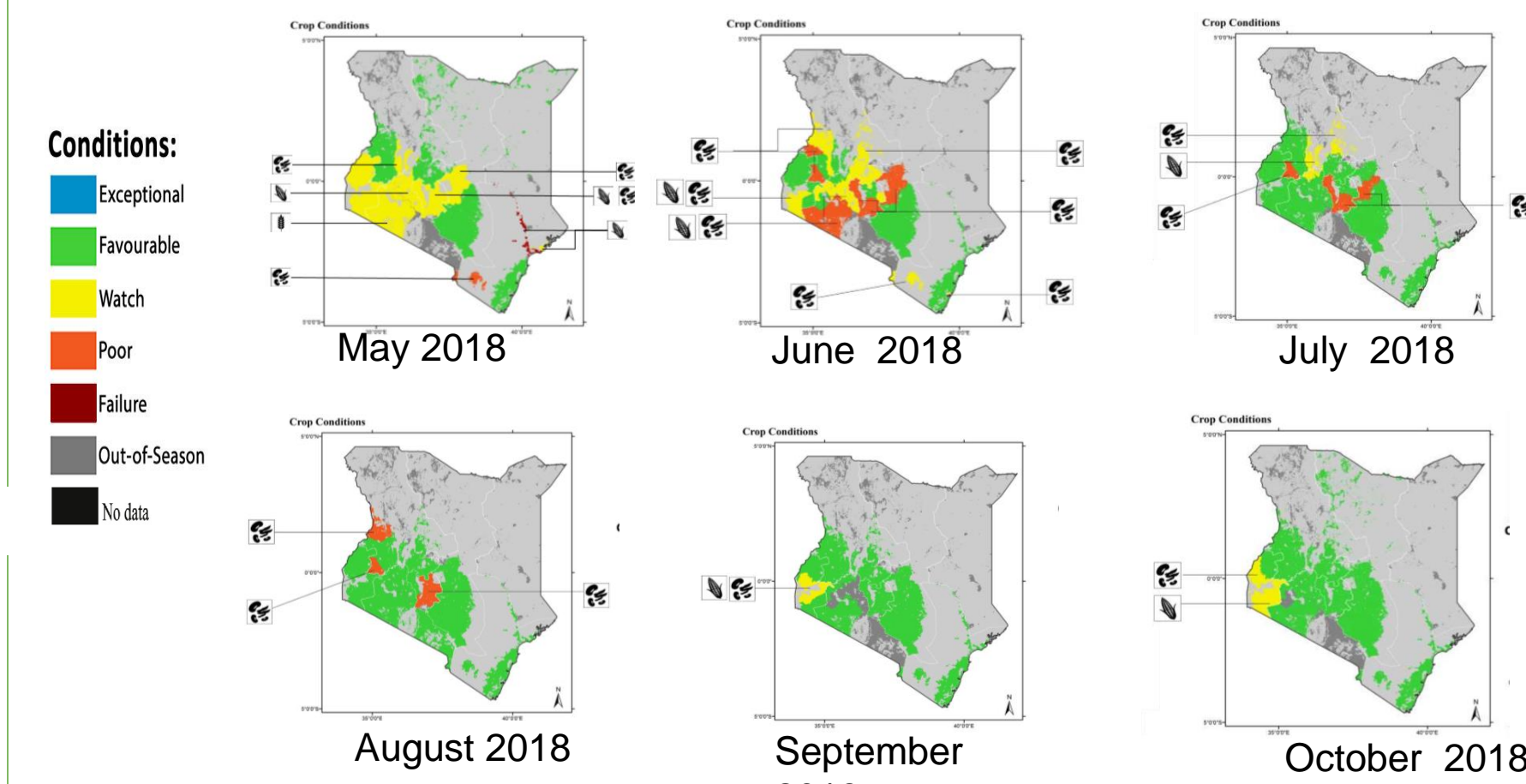**Beneficiaries:** Farmers, Food Security Agencies

Background

✓ SERVIR Eastern and Southern Africa (SERVIR E&SA) is a joint initiative of National Aeronautical Space Agency (NASA) and USAID; with the Regional Centre for Mapping of Resources for Development (RCMRD) as the implementing organization.

✓ SERVIR E&SA's overarching goal focuses on assisting developing countries improve environmental management and resilience to climate change by strengthening the capacity of governments and other key stakeholders to integrate Earth Observation information and geospatial technologies into development decision-making.

