

ITC ENSCHEDE, THE NETHERLANDS

*Gateway to international knowledge
exchange and institutional development in
earth observation and geospatial
information*

Earth Observation: the Last Mile An Introduction to ITC Freek van der Meer

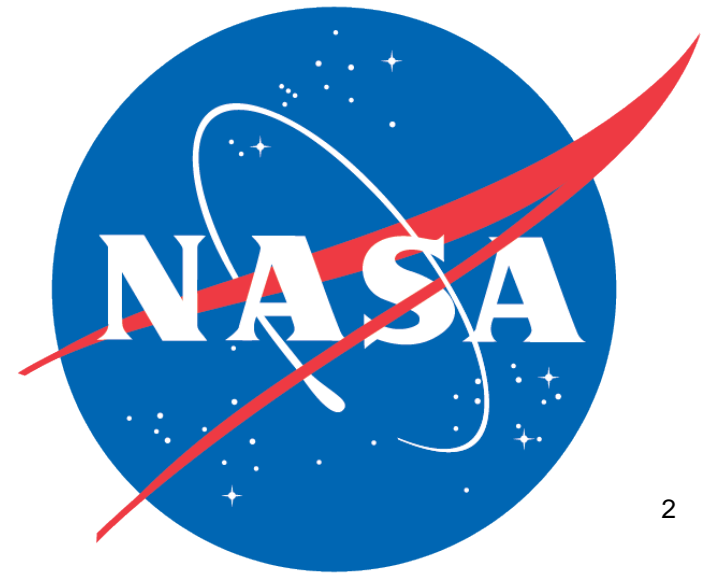
Photograph: NASA/REID
WISEMAN/EPA



UNIVERSITY OF TWENTE.

Memorandum of Understanding between NASA SERVIR and ITC

- COOPERATION ON CAPACITY BUILDING AND USING EARTH OBSERVATION DATA AND GEOSPATIAL TECHNOLOGY FOR CLIMATE RISK MANAGEMENT AND LAND USE
-aims joint development of training, strengthening institutional and regional capacity building, and conducting research in SERVIR Hub regions in four (4) Thematic Service Areas: Agriculture and Food Security; Water Resources and Hydroclimatic Disasters; Land Cover and Land Use Change and Ecosystems; and Weather and Climate.



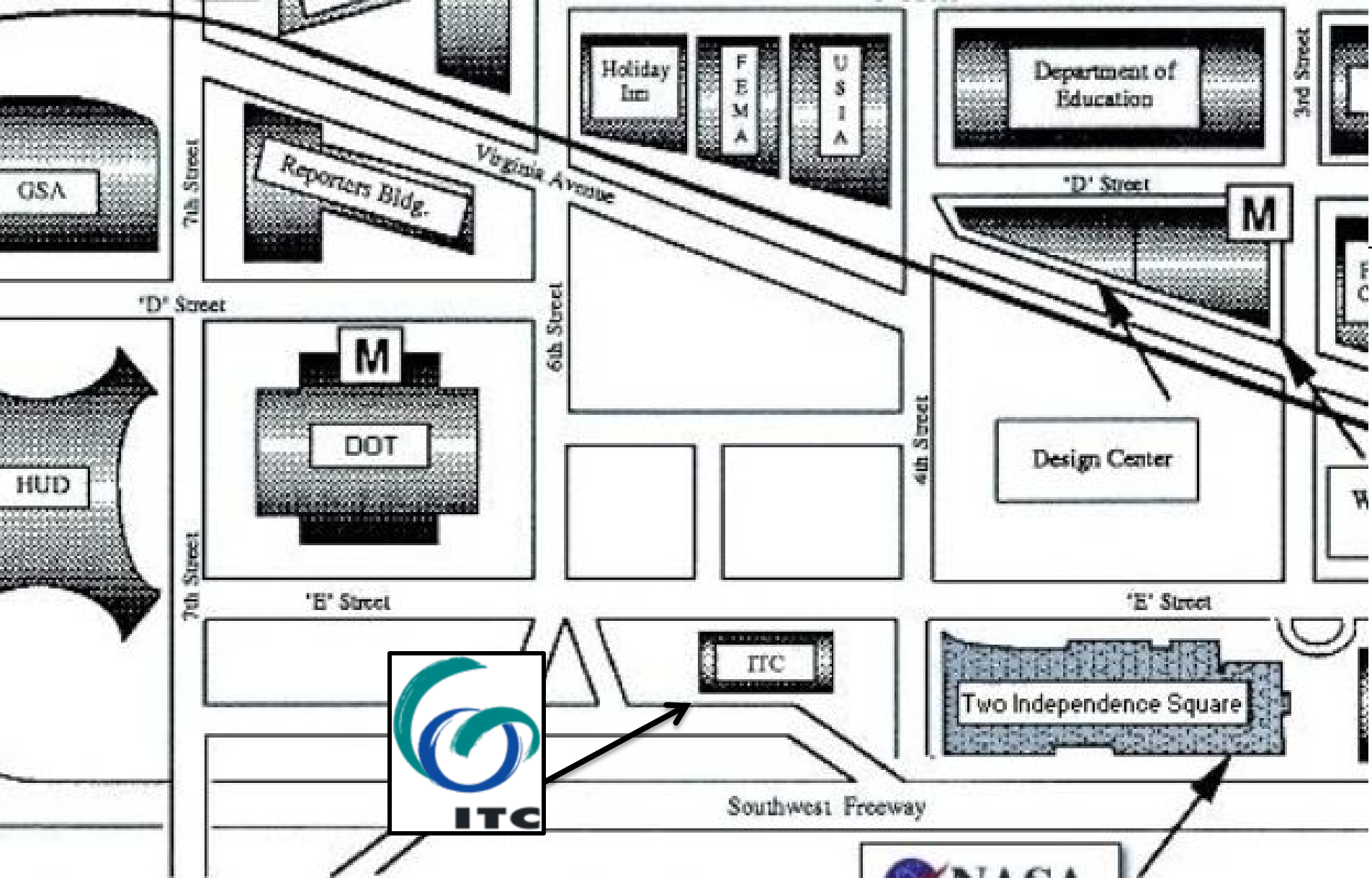


THE LAST MILE

IN EARTH OBSERVATION

- Part 1: About ITC
- Part 2: EO the last mile
 - Bring EO data products to the people (end user)
 - EO firmly embedded in policy making and governance
 - EO and market development: entrepreneurial

The last mile is the common colloquialism referring to the portion of the telecommunications network chain that physically reaches the end-user's premises - Wikipedia



S.W. Washington, D.C.





INTRODUCTION TO THE UNIVERSITY OF TWENTE

UNIVERSITY OF TWENTE.



UNIVERSITY OF TWENTE.

HIGH TECH HUMAN TOUCH

- Societal impact: making a real difference
- Synergy: excellence in combinations
- Entrepreneurship and innovation
- Internationalization: tomorrow's global citizens.

