Space Based Geospatial Information for Food Security.

United Nations/United Arab Emirates High Level Forum: "Space as a Driver for Socio-economic Sustainable Development

6 – 9 November 2017, Dubai, United Arab Emirates

UNITED NATIONS
Office for Outer Space Affairs

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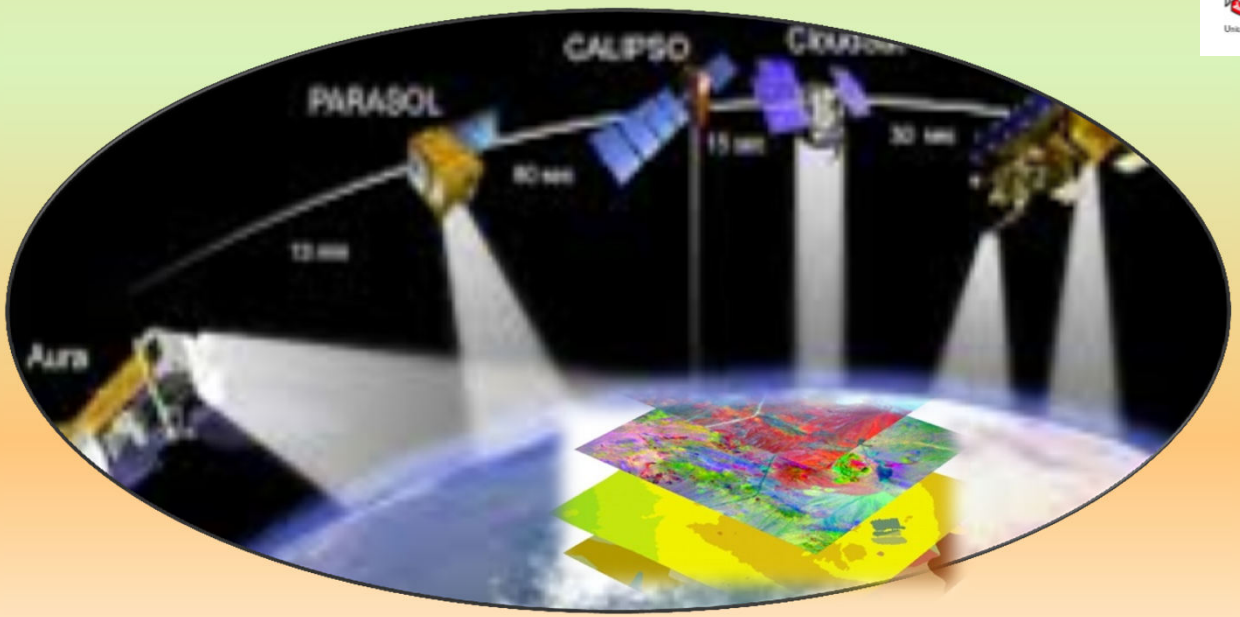

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Republic of Botswana

BIUST
BOTSWANA INTERNATIONAL UNIVERSITY OF SCIENCE & TECHNOLOGY
Botswana International University of Science & Technology

Botswana

Mining

Wildlife/Tourism

Livestock

Farming

- Size: 582,000 sq km , Semi arid environment.
- Estimated Population of 2 million.

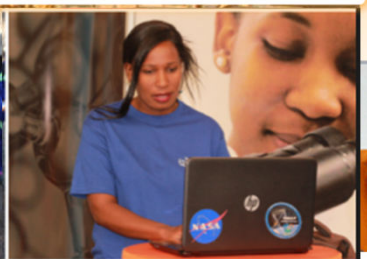
Republic of Botswana

BIUST _OVERVIEW

BOTSWANA INTERNATIONAL UNIVERSITY OF SCIENCE & TECHNOLOGY

BIUST is;

- ✓ **A center of excellence and a world class research Institution.**
- ✓ **The Science, Engineering and Technology University of choice in the African continent**

