Implemented by:

SASI Sustainable Agricultural Supply Chains Initiative

LUNCHBREAK

Federal Ministry for Economic Cooperation and Development

AI powered Geospatial Solutions for Smarter Due Diligence

10 October 2025, 12 – 1 pm

i4Ag

FUND FOR THE PROMOTION
OF INNOVATION IN AGRICULTURE

Digitally Enabled Resilience and Nutrition Policy Innovations (DERPIn)

OCT 2025

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cooperation
DEUTSCHE ZUSAMMENARBEIT

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Context

- Increasing extreme weather events (e.g., droughts, storms, floods, irregular rainfall, and temperature spikes) are disrupting agricultural production, destroying assets and hampering livelihoods.
- Vulnerability of rural communities is exacerbated by severely limited access to user-friendly information based on timely, reliable, and spatially disaggregated data, including future forecasts.
- National systems and mandated institutions need to be prepared for the expected frequency and severity of future climatic and economic shocks and often do not adequately capture gender-specific or intersectional disadvantages.

Project Overview

- Project under Fund for the Promotion of Innovation in Agriculture (i4Ag)
- Countries: Benin, Ghana, Malawi, Senegal, Uganda
- Implementing Partners: Akademiya2063, PAFO
- Innovation Areas
    - Crop type mapping and crop production forecast
    - Nutrient adequacy
    - Multi-dimensional Vulnerability Index
- Duration: 10/22 to 12/25
- Stakeholder groups - Senior government representatives, policy analysts and planners, smallholder farmers, farmer organizations, private sector operators, research and academic institutions.

Country Level Partners

01	02	03	04	05
Benin - INSTITUT NATIONAL DES RECHERCHES AGRICOLES DU BENIN (INRAB)	Malawi - Malawi University of Science & Technology (MUST)	Uganda - Makerere University	Senegal - Institut Sénégalais de Recherches Agricoles, Senegal	Ghana - University for Development Studies

Potential Applications

❖ Direct Use Cases

- Insurance industry
- Banking industry
- Supply chain industry
- Policy & Decision Making

❖ Broader Technological Use Cases

- Forest mapping
- Land consolidation
- Green house gas estimation
- Water resource management

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AI powered Geospatial Solutions for Smarter Due Diligence

Racine Ly, Ph.D.
Director, Geospatial and Artificial Intelligence

October 10, 2025
SASI Lunch break – Online.

1. Rationale

The Need

- African population to reach between 2.5 – 2.6 billions by 2050; A need to increase production by +70%.
- Increasing production is not sufficient, it must be nutritious and environmentally sustainable.

The Challenges

- Climate change impacts, land and water scarcity, market inefficiencies; constraining productivity and resilience.
- Lack of M&E systems, anticipatory approaches, and effective intervention planning.

The Opportunity

- Use of Geospatial and Artificial Intelligence Technologies to bring the science of **Where** to support our understanding (**Why**) and plan for **What** to do and **When.**

1. Guiding Questions

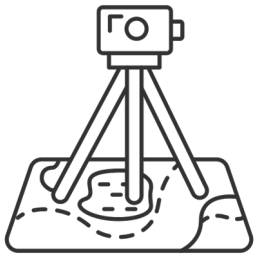
- What type of crops are growing where?
- What are their level of production?
- What are the crops growing conditions and stages?
- Where else those crops could grow?
- What are the crops' Greenhouse gas footprint?

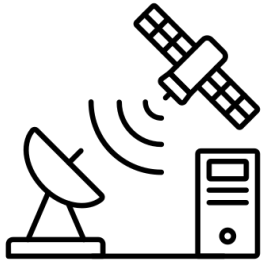
Pilot work in 5 African countries: Senegal, Benin, Ghana, Malawi, and Uganda.

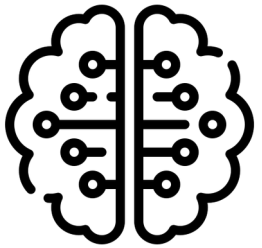
Remote sensing data with a minimum of 10 meters spatial resolution.

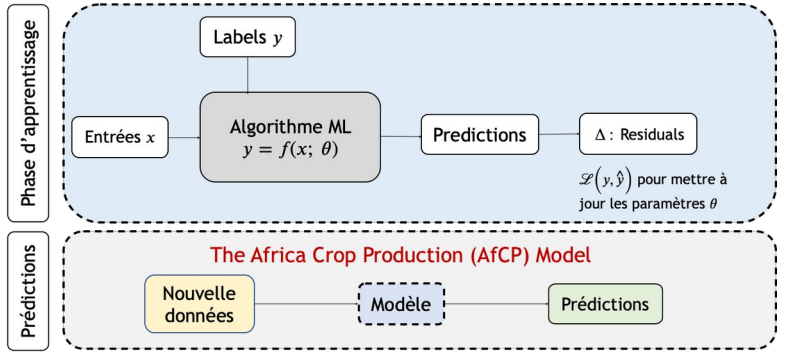
Based on ground truth data with AI as a predictive framework.