UNIVERSITY OF TWENTE

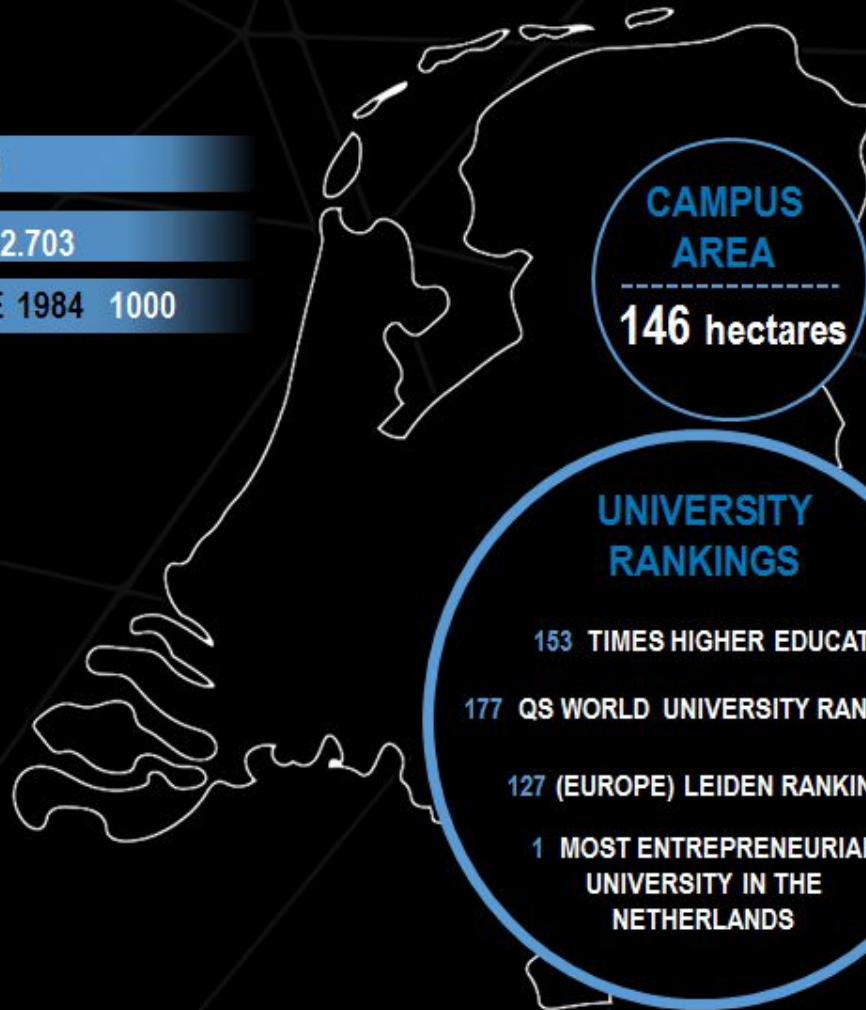
- An entrepreneurial campus university established in 1961
- More than 10,000 students
- 3,300 staff members

SCIENTIFIC OUTPUT

PUBLICATIONS TOTAL 3.098

REFEREED PUBLICATIONS 2.703

SPIN-OFF COMPANIES SINCE 1984 1000



STUDENTS 9.645

INTERNATIONAL 2.411

BACHELOR STUDENTS 5.260

MASTER STUDENTS 3.994

EMPLOYEES 2,602

ACCOMMODATION 2.125

SOCIETIES 57

UNIVERSITY
OF TWENTE.

UT IN ONE SLIDE

Five faculties

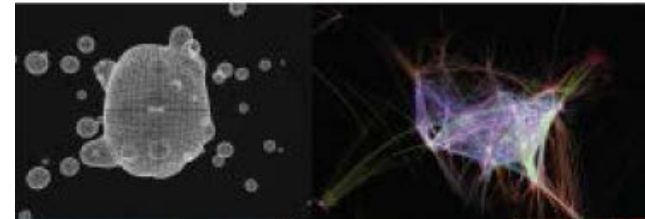
- **BMS** Behavioral, Management and Social sciences
- **CTW** Engineering Technology
- **EWI** Electrical Engineering, Mathematics and Computer Science
- **TNW** Science and Technology
- **ITC** Geo-Information Science and Earth Observation

Research institutes


- **MESA+** Institute for Nanotechnology
- **MIRA** Institute for Biomedical Technology and Technical Medicine

Virtual institutes

- Twente Graduate School (MSc+PhD)
- ATLAS “university college”





A large, multi-story brick building with a red-tiled roof, identified as the University of Twente. The building has many windows and is surrounded by greenery, including a purple corrugated metal structure in the foreground and a tall evergreen tree on the right. The sky is blue with light clouds.

ITC FACULTY OF GEO-INFORMATION SCIENCE AND EARTH OBSERVATION

Source: ITC corporate presentation

UNIVERSITY
OF TWENTE
FACULTY ITC

About the Faculty ITC

Established: 1950 - Appeal by UN in framework of official development assistance – ODA (joint UT in 2010)

Aim: Build capacity for economic development in developing world

Main field of science: earth observation, geoinformation science applied to problem-solving in earth sciences, natural and water resources and urban studies (disasters, climate adaptation, water/food security, urbanisation)

Achievements: 23 000 alumni (predominantly) mid-career professionals from 170+ countries

Key numbers: 245 staff, 143 PhD, 200 MSc (150 in house)

Awards: No.6 of the world in 'remote sensing' in Shanghai Subject Ranking

Top rated master program MSc GEO 2015 – 2018

Participating Organisation in GEO for Capacity Development



Rank 6 in remote sensing

Top master 2016-2018





ITC ESTABLISHED IN 1950
BY MINISTER WILLEM SCHERMERHORN

1950

International
Training
Centre for
Aerial Survey,
ITC

1968

International
Institute for
Aerial Survey
and Earth
Sciences, ITC

1985

International
Institute for
Aerospace
Survey and
Earth
Sciences, ITC

2002

International
Institute for
Geo-
Information
Science and
Earth
Observation,
ITC

2010

Faculty of
Geo-
Information
Science and
Earth
Observation,
ITC
University of
Twente

ITC ALUMNI

Total students 1950-2017 23,825
Total countries 1950-2017 191

Asia	10,016
Africa	7,217
Europe	3,386
America	2,803
Australia & Oceania	254
Unknown	149



COURSE PARTICIPANTS 1950-2017
ORIGIN OF ITC STUDENTS

UNIVERSITY
OF TWENTE.
FACULTY ITC



UNIVERSITY OF TWENTE.

Source: ITC corporate presentation





Now fully self supported



DATA COLLECTION

- Satellite data
- Aerial data
- Digital Maps
- Field measurements
- Tabular data



GIS ANALYSIS

- Modelling
- Internet GIS
- Processing Synthesis



DATA & INFORMATION DISSEMINATION

- Web portals
- Internet GIS



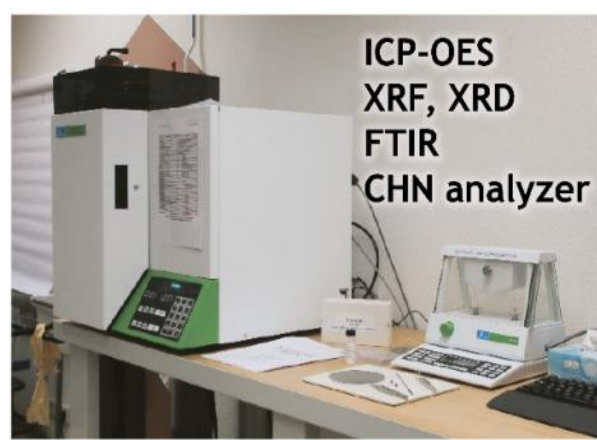
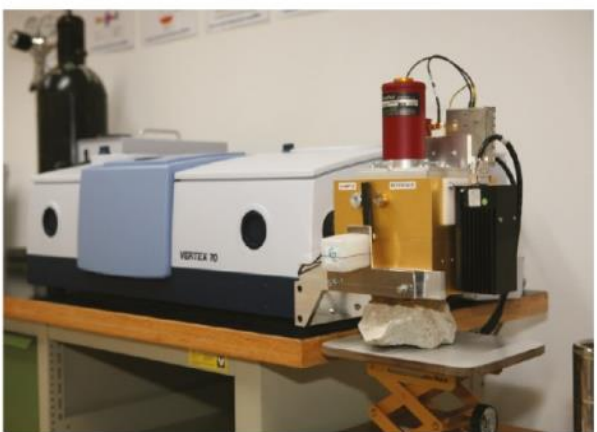
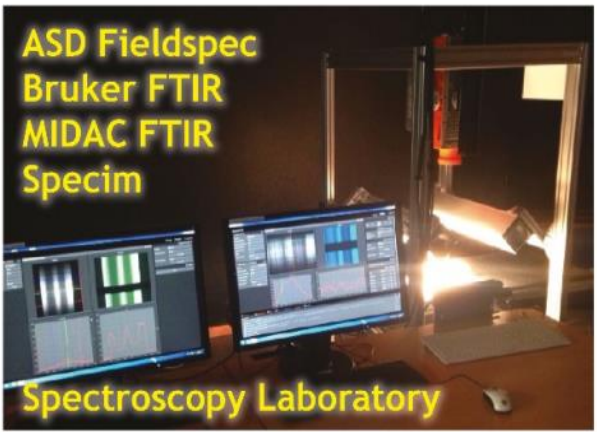
RESEARCH THEMES

LED BY ITC PROFESSORS

- 4D Earth
- Acquisition and Quality of Geo-spatial Information
- Forest Agriculture and Environment in the Spatial Sciences
- People, Land and Urban Systems
- Spatio-temporal Analytics, Maps and Processing
- Water Cycle and Climate

APPLICATION on:

- food security
 - water management
 - urban planning/land administration
 - disaster management/climate adaptation
 - strengthening civil society
 - earth sciences/geohazards-georesources
 - environmental management and biodiversity
- 





Flux towers
CalVal EO satellites
Sites in:
Kenya
Tibet
Spain
Netherlands





WHAT IS ITC AIMING TO ACHIEVE IN 2020 (IN CAPACITY DEVELOPMENT)



- **Regional training networks** where ITC acts as a knowledge broker
- ITC will develop state of the art education (**blended learning**) that will train the future generation of Geo-information and Earth Observation
- ITC MSc and PhD programs will fulfill real **societal demands** and appeal to the individual
- ITC will focus on the '**last mile**' in order to embed Earth Observation firmly in society
- ITC will train students in **entrepreneurial** skills and support setting up their own **business** as professional



training

data

GIS/RS training course,
Geological Survey Cyprus, 1994.