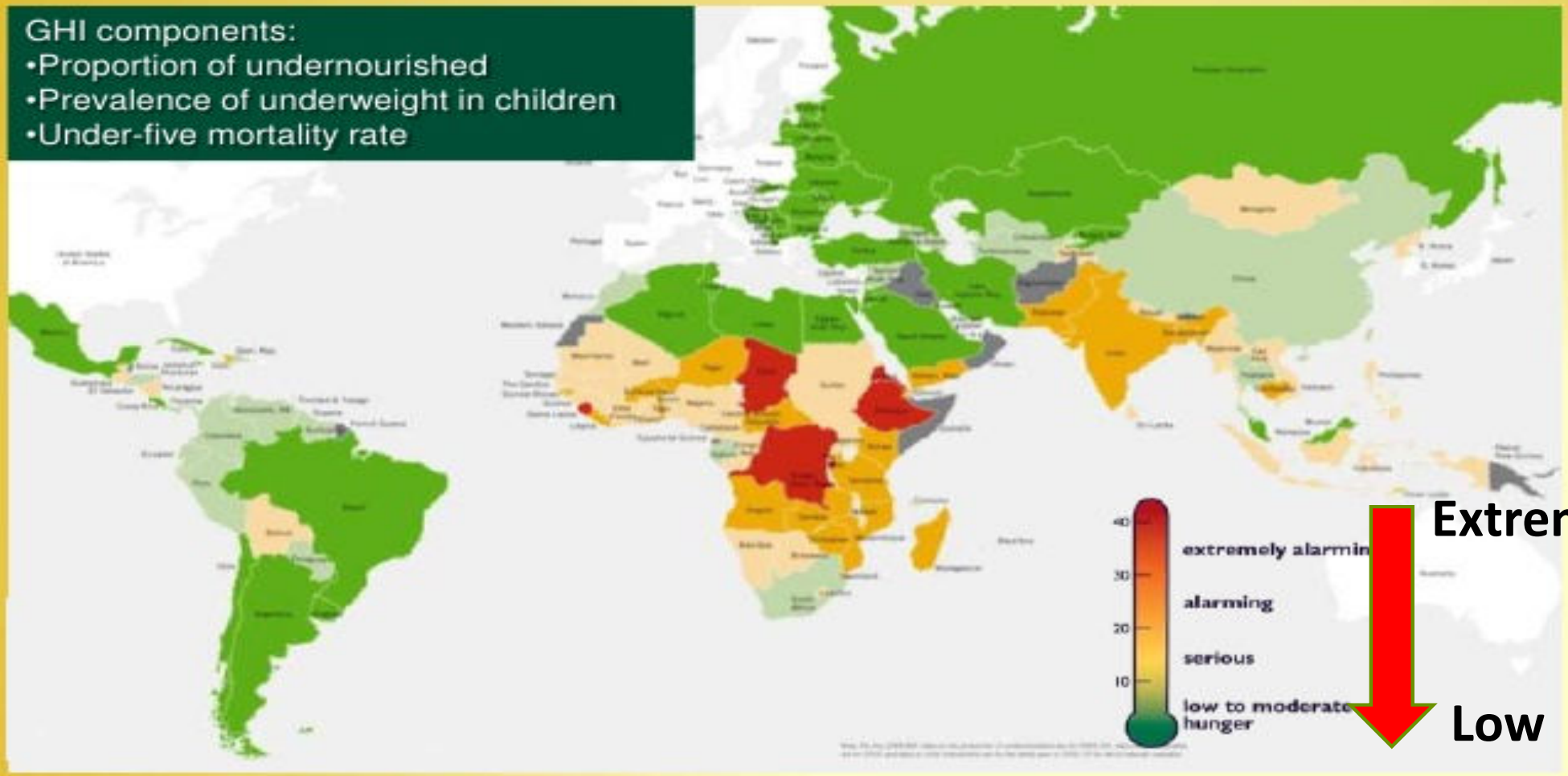


Outline

- Introduction
- Food security
- Why Space a Driver & Solution?
- Space base geospatial technology Case study
- Conclusion
- Recommendations

Global level of hunger

29 countries have "alarming"/"extremely alarming" levels of hunger (2009 GHI)



Source: von Grebmer et al. 2009.

Causes of Food Insecurity

- ✓Climate change
- ✓Rapid population growth
- ✓Lack of emergency plans.
- ✓Food and agricultural policy.

Farmers need precise spatial geographic data and information about the resources.

“Space is the Driver & Solution”

Why Space the Driver & Solution ?

- ✓ Space based geospatial information for food security is the driver of sustainable development.

- ✓ GI can be used as an effective decision -making support tool to support societal activities related to;
  - land and water,
  - environment and the atmosphere.

Why Space a Solution ?

Geospatial information is best for

- ✓ monitoring,
- ✓ Management
- ✓ planning of resources for decision making for Sustainable Development through satellite images and Global Satellite Navigation System (GNSS) and Global Positioning Systems (GPS).