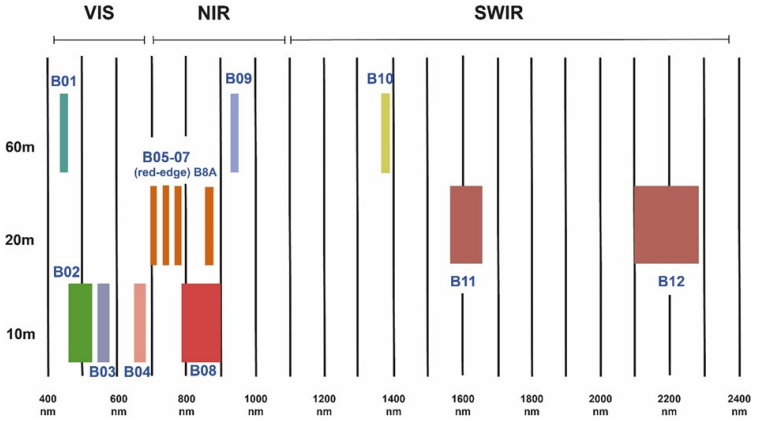
2. Methodology / Approach











Ground data collection with country partners equipped with tablets and collecting not point data but field data. Collected data are appended with geotagged pictures.

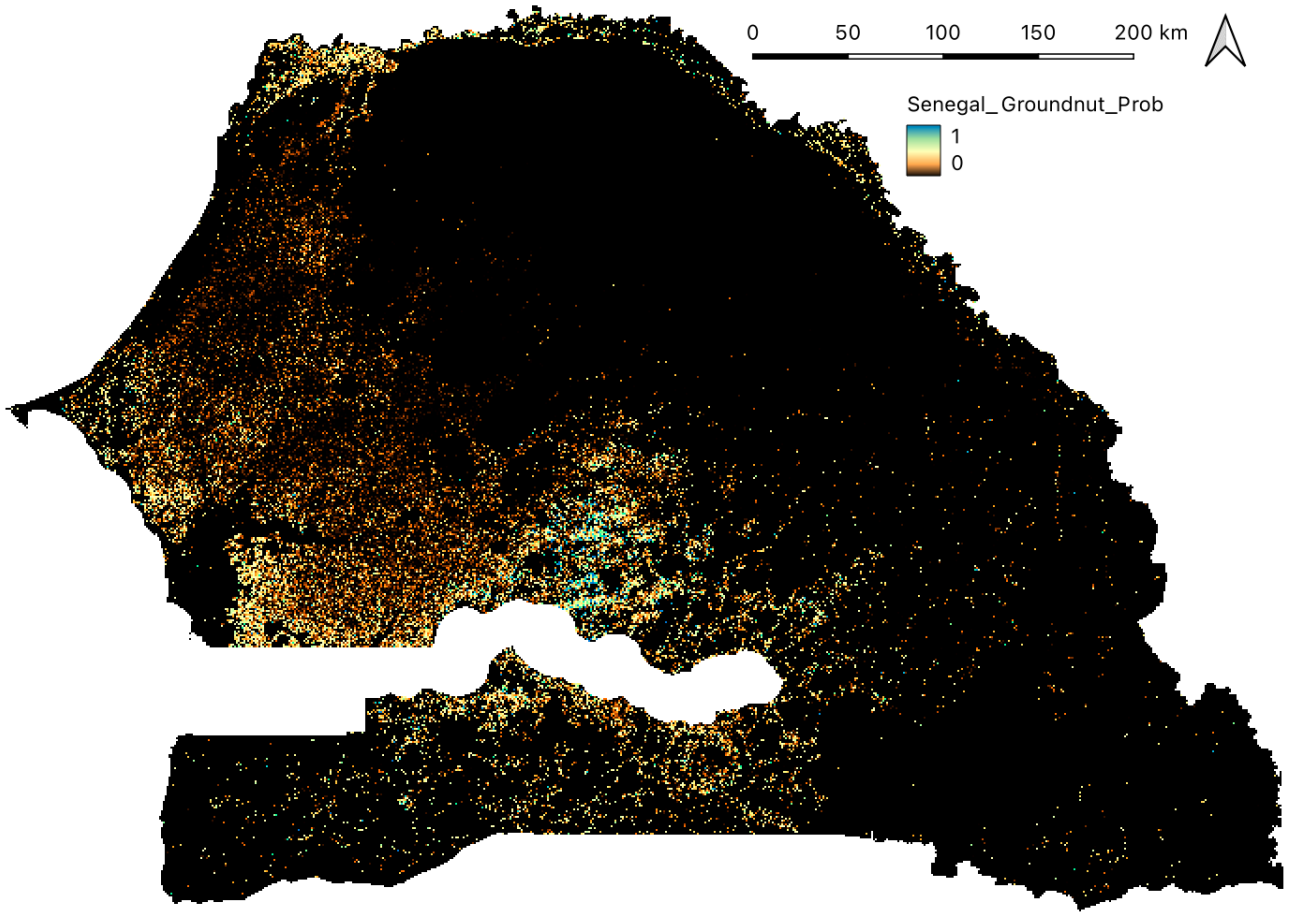
Using Sentinel 2 imagery spectral bands and several derived indices to add explainability to the dataset and to make sure with disentangle crop signature one to another.