Source: van der Meer

- **Human resource development**, the process of equipping individuals with the understanding, skills and access to information, knowledge and training that enables them to perform effectively.
- **Organizational development**, the elaboration of management structures, processes and procedures, not only within organizations but also the management of relationships between the different organizations and sectors (public, private and community).
- **Institutional and legal framework development**, making legal and regulatory changes to enable organizations, institutions and agencies at all levels



	PURPOSE	FOCUS
CAPACITY BUILDING FOR GEOINFORMATICS	Human resources development	Supply of technical and professional personnel
	Organisational strengthening	Strengthen the management capacity of organisations
	Institutional strengthening	Strengthen the capacity for inter-agency coordination

NEW Dimensions to Capacity Development

- The government to government or country to country dimension considering that in a globalizing world countries cannot maintain to operate as stand-alone entities.
- The cross cutting dimension of the government and academic sector against the private sector->'entrepreneurs'
- South South->trilateral collaboration



Our Earth Observation Knowledge domain Is getting connected to society and other Geo technologies

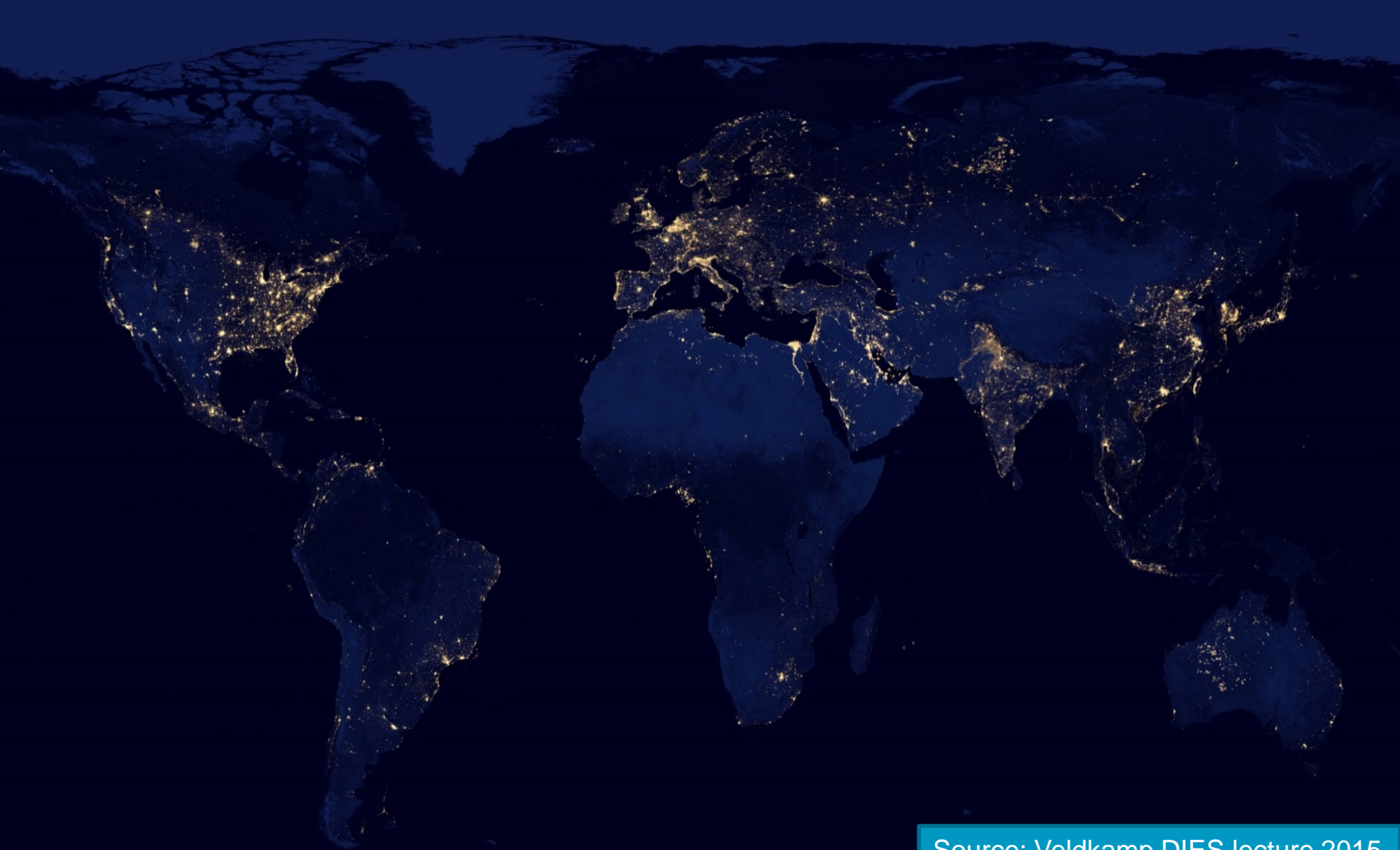


Rapid acceptance and users
Of geospatial data
applications
and technologies



robo-fly, developed at Harvard, weight < 1g





Source: Veldkamp DIES lecture 2015

Only an estimated 1 % of global population is estimated to be a global citizen. They all have to operate in a local context

INTERNATIONALIZATION IMPLIES COMBINING GLOBAL AND LOCAL CONTEXTS

- Cultural and context specificity
- Sustainable collaboration
- Network and teamwork on location
- Experimentation together co-creation

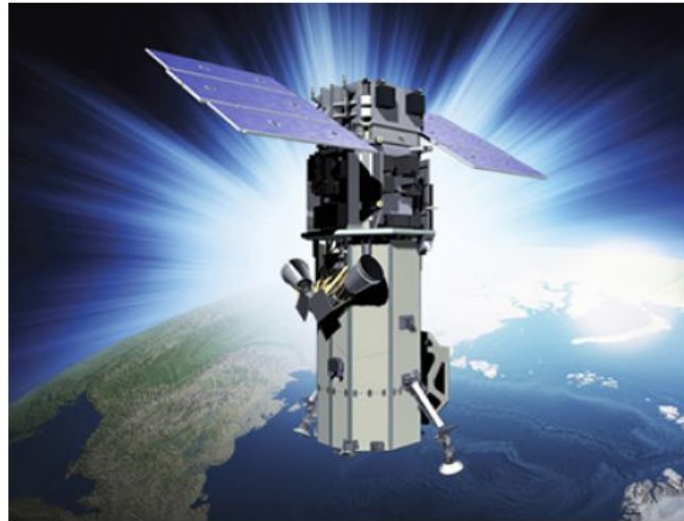


New trends in EO: the opportunity

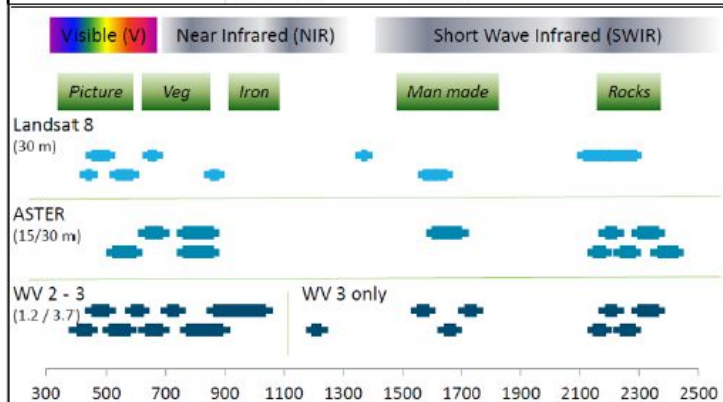
- **Availability** → many more satellites: e.g. EC Copernicus, small sat constellations
- **Accessibility** → ICT, the Cloud
- **Adaptability** → standards, adaptable usage (GIS/mobile)
- **Affordability** → free/low cost data, lower cost value adding
- **Acceptability** → fit-to-purpose, increased quality level

