Hackathon Challenge Track 1: Field Delineation Modelling for Climate-Smart Agriculture

1. Background

Farmers need clear maps of their fields to make better decisions about planting, irrigation, and harvesting. This process — field delineation — involves identifying and drawing the exact boundaries of farmland.

Why this matters:
- Better resource management (water, seeds, fertilizer).
- Improved crop monitoring.
- More effective climate adaptation strategies.

Climate-Smart Agriculture uses technology to improve farming in sustainable ways. With accurate field maps, we can help farmers increase yields, reduce waste, and adapt to changing climates.

Data Sources:

AGWAA API Documentation: https://www.aagwa.org/docs/derpin-api.html

AGWAA API Documentation specific to the DERPIn countries.
https://www.aagwa.org/Senegal/data?p=Senegal
https://www.aagwa.org/Ghana/data?p=Ghana
https://www.aagwa.org/Benin/data?p=Benin
https://www.aagwa.org/Uganda/data?p=Uganda
https://www.aagwa.org/Malawi/data?p=Malawi

Country Specific Portals:

1. https://www.aagwa.org/Benin
2. https://www.aagwa.org/Senegal
3. https://www.aagwa.org/Ghana
4. https://www.aagwa.org/Uganda
5. https://www.aagwa.org/Malawi

Note: These sources provide satellite and geospatial data in `.tif` (GeoTIFF) format, which can be processed using GIS tools.

2. Main Objective

1. Build a field delineation model that can detect and outline field boundaries from `.tif` geospatial data.
2. Integrate your model into a mobile app, interactive dashboard, or another user-friendly tool.

3. The Challenge

- Connect to the AGWAA API or country portal and download `.tif` (GeoTIFF) geospatial data.
- Process the `.tif` data using image analysis, AI, or GIS methods to create a model that detects field boundaries.
- Integrate that model into:
  - A mobile application (farmers can use it in the field), or
  - An interactive dashboard (researchers, planners, or policymakers can use it online).

4. Deliverables

1. Field Delineation Model
   - Input: `.tif` geospatial data from the AGWAA API or portal.
   - Output: Accurate maps showing field boundaries.

2. Prototype Application
   - Mobile app, dashboard, or another interface.
   - Displays the model's results on a map.
   - Allows users to zoom, explore, and interact with field boundaries.

3. Technical Documentation(one pager)
   - How the model works (methods, algorithms).
   - How `.tif` files were processed.
   - How the AGWAA API or portal was used.
   - Instructions for running the project.

4. Demo or screen recording
   - 5–10 minute demo or screen recording showing how your solution works

5. Judging Criteria

Criteria	Description
Model Accuracy	How well your model performs - it can detects and outlines field boundaries from .tif data - evaluation metrics to use dependent on the modelling solution you build.

Integration	How smoothly is the model embedded in your app/dashboard?
Usability	Is it simple and intuitive for your target users (farmers, planners, etc.)?
Innovation	Does it use creative approaches or unique features?
Impact	How much potential does it have to benefit farming communities?

6. Notes for Participants

What is `.tif` (GeoTIFF) data?
It's a type of file that stores satellite imagery and geographical information. It can be opened and processed using GIS tools like QGIS, ArcGIS, or programming libraries like `rasterio` or `geopandas` in Python.

Getting Started:
1. Read the AGWAA API documentation.
2. Learn how to fetch `.tif` data for your region of interest.
3. Use a GIS or programming toolkit to view and process the `.tif` image.
4. Train your model to detect field shapes.
5. Display results in your app/dashboard.

7. Final Output Expectation

By the end of the challenge, each team should have:
- A working model that processes `.tif` data to detect fields.
- An app/dashboard that uses this model to show field boundaries interactively.
- Documentation and a live demo ready for judging.