AfriCultuReS

ENHANCING FOOD SECURITY IN AFRICAN AGRICULTURAL SYSTEMS WITH THE SUPPORT OF REMOTE SENSING

Juan Suarez – AfriCultuReS Project Coordinator
AfricaGIS 2017 – Addis Ababa - November 22nd 2017

This project has received funding from the European Union's Horizon 2020 Research and Innovation Framework Programme under grant agreement No 774652

SETTING

THE SCENE

MAGNITUDE OF THE PROBLEM

- The number of **undernourished people in 2016** was around **795 million**
- **224 million** individuals, about **38% of the population above 15** years in **sub-Saharan Africa,** suffered from severe food insecurity in 2016
- In other words, **26% of the world's population threatened by food** insecurity lives in **sub-Saharan Africa ≅ 3% of the current World Population**

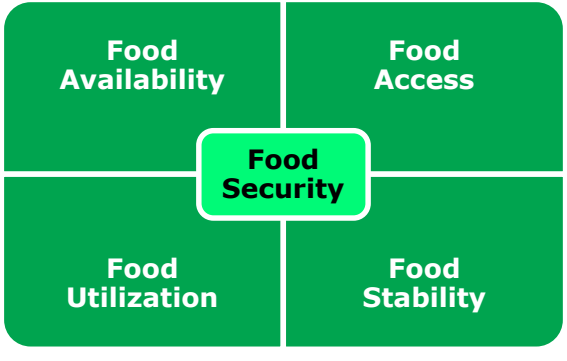
FAO estimations, Nov-2016

This project has received funding from the European Union's Horizon 2020 Research and Innovation Framework Programme under grant agreement No 774652

WHAT IS IT?

Food security exists when all people, at all times, have physical and economic access to sufficient safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life

FAO, 1996 World Food Summit



- **Physical availability** of food, related to the production;
- **Economic** and **physical access** to food;
- Food **utilization by individuals**, determines the nutritional condition of the people;
- **Stability** of the three precedent factors over time.

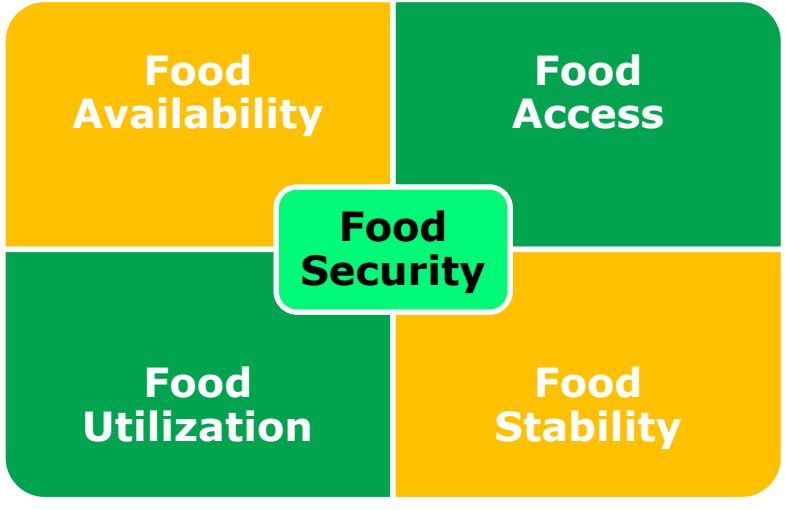
Food security is **achieved when the four components** are convergent in a **given area along time**

This project has received funding from the European Union's Horizon 2020 Research and Innovation Framework Programme under grant agreement No 774652

THE ROLE OF GEOSPATIAL SCIENCE

Food security is **achieved when the four components** are convergent in a **given area along time**