USE OF SPECTROSCOPY IN MINERAL INDUSTRY

Worldview 3



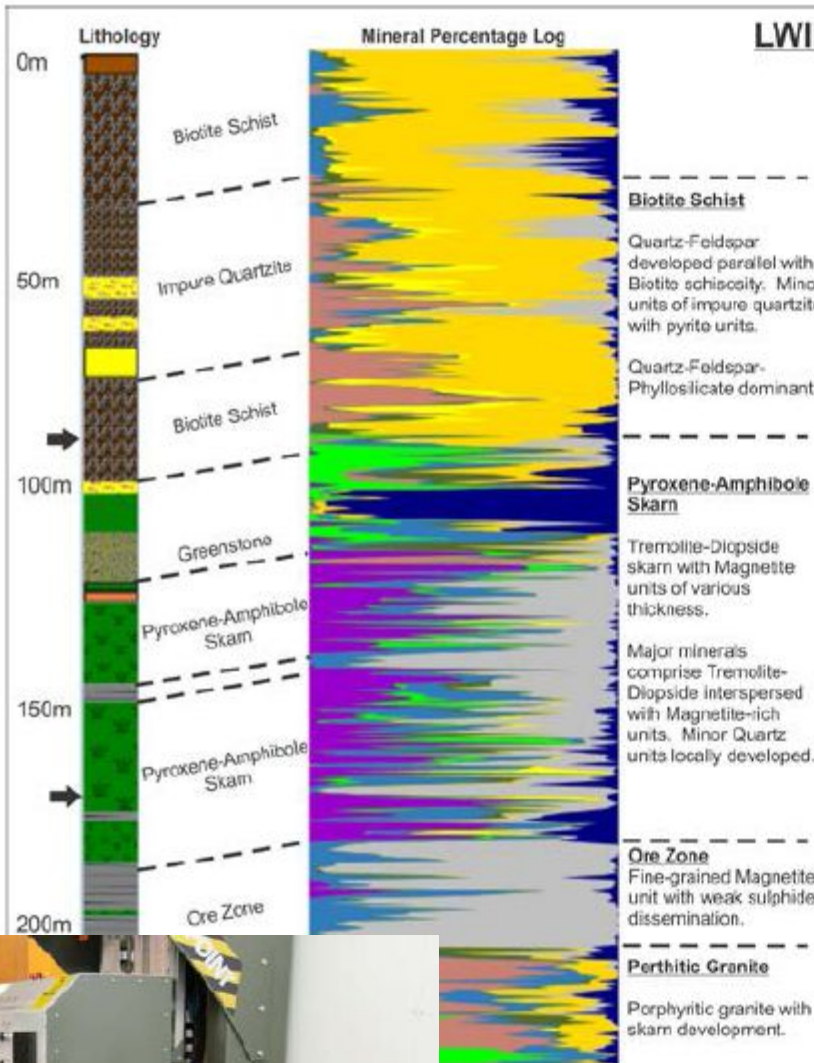
Sensor Bands	
Panchromatic: 450 - 800 nm	
8 Multispectral:	
Coastal: 400 - 450 nm	Red: 630 - 690 nm
Blue: 450 - 510 nm	Red Edge: 705 - 745 nm
Green: 510 - 580 nm	Near-IR1: 770 - 895 nm
Yellow: 585 - 625 nm	Near-IR2: 860 - 1040 nm
8 SWIR Bands:	
SWIR-1: 1195 - 1225 nm	SWIR-5: 2145 - 2185 nm
SWIR-2: 1550 - 1590 nm	SWIR-6: 2185 - 2225 nm
SWIR-3: 1640 - 1680 nm	SWIR-7: 2235 - 2285 nm
SWIR-4: 1710 - 1750 nm	SWIR-8: 2295 - 2365 nm
12 CAVIS Bands:	
Desert Clouds: 405 - 420 nm	Water-3: 930 - 965 nm
Aerosol-1: 459 - 509 nm	NDVI-SWIR: 1220 - 1252 nm
Green: 525 - 585 nm	Cirrus: 1365 - 1405 nm
Aerosol-2: 635 - 685 nm	Snow: 1620 - 1680 nm
Water-1: 845 - 885 nm	Aerosol-3: 2105 - 2245 nm
Water-2: 897 - 927 nm	Aerosol-3: 2105 - 2245 nm
Sensor Resolution (or GSD, Ground Sample Distance; off-nadir is geometric mean)	
Panchromatic Nadir:	0.31 m
20° Off-Nadir:	0.34 m
Multispectral Nadir:	1.24 m
20° Off-Nadir:	1.38 m
SWIR Nadir:	3.70 m
20° Off-Nadir:	4.10 m
CAVIS Nadir:	30.00 m



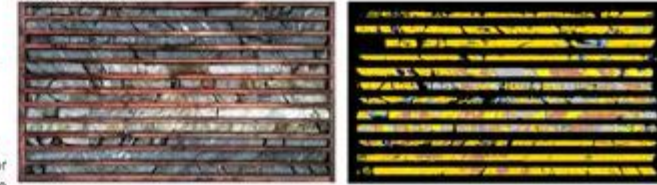
VNIR 1.24 m

SWIR 7.5 m (3.7 m native only for authorized users)
Alteration mapping scale ~1:15,000/1:7,000

