Cropin

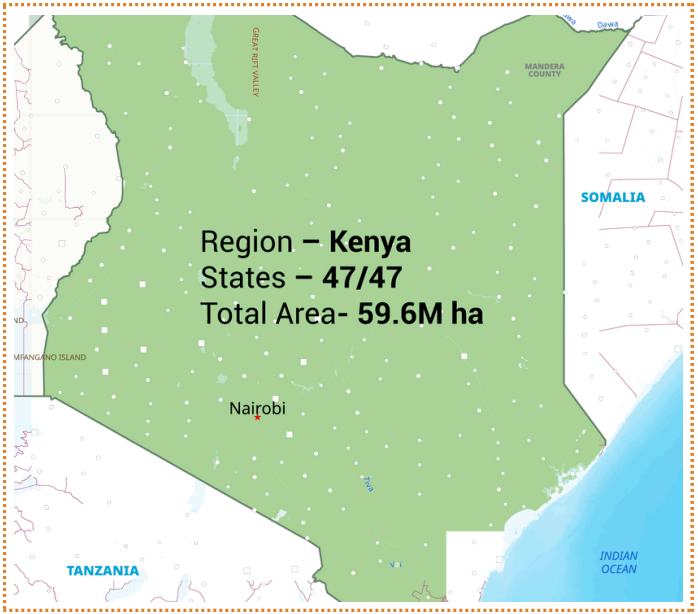
Early Insights on Market Intelligence for Maize

Kenya | Aug'24

Prepared by:
Cropin Technology Solutions

Summary

This report provides a comprehensive analysis of maize cultivation in Kenya for the Long Rain season of 2024. Leveraging advanced AI/ML models and non-invasive satellite data analytics, Cropin's insights provide unparalleled accuracy, surpassing traditional methods like survey extrapolations using crop-cutting experiments.



Datasets assessed by Cropin's contextualised advanced AI/ML models: Dynamic LULC, Crop Health & Stage obtained from Satellite Data, Cropi's proprietary crop knowledge graph, Weather Maps.

The derived insights elucidate maize crop dynamics, production trends, and regional performance across Kenya. By providing accurate and timely data, Cropin empowers stakeholders with the insights needed for informed decision-making and strategic planning.

5 insights that stood out

Annual Production trend & top performing regions I Harvest Window Prediction I Crop Health I Temperature Anomaly I Precipitation Anomaly

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Maize: A Cornerstone of Kenyan Agriculture

Maize (Zea mays L.), a staple for over 85% of Kenya's population, is crucial to both food security and economic development. As the most widely cultivated cereal, it contributes significantly to the livelihoods of millions of smallholder farmers. Agriculture, accounting for 20% of Kenya's GDP and employing over 40% of its population, is heavily reliant on maize, which is cultivated in 40% of Kenya's arable land.

Addressing Import Dependency:

Despite maize being by far the most important food crop in Kenya, the nation remains heavily dependent on its imports to meet domestic demand. To enhance food security and reduce reliance on imports, the Kenyan government implemented various initiatives to boost domestic maize production. These efforts have yielded positive results, particularly in 2023, driven by favorable weather conditions, expanded cultivation areas, and government support programs.

According to Kenya National Bureau of Statistics (KNBS) in 2023

Maize production increased by **38.8% to reach 47.6 million bags.**

Maize imports declined by **36% to 507,900 metric tonnes.**

Read more to learn what 2024 has in store!

The Long Rain Season: A Critical Period

The Long Rain season, spanning from April to September, is a crucial period for maize production in Kenya. Farmers aim to sow maize with the onset of the first rains in March, and harvest typically begins in late September. While this season offers the potential for high yields, it also presents significant challenges, such as unpredictable weather, pests, and diseases. Climate change has shifted the sowing and harvest window and impacted the quality and quantity of yield. To navigate these challenges effectively, data-driven insights are essential.

Cropin's Maize Report

Maize production in Kenya has shown significant trends and patterns influenced by various factors, including climate conditions, resource provision, and advancements in agricultural practices. Cropin's deep learning AI/ML models overlay non-invasive satellite imagery data, land use land cover (LULC), crop knowledge graphs, weather data, and more to understand maize cultivation dynamics in Kenya. The report provides accurate and timely information on acreage, production, yield, crop health, harvest window estimation, and many other datasets as of 15 Aug 2024. By the end of the season, production is expected to increase.

Cropin's innovative approach harnesses the power of non-invasive satellite data analytics. Unlike traditional methods that require physical intervention for surveys, Cropin's technology offers a more efficient and accurate process that saves time and resources and minimizes the risk of affecting on-field operations during field inspections. The key insights include top maize-producing counties, the impact of seasonal variations on harvest window, and the high-risk weather anomalies. This extensive market research analysis is immensely valuable for procurement and trend analysis to mitigate risks associated with climate change.

