Space Based Application: A sustainable tool for Human to Achieve SDGs

United Nations/United Germany High Level Forum: "The way Forward after UNISPACE +50 and on Space 2030

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Republic of Botswana

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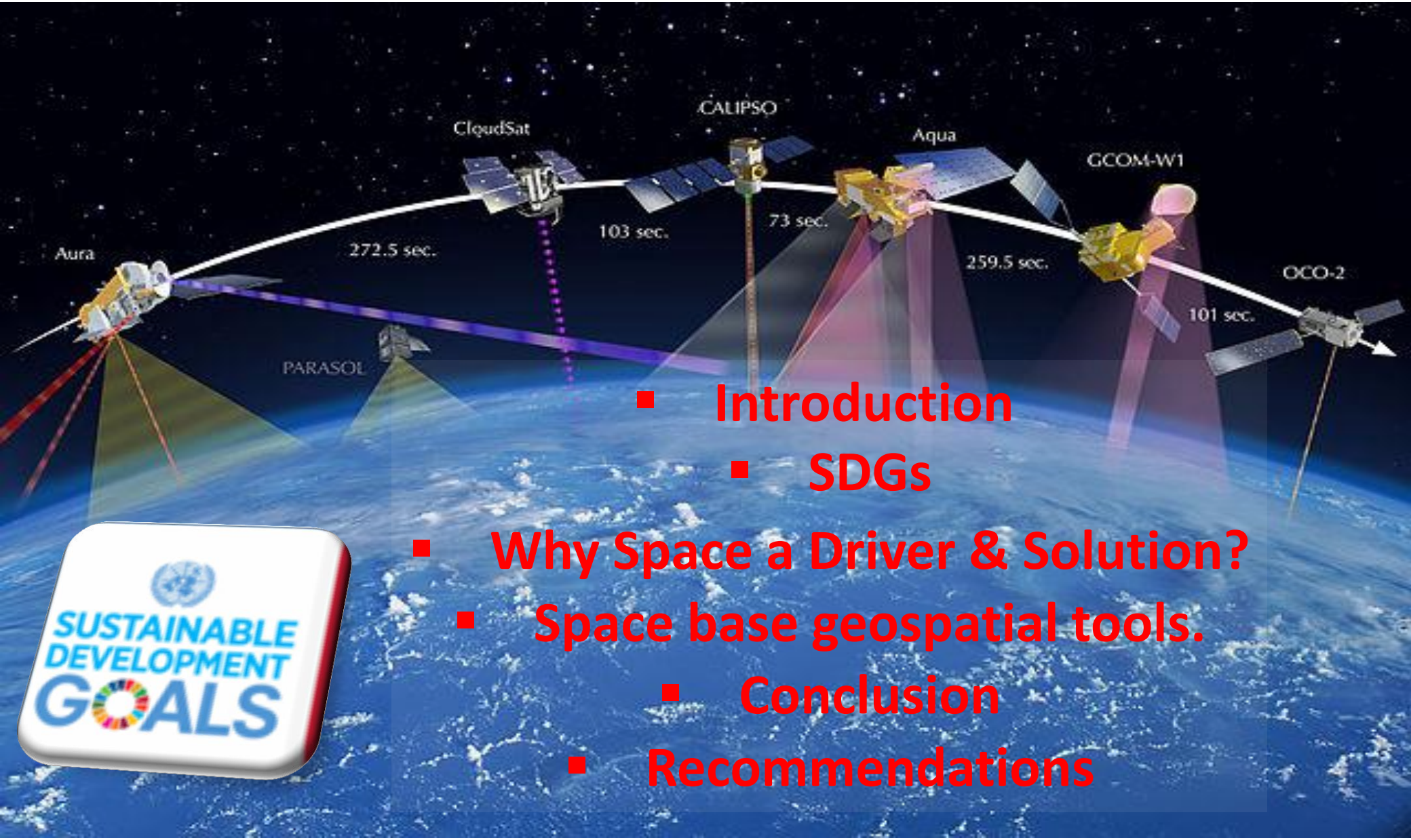
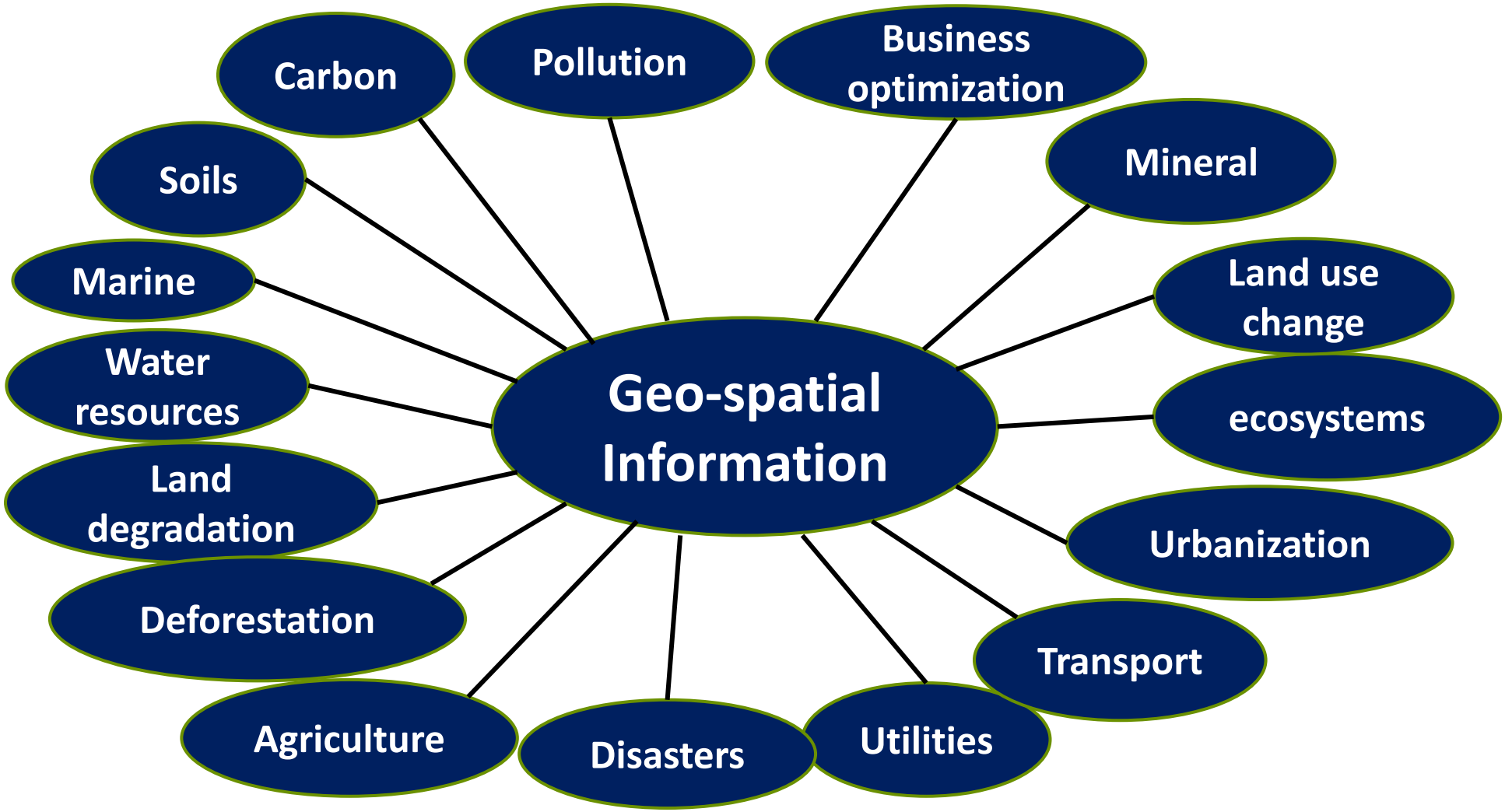
Presentation Outline