Monitoring
Early Warning
Estimations
Risk Assessment
…



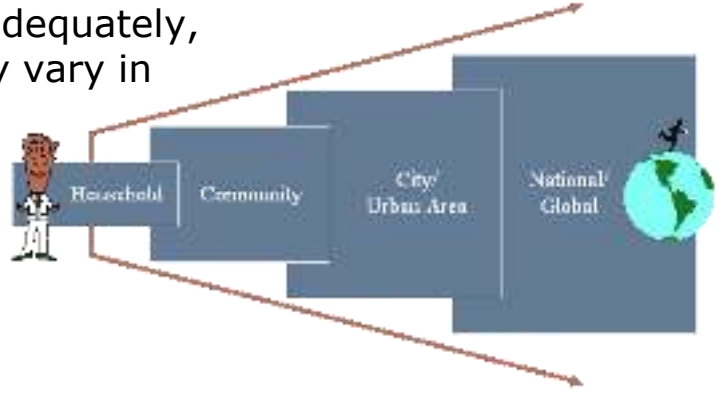
Time Series
Projections
Timelines
Repeat
…

Food production has **unique characteristics** that differ from other forms of production
Food production is affected by random phenomena characterized by a **high degree of spatial and temporal variability**

This project has received funding from the European Union's Horizon 2020 Research and Innovation Framework Programme under grant agreement No 774652

THE ROLE OF GEOSPATIAL SCIENCE

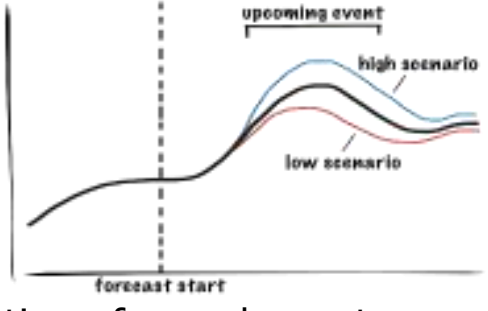
To cope with the **complexity of terrestrial systems** adequately, a wide variety of data must be recorded. Such data may vary in



[1] Spatial scale, ranging from in-situ collected point information to satellite imagery providing spatially continuous information

and

[2] Temporal scale, from past observations to future scenarios analysis and forecasts.



Therefore, **tackling food security** requires a

holistic approach based in the collaborative integration of complementary **earth and atmosphere sciences** to accurately map and forecast food production.

This project has received funding from the European Union's Horizon 2020 Research and Innovation Framework Programme under grant agreement No 774652

THE ROLE OF GEOSPATIAL TECHNOLOGY

Geospatial science can provide **accurate information & data** related to food production:

- is that area dedicated to and appropriate for food production?,
- how long is that area been used for food production?,
- when is the right time for planting and for what crop?,
- when was planted?,
- which crop was planted?,
- when was the crop harvested?,
- which is the potential yield in that area?,
- what is the physiological status of the culture?,
- how does it differ from the normal behavior?, how much does it differ?,
- has the crop been affected by an adverse phenomenon?, how severely?,
- what is the likelihood of occurrence of the phenomenon in a given area?, how severe can the effects be?

etc, etc… ALMOST A NEVERENDING LIST

This project has received funding from the European Union's Horizon 2020 Research and Innovation Framework Programme under grant agreement No 774652

THE ROLE OF GEOSPATIAL TECHNOLOGY

Geospatial science can provide **accurate information & data** related to food production:

- is that area
- how long is
- when is the
- when was p
- which crop
- when was t
- which is th
- what is the
- how does it
- has the crop been affected by an adverse phenomenon?, how severely?,
- what is the likelihood of occurrence of the phenomenon in a given area?, how severe can the effects be?

etc, etc… ALMOST A NEVERENDING LIST

This project has received funding from the European Union's Horizon 2020 Research and Innovation Framework Programme under grant agreement No 774652

THE ROLE OF GEOSPATIAL TECHNOLOGY

Having **accurate information is not enough** to deal with decision making

Geospatial decision making relies on the **seamless and joint exploitation** of unstructured georeferenced information that