Key Objectives

This report aims to:

Provide a comprehensive analysis of maize cultivation in Kenya during the Long Rain season 2024.

Identify key trends and challenges affecting maize production

Equip stakeholders with the necessary data-driven insights to make informed decisions.

Methodology

Cropin's advanced methodologies are rooted in our contextualized deep learning AI/ML models and a host of data sets, including our proprietary crop knowledge graphs encompassing over 10,000 crop varieties and data from satellite imagery, to deliver accurate and actionable crop insights. Our easily scalable approach is grounded in a robust framework that encompasses the following:

Crop identification model: Cropin utilizes annotated ground data for training and testing, ensuring our advanced models are hyper-tuned. The pre-processing routines prepare the input data for real-time crop identification, and the post-processing routines refine the results. Cropin employs automated pipelines for data generation, quality assurance, and publishing results on the platform, enhancing efficiency and consistency in data delivery.

The yield estimation model combines weather data, crop-agnostic information, and phenology derivatives obtained from Sentinel-2. It also uses crop energy parameters from Landsat 8/9 and Sentinel-2, creating a comprehensive dataset for accurate yield predictions.

Acreage and yield estimates are rigorously validated to ensure accuracy. This involves comparing our outcomes with plot-level ground truth (GT) data from previous and current seasons provided by clients, as well as our crop knowledge graphs. Additionally, the estimates are validated against global datasets, offering a robust verification framework.

By leveraging satellite data, deep learning AI models, and rigorous validation processes, Cropin provides highly accurate and timely data that empowers farmers and agricultural companies to optimize their practices and improve productivity. Understanding these methodologies helps stakeholders appreciate the complexity and precision involved in modern agriculture, paving the way for more informed decision-making and sustainable farming practices.

Crop Map & LULC

The Land Use Land Cover (LULC) - Dynamic Agri Mask updated by Cropin shows that 11.35% of land in Kenya is agricultural land.

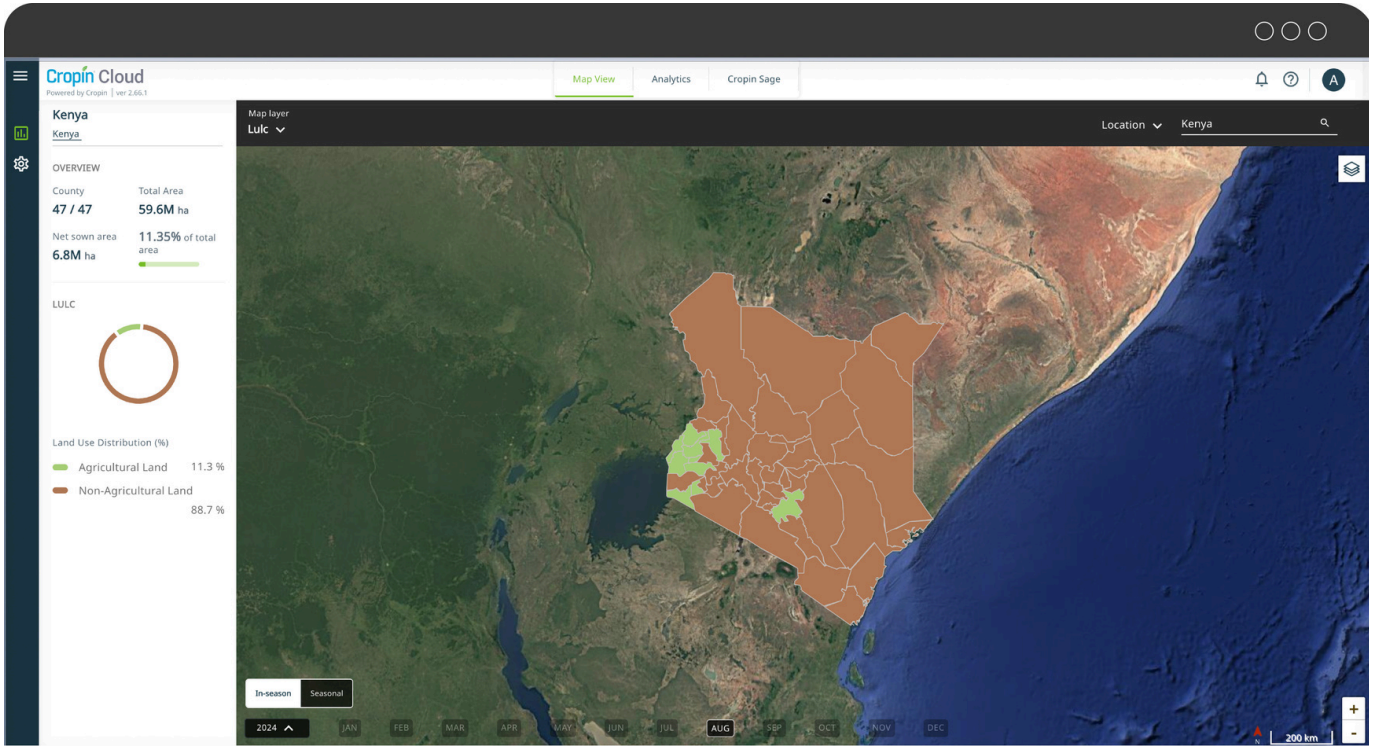


Figure 1: Dynamic LULC distribution

Legend: The counties in green represent regions with over 50% crop-land.