✓ The University of Maryland (UMD) supported the implementation and customization of the GEOGLAM Crop Monitor for national reporting as part of the SERVIR E&SA Applied Science Team(AST).

✓ The Group of Earth Observation for Global Agricultural Monitoring (GEOGLAM) has been supporting global assessments for partners in the Agricultural market information system (AMIS) and in countries that are at risk of food insecurity with the Crop Monitor for AMIS and Crop Monitor for Early Warning respectively
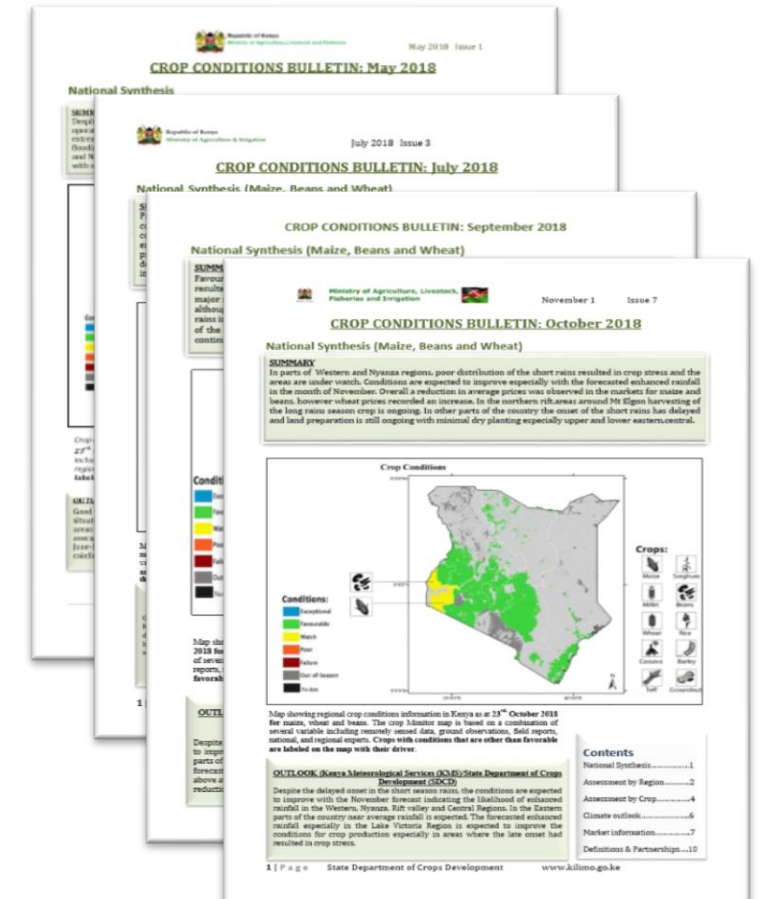
Earth Observations Inputs

NDVI Anomalies | CHIRPS Anomalies | Soil Moisture Anomalies | Evaporative Stress Index

Customizations for National Reporting

District Specific Calendars for Priority crops

Crops: Maize, Sorghum, Millet, Beans, Wheat, Rice, Cassava, Barley, Teff, Groundnut — Priority Crops

Conditions:
- Exceptional
- Favourable
- Watch
- Poor
- Failure
- Out-of-Season
- No data

Drivers: Dry, Pests, Disease, Flood, Wet, Late Rains, Socio Economic, Wild Life, Early Rain Cessation, Extreme Event

Crop specific Extent Maps

Monitoring units

Periodicity
- Monthly bulletins
- Seasonal bulletins

Additional Information
- Monthly& Seasonal climate forecasts
- Market information
- Crop stage
- Trends & EOS outlook

2018 Milestones

7 Bulletins Produced
Fully Customized Crop Monitor
County crop conditions reporting template developed
Capacity building of National and county officers (29 officers trained and reporting)
Improved capacity of the Ministry in using EO for decision making
National team created for region specific monitoring
Timely production of the bulletin

Building the capacity of the Agricultural officers in application of the crop monitor for monitoring and decision making. (Photo Credits: RCMRD)

Bulletin Highlights

National Synthesis maps providing a summary of the overall crop conditions

Conditions:
- Exceptional
- Favourable
- Watch
- Poor
- Failure
- Out-of-Season
- No-Info

May 2018 | June 2018 | July 2018 | August 2018 | September 2018 | October 2018

Improved reporting and communication crop situation to govt and food security stakeholders

