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Excellence in  
Agronomy

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agronomic solutions

EiA AgWise:

# A Data Science Solution for Site-Specific Agronomic Recommendations

AgWise is a data-driven agronomic recommendations engine for cassava, maize, rice, potato, and wheat that uses the latest **data science and** modeling techniques and field data to produce customized advice on fertilizer requirements, optimal planting dates and cultivars, and good agronomic practices for farmers.

## AgWise Functions

### Tailored fertilizer advice



- Data aggregation and standardization (legacy field + survey data)
- Model yield response to intervention by environment interaction
- Apply empirical prediction models, machine learning applications and process-based crop models
- Account for locally relevant factors (ag input, market, socio-economics, organic input, etc)
- Optimized to user need (maximum profit, increase target yield, reduce fertilizer quantity, ...)
- Aggregated to user deliver system capacity

### Demand mapping



- Assess target user needs and capabilities
- Gather existing knowledge and data
- Identify knowledge gaps and data requirements
- Decide on tool functionality

### Optimal planting dates and cultivars



- Process based crop models (DSSAT, APSIM, WOFOST, Oryza)
- Satellite image analysis
- Similar domain analysis

### Climate forecast



- Partner with different forecast data sources
- Assess spatial and temporal accuracy
- Include weather uncertainty in the prediction models
- Enable within season advisory adjustment

### Support to advisory platforms



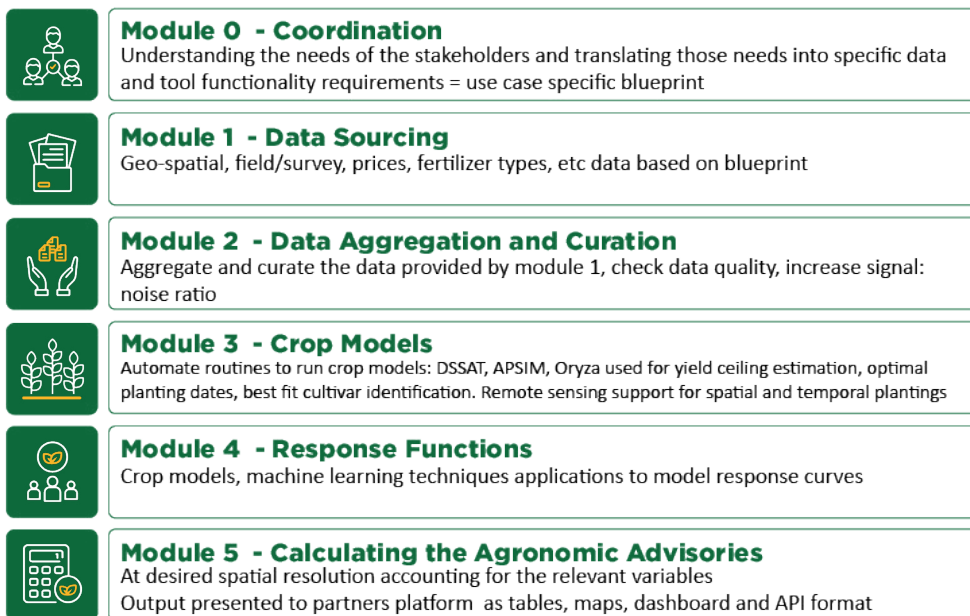
- Support to embed content into partners existing platform
- Access to advisories via API, tables, maps, scripts
- Connect to feedback-loop to re-calibrate and update
- Capacity building and training Materia support