- Introduction
- SDGs
- Why Space a Driver & Solution?
- Space base geospatial tools.
- Conclusion
- Recommendations

Space Application Technology

Space based Geospatial Information



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

Why Space Application?

Geospatial information is best for

- ✓ monitoring,
- ✓ Management
- ✓ planning
- ✓ Provision of precise geospatial Information

for decision making for Sustainable Development

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

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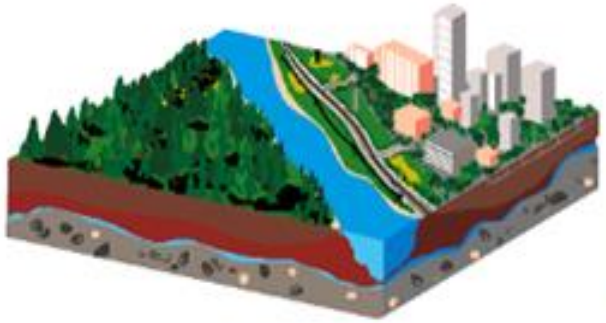
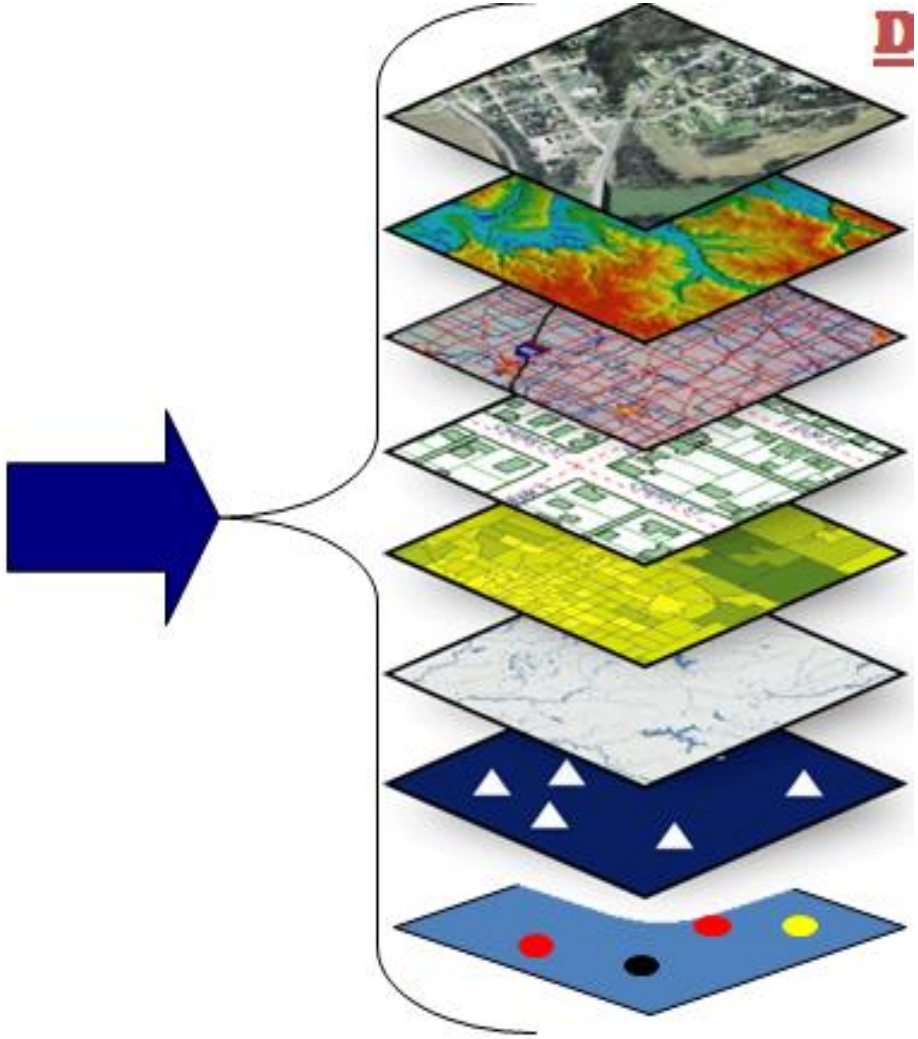
The Real World



Land use



Cities & towns

Industries

Infrastructures

Research Inst..