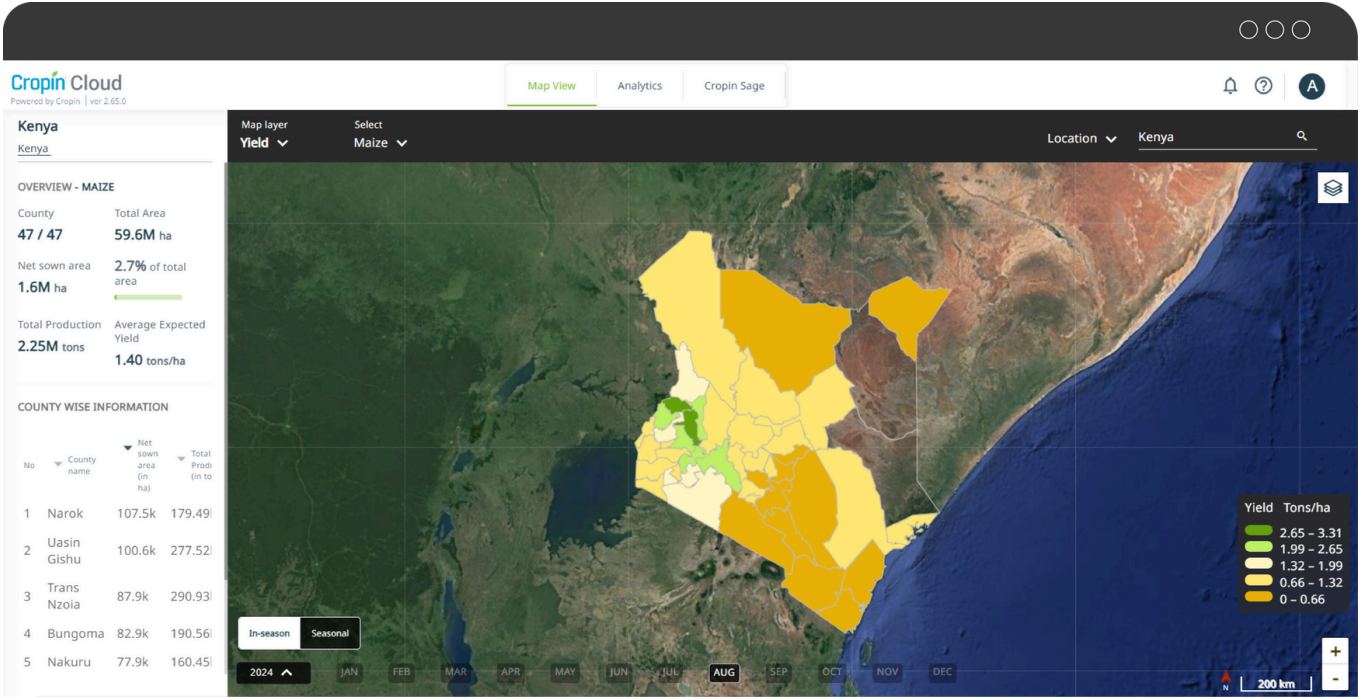


Figure 2 : Latest Crop Map of Maize in Kenya

Our comprehensive Kenya Crop Map highlights the top maize-producing counties and provides the latest acreage, total production & average yield estimates for the ongoing Long Rain season. Trans Nzoia is the top producer among the counties, followed by Uasin Gishu for the long season of 2024.

Beyond the national/regional level, we offer detailed insights into every arable small-sized farmland. **Our proprietary spectral library enables precise crop identification at the varietal level, while our granular insights at a 10x10 meter resolution provide unparalleled detail.**