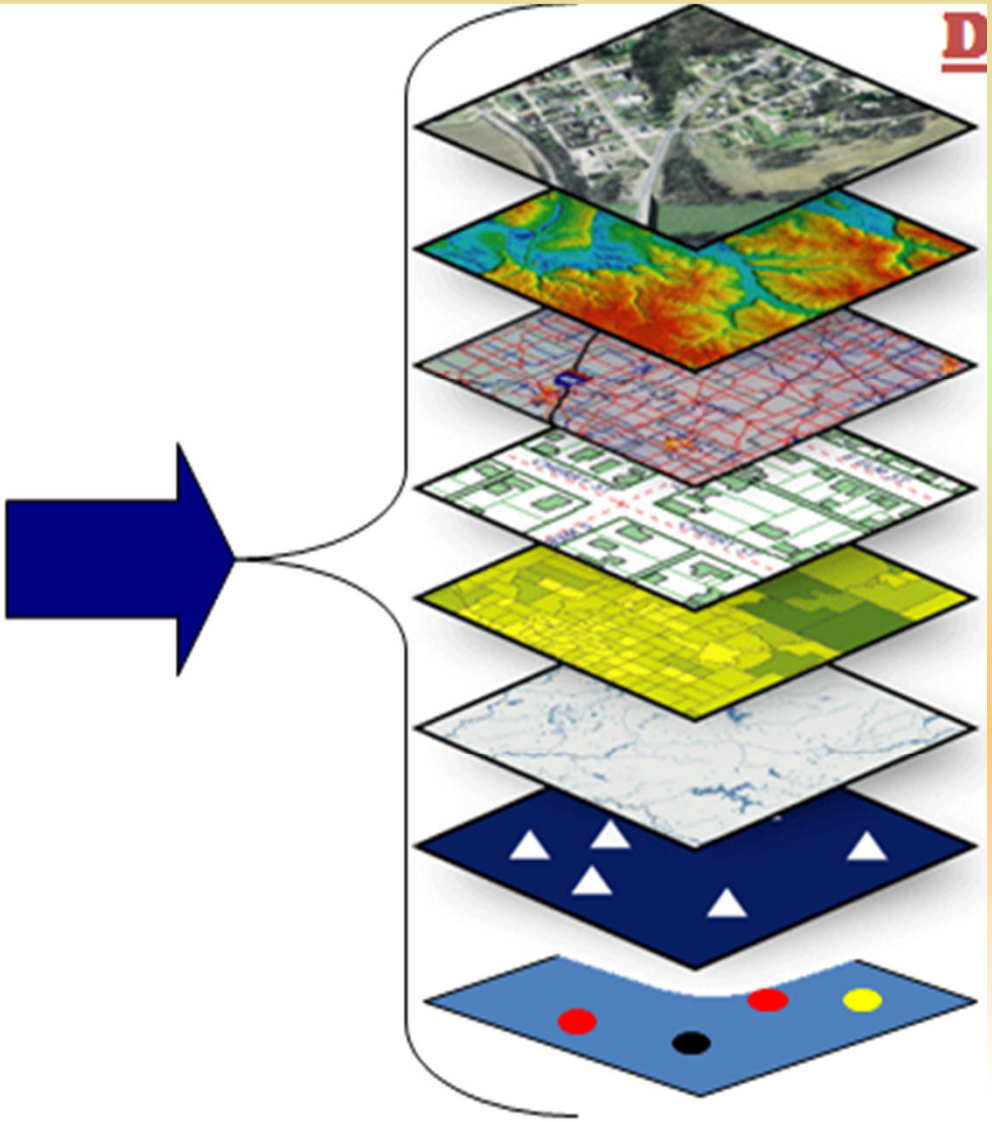
Geospatial technology changes the traditional way of managing and monitoring the atmosphere, land, and water resources into modern digital precise spatial information

Land use Geospatial Information

"Space for Global Development"

The Real World

Land use



Cities & towns

Industries

Infrastructures

Research Inst..

Space centers

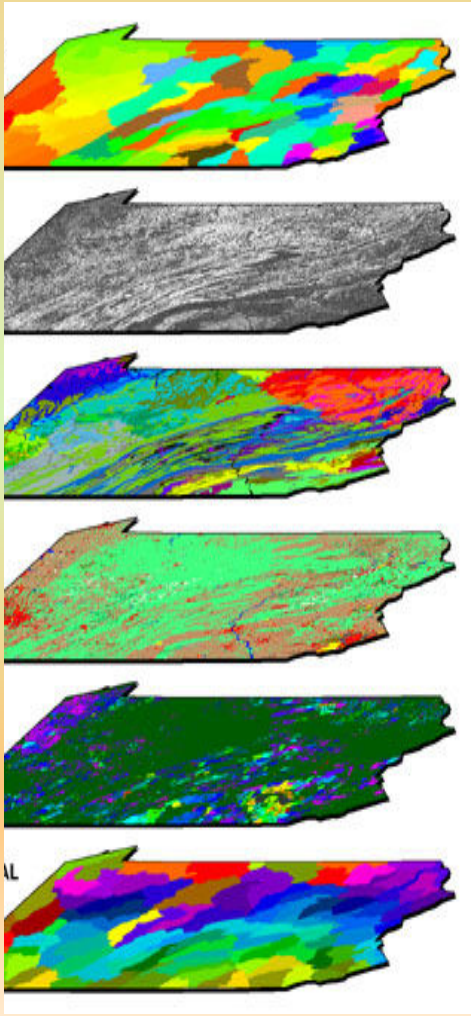
Global Markets

Population

Biophysical Geospatial Information

"Space for Global Development"