Space centers

Global Markets

Population

Land cover change_ Sumatra , Indonesia

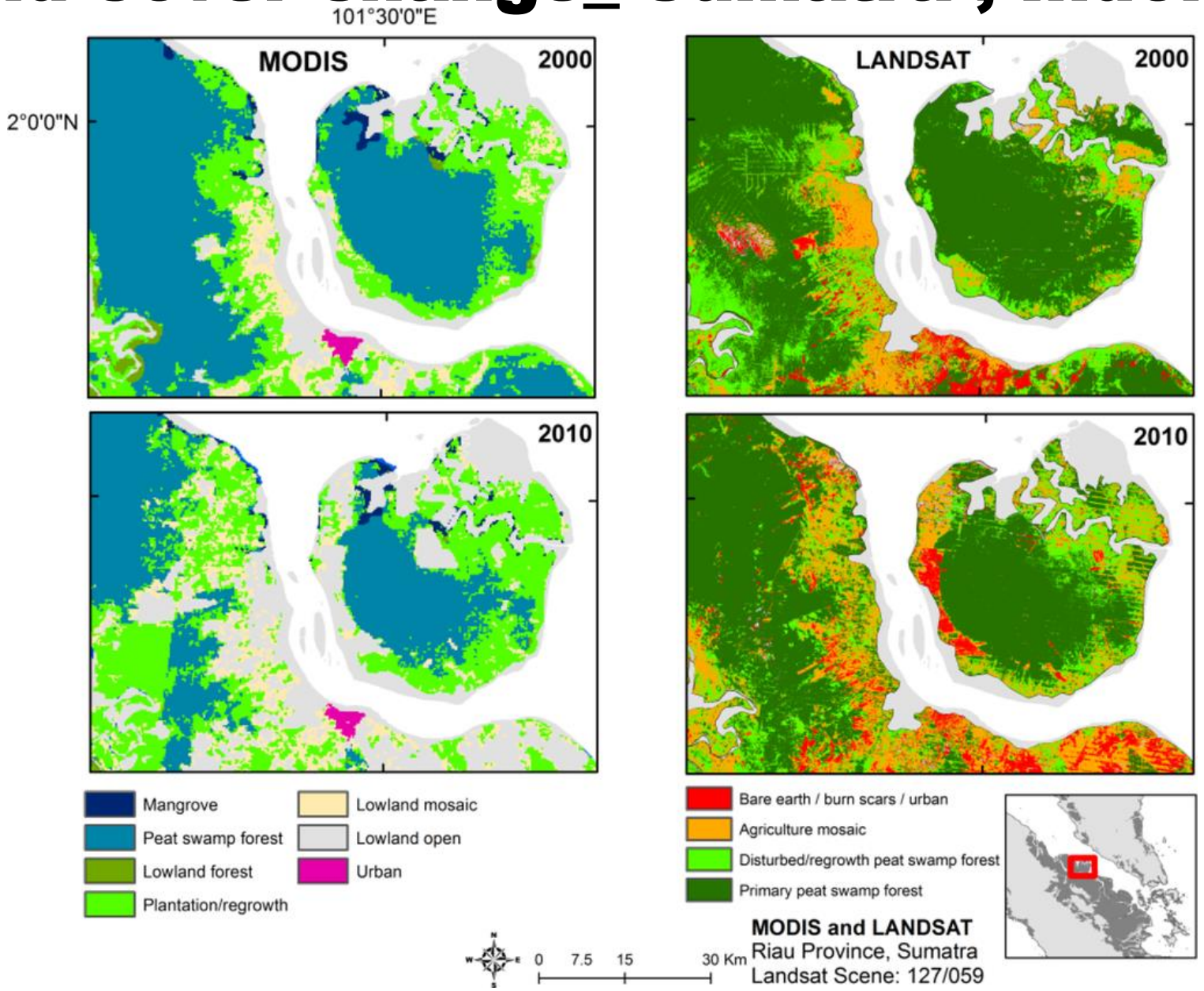
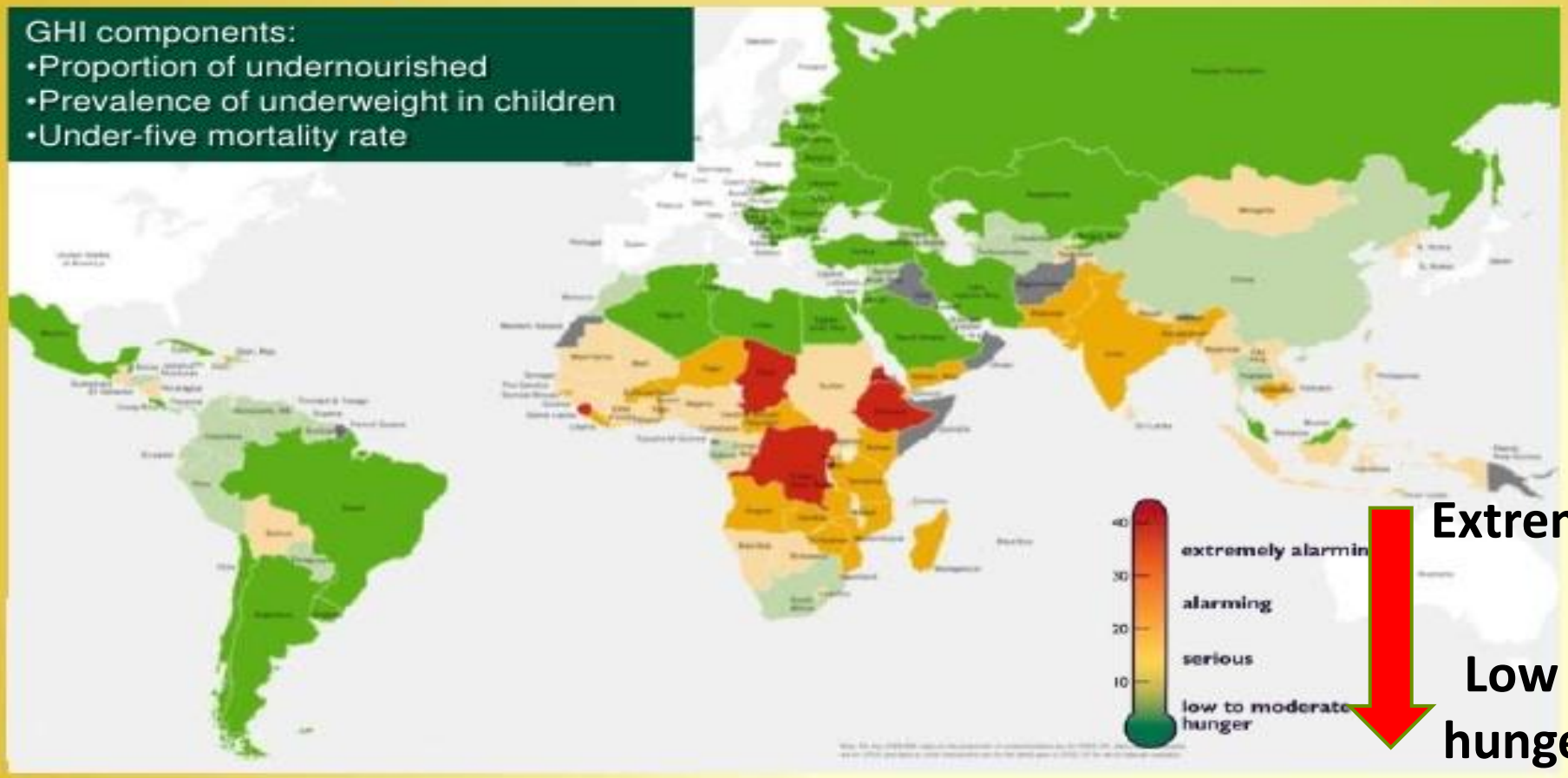