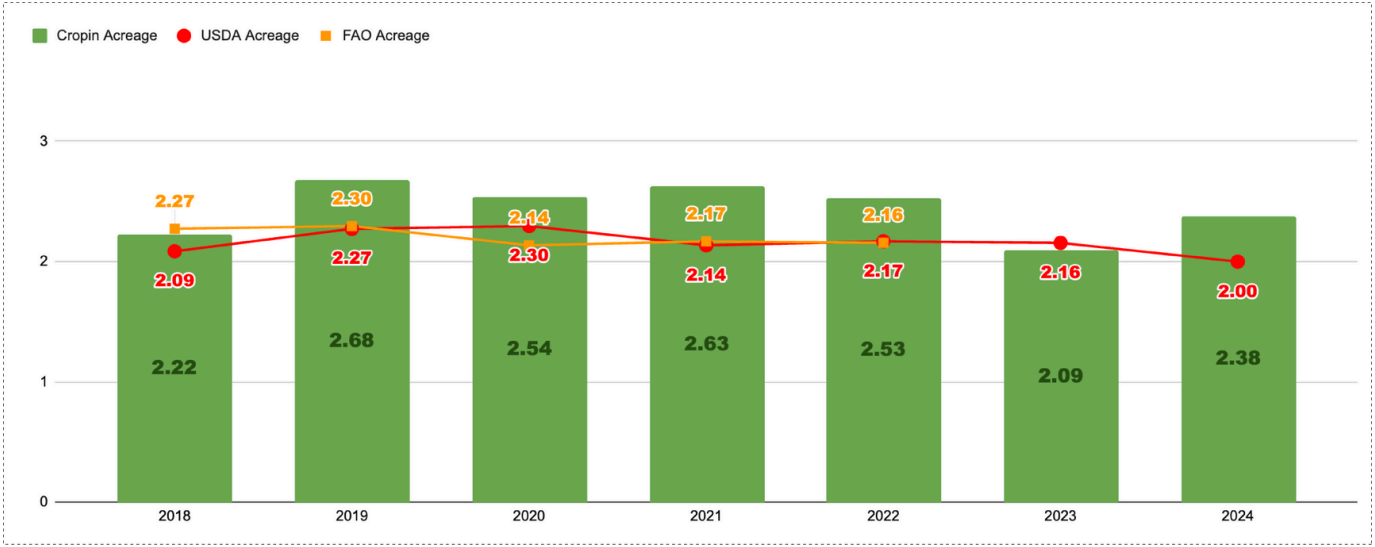


Figure 3: Annual Acreage Trend in comparison to global/local open source data

The graph illustrates a notable difference between Cropin's acreage estimates and those provided by USDA and FAO for the 2024 season. Cropin's higher acreage estimates can be attributed to several factors:

- **Nationwide Coverage:** Cropin's data collection extends to the entire nation, ensuring comprehensive coverage of maize cultivation areas.
- **Granular Resolution:** Cropin's 10x10 m resolution provides a more detailed and accurate assessment of land use and crop distribution.
- **Advanced Analytics:** Cropin's AI/ML models leverage satellite imagery and other data sources to refine acreage estimates, minimizing errors.
- While **USDA and FAO** provide valuable agricultural data, their estimates may be less accurate due to limited sampling of cultivated areas and extrapolation of data.

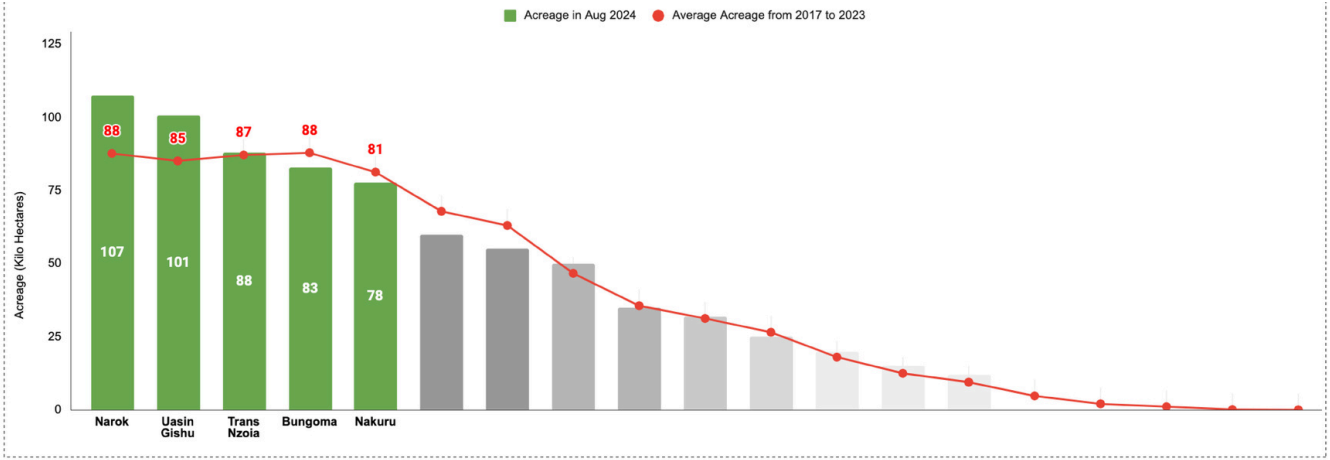
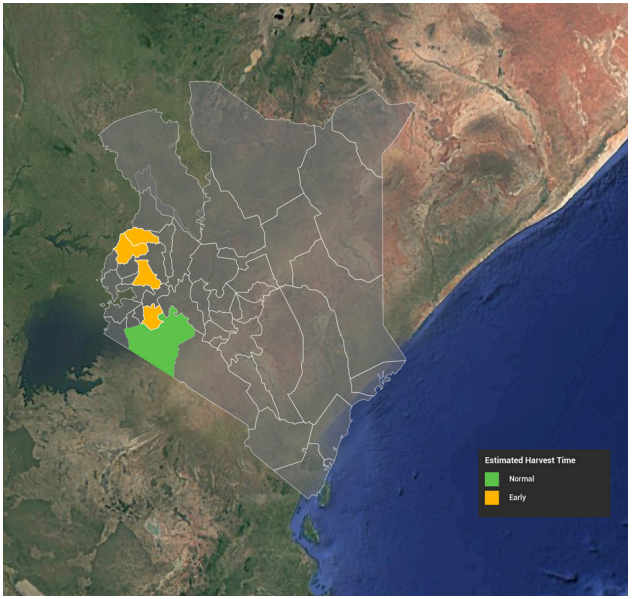