### Good agronomic practices



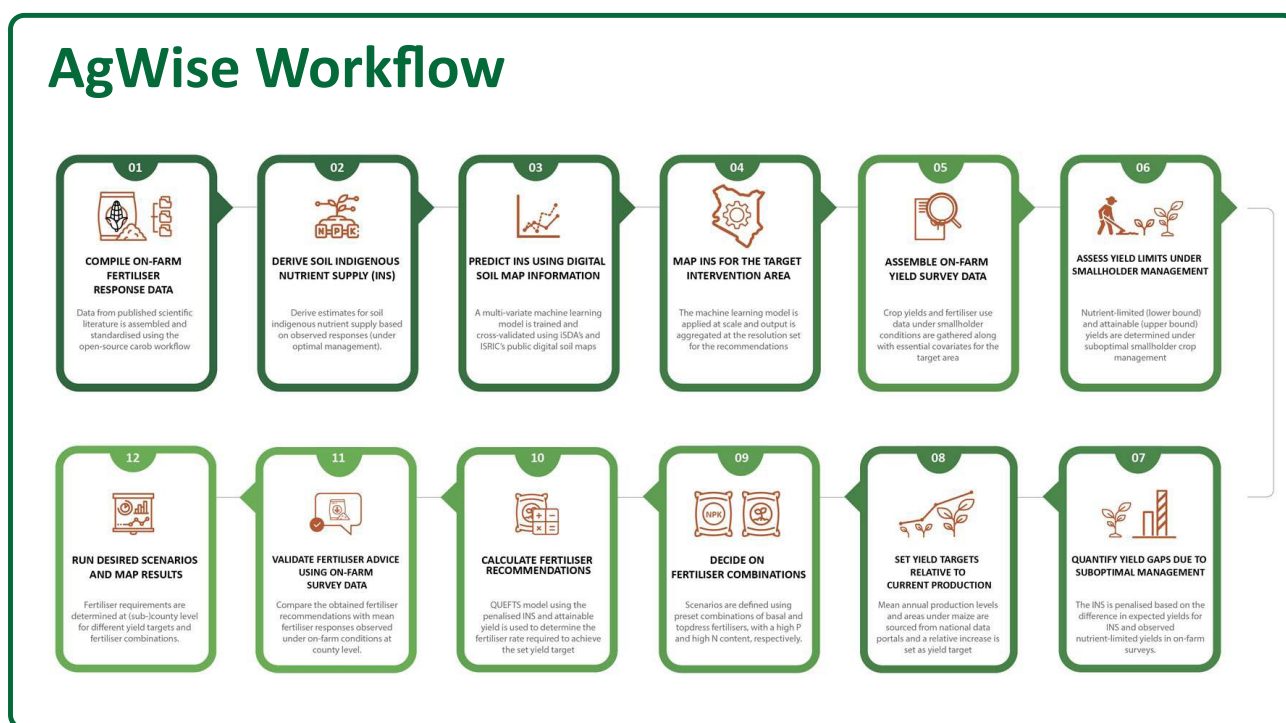
- Soil health and acidity
- Land preparation
- Weed management
- Planting material/seed quality
- Ag input application

AgWise is developed by the Excellence in Agronomy Initiative and its Partners. It includes the following modules:



## What is Unique About AgWise?

- AgWise produces agronomic recommendations in a way that is different from typical solutions:
- It uses large volumes of field trial, market, and climate and soil data to produce the most accurate recommendations possible for any context. These data are FAIR – Findable, Accessible, Interoperable, and Reusable.
- It factors in locally relevant variables to provide farmers with tailored advice optimized for specific agronomic and profit targets.
- It combines the expertise from a multi-disciplinary team of CGIAR and partner data scientists, agronomists, economists, geographers, and software developers.
- It bundles advice on optimal planting times, cultivars, best-suited fertilizer types and quantities, and it does so in the face of predicted weather and seasonal climate conditions.
- It builds on several decades of agronomic research and decision support systems such as [AKILIMO](#), RiceAdvice, amongst others.
- It is designed modularly to promote flexibility and adaptability, while reducing maintenance costs and enabling deployment at scale.
- The AgWise framework is open-source and freely available, and it is co-developed with partners.



## Who is Using AgWise?

Right now, AgWise is being field-tested in Kenya and Rwanda with partners including the Kenya Agriculture and Livestock Research Organization (KALRO), the Government of Kenya, and the Rwanda Agriculture Board (RAB), and is expected to be available to farmers in other countries. In Kenya, it is expected to support the country-wide fertilizer subsidy program, which is targeting just over 2 million farmers in its first phase. In Rwanda, the AgWise team and the RAB are currently working on the testing and deployment of AgWise for maize, rice, and potato crops. These crops play a significant role in providing a substantial portion of Rwandans' dietary intake. Our roll-out plan for 2023 and onwards includes deploying AgWise in at least 12 more countries over the next five years. This roll-out plan will also include extending AgWise to other key crops such as beans and soybeans.

## What are the Benefits from AgWise's Agronomic Recommendations?

The recommendations derived from AgWise can help farmers increase crop productivity by up to 30% over current averages. Especially in sub-Saharan Africa, if realized, these productivity increases would potentially close about a third of the yield gaps in the region. Increases in productivity also generate income benefits, while reducing fertilizer use's environmental impact. Furthermore, AgWise's use of climate predictions in advisory generation means that farmers are also offered climate-adaptive advice.

## What's AgWise's Level of Maturity?

A deployable version of AgWise for several crops is expected by December 2023, supported by experts across CGIAR, through a multidisciplinary team to revolutionize the provision of agronomic advisory.

## What is Next for AgWise?

Apart from our key milestones as shown above, we are,

- Exploring bundling agronomic advice with complementary services (e.g., credit, crop insurance) to reduce risk and maximize farmer returns.
- Developing efficient feedback mechanisms to better understand advisory use and benefits, and user preferences and capabilities.
- Supporting scaling and dissemination partners in rapidly adapting and creating new content, testing emerging techniques such as generative pre-trained language models.

## Where can I get access to AgWise's advisory?

AgWise is deployed as part of a co-construction process. Send us an email to [agwise@cgiar.org](mailto:agwise@cgiar.org), and we'll help you through accessing data and software, to deploy a version of AgWise to suit your needs.

## Contributors

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