Image Credit: Wijedasa et al., 2012.

Global level of hunger

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

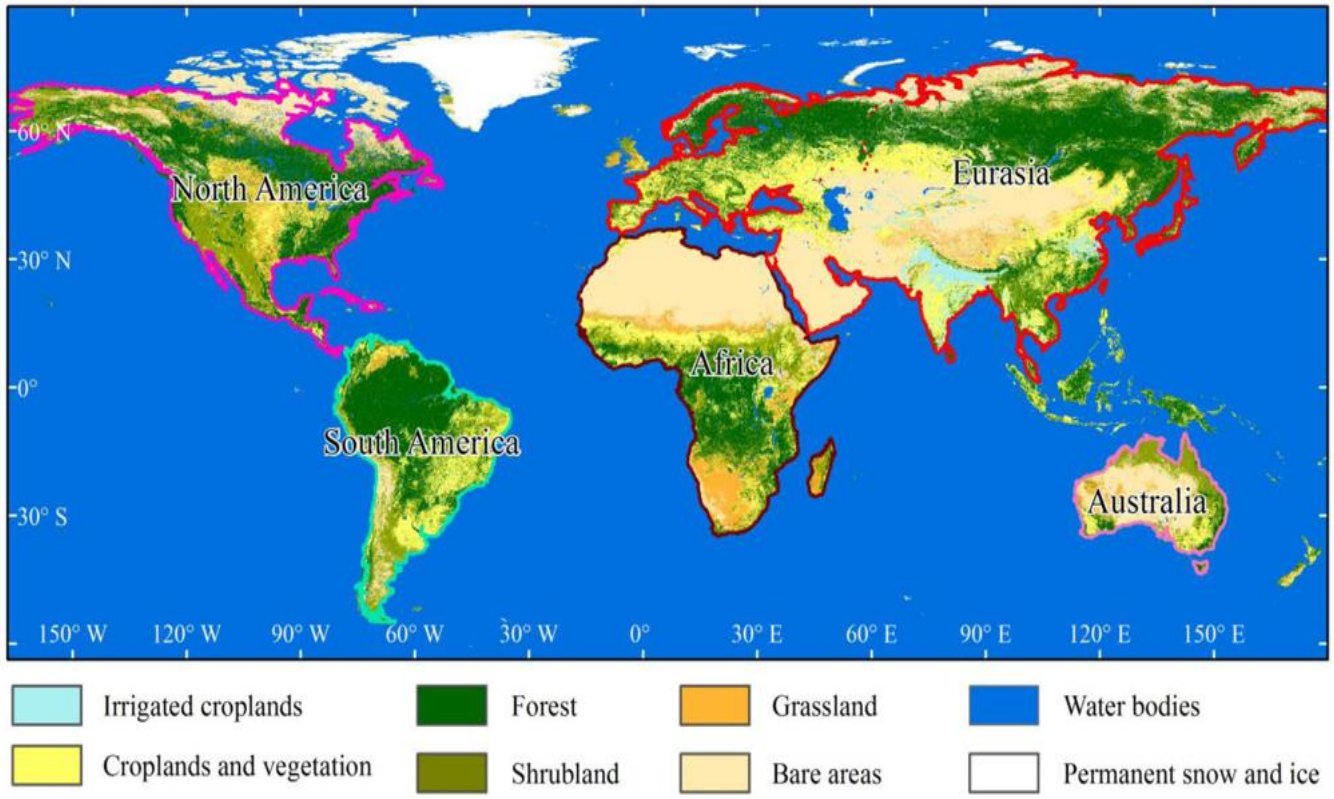


Source: von Grebmer et al. 2009.