Satellite data are collected at the date close to the ground truth data collection.

Validation for GeoAI products are performed with out of the back approach and comparison between ground truth datasets and forecasts (values or classes).

3. GeoAI Products

Crop Mapping



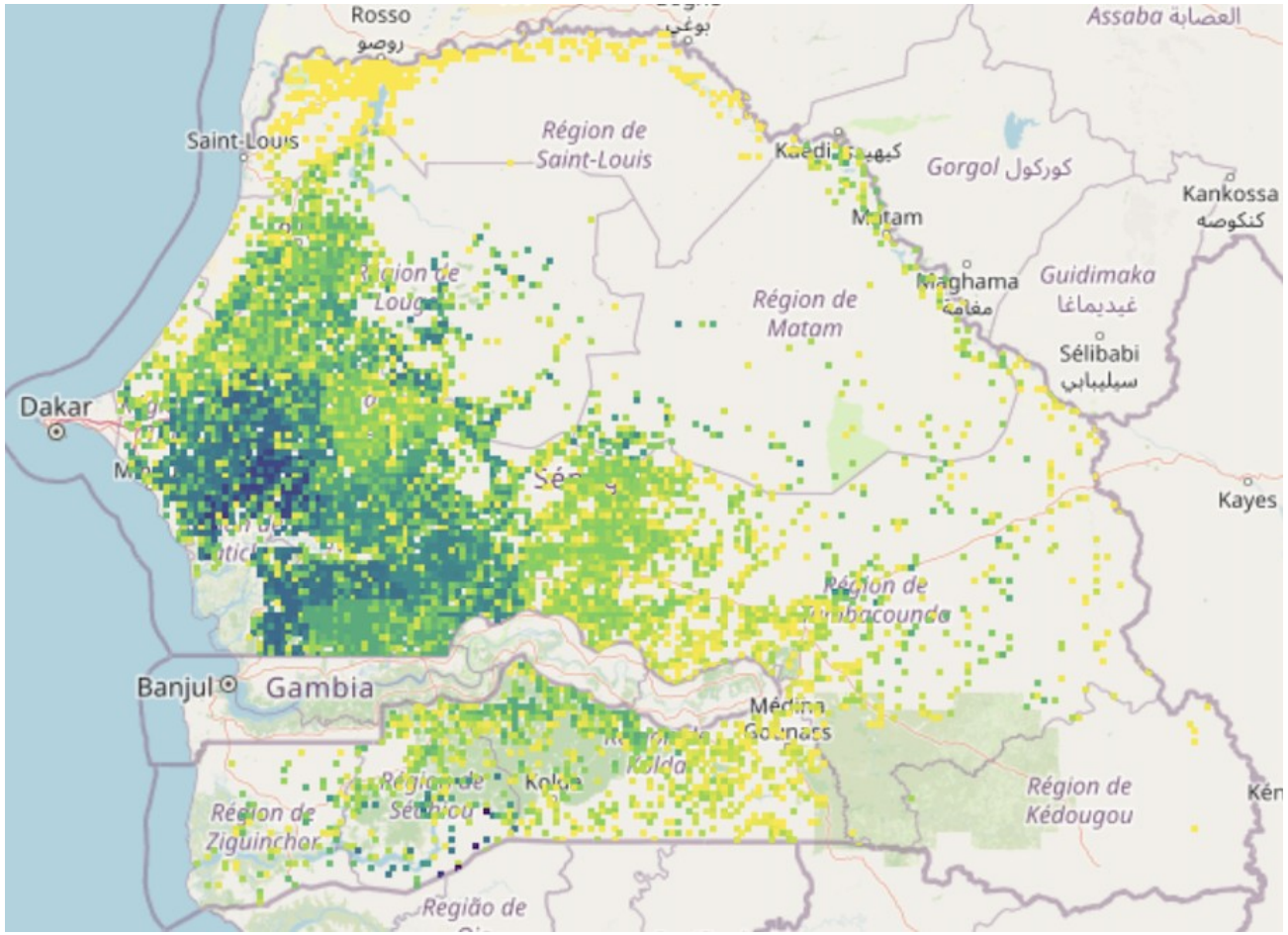
- Near real time probabilistic crop mapping. Allowing flexibility in identifying monocropping versus. mixed cropping practices.
- Pixel size at 10-by-10 meters. Every pixel is a 100 square meters on the ground suitable for African Agricultural landscape.

Smarter Due Diligence

- Tracking production areas at a high resolution (production origin).
- Identifying crop extension at a cost of deforestation. (Environmentally sustainable, EUDR).
- Identifying new production hotspots (alternative production availability).