- have different degrees of accuracy and consistency,
- is acquired through a number of disparate data collection methods and data formats

Again geospatial technology comes to the rescue…

PixelWoman and *VectorMan* have joined their super-powers to create…

MUST HAVE

…The GEO-ENABLED Decision Support System

This project has received funding from the European Union's Horizon 2020 Research and Innovation Framework Programme under grant agreement No 774652

THE ROLE OF GEOSPATIAL TECHNOLOGY

MUST HAVE

The GEO-ENABLED Decision Support System

- Designed to solve unstructured or semi-structured questions
- User friendly with a powerful interface
- User understandable language
- Flexible to combine data and predictive models
- Capable to handle different models to allow evaluate alternatives, assess the results and then choose
- Adaptable, portable and scalable
- Standard based, interoperable

This project has received funding from the European Union's Horizon 2020 Research and Innovation Framework Programme under grant agreement No 774652

THE ROLE OF GEOSPATIAL TECHNOLOGY

The GEO-ENABLED Decision Support System

CAST, IN ORDER OF APPERANCE

- Users Requirements
- Analysis of food production systems in Africa
- Risk Assessment
- Data Science and Data Fusion
- Earth Observation
- In-situ data and crowdsensing
- Crop modelling
- Weather Forecast
- Climate Projections

This project has received funding from the European Union's Horizon 2020 Research and Innovation Framework Programme under grant agreement No 774652

AfriCultuReS

THE PROJECT

KEY FIGURES

H2020 - EO services for the monitoring of agricultural production in Africa

17 Partners | 50% African + 50% European | Industry & Academia | Multidisciplinary Team

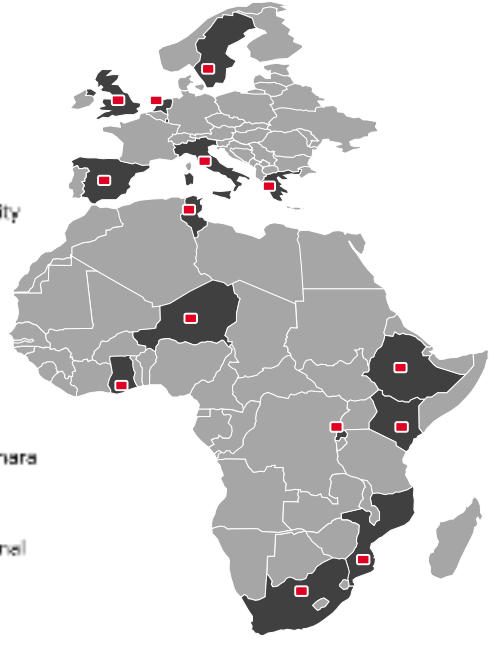
EU H2020
SFS-43-2017

Duration
48 months

Budget
8.5M€

Project period
Nov. 1, 2017 to
Oct. 31, 2021

- GMV (lead, ES)
- Aristotle University of Thessaloniki (GR)
- DRAXIS (GR)
- HCP International (NL)
- Sapienza University of Rome (IT)
- Swedish Meteorological and Hydrological Institute (SE)
- University of Cantabria (ES)
- University of Leeds (UK)
- University of Sheffield (UK)
- Centre Régional AGRHYMET (NE)
- CGIS – University of Rwanda (RW)
- CERSGIS – University of Ghana (GH)
- GeoSAS (ET)
- LocateIT (KE)
- Observatoire du Sahara et du Sahel (TN)
- South African National Space agency (ZA)
- Eduardo Mondlane University (MZ)