Surface Model



Soil type

DEM (Slope)

Drainage

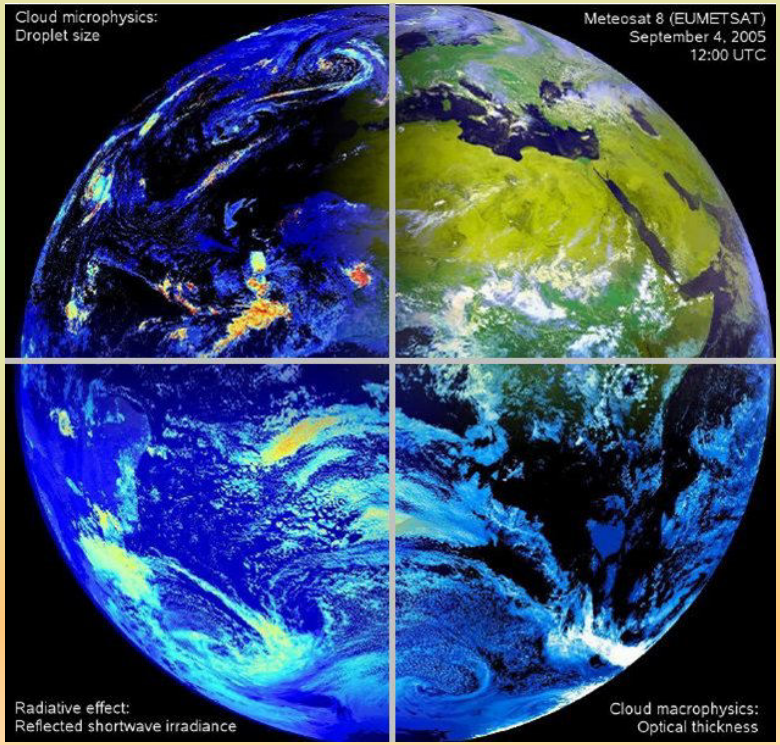
Soil moisture

Vegetation cover (NDVI)

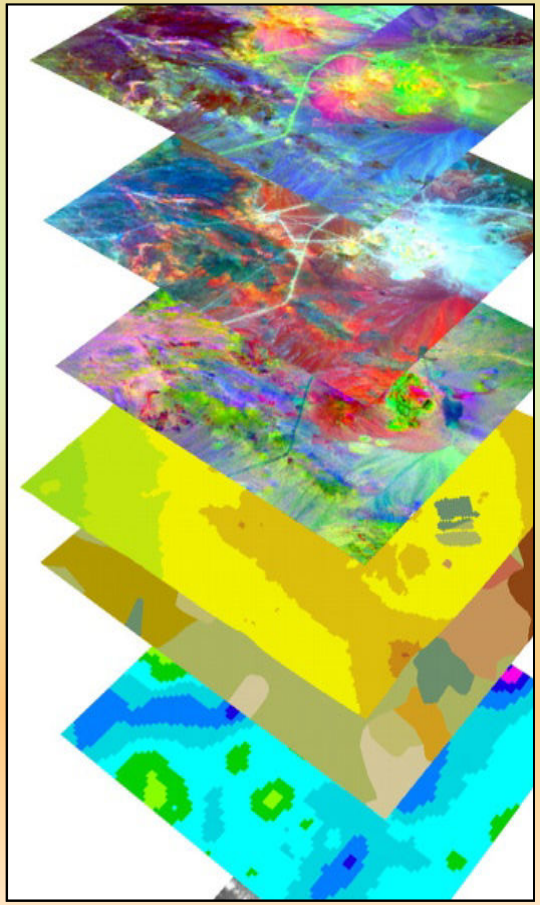
Soil temperature

Atmospheric Geospatial Information

"Space for Global Development"



Atmosphere



Air pollution

Temperature

Carbon (GHGs)