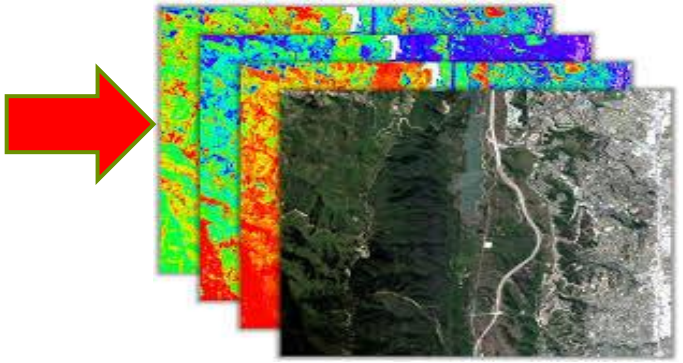
Space Applications on the Environment

Physical Monitoring

Global land cover _ 2009



Source: ESA 2009 - 2011 data



Earth Observation Images monitoring

Biophysical Geospatial Information

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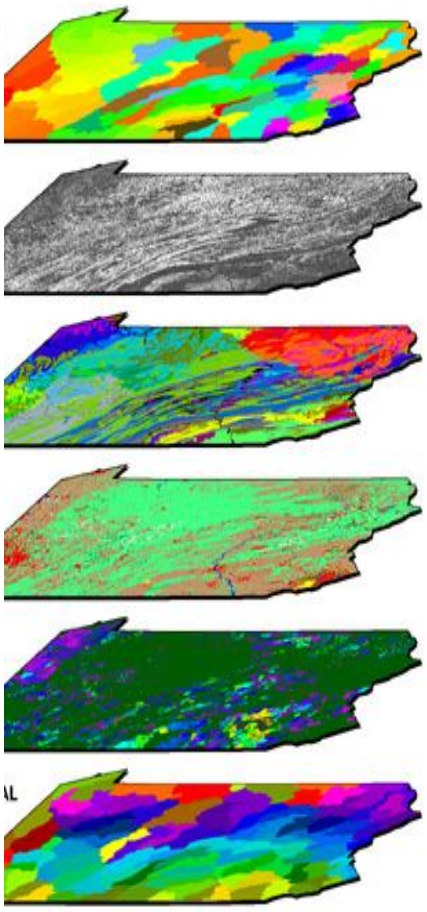
Surface Model



Soil type

DEM (Slope)

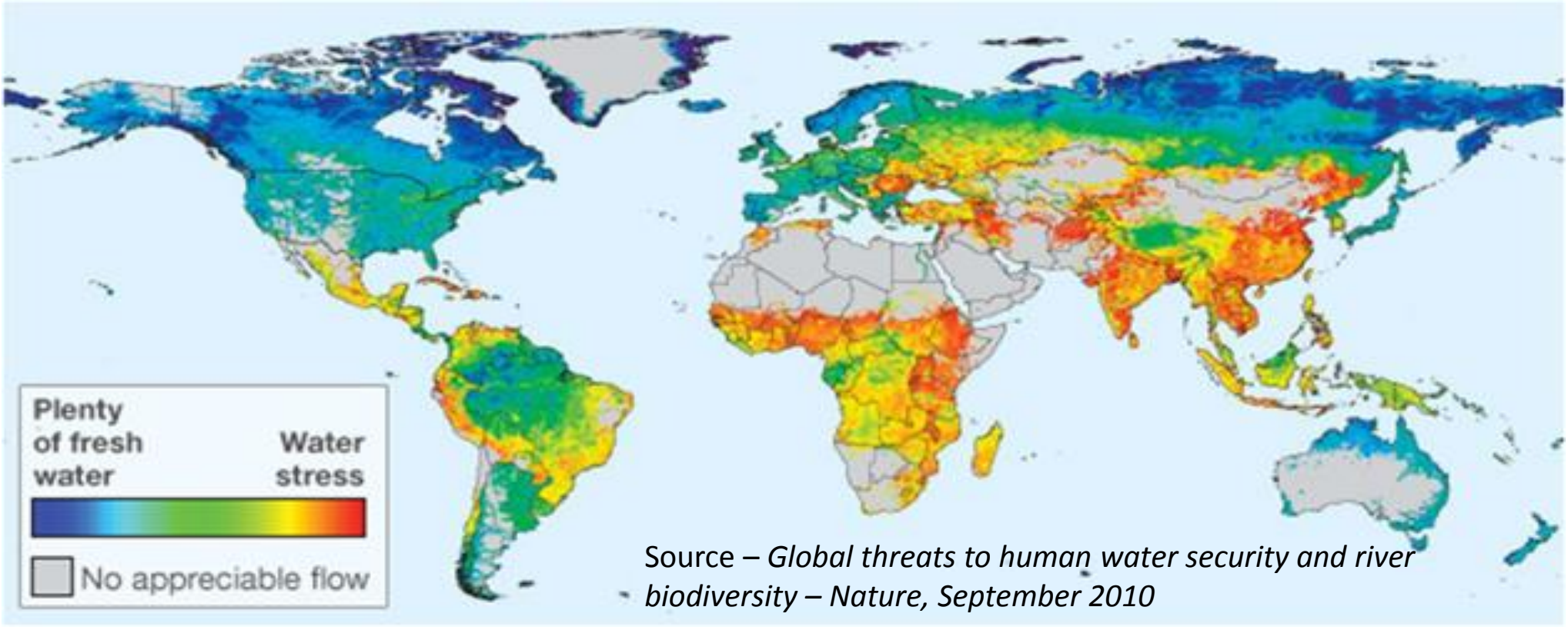
Drainage

Soil moisture

Vegetation cover (NDVI)