Outlook and projected implications on end of season yields informs the Govt Crop Insurance Program
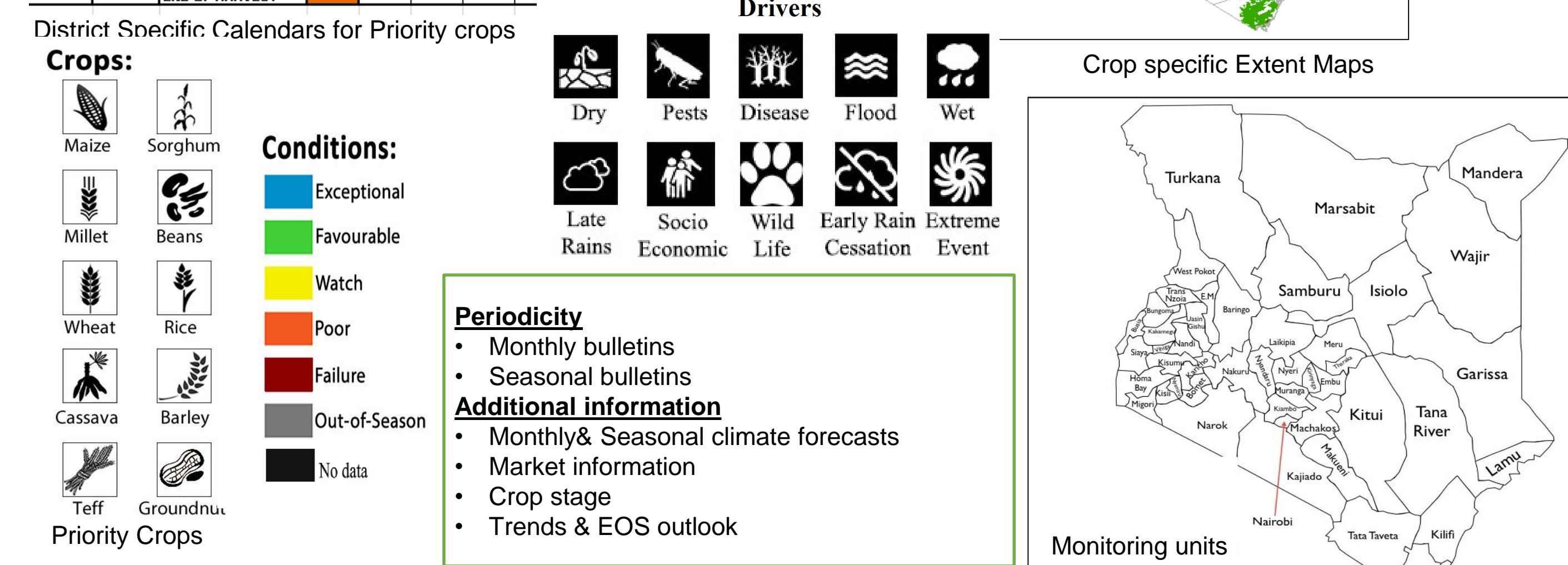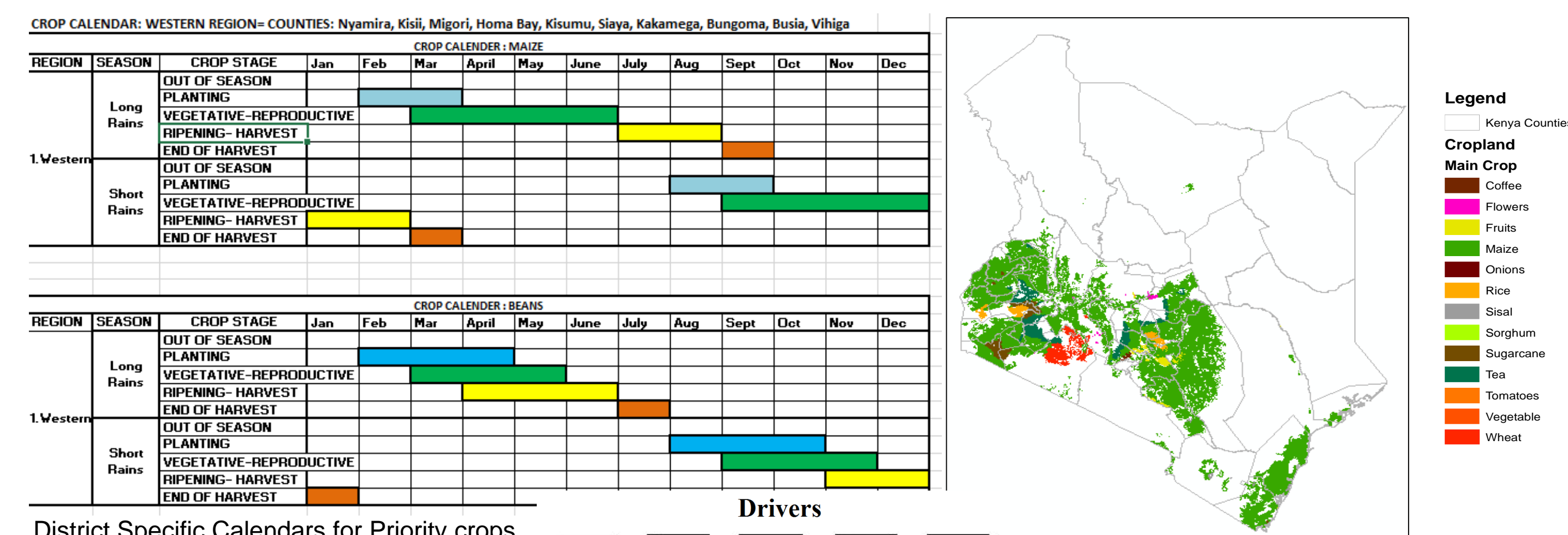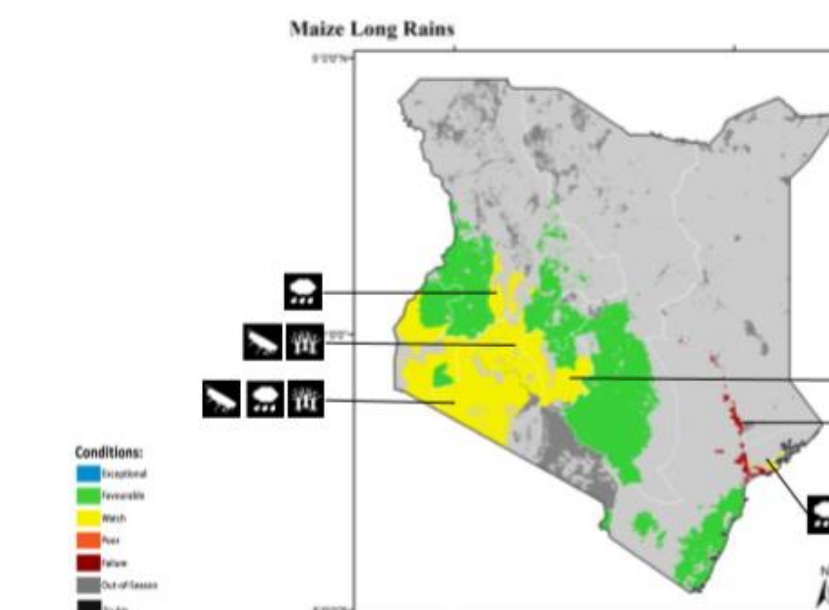
Outlook: Normal yields are expected for maize in most of the counties except in Nakuru county where the yields will be above normal if the current conditions persist. However, the wet conditions has resulted in reduced beans production attributed to poor podding and fungal disease. Up to 50% of beans yield reduction is expected in Nakuru. Wheat production will decline in Narok but will be above normal in Nakuru county.