3. GeoAI Products

Food Crop Production Forecasts



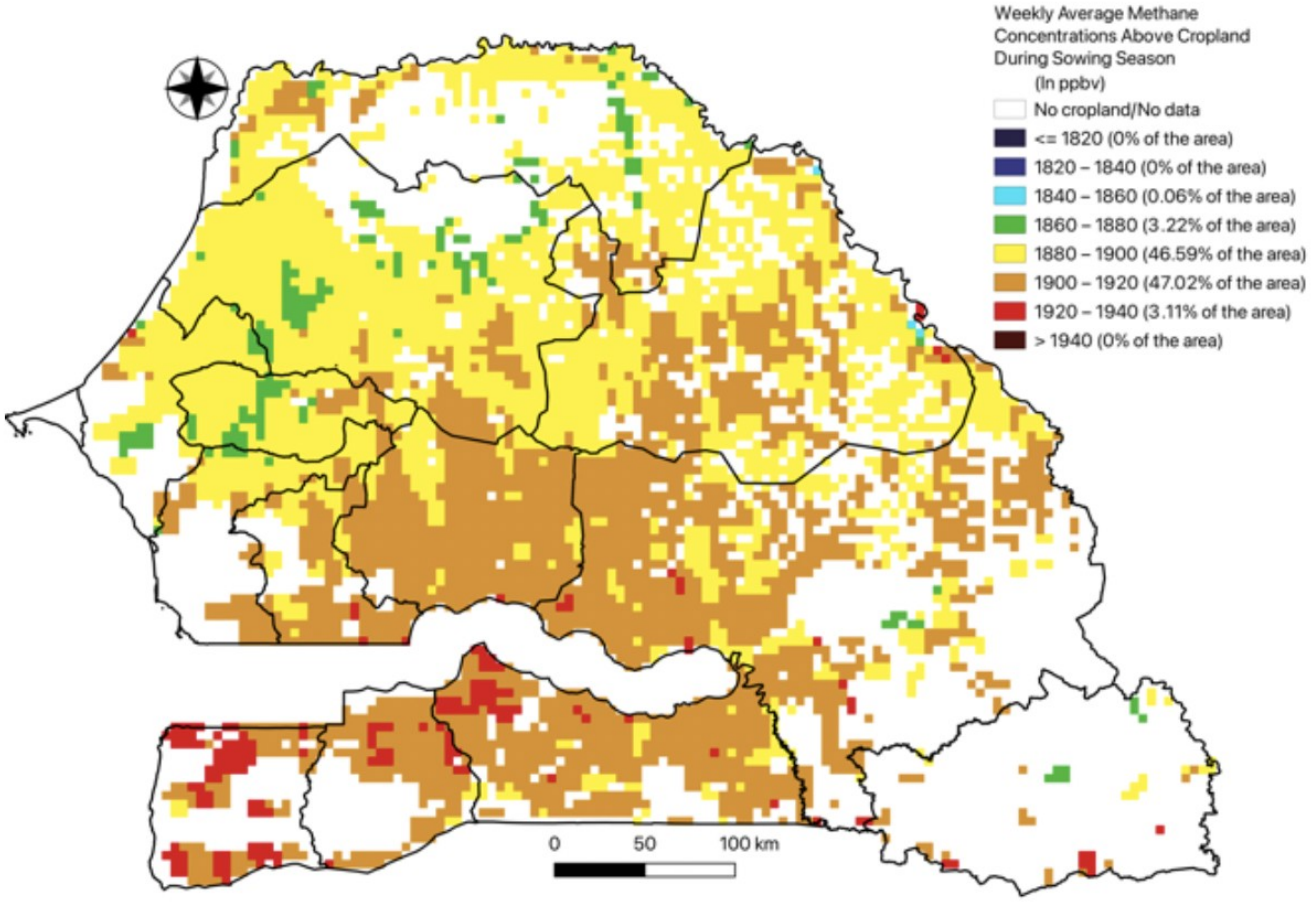
- Production forecast before the harvesting period at a resolution of 10 by 10 meters.
- The production model has an average accuracy of 94% based on a continental assessment. Some countries have less than 94% accuracy (one model per country).

Smarter Due Diligence

- Early production level estimates in the country.
- Early warning in terms of production increase or decrease.
- Identifying new production hotspots (alternative production availability).