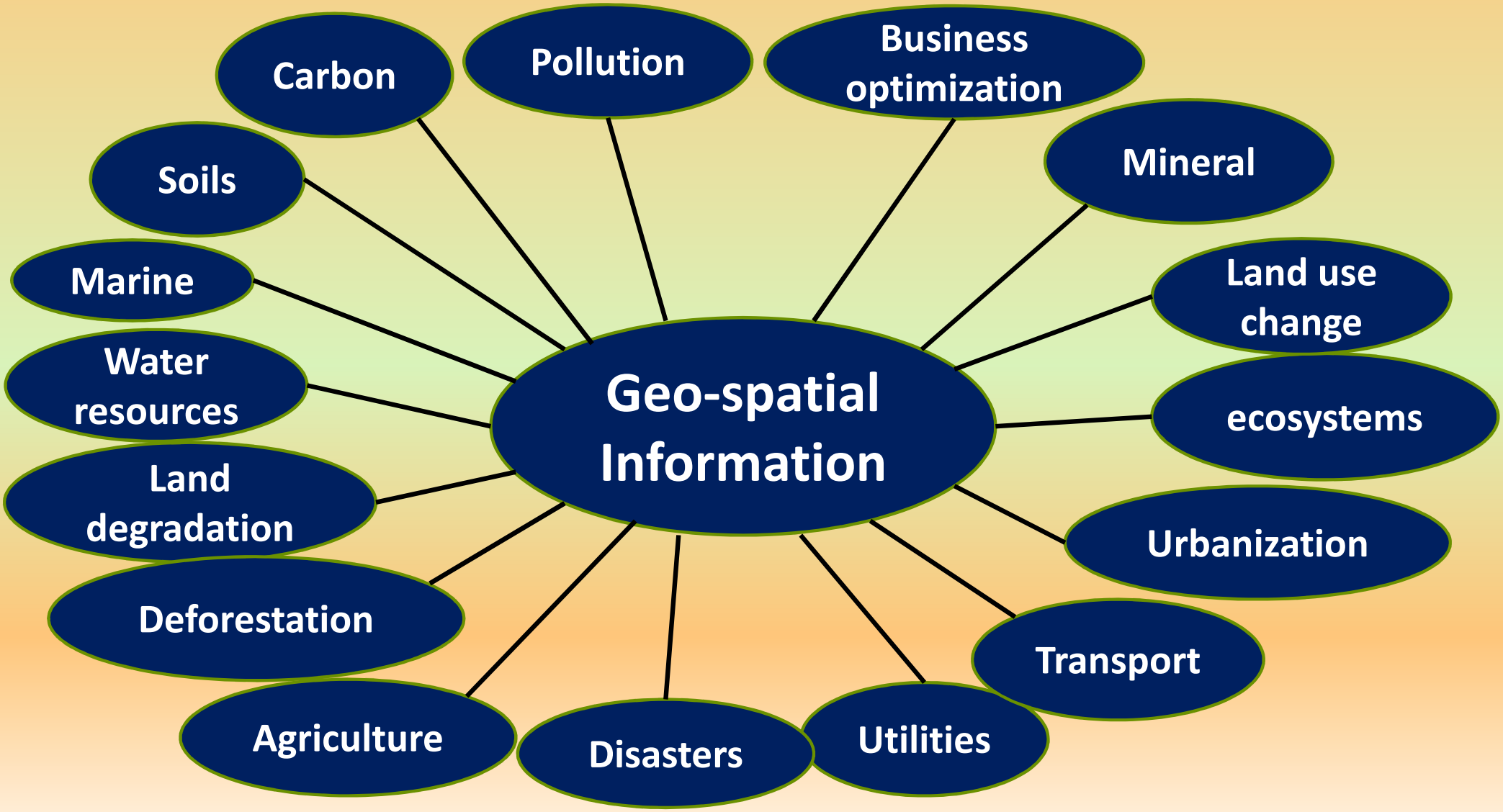
Humidity

Cloud cover

Wind speed

Geospatial Information

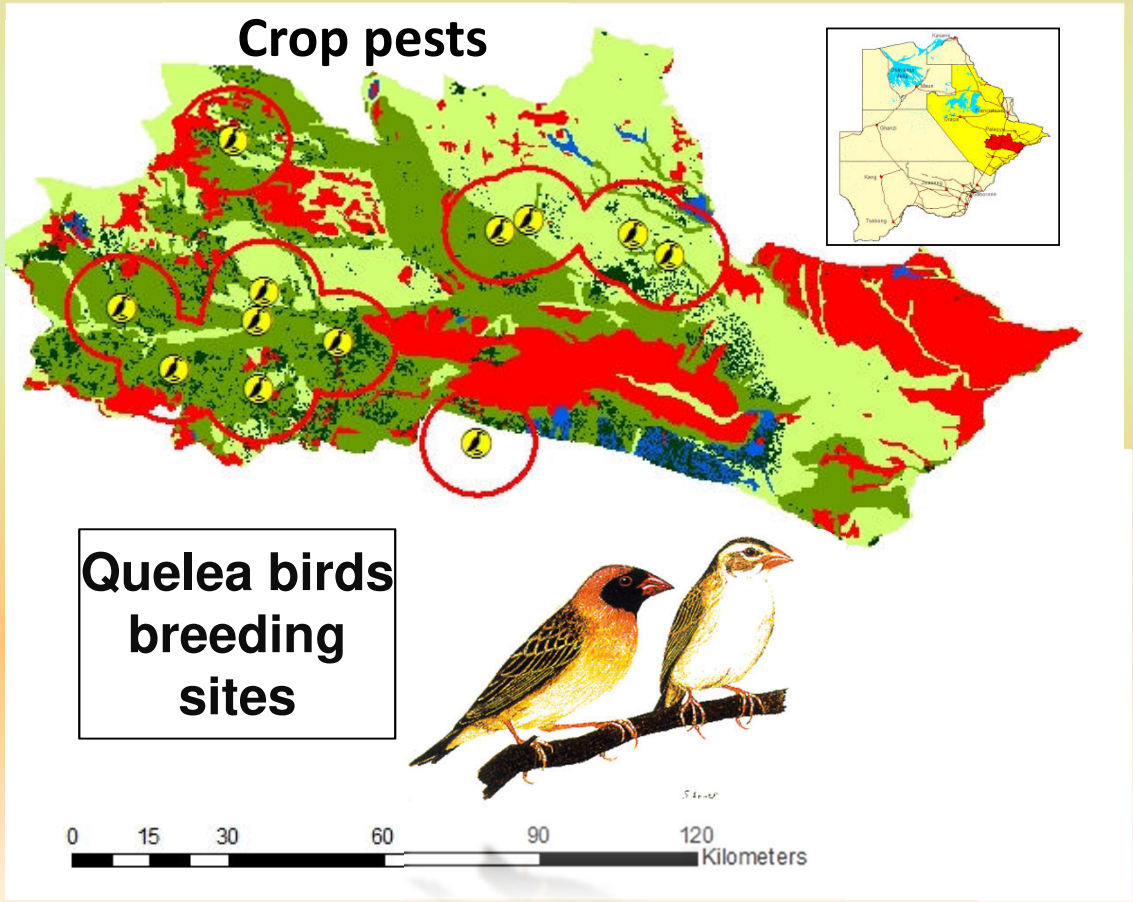
Space based Geospatial Information

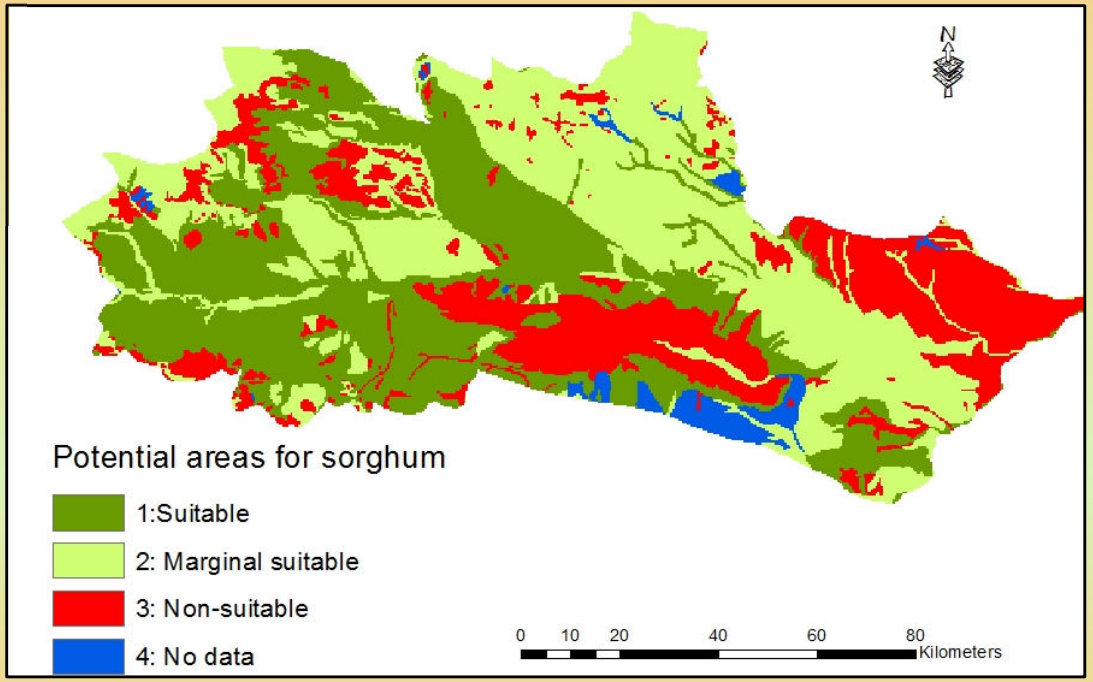