LWIR Mapping of an Iron Skarn Intersection



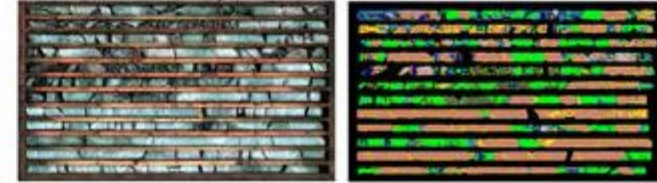
Biotite Schist



Pyroxene-Amphibole Skarn with Magnetite-rich Mineralization



Perthitic Granite with Pyroxene Skarn Alteration



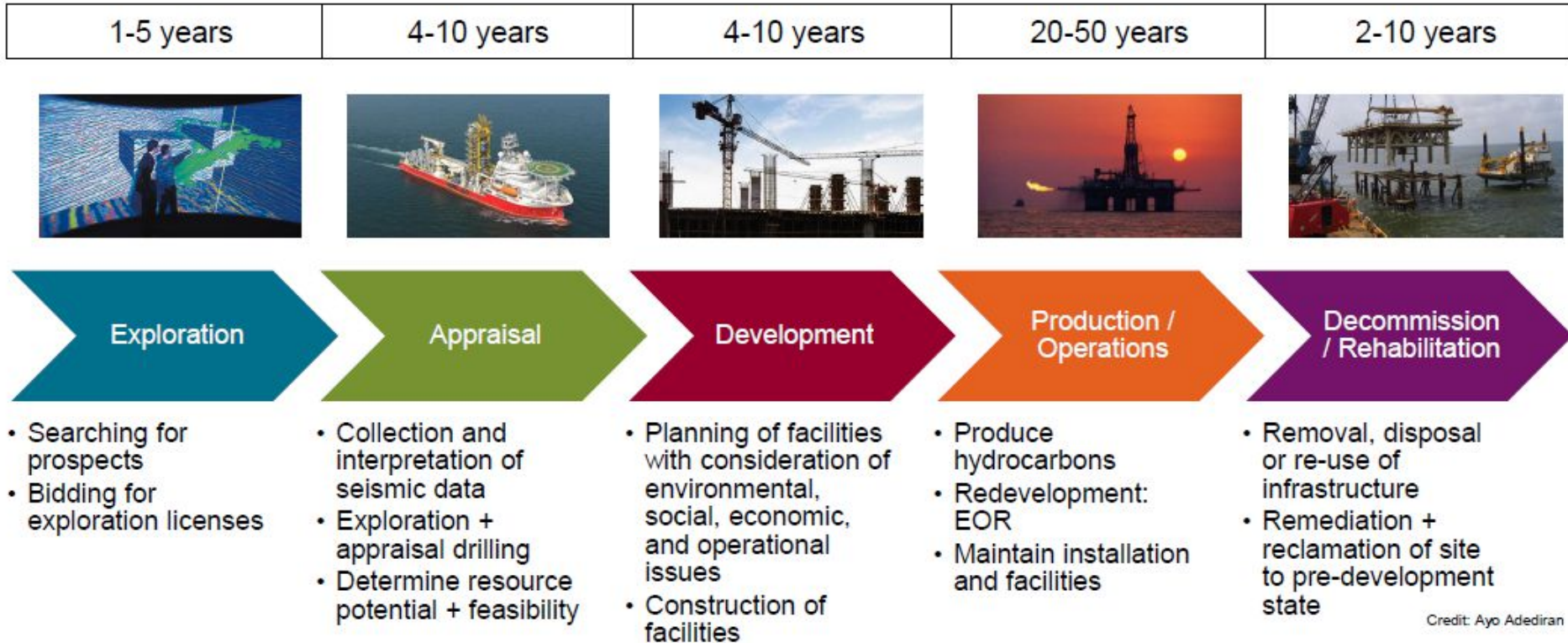
Mineral Legend

	Quartz		Clinopyroxene
	Feldspar-Quartz		Amphibole
	Quartz-Feldspar-Phyllosilicate		Sulphide-Oxide
	Phyllosilicate		Unknown Mineral
	Low reflectance Minerals		



Source: David W. Coulter

REMOTE SENSING EMBEDDED IN THE OIL&GAS SECTOR



Credit: Ayo Adediran

NORTH KOREA

Huge Gap Predicted In Supply

guardian.co.uk | The Observer

Food aid to poorest countries slashed as price of grain soars

UN warns of drastic crisis as relief workers urge donor countries to help beat shortages by switching to giving cash or vouchers

Drought is key factor in Kenya's food crisis

Mat Brown, Foreign Correspondent
Last Updated: March 27, 2009 9:56AM UAE / March 27, 2009 6:55AM GMT

TRURO, Kenya's most fertile land had a corn harvest in six months. Last year's late rains and the current rainy season is already a month late, meaning the corn plant for at least another month.



"The greatest earth in the world is being lost to poverty and hunger. More than 1 billion hungry, UN says"

15 October 2009

More than 1 billion people, one sixth of humanity, undernourished by the end of 2009, was reported on Wednesday. The ranks of the hungry 100 million people in one year, a result of the since the Great Depression.

"The State of Food Insecurity," produced by the Organisation for Economic Co-operation and Development (OECD) and the World Food Programme, says the sharp increase in global hunger is not the result of natural disasters, but the man-made causes of unemployment, and declining incomes.



Asia facing a major rice shortage

MATT CRAWOOD

Climate change compounds Ethiopia's food crisis

APP - Standing amidst a group of scrawny before Ethiopian farmers, Take Strica points to the scorching sun when asked why his food reserves have dwindled this year.

"The weather has changed. It's not as fit used to be before," he laments. "The rains are increasingly erratic."



China View

WORLD

Food crisis grip rural parts of Nepali Chitwan district

www.chinaview.cn 2009-11-15 11:52:27

The Telegraph

Now we are seven billion, let's feed the world

Why do we reject the technology that would put food on the plates of



The New York Times

Food Chain: Drought's Toll

Every six seconds a child on this planet dies of hunger.

NEWS

Last Updated: Friday, 23 March 2007, 00:15 GMT

Biofuel demand makes food expensive

Every six seconds a child on this planet dies of hunger.

The Economist

World politics | Business & Finance | Economics | Science & Technology | Culture | Books

Africa

Beobab

In pictures

Hunger in the Horn of Africa

Aug 4th 2011, 27:46 by The Economist online

NEVER again, said the world after the horror Ethiopia's famine in 1984. And for years part of Africa. But after the worst drought in 60 years, 8.225 south-eastern Ethiopia, southern Somalia and Djibouti have estimates that more than 12m people in the more of Africa need hands have already died and hundreds of thousands more risk been annihilated. Hundreds of thousands of people are in search of help. Mortality rates in some areas are five

The Great Food Crisis of 2011

It's real, and it's not going away anytime soon.

BY LESTER BROWN | JANUARY 10, 2011



DAILY NATION

Kenya among food crisis nations, UN says

Kenya is among the nations that will be hit hard by the global food crisis, the United Nations says.



BBC NEWS AFRICA

Somalia famine: UN warns of 750,000 deaths

As many as 750,000 people could die in Somalia's drought-stricken in the coming months, the UN has warned, declaring a famine in a new area.



TIME FAMINE

Why are Ethiopians starving again? What should the world do - and not do?

The New York Times

The Food Crisis

February 24, 2011

Prices are soaring to record levels, three countries with mass hunger and political instabilities of the Group of 20 leading economic meeting in Paris last week, but for all of it

The New York Times

2010 Pakistan Floods

BBC NEWS

Bangladesh bans most rice exports

Bangladesh has banned exports of nearly all the rice it produces to prevent shortages and keep food costs down.



Bloomberg.com

Global Food Crisis



TIME

Little Keeps Nigeria From Crisis



Hunger in India: The Crisis Wor...



U.N. Food Agency Issues Warning on China Drought



REUTERS

Food crisis worsens in Africa: global action: U.N

Written by Sevencam
Wednesday, 11 November 2009 00:00

The World's Growing Food



Food security for 7 billion



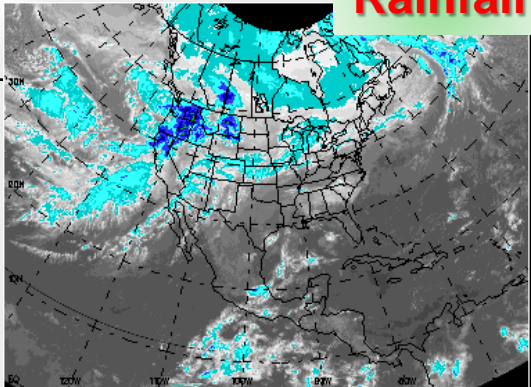
Time as a classifier?



Time as a 'new' variable!

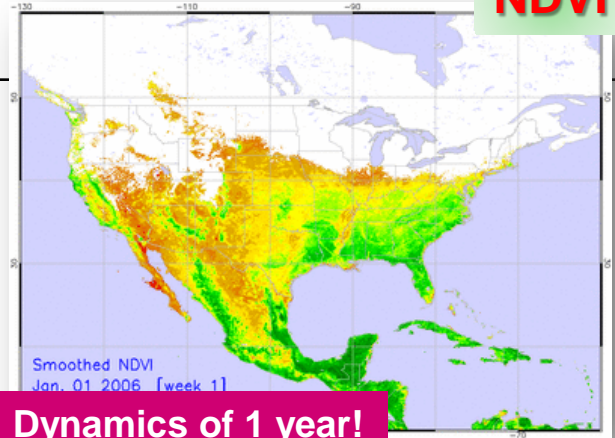
Time as a 'new' coordinate-axis!

Rainfall

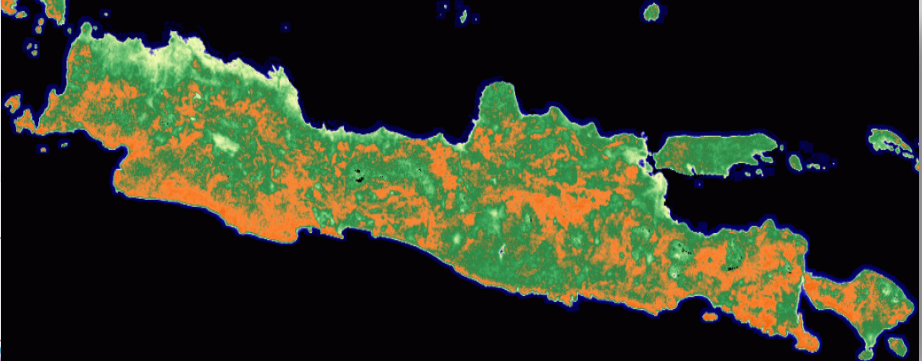


Dynamics of 2 days!