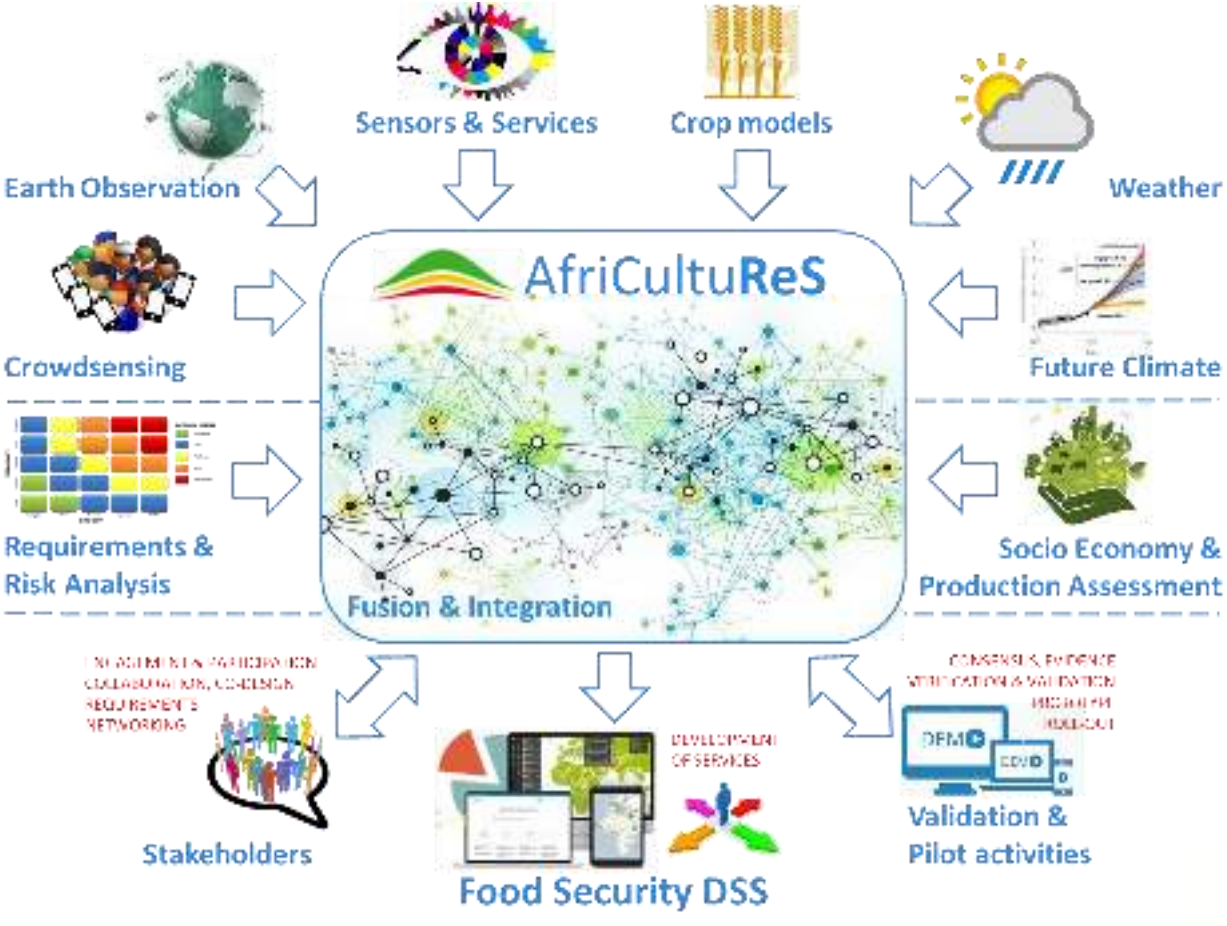
This project has received funding from the European Union's Horizon 2020 Research and Innovation Framework Programme under grant agreement No 774652

OBJECTIVES

1. To **improve** crop and grassland **monitoring and forecasting** methods in Africa
2. To **diminish** the current subjectivity and error in crop area and yield estimates
3. To **extend** the EU knowledge on EO based services for AG monitoring to Africa
4. To turn **operational** new crop monitoring and forecasting methods in Africa
5. To deliver a **platform** to assess and analyze the production of food
6. To predict **upcoming threats** due to CC and propose sustainable adaptation
7. To deliver information and best practices in an **user friendly** way
8. To **build capacity** and leverage **awareness raising** among decision makers