3. GeoAI Products

Methane tracking



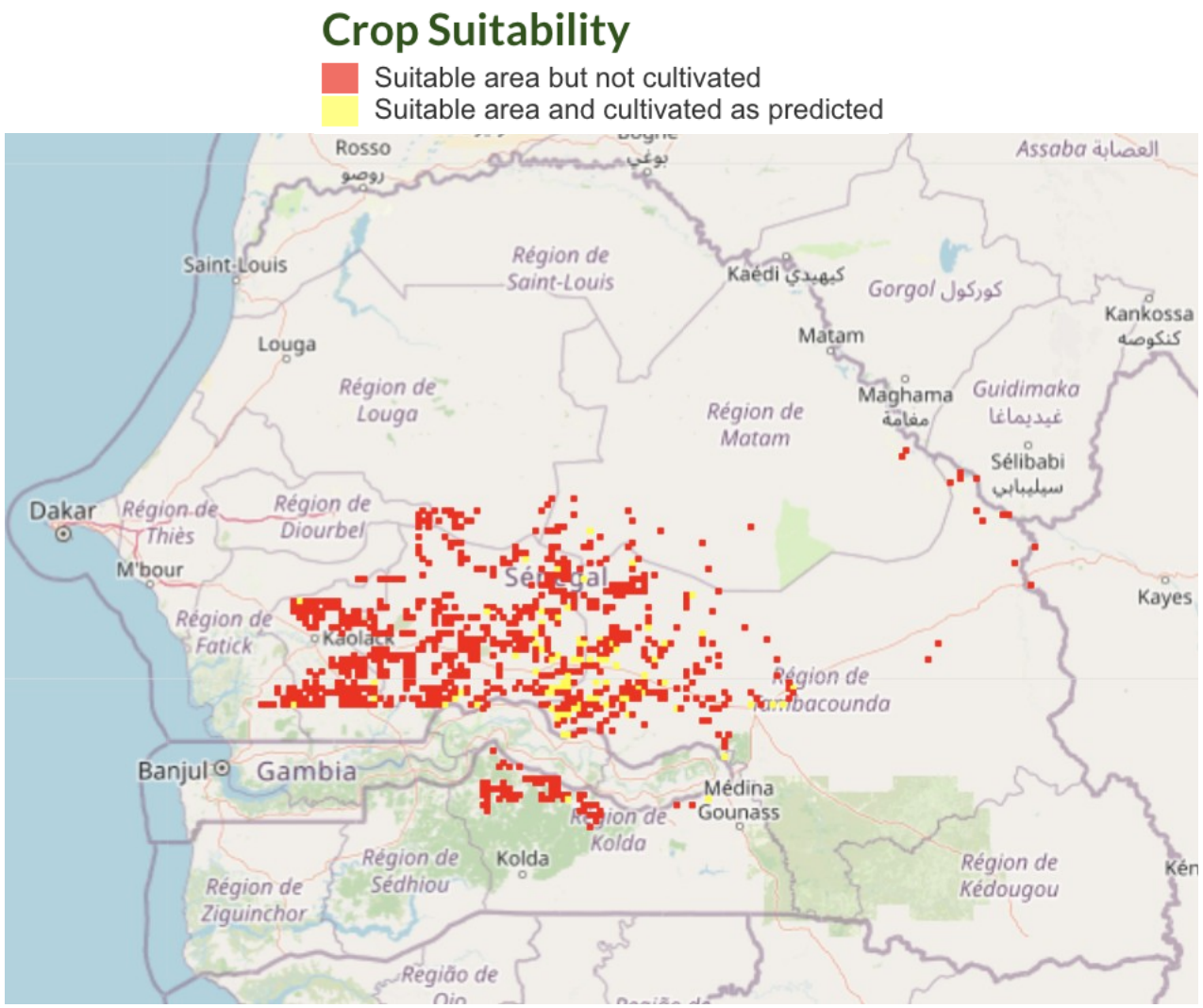
- Tracking methane concentration above active croplands and elsewhere (weekly data).
- Tracking methane emission against crop growing conditions.

Smarter Due Diligence

- Identify potential areas for fertilizers' overuse.
- Identify potential areas of certain farming practices (tillage).
- Identify potential areas of soil degradation and farming intensification.

3. GeoAI Products

Crop suitability map



- Identifying where else in the country a specific crop could grow with suitable geo-biophysical parameters.

Smarter Due Diligence

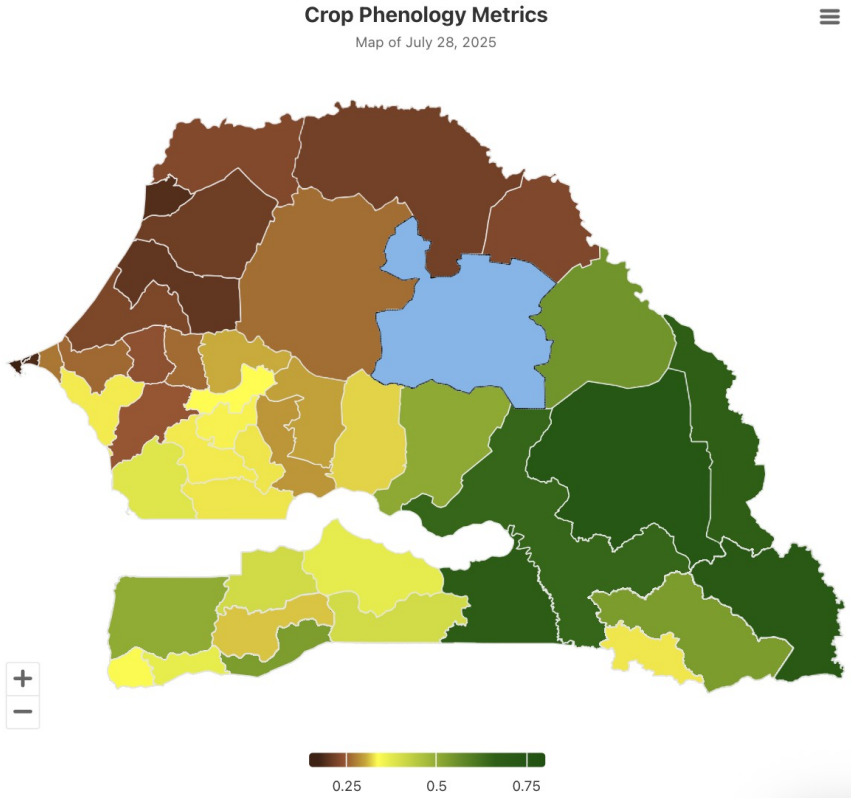
The crop suitability map can also be used to identify appropriate growing areas for specific crops, avoid high-risk zones such as protected areas, fragile ecosystems, or areas prone to overexploitation, and provide evidence compliance with environmental standards and land-use regulations.

