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Session 4 – Monitoring and evaluation using Earth Observation

EO4SD consortium, presented by Remco Dost



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The consortium of EO4SD – Agriculture and Rural Development





Satellite based applications and data to optimise crop production and water management

www.eLEAF.com Established in 2000 eLEAF is a Netherlands based high-tech company with global experience offering quantitative information

Quantitative Remote Sensing

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EO can contribute to:

Accountability

(ie. monitoring land degradation, productivity)

Operational management (ie. quantifying trends to improve performance)

Strategic management

(ie. evaluating project impact)

Capacity building

(ie. provide tooling to boost capacity and self reliance)





→ EARTH OBSERVATION FOR SUSTAINABLE DEVELOPMENT Agriculture and Rural Development	UNDP, 2012	European Space Agency
	2012	

EO4SD (local) demonstrations that showcase the continental potential



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Evaluating project impact

Related projects:			
Ethiopia	Sustainable land management project 2 (SLMP-2)		
	2nd Agricultural Growth Project (AGP-2)		
	Participatory Small-scale Irrigation Development Programme II (PASIDP II)		
	Integrated Landscape Management to Enhance Food Security and Ecosystem Resilience in Ethiopia (GEF/IFAD IAP Food Security child project)		







Areas of engagement



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Customized land cover map 2016, Angolelana Tera 10m spatial resolution





Free prototype land cover map at 20m for Africa





EO4SD Customized land cover map 10m









Biomass production in Northern Shewa



Retrieval of indicators

Biomass production differences between years and land cover types



Biomass production was higher In 2013



Decrease in biomass production is highest in non-vegetated, agriculture and grassland areas



Soil erosion

Land cover, climatic, soil and topographic geoinformation combined help to identify areas prone to water-based soil erosion.





Potential Soil Erosion by Water

very low low mandarat.

[___] IAP Food Security Child Project Area

Map Coordinate System: WGS 1984 UTM Zone 37N Grid: WGS 84 geographical coordinate system

Data sources: Potential Soil Erosion @ GeoVille 2017 SRTMGL1N @ NASA JPL 2013



Geoville

Changes in productivity

General trend:

In all agricultural areas, 2017 biomass production is lower than 2013 biomass production

Project area:

Overall decrease in biomass production is lower, and in some fields a clear increase is visible

Possible cause:

Degradation Different (high value) crop Different growth season(s) Need for field data!







Monitoring Agricultural productivity at field scale



Biomass production (kg/ha/day)



Information at 10m spatial resolution





Regional patterns







Vegetation dynamics: quantifying trends per land cover







Note: statistics should be extracted for intervention areas, to assess the project impact



Vegetation productivity: quantifying trends per watershed

Before intervention (hectares)



After intervention (hectares)



Degradation 3757 Stable 838 Improvement 9327



Service fact sheet

EO product	Vegetation dynamics	Land cover	Soil erosion	Biomass production
Detail	Local to regional	medium/high	medium/high	Field level and regional
Period	Historic	Historic / NRT	Historic / NRT	Historic / NRT
Frequency	Yearly/custom	Yearly/custom	Yearly/custom	Daily/weekly/monthly/year ly/custom
Delivery type	Table/map/graph/report	Table/map/graph/report	Table/map/graph/report	Table/map/graph/report
Source	Open	Open/Commercial	Open/Commercial	Open/Commercial
Cost range (USD)	0.5 – 1.5/km2, minimum order siz 10,000 USD	e 0 - on request	0 - on request	1-10 USD/ha 0.5-1.0 USD/km2, minimum order size 25,000 USD
	EO indicator	M&E		
	Detail	low/medium/high		
	Period	Historic / NRT		
	Frequency	Daily/weekly/monthly/year	ly/custom	
	Delivery type	Table/map/graph/report		

Institutional / Commercial

Cost range (USD) 2-75 US\$/ha, on request

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Source



Related demonstrations:		
Morocco	Atlas Mountains Rural Development Pro	oject
→ EARTH OBSERVATIO Agriculture and Rura	N FOR SUSTAINABLE DEVELOPMENT Il Development	Investing in rural people

Value chain mapping

Areas of interest - Morocco



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Value chain mapping

Targeted agricultural value chain assessments – Morocco

How well are agricultural areas connected to markets?







Roadless area patch size

Areas that have at least 1 km distance to the nearest road are defined as roadless areas.

Enhancement of aspects of land use planning and sustainable rural development:

- Ecological value of remaining contiguous areas that are undisturbed by roads
- assessment of needs in rural infrastructure investments and the identification of underdeveloped areas



Travel times from production to market areas

For each agricultural production area the closest town is identified.

The map depicts travel paths within the transportation network and indicates corresponding travel time.





Service fact sheet

EO product	Land cover	Soil erosion	Vegetation dynamics	Vegetation trends	Road map
Detail	medium/high	medium/high	medium/high	medium/high	medium/high
Period	Historic / NRT	Historic / NRT	Historic / NRT	Historic / NRT	Historic / NRT
Frequency	yearly/custom	yearly/custom	yearly/custom	yearly/custom	yearly/custom
Delivery type	Table/map/graph/report	Table/map/graph/re port	Table/map/graph/report	Table/map/graph/report	Table/map/graph/report
Source	Open/Commercial	Open/Commercial	Open/Commercial	Open/Commercial	Open/Commercial
Cost range (USD)	on request	on request	on request	on request	on request



EO indicator	Distance to market	Assessment rural transport infrastructure	
Detail	low/medium/high	High	
Period	Historic / NRT	Historic / NRT	
Frequency	Custom	Custom	
Delivery type	Table/map/graph/report	Table/map/graph/report	
Source	Institutional / Commercial	Institutional / Commercial	
Cost range (USD)	On request	0 - on request	

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Round table questions

- Evaluate requirements for successful embedment of EO services in the project cycle
- Discuss opportunities in upcoming projects and programmes for EO services
- Discuss what additional support from EO specialists is required
 - Access to (demo)services
 - Project preparation
 - $\circ~$ Capacity building



Thank you!

For more information http://eo4sd.esa.int/agriculture http://eo4sd.Lizard.net

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