Figure 4: 2024 Current Season vs Average Acreage across Kenya

Harvest Window Estimation

Cropin's advanced Crop Stage model provides valuable insights into crop development. By leveraging remote sensing data, weather information, and crop science, the model predicts the current stage of the crop, its progress from sowing, and the accumulated growing degree days (GDD). It offers insights into the crop's maturity and potential harvest window, crucial information in the context of climate change, which can accelerate plant growth and seed filling, resulting in earlier harvests. The model estimates the deviation in days from the typical harvest window based on the long-term normal of GDD. Uncover counties where early harvests are predicted, like Trans Nzoia, Uasin Gishu, and Kakamega, with the number of days of deviation.

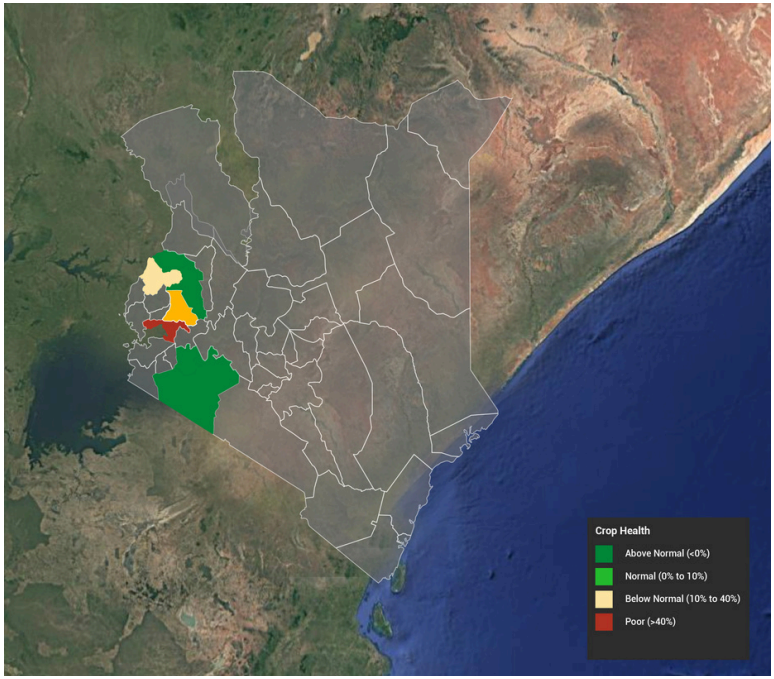


State / Country	Harvest Indication	Normal Harvest Window	Harvest Window Deviation (Days)
Narok	Normal	Early October	6
Uasin Gishu	Early	Early October	11
Trans Nzoia	Early	Early October	17
Bungoma	Early	Early October	21
Nakuru	Early	Early October	16

Figure 4: Cropin Dashboard of Estimated Harvest Time of Maize in Kenya (Long Rain 2024)

Crop Health/Performance Monitoring

Crop health monitoring is crucial for understanding the quality of agricultural produce. Cropin's innovative approach leverages satellite imagery to assess crop health, using the deviation from the long-term normal crop health index as the defining metric. Our AI models estimate crop health monitoring metrics from canopy greenness, which is derived from normalized difference vegetation index obtained from satellite data.



State / County	Crop Health
Nakuru	Above Normal
Nandi	Above Normal
Trans Nzoia	Above Normal
Bungoma	Below Normal
Kencho	Poor

Figure 5: Cropin Dashboard of Crop Health Monitoring of Maize in Kenya (Long Rain 2024)

Weather Summary

Adverse Weather Conditions threaten crop yield, harvest, and post-harvest processing. Cropin provides weather forecasts for the upcoming six months. The weather anomaly data is provided for the entire duration of the crop season. Right at the beginning of the season Cropin provides weather forecasts till the end of the season.

Temperature Anomaly

This can be identified as temperature anomaly data derived based on deviation from the long-term normal computed using historical 10~30 years. The graph buckets temperature into normal, cold, and warm, which can be drilled down county-wise. In 2024, major maize producers of Kenya witnessed warm or normal temperature variations in Aug & Sep 2024 compared to the long-term average over the past 30 years.