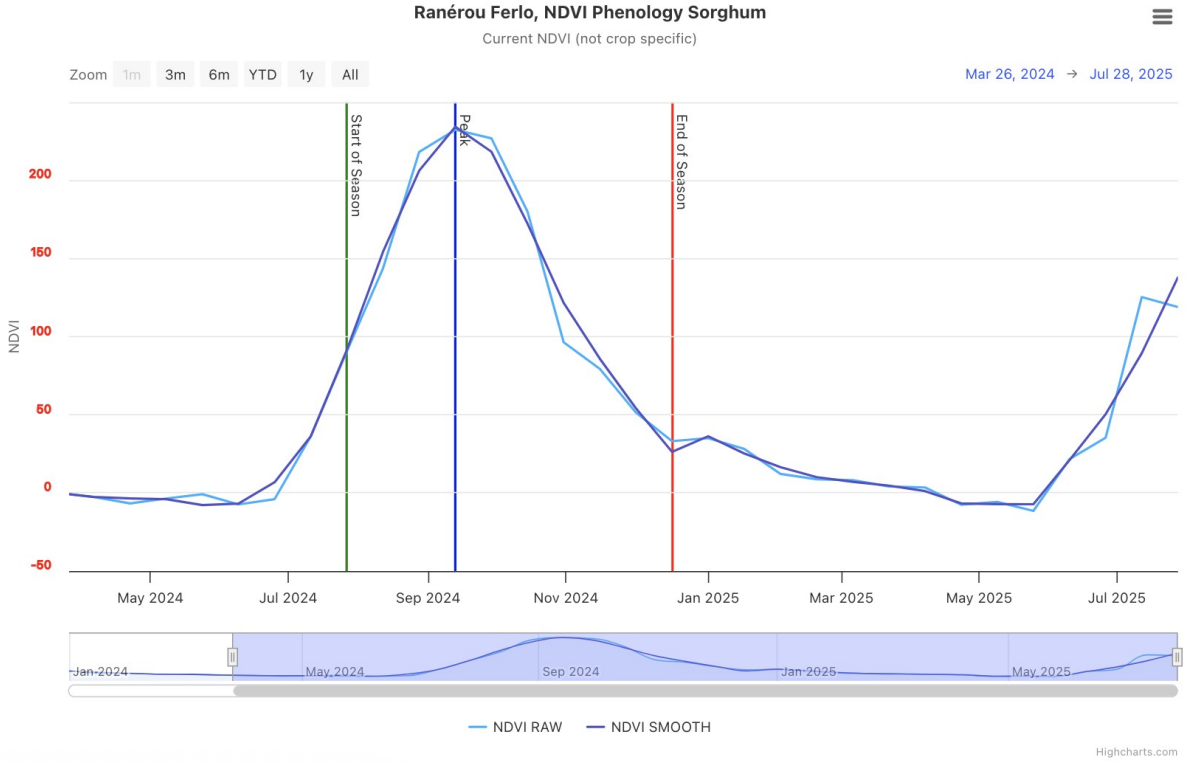
3. GeoAI Products

Crop growing stages

Support companies verify supplier claims about yields and production practices and detect unsustainable intensification (double cropping where it should not be happening for example, suggesting, to some extent overuse of water or land).