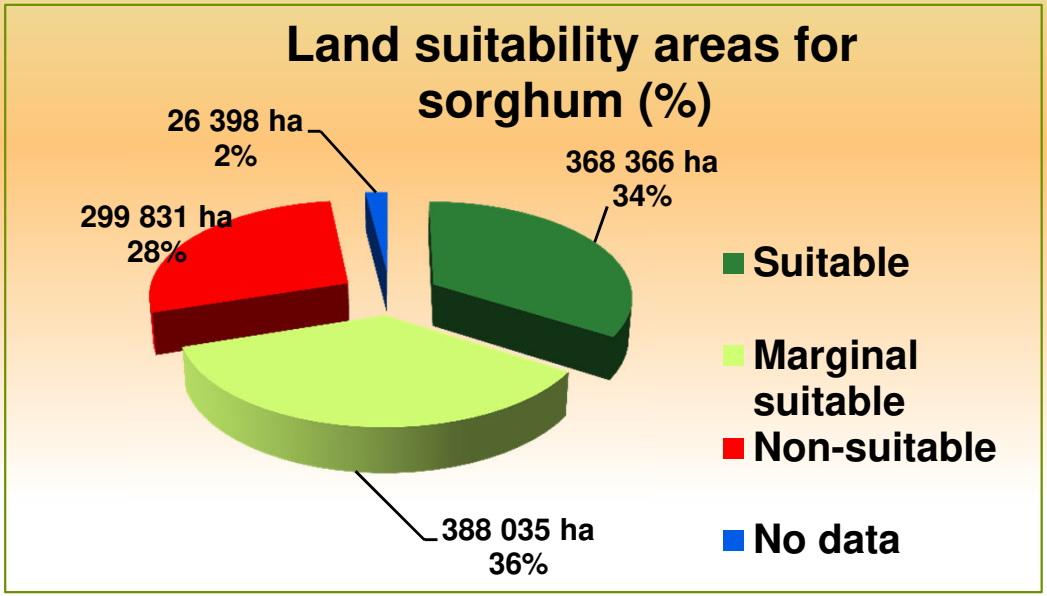
A key for monitoring, management & planning of resources for Decision making

Geospatial land quality evaluation model: Botswana case

Land suitability for Sorghum in (Palapye/Serowe areas) of Botswana