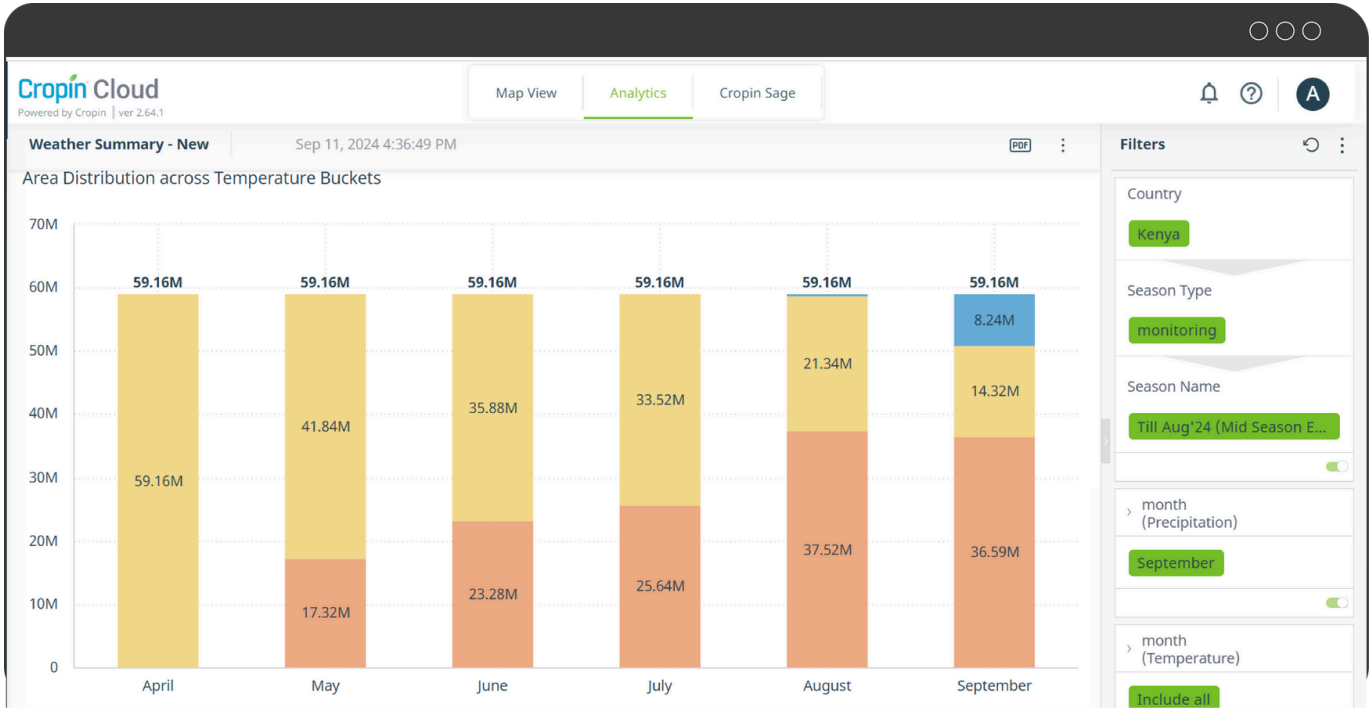


Figure 6: Cropin Dashboard of Weather Summary – Temperature Distribution (Long Rain 2024)