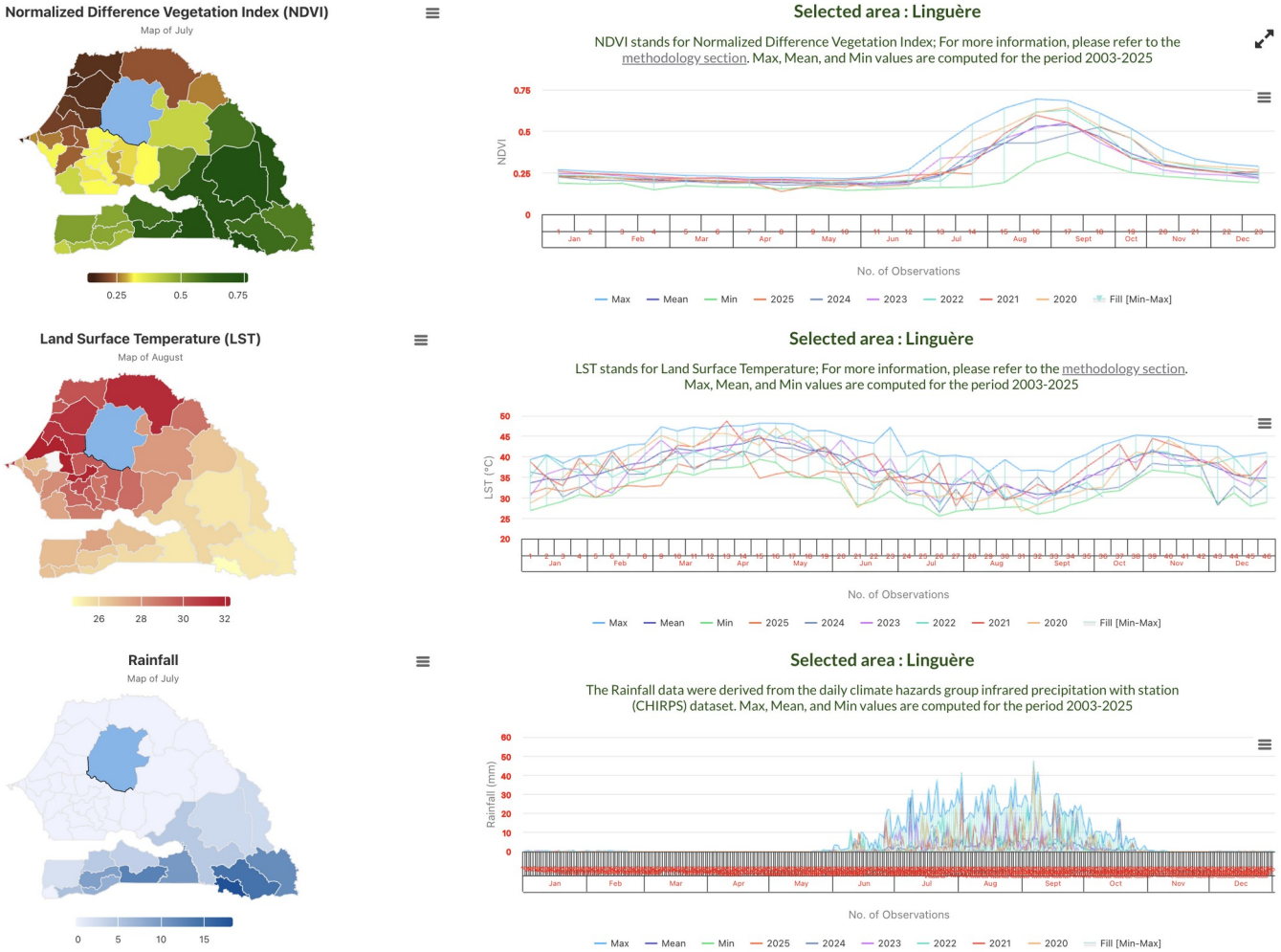
It can also help identify regions at risk of crop failure. It can also be overlaid with a shipment record to confirm whether claims harvest times match observed cycles.





3. GeoAI Products

Crop growing conditions



Smarter Due Diligence

Tracking growing conditions from a climate perspective (climate profile) to bring explainability to the levels of production.

Overlaying soil information to measure level of nutrition in agricultural production.

Overlay climate, port and airport map, road network, conflict data to assess risk of safe and integral transport of products.

Thank You

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Panafrican farmers' organization
Organisation panafricaine des agriculteurs
المنظمة الإفريقية للفلاحين

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SASI Lunchbreak
Theme "Private sector & Farmer linkages through PAFO"

October 10,2025

Presented by
Mr. Aimable TWAGIRAYEZU
Programs Officer-PAFO

Presentation

1. PAFO introduction
3. Areas of cooperation for Private sector

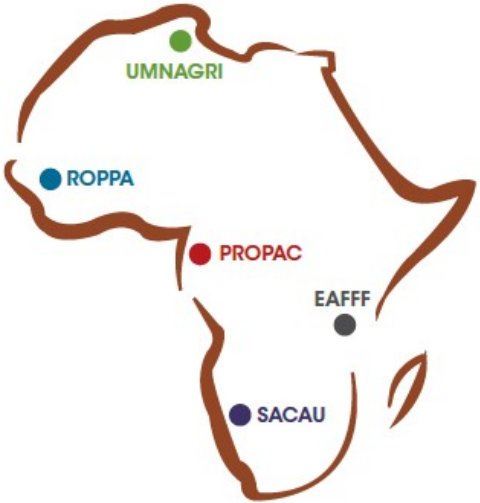
Outline

2. Key PAFO Achievements- Private sector
4. Conclusion

1. PAFO Introduction

- The Pan-African Farmers' Organization (PAFO) is a continental organization with a membership base composed of Regional Farmer's Networks.
- Its Constitutive Assembly was held under the sponsorship of the African Union in Lilongwe, Malawi, from October 27 to 29, 2010. PAFO is recognized as the representative body of African farmers' organizations at the highest continental level.
- PAFO is the voice of more than 80 million African farmers integrated into nearly 73 national organizations, unions, federations, cooperatives, associations, etc., present in more than 48 countries on the continent, and united in five regional networks operating at the heart of African agriculture.