Soil temperature

Global Water Crisis



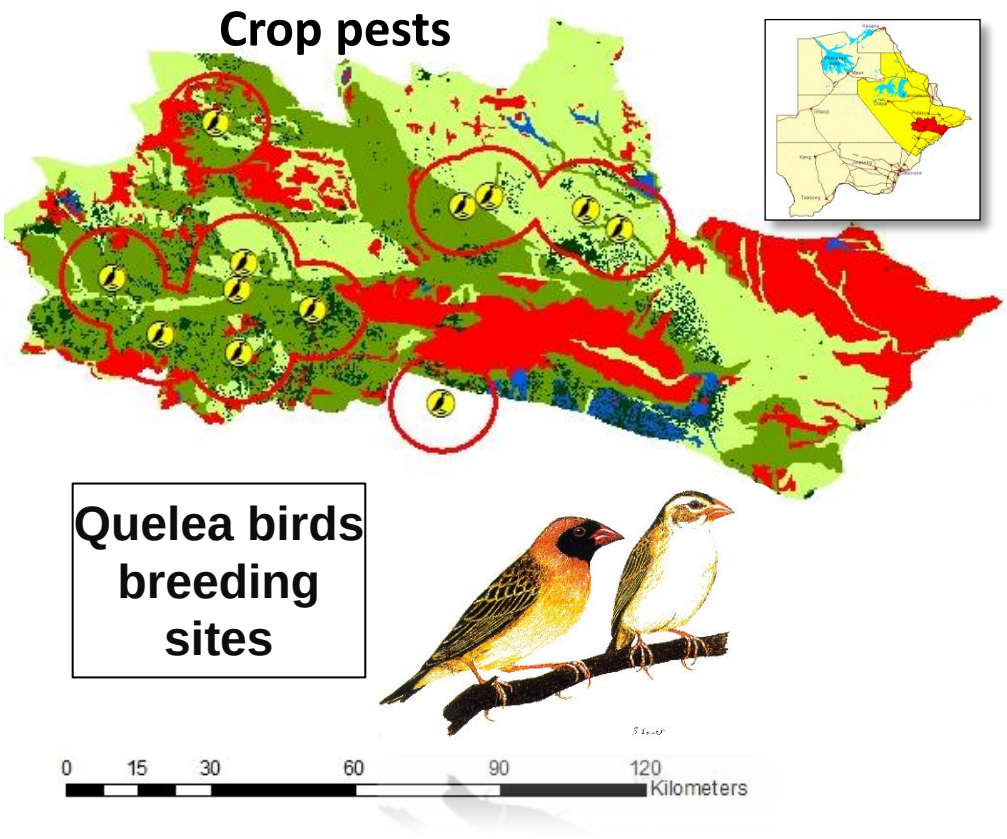
Source – *Global threats to human water security and river biodiversity – Nature, September 2010*

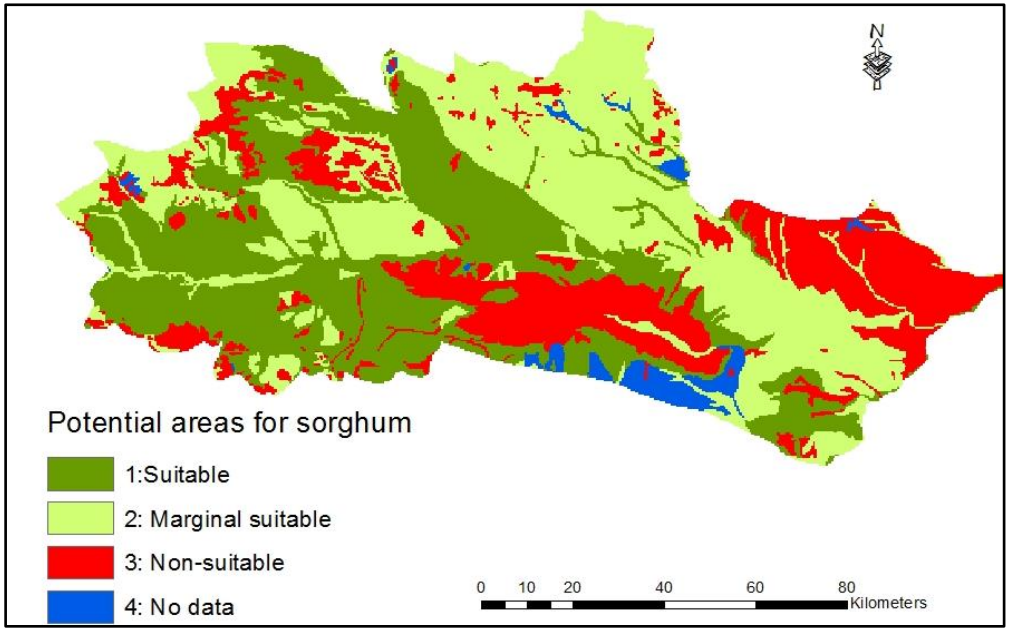
- 2/3 world's population currently lives in areas of water scarcity for at least one month a year.

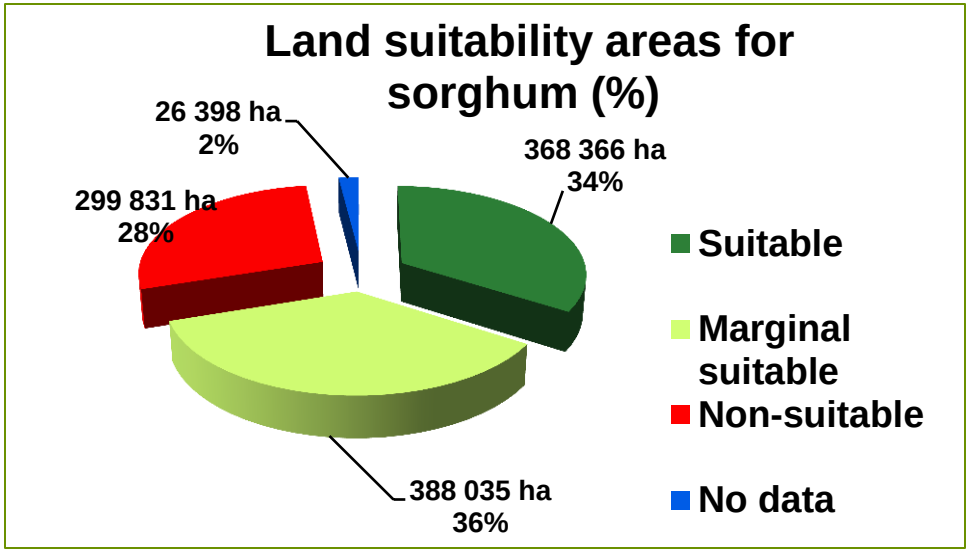
- About 500 million people live in areas where water consumption exceeds the locally renewable water resources by a factor of 2 (UN World Water Development Report 2017).