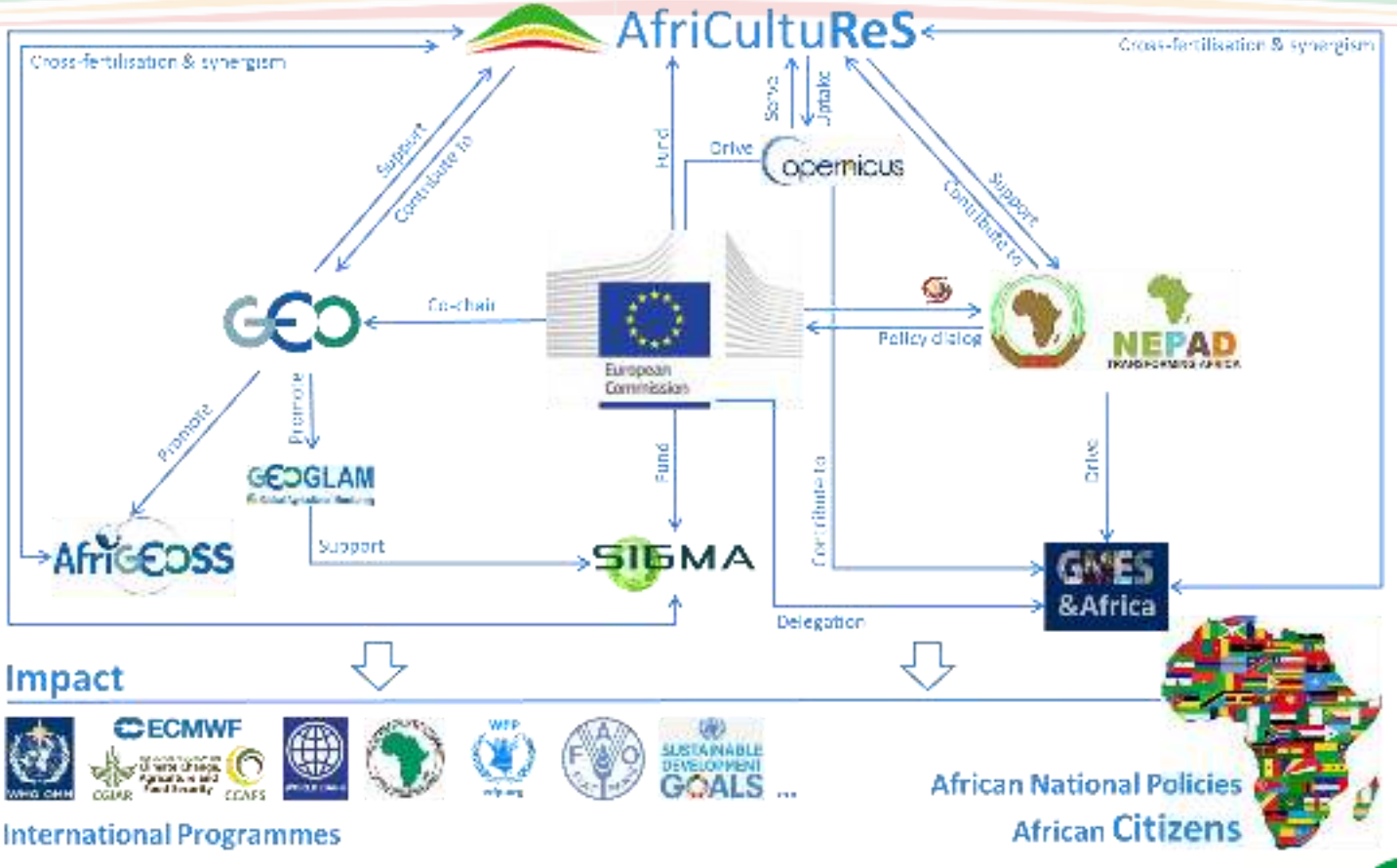
This project has received funding from the European Union's Horizon 2020 Research and Innovation Framework Programme under grant agreement No 774652