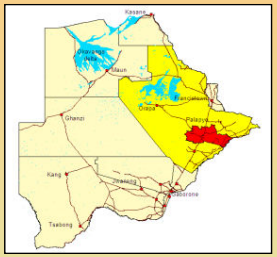






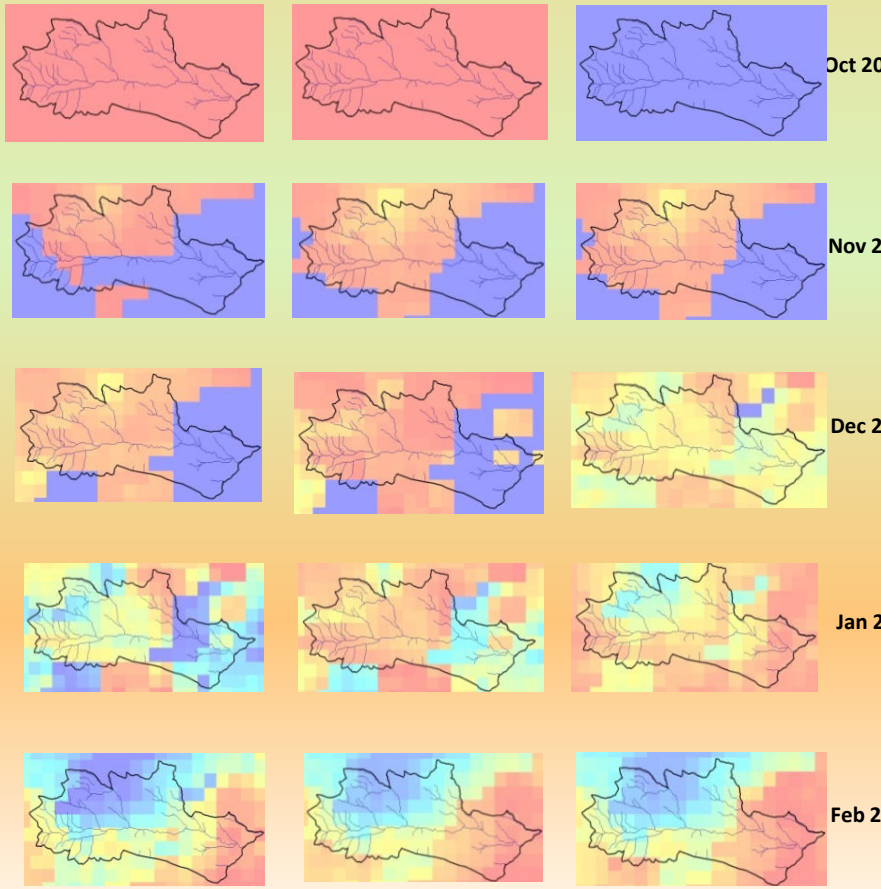
Source: Bolo, 2016

Geospatial soil moisture & rainfall conditions: Botswana case Serowe & Palapye areas