Geospatial land quality evaluation: Botswana case

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







Source: Bolo, 2016

Atmospheric Geospatial Information

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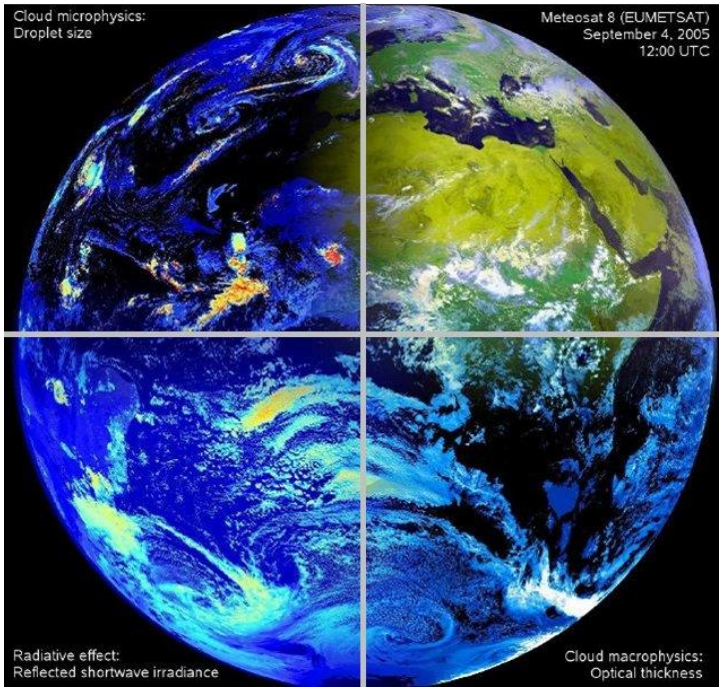
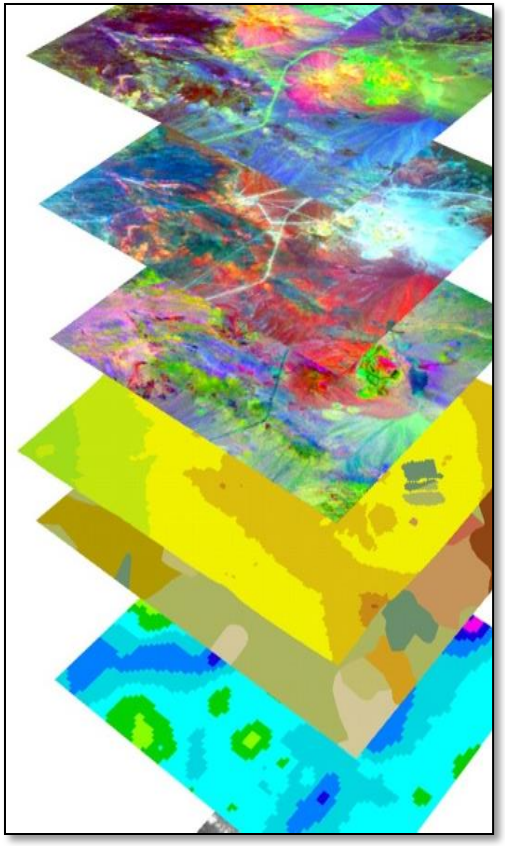


Atmosphere



Air pollution

Temperature

Carbon (GHGs)