Actionable summary for high level decision making and linkage to Met forecasts, Sept 2018

SUMMARY
Prevailing conditions are favourable for maize production in most parts of the Country. Harvesting is complete in most parts of the country with average to above average yields being realised. Extremely wet conditions adversely affected beans production in most parts of the country during the season. Wet conditions in the Central highlands led to rotting and delayed harvesting of the beans. Wheat production is favorable in most of the growing areas although heavy rains resulted in late planting and a reduction in planted acreage.Land preparation for the short rains is ongoing. Wholesale prices of most commodities continued to decline due to adequate supplies from the season's harvest.

OUTLOOK (Kenya Meteorological Services (KMS)/State Department of Crops Development (SDCD))
Good maize crop performance is expected to continue North Rift, Western and parts of Central and South Rift. While most of the country are expected to be generally dry; the highlands west of the Rift Valley and parts of the Central Rift Valley will experience near-average to below average rainfall. The expected dry conditions in most parts of the country will allow for drying and harvesting of the mature crops. However, beans production has been adversely affected in most parts of the country due very wet conditions which resulted in depressed yields.

Monitoring changes in market prices due to prevailing conditions informing supply and demand

1. **Maize**
In June Dry maize prices averaged Ksh. 2500 down from Ksh 2600 in May, with Kisumu selling at the highest price of Ksh. 3200 per 90 Kg bag.