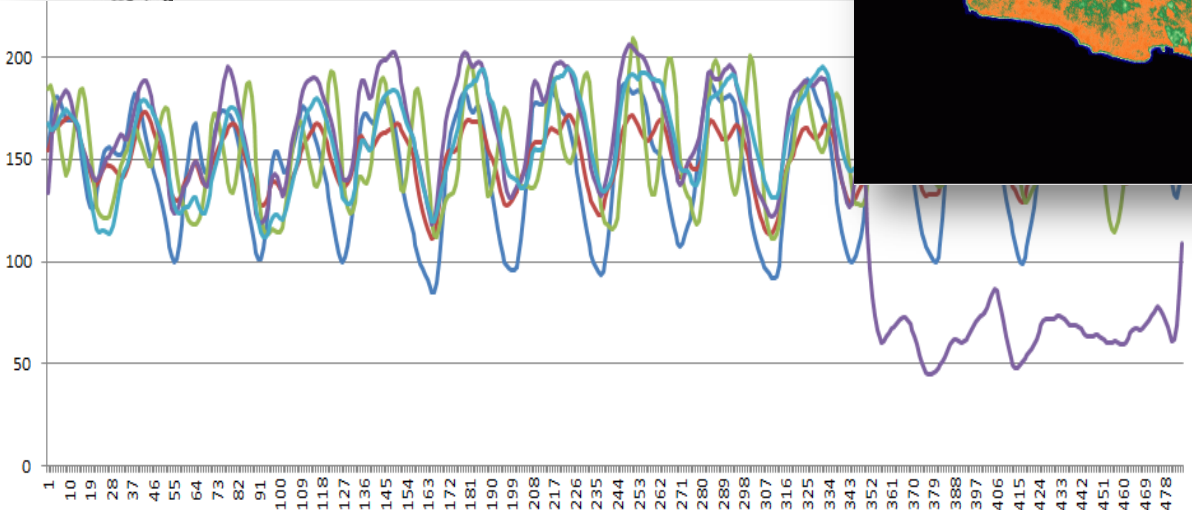
NDVI



Dynamics of 1 year!

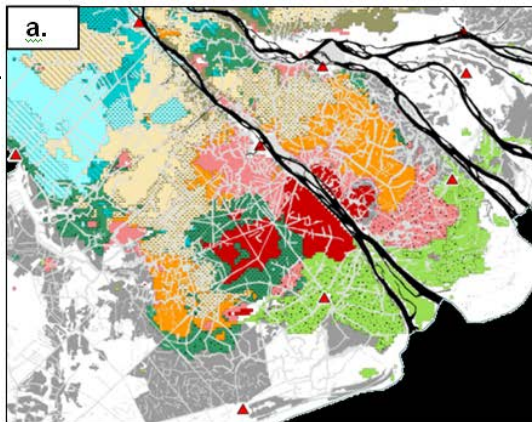


Java: Spot-VGT NDVI 15 yr data

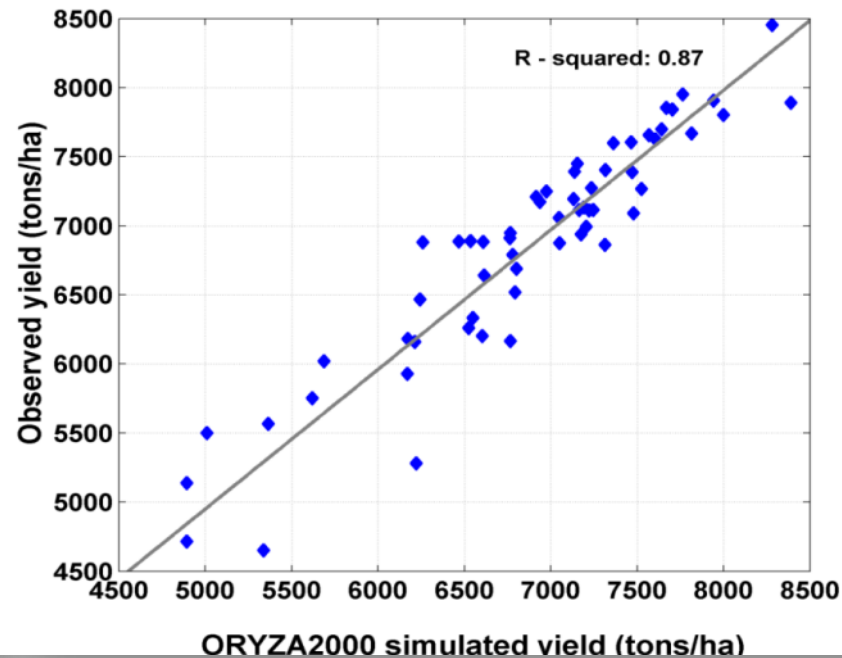
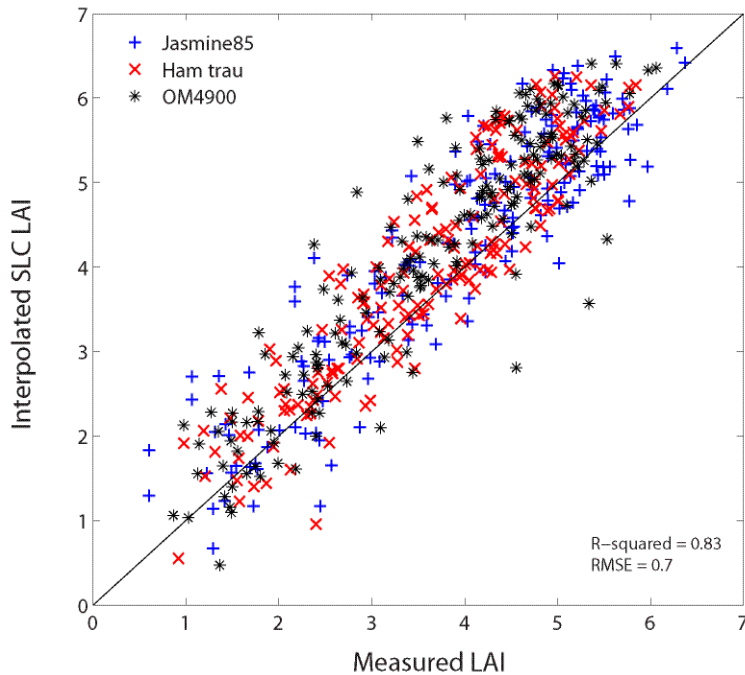


Example using Accumulation Measurements (*Rice, Mekong Delta, Vietnam*)

Rice yield estimates; 58 sites (*Nguyen Thi Thu Ha et al., in prep.*)