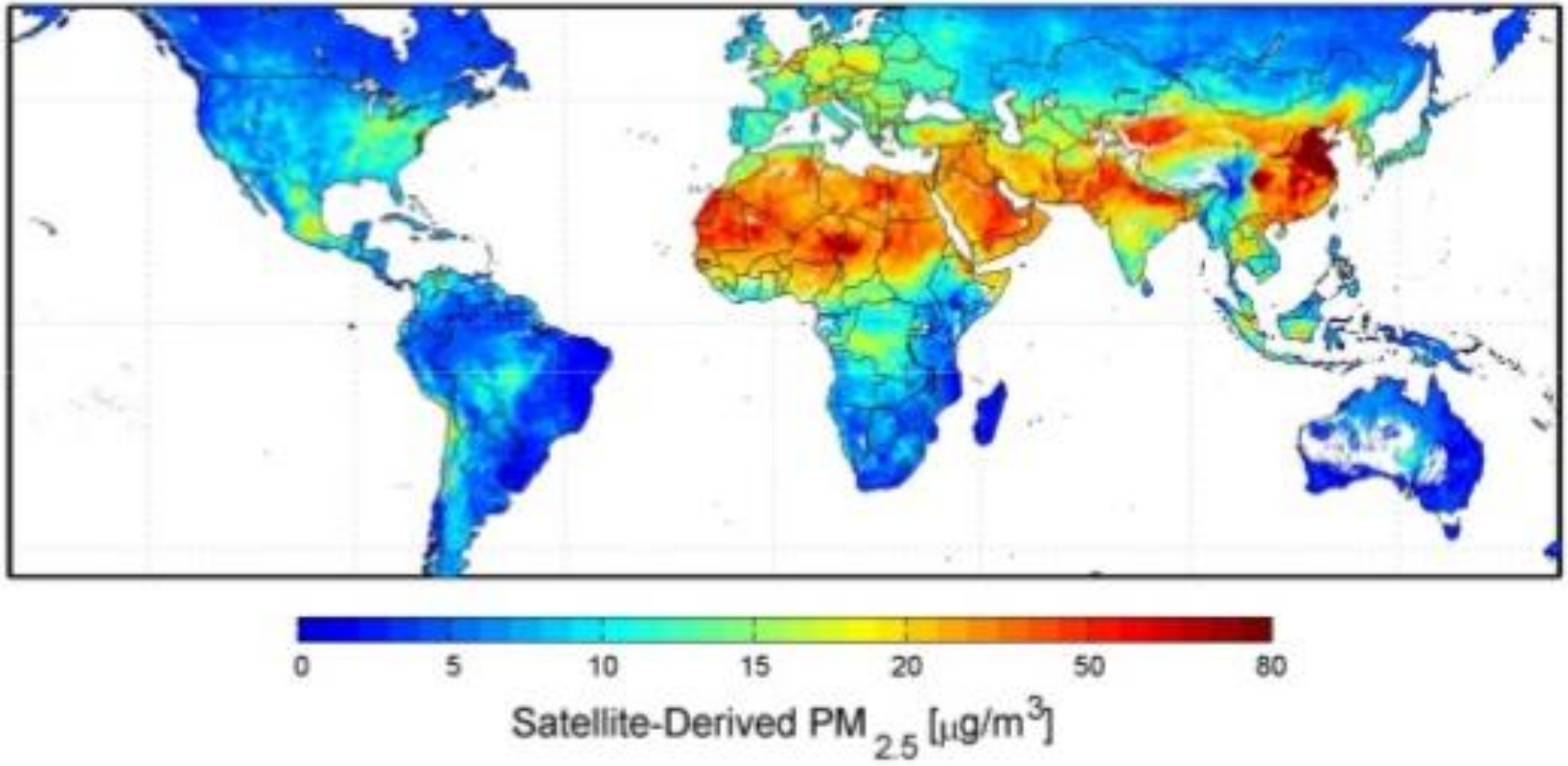
Humidity

Cloud cover

Wind speed

Geospatial Information

Global Satellite-Derived Map of $PM_{2.5}$ Averaged Over 2001-2006



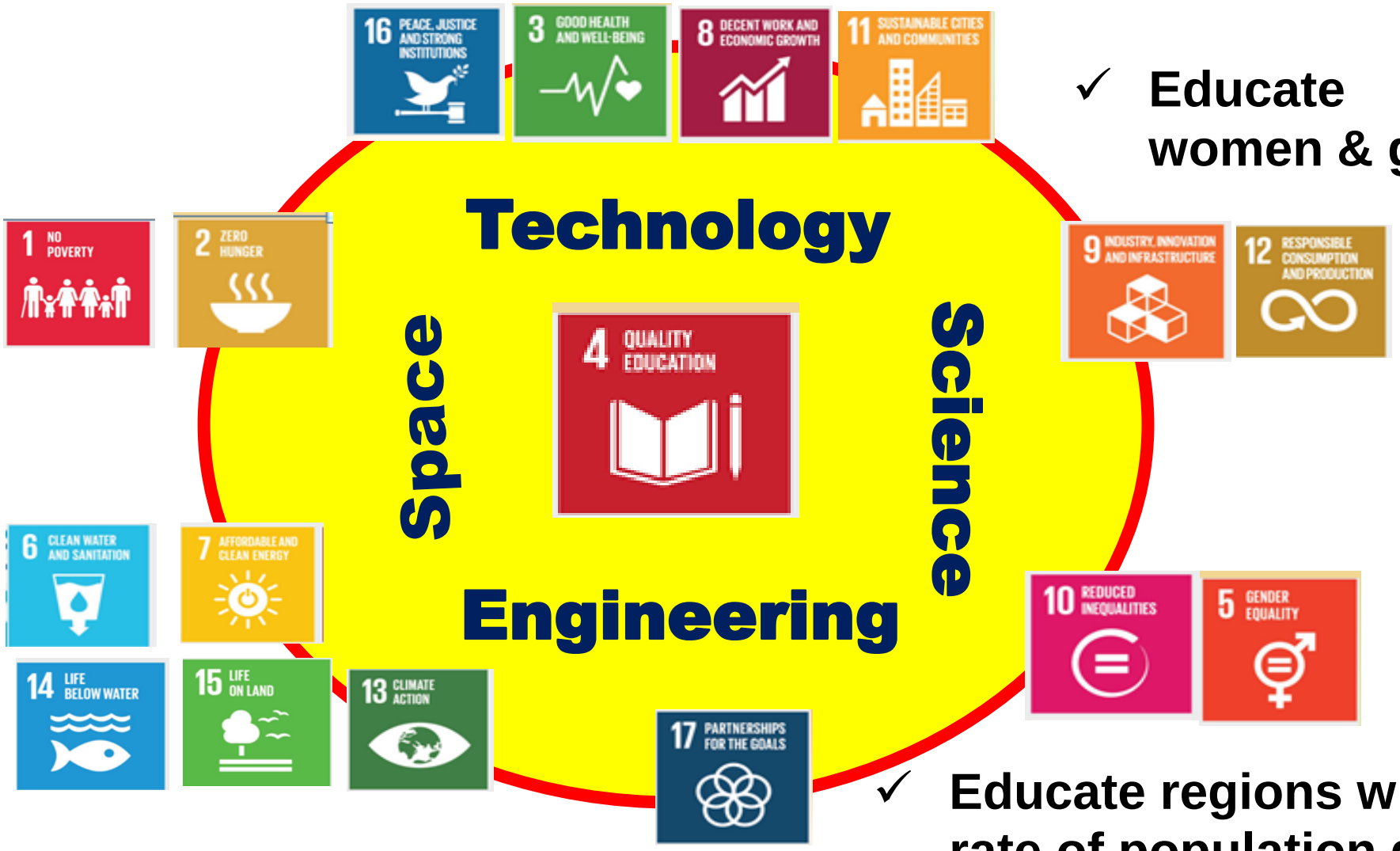
Aaron van Donkelaar et. al, 2010; Evans et al, 2012
(http://www.nasa.gov/topics/earth/features/health-sapping.html)

Conclusion

- ✓ Space provide precise geospatial information for Sustainable development.
- ✓ Space provide long term drive & solution for Sustainable Development Goals.

Space Science & SDG 4

- ✓ Space curriculum at primary level is important .



- ✓ Educate women & girls .
- ✓ Educate regions with high rate of population growth

Recommendations

To increase the use of Space technology for Sustainable Development;

- ✓ Space researchers must be encouraged to do researches that address the need of nations and the SDGs
- ✓ Develop space applications frameworks for SDGs
- ✓ Educate girls and women into space and empower them. Women represent over half the world population (UNESCO Institute for Statistics, 2012)
- ✓ Reduce Gender gap, women make up 28% of scientific researchers worldwide (UNESCO Institute for Statistics (UIS))

Recommendations

To increase awareness about on-going Space activities;

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


CALIPSO
CloudSat
Aqua
GCOM-W1
Aura
272.5 sec.
103 sec.
73 sec.
259.5 sec.
OCO-2
101 sec.
PARASOL
SUSTAINABLE DEVELOPMENT GOALS
SUSTAINABLE DEVELOPMENT GOALS
SUSTAINABLE DEVELOPMENT GOALS
Thank You !