Green maize was selling at an average price of Ksh 2800 a decrease from May's Average price of Ksh. 3315 with Mombasa topping the price at Ksh 5400 down from Ksh. 6790 in May per 115 Kg bag.

2. **Beans**
In July beans were selling at an average price Ksh. 5800 for the Canadian Wonder variety. Ksh. 5380 for Mwitemania beans and Ksh5880 for the Rosecoco variety per 90kgs bag. This represented a decrease in prices for all the varieties when compared with prices in June.

Nairobi and Kisumu recorded the highest prices for the Canadian Wonder Variety at Ksh. 7200 with the lowest prices being observed in Kitale at Ksh. 4000.
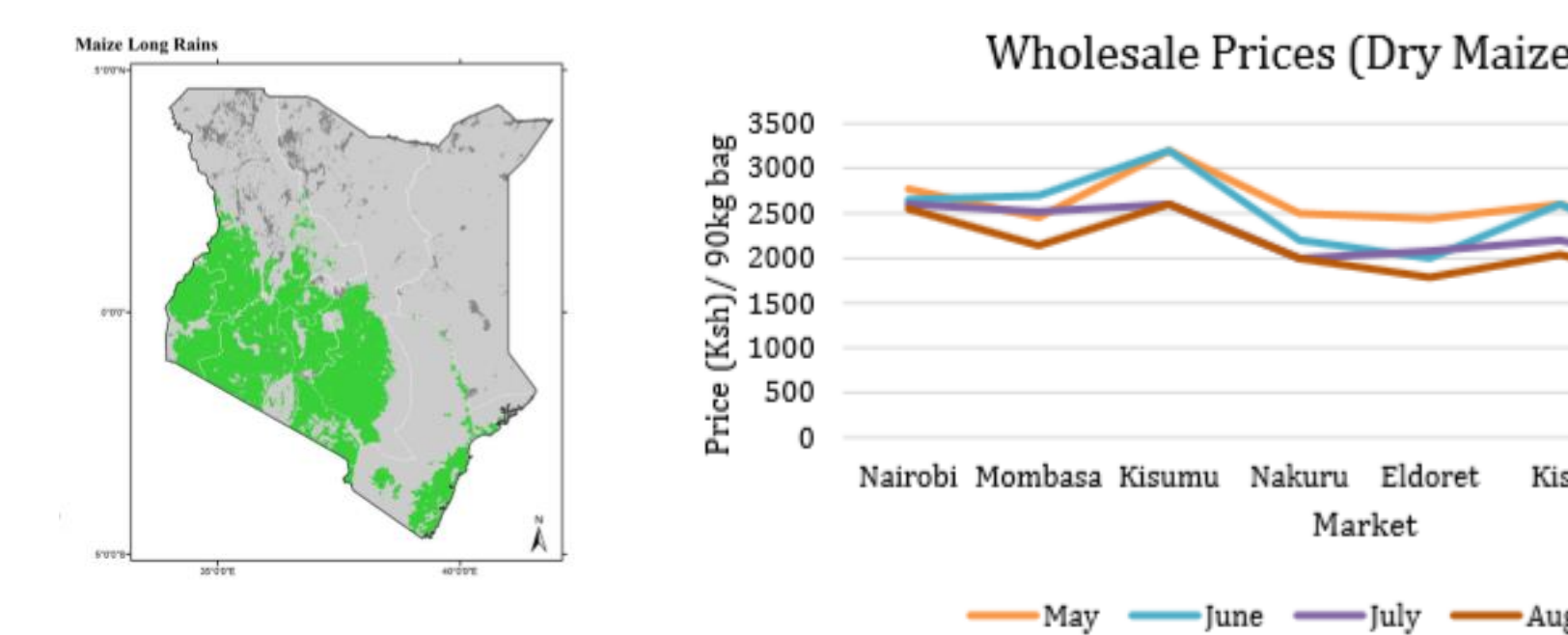
Use Cases

Monitoring Spread of the Fall Army worm in Maize, May 2018

Government Prioritization in distribution of interventions

The government has launched a short text messaging service to help small scale farmers fight the fall army worm across the country. Send the word 'FAW' to '30606' to subscribe to SMS. Sending and receiving the messages will be free. (Courtesy)

Informing Government on Season Performance, September 2018

Government Regulation of Maize prices due surplus and seeking new markets

Farmers' stores full of last year's maize as harvest season begins