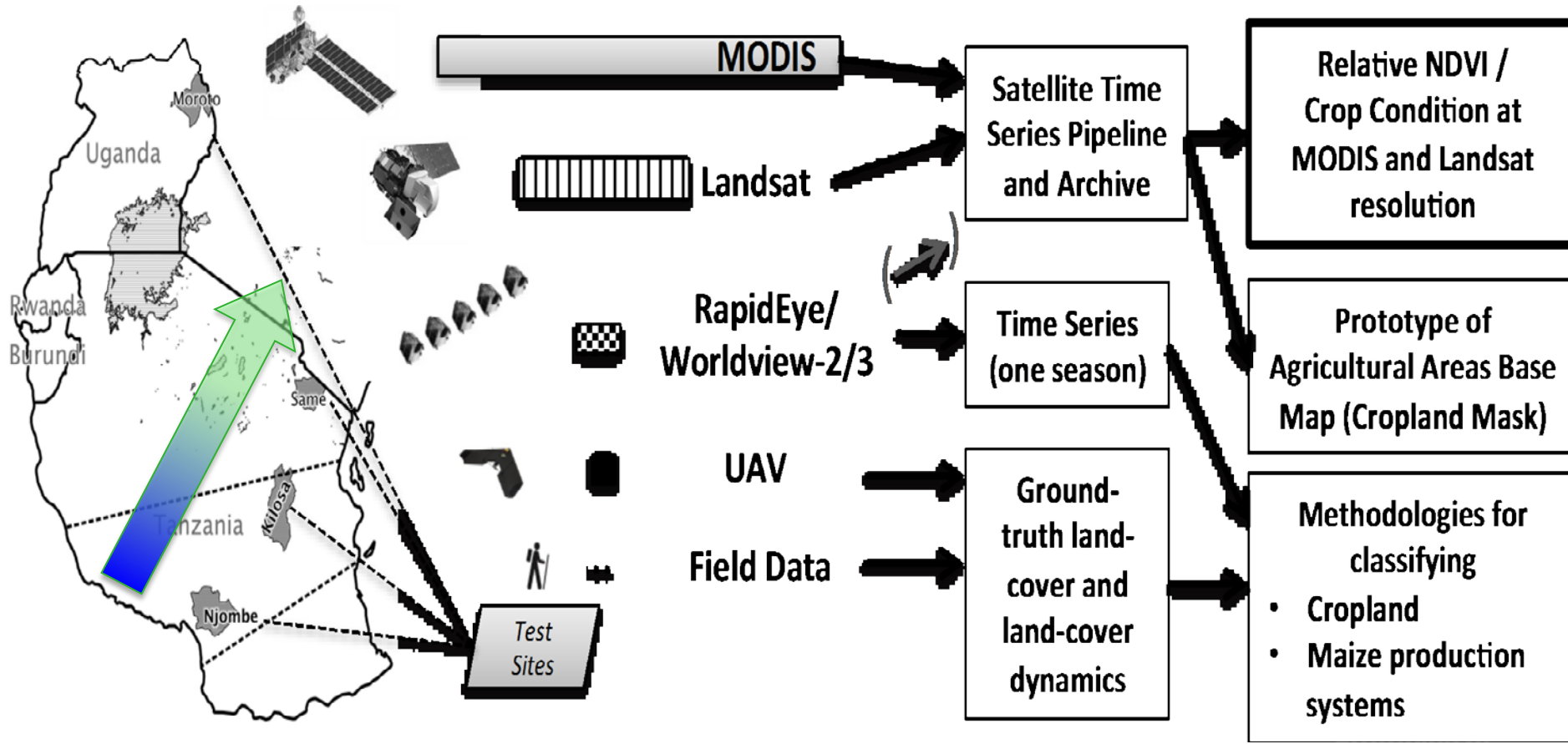
Ref. Map Unit	Flood Regime	Sequential Rice Cropping System	Crop Calendar from Interviews with Notes																
			Map Units	NDVI Class	Area (Ha)	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep		
A	Uncontrolled Flooding	Extensive Flooding	3x Rice	53	92,415							Jasmine 85	OM 1940	Jasmine 85					
				57	72,368								IR 50404	IR 50404	IR 50404				
				51	111,860									IR 50404	IR 50404	IR 50404			
				37	46,931									Before Oct '02, only 2x Rice was grown per year; salinity/acidity problems detected.					
				55	3,885									Acidity problems detected.					



Monitoring crop health status



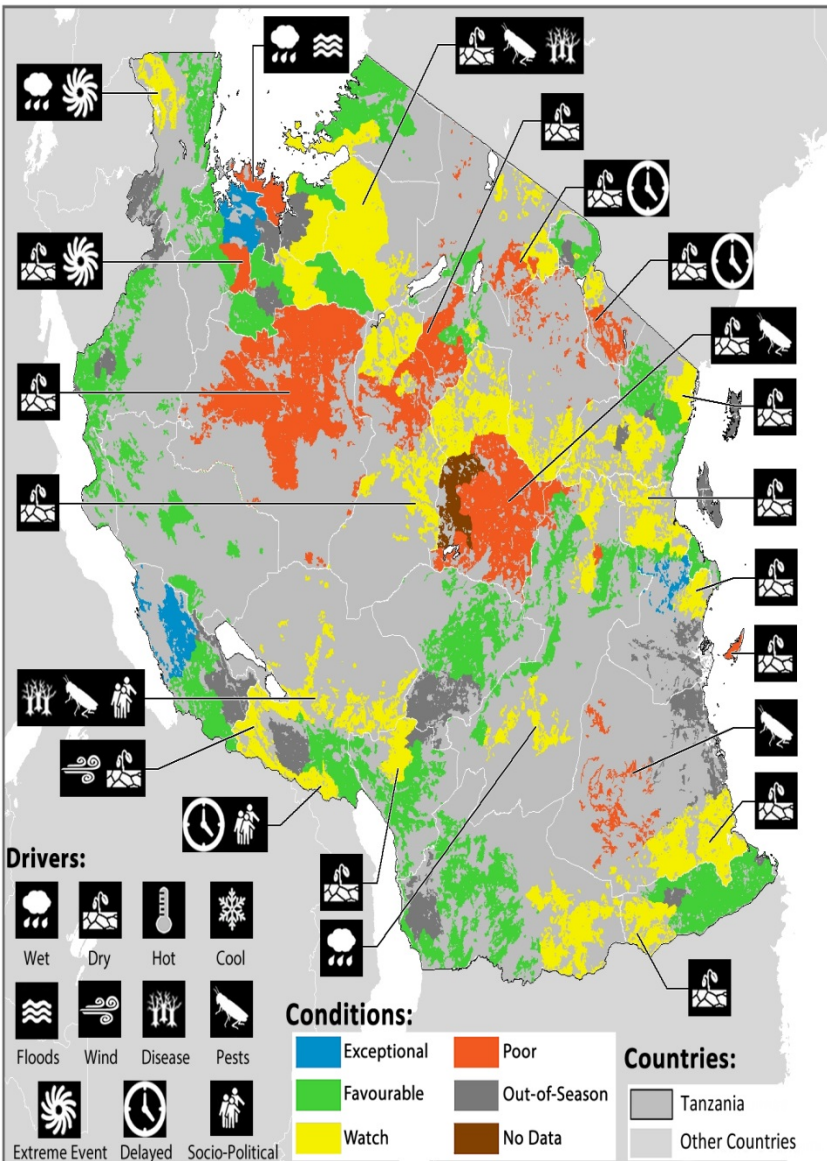
SPURRING A
TRANSFORMATION FOR
AGRICULTURE THROUGH
REMOTE SENSING



Crop Monitor Tanzania

from data to information

Provides real-time information on crop conditions to support decisions such as mobilization of food, grain storage, food reserve purchases, market intelligence that can promote private industry



Example for prototype in May

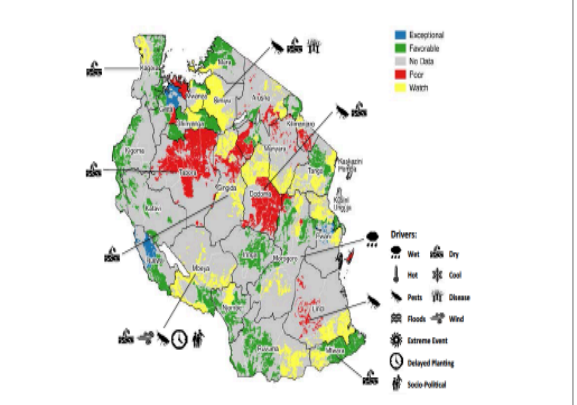
Map depicting crop conditions in each region over cropland areas.

Where conditions are below average, an icon with the driver is provided. i.e. in Morogoro, dryness and pests were negatively impacting crop conditions

Prototype National Food Security Bulletin- Tanzania Bringing RS, tablet, & online GIS tools together

THE UNITED REPUBLIC OF TANZANIA
MINISTRY OF AGRICULTURE FOOD SECURITY AND COOPERATIVES
 Kilimo House 1, Temeke, P.O. Box 9192, DAR ES SALAAM, Telephone: +255 - 022-2862064, Fax: +255 - 022-2862077, E-mail: pfs@kilimo.go.tz
NATIONAL FOOD SECURITY BULLETIN
 Volume 2015, No. 05 www.agriculture.go.tz 30th May, 2015

Major Crop Conditions in Tanzania (as of 30th May 2015)



This crop condition map synthesizes information for all crops as of 30th May 2015. Crop conditions over the main growing areas are based on a combination of national and regional crop analyst inputs along with remote sensing data and rainfall data provided by the Tanzania Meteorological Department. Areas that are in other than favorable conditions are displayed on the map with their drivers

NATIONAL HIGHLIGHTS
 The maize crop growing areas of the southern highlands conditions are fair to favorable with the exception of Mbeya where conditions are poor. The region experienced a delayed start to the rainy season, which has created early moisture deficits in many areas.