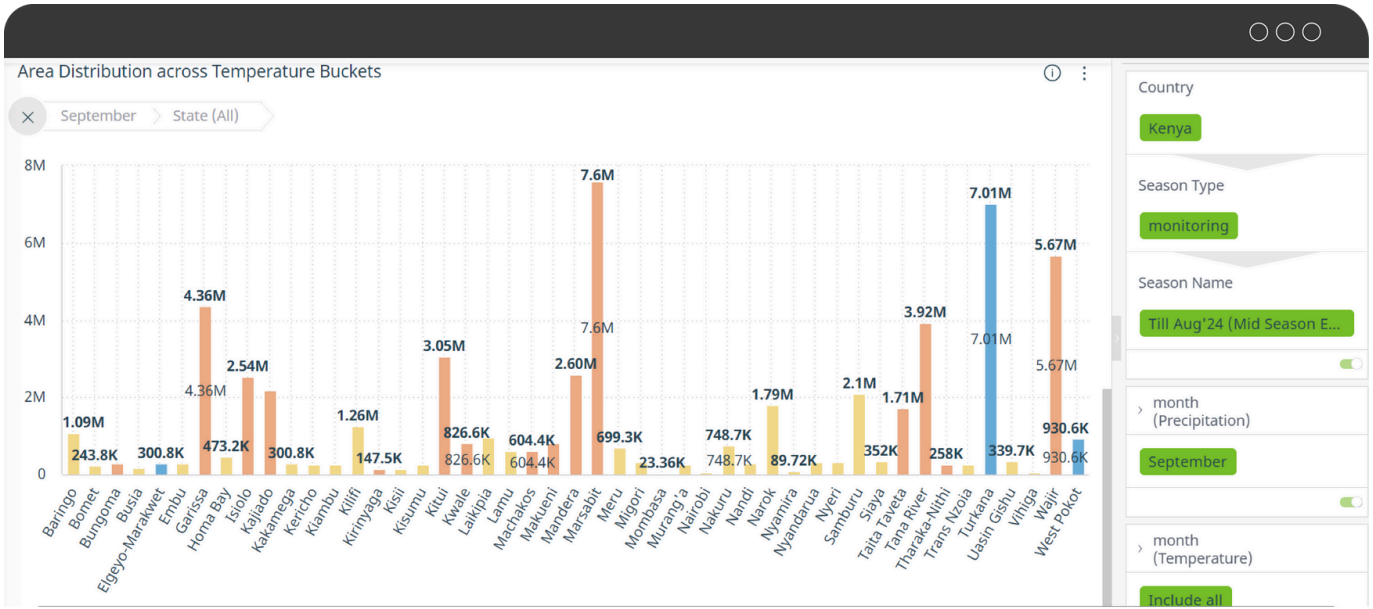


Figure 7: Cropin Dashboard – Drill down of Temperature Distribution (Long Rain 2024)

Legend: The figures in the graph represent the acreage distribution county-wise.

Precipitation Anomaly

Understanding weather patterns is crucial for effective agricultural planning. Adverse weather conditions can significantly impact crop yields, harvested produce, and overall production. Adverse Weather Conditions can be identified as precipitation anomaly data derived based on deviation from the long-term normal computed using historical 10~30 years. Major Corn Producers recorded above-normal precipitation compared to the long-term average over the past 30 years in Sep 2024

Figure 6: Cropin Dashboard of Weather Summary – Temperature Distribution (Long Rain 2024)

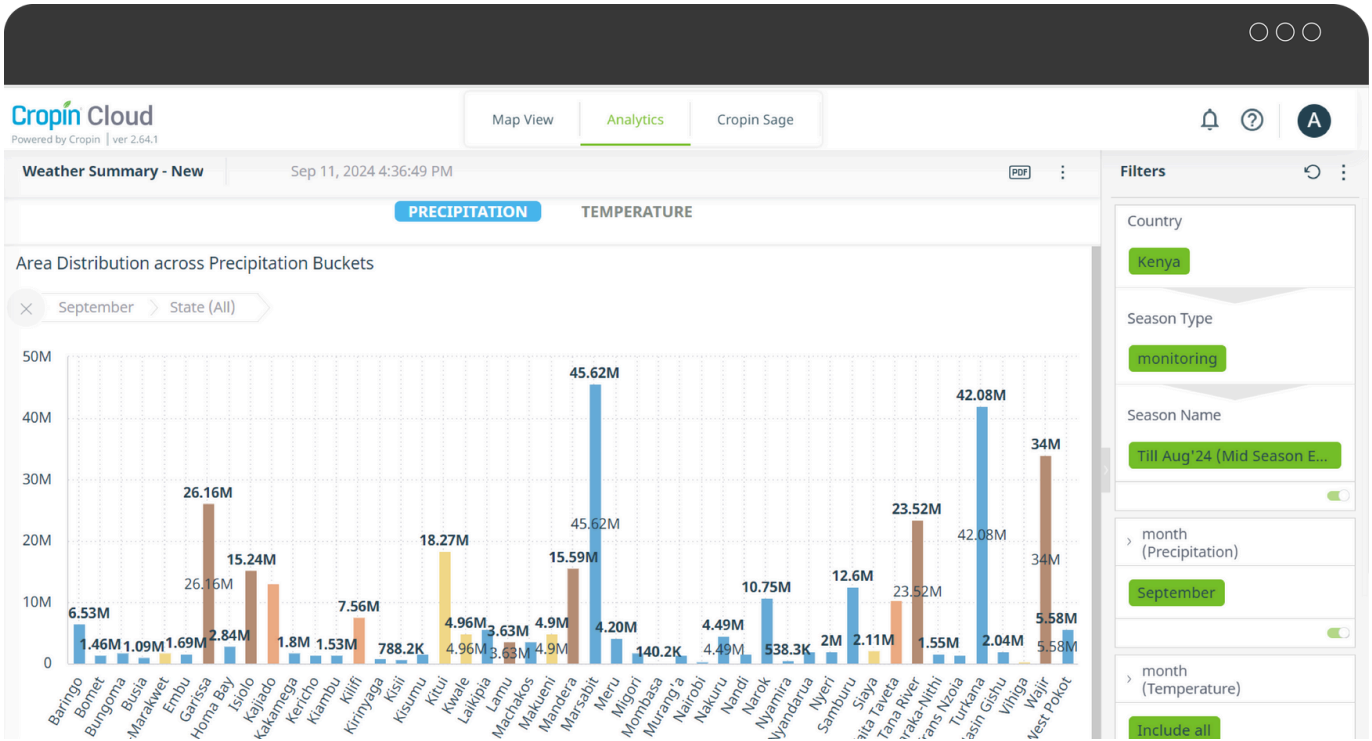


Figure 9: Cropin Dashboard – Drill down of Precipitation Temperature Distribution (Long Rain 2024)

Legend: The figures in the graph represent the acreage distribution county-wise.