1. PAFO Introduction (Con't)



Eastern African Farmers Federation (EAFF)

Regional Platform of Farmers' Organizations of Central Africa (PROPAC)

Network of farmers 'and producers' organizations in West Africa (ROPPA)

Southern African Confederation of Agricultural Unions (SACAU)

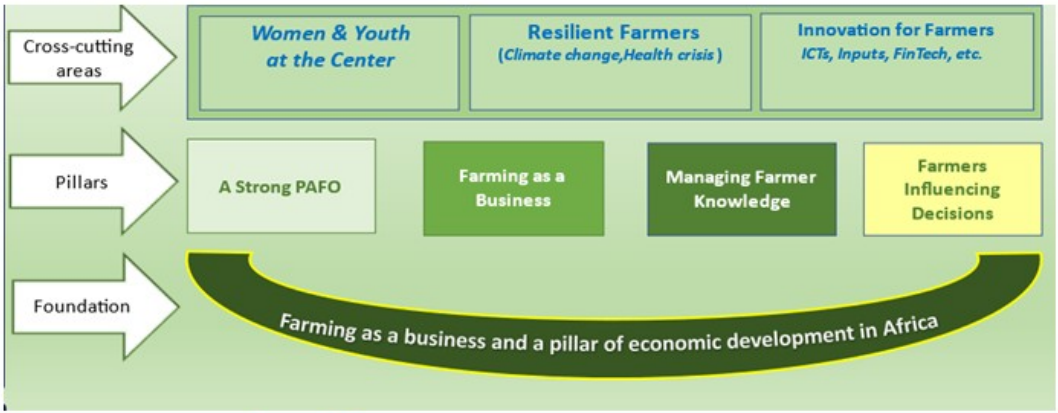
Maghrebian and North African Union of Farmers (UMNAGRI)

1. PAFO Introduction (Con't)

PAFO is registered in Rwanda as an international non-governmental organization and is certified by the Rwanda Governance Board to operate legally and establish its headquarters in Rwanda under the number 001/RGB/19.

We are developing new strategic plan 2026-2030 which will be adopted by GA/December 2025.

PAFO Strategy (2021-2025)



2. Key PAFO Achievements-Private sector

No.	Program	Key results
1	Farmer Organizations for Africa, Caribbean and Pacific (FO4ACP) EU/IFAD 2019-2025	❑ Between May and July 2025, organized 5 regional and 1 continental Post Malabo consultations ❑ Developed and submitted the Independent Memorandum advocating for private sector agenda: Investment, trade and PPPs ❑ Participated in various global and continental events: Policy and advocacy
2	Innovation series EU/COLEAD	❑ Organized so far 24 innovation series since 2022: Innovative Entrepreneurs showcase their projects and activities
3	Mentorship program FAO	❑ Selected 50 Young agripreneurs across Africa and mentors to train them

2. Key PAFO Achievements-Private sector

No.	Program	Key results
4	Exchange platform AHA	❑ Between 2023 to date, organized about 20 sessions about various topics including Investment, role of private sector at national, regional and continental levels, trade, role of private sector.... ❑ Organized various webinars to advocate areas in line with private sector
5	DERPin GIZ AKADEMIYA2063	❑ Mobilized farmers for learning events, trainings and workshops to discuss the use of Geospatial tools with stakeholders including private sector ❑ Participated in research by collaborating with Research Institutions
6	Conference AfDB	❑ March 15, 2025: Organized with AfDB, a high level continental conference on climate financing

3. Areas of cooperation for Private sector

No.	Level	Areas
1	Continental 14 seats: Continental and global	Advocacy with AUC, NEPAD…: CAADP 3: Kampala as we sit for Biennial Review Committee Research Knowledge sharing/Management corporate due diligence / compliance with EU regulations (like e.g., helping to communicate with or train farmers) Specific partnerships…
2	Regional	Advocacy at Regional level with RECs Regional Agricultural Investment Plans (RAIPs) Support Regional Farmer Organizations (RFOs) projects Specific partnerships…
3	National/Local	Support Advocacy Agenda at National level especially domestication of Kampala Declaration: 10% investment Support the National Agricultural Investment Plans (NAIPs) Avail and use good farming equipments, machinery, inputs… Specific partnerships…

4. Conclusion


thank you
gracias
merci
danke
謝謝
ngiyabonga
teşekkür ederim
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Thank you for joining !

See you at our next Lunchbreak in November.

The topic will be shared soon.