Poor conditions persist in Tabora, Lindi and parts of Geita, Arusha, Kilimanjaro and Dodoma. There is reports of pests and diseases in Simiyu, Dodoma, Lin and Mbeya. The common crop pest is the Larger Grasshopper (Dumuzi) affecting maize crops in all the districts in Sinuhaba. The common pest and disease in Mwanza is Maize Leaf Necrosis (MLND), Cassava Mosaic Virus and Brown Streak
 Seasonal rains have begun to intensify in the last two decades, however the effects early season rainfall deficits are still evident. April is the peak month for the long-rain season and given a positive two-week forecast, some relief is expected

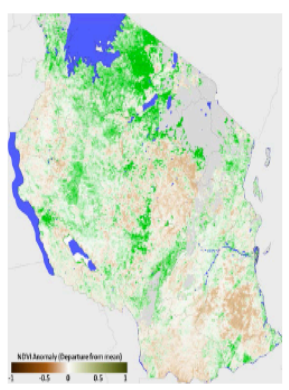
Contents

Major crop conditions	1
National highlights	1
Vulnerability	4
Intervention programs	4

Strong interest from Ministry, Prime Minister Delivery Bureau, and Deputy Permanent Secretary to develop operationally

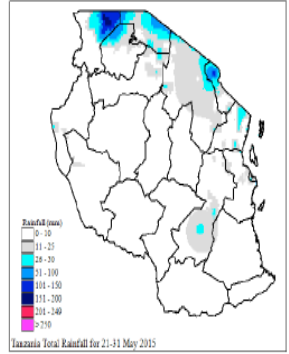
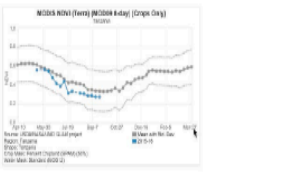
Contents

Vulnerability	4
Intervention programs	4



NDVI Summary:
 NDVI anomaly data for the country show above average conditions for the country with Simiyu, Shinyanga, Tabora and some parts of Mbeya and Rukwa performing relatively above average conditions compared to the long-term average for the month of May. Some parts of Iringa, Lindi and Dodoma current vegetation conditions fall slightly below average.

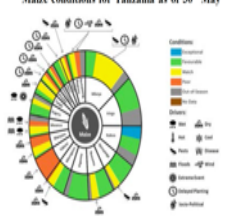
Remaining regions portrays normal vegetative conditions



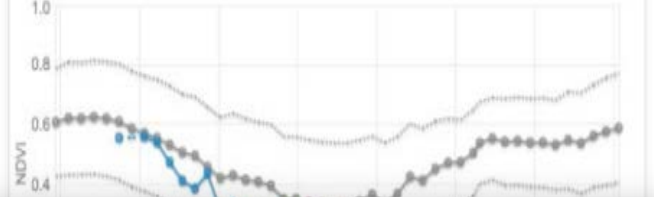
Agro-meteorological outlook:
 The Tanzania Meteorological Agency (TMA) reports that with the observed synoptic conditions during May 21-31, 2015, Masika continued to feature over some of the bimodal areas especially north-eastern highlands and Lake Victoria Basin. However, parts of those areas and much of the northern coast experienced dry conditions. The unimodal areas on the other hand experienced mostly drenching rains including over the normal to above normal rainfall. (mostly in Morogoro)

Highlights by Major Food Crop

Maize:
 A delayed start of the 2015 Masika for maize has led to significant rainfall deficits in parts of Njombe and Iringa. A major proportion of the maize growing areas of Dodoma are experiencing poor conditions. The three crop growing areas Singida, Kilimajaro, and Tabora are currently in a watch status due to abnormally hot temperatures and reduced rainfall. The maize growing area of SNNPR has been significantly impacted by these same drivers, but also experienced a more significant delay in the onset of seasonal rains, thus owing to the areas poor cropping conditions. Cattle herds have been reported in Morogoro (see below).



MODIS NDVI (Terra) (MOD09 8-day) (Crops Only) Tanzania



Food Prices by region:



Real-time *DATA* leading TO *Informed DECISIONS*



Figure 3: Crop Conditions in Rupa Sub-County August 13, 2015.
A food security monitoring officer talking to a farmer whose maize garden totally failed.



Figure 4: Crop Conditions in Nadunget Sub-County August 14, 2014
The above garden should have been at harvest stage at the time the above photograph was taken.
On 17th August 2015, the Hon. Minister for Relief, Disaster Preparedness and Management visited the area and wrote and physically delivered a letter to the Hon. Minister of Finance pointing out the worsening situation. On 24th August 2015, the Rt. Hon. Prime Minister called a meeting with the Ministers for Finance, Agriculture, and Disaster on the subject. The meeting was chaired by the Minister for Relief, Disaster Preparedness and Management and attended also by the PS /Secretary to Treasury who promised to avail funds within one week; however, the funds have not been released.

THURSDAY, OCTOBER 15, 2015 | Last Updated 3 Hours Ago | CONTENT RIGHTS AND PERMISSION | RSS | ADVERTISE | SUBSCRIBE

New Vision

UGANDA'S LEADING DAILY

HOME TODAY'S PICK NATIONAL BUSINESS SPORT MULTIMEDIA ENTERTAINMENT WORLD SCIENCE & TECH

Indian man who woke up on autopsy table dies | Museveni gets Father-of-the-Nation medal | Pope is scandal

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Environment

Govt to distribute relief food to Karamoja

Published Date: Sep 26, 2015

Prime Minister Dr. Ruhakana Rugunda chaired a meeting that discussed the food situation in Karamoja region. (File photo)

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newvision



Food security report presented to Inter-Ministerial Committee September 25, 2015



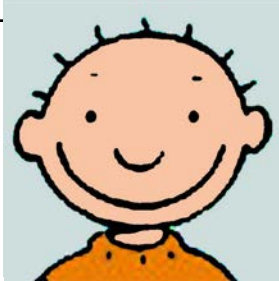
First trucks of relief food dispatched September 26, 2015

DROUGHT AND EAST AFRICAN PASTORALISTS

- Horn of Africa:
 - > 20 million pastoralists that depend on livestock
 - exports of livestock & livestock products > \$1billion
 - drought is main cause of livestock loss → source of poverty
 - standard responses (food/cash aid) are slow, costly, and insufficient
- Insurance as option?



HOW DOES INSURANCE WORK?



INSURING ANIMALS?

- Traditional insurance: need to check losses → \$\$
 - In remote areas: no cost-effective options to check losses
- Alternative: Index insurance:
 - base premium and payout on a biophysical index
 - correlates to losses
 - key issue: basis risk



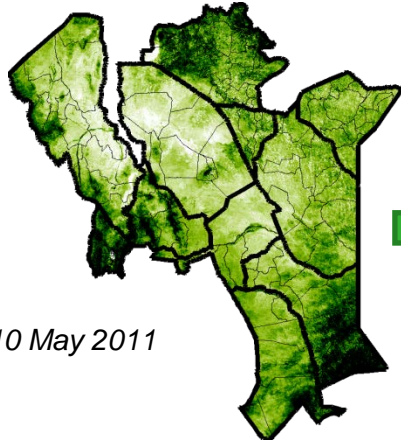
index construction

Drought occurrence can be estimated in many ways->chosen for forage scarcity index as a measure of area-average seasonal forage availability



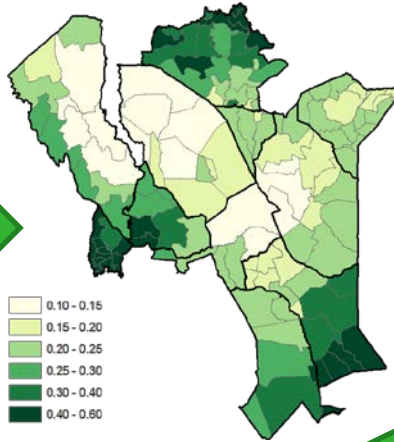
FORAGE SCARCITY INDEX: APPROACH

NDVI image (10 day)

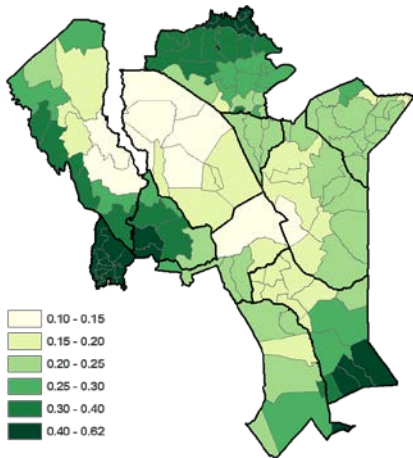