Conclusion

Cropin's expertise, spanning over 14 years and encompassing 500 crops across 103 countries, enables us to provide a comprehensive analysis of maize cultivation in Kenya. Our report offers unparalleled insights into acreage, production, harvest windows, crop health, and weather anomalies, providing a granular understanding of the Kenyan maize landscape. Cropin's comprehensive maize report offers invaluable insights into the dynamics of maize cultivation in Kenya. We offer unparalleled accuracy and actionable intelligence by leveraging advanced AI/ML models and non-invasive satellite data analytics.

Strategic Focus: Prioritize interventions in top-producing states like Trans Nzoia, Uasin Gishu, Bungoma, Narok, Nakuru, and Kakamega.

Risk Management: Address challenges in regions with below-normal crop health and adverse weather anomalies.

Future Planning: Utilize yield forecasts and harvest window estimations for effective resource allocation and strategic planning.

By harnessing the power of advanced analytics, Cropin's market intelligence report on maize production in Kenya offers insights into top-performing regions, harvest window predictions, crop health insights, and weather anomaly assessment. This comprehensive analysis underscores the critical role of data-driven intelligence and empowers stakeholders with actionable insights for decision-making and sustainable growth. Government agencies, agri-businesses, and commodity trading companies can leverage this intelligence to optimize operations, mitigate risks, and enhance food security.

Request for full access:

Why Access the Full Report?

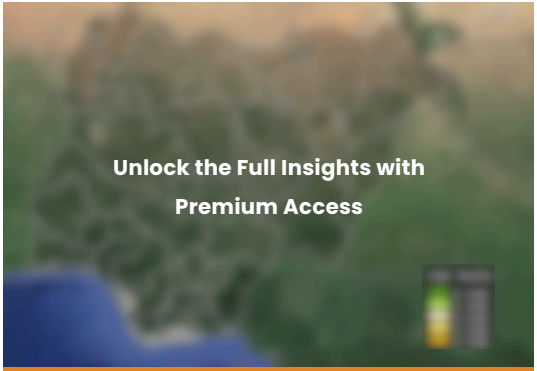
- Season-End Insights: Gain access to the most up-to-date and accurate crop intelligence data.
- Comprehensive Analysis: Explore in-depth insights into all key aspects of maize cultivation.
- Causal Relationships: Understand the underlying factors driving fluctuations in production and acreage.
- Informed Decision-Making: Leverage Cropin's expertise to make strategic decisions and gain a competitive edge.

What You'll Get with Full Access

- Nationwide Coverage: Detailed analysis for all Kenyan states.
- Highest Accuracy: Benefit from Cropin's state-of-the-art technology and methodologies.
- Comprehensive Insights: Explore in-depth information on crop mapping, production trends, harvest windows, crop health, and weather anomalies at the state and district level.
- Granular Analysis: Understand the factors driving fluctuations in yield, acreage, and production at a granular 10x10 m resolution.

Don't Miss Out! Subscribe today and unlock opportunities for growth and success.

Request full access now to revolutionize your agricultural strategy!



Decode uncover the hidden patterns in Kenya's Maize landscape.

Cropin's comprehensive maize report offers unprecedented insights into the complexities of maize cultivation in Kenya. Our advanced analytics leverage multiple datasets, including vegetation indices from satellite imagery to provide detailed information on crop mapping, production trends, harvest windows, crop health, weather anomalies and more.

Cropin®

Founded in 2010, Cropin is the world's most advanced AI Platform for Food and Agriculture. Cropin Cloud, the world's first industry cloud for agriculture, has computed 10% of the world's cultivable lands. Implemented by over 250+ enterprises, Cropin empowers stakeholders to make informed decisions that enhance farming efficiency, productivity, and sustainability. Our teams are spread across India, The United States, Italy, The Netherlands, and Brazil. We have digitized 30 million acres of farmlands and positively impacted over 7 million farmers worldwide. Our crop knowledge graph, spanning 350 crops and 10,000 varieties in 103 countries, powers the Cropin Cloud. We are at the forefront of uniting agribusinesses, development agencies, international organizations, and governments to leverage Agtech systems to transform global food systems and attain climate goals. Cropin is backed by Google, Bill & Melinda Gates Foundation, ABC Impact, and Chiratae Ventures, among other notable investors.

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