OVERALL CONCEPT



This project has received funding from the European Union's Horizon 2020 Research and Innovation Framework Programme under grant agreement No 774652

BCKGROUND CONTEXT



This project has received funding from the European Union's Horizon 2020 Research and Innovation Framework Programme under grant agreement No 774652

SUPPORTED BY…

European Commission | Horizon 2020 European Union funding for Research & Innovation

African Union

Thank you!

GEO GROUP ON EARTH OBSERVATIONS

This project has received funding from the European Union's Horizon 2020 Research and Innovation Framework Programme under grant agreement No 774652

COLLABORATION AND FEDERATION

Definition of COLLABORATE

collaborated; collaborating

intransitive verb

1 : to work jointly with others or together especially in an intellectual endeavor • An international team of scientists *collaborated* on the study.

Definition of FEDERATION

1 : an encompassing political or societal entity formed by uniting smaller or more localized entities: such as
a : a federal government
b : a union of organizations

2 : the act of creating or becoming a federation; *especially* : the forming of a federal union

This project has received funding from the European Union's Horizon 2020 Research and Innovation Framework Programme under grant agreement No 774652

COLLABORATION AND FEDERATION

This project has received funding from the European Union's Horizon 2020 Research and Innovation Framework Programme under grant agreement No 774652

COLLABORATION AND FEDERATION

Requirements are **almost infinite** while **resources are finite.**

Need to **coordinate efforts**, **share** and integrate multi-source, multi-agency, multi-purpose data and services to **cope with Global matters** such as Food Security

You know… **raindrops united forming rivers reach the sea**

This project has received funding from the European Union's Horizon 2020 Research and Innovation Framework Programme under grant agreement No 774652

CONCERNS…

SCIENCE **GEOSPATIAL TECHNOLOGY** **RESEARCH** **INVESTIGATION**

CROSS-FERTILIZATION

Nice frame

CAPACITY BUILDING

COOPERATION **SHARING** **FEDERATION** **SUSTAINABILITY** **DIALOGUE**

This project has received funding from the European Union's Horizon 2020 Research and Innovation Framework Programme under grant agreement No 774652

CONCERNS...

SCIENCE **GEOSPATIAL TECHNOLOGY** **RESEARCH** **INVESTIGATION**

CROSS-FERTILIZATION

Nice frame, but above all, AfriCultuReS' **focus is on people's wellbeing**.

CAPACITY BUILDING

CO-DESIGN **CO-DEVELOP** **MULTIACTOR**

COOPERATION **SHARING** **FEDERATION** **SUSTAINABILITY** **DIALOGUE**

This project has received funding from the European Union's Horizon 2020 Research and Innovation Framework Programme under grant agreement No 774652

LET'S BUILD A HOUSE

Called *AfriCultuReS*… a serious game!!

There is no instructions manual but advice, best practices, recommendations, clear ideas, hard work, collaboration, friendship, good travel mates and…

…loads of coffee

This project has received funding from the European Union's Horizon 2020 Research and Innovation Framework Programme under grant agreement No 774652

LET'S BUILD A HOUSE

Called *AfriCultuReS*… a serious game!!

Every single brick counts… whether you are a plumber, a bricklayer, construction manager…

… doors are open for joint collaboration

USERS

ADVISORS

STAKEHOLDERS

This project has received funding from the European Union's Horizon 2020 Research and Innovation Framework Programme under grant agreement No 774652

Juan Suárez
AfriCultuReS Coordinator

GMV Aerospace and Defence S.A.U
+34 91 807 21 00
jusuarez@gmv.com

thank you