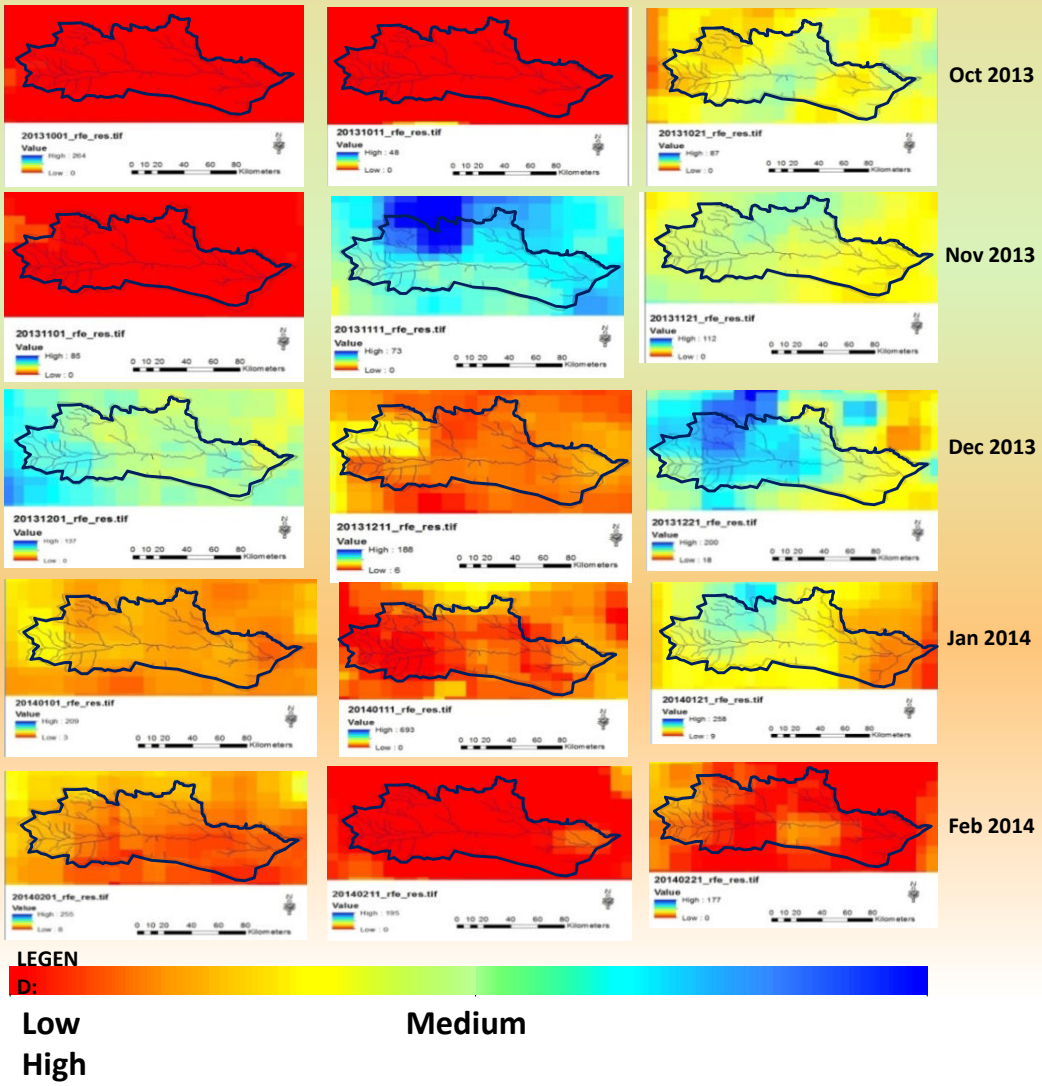


Soil moisture & rainfall conditions for the growing period of sorghum (October 2013 – February 2014)

Soil moisture (October 2013 - February 2014)



Rainfall estimates _ (October 2013 - February 2014)



Conclusion

Space based Geospatial information is a long term tool for

- ✓ monitoring,
- ✓ Management
- ✓ planning of resources for decision making for Sustainable Development.

Space provide precise geospatial information for Sustainable development.

Space provide long term drive & solution for Sustainable Development.

Recommendations

To increase the use of Space technology for Sustainable Development;

- ✓ Create more opportunities for Space scientist and researchers that aim at solving a challenge than for publication.
- ✓ Space researchers must be encouraged to do researches that address the need of nations
- ✓ Include girls and women into space and empower them. Women represent over half the world population (UNESCO Institute for Statistics, 2012)

Recommendations

To increase the use of Space technology for Sustainable Development;

- ✓ Create more opportunities for voluntary actions, not from the institutions only but also for individuals who are interested.

Recommendations

To increase awareness about on-going Space activities;

- ✓ Engage all countries by including them in Space outreach through invitations.
- ✓ Host conferences and meetings in those countries without Space centers to inspire and motivate them.
- ✓ Form Regional Space Committee to collaborate on Space sector issues.
- ✓ Involve everybody into space and talk more about space.

Thank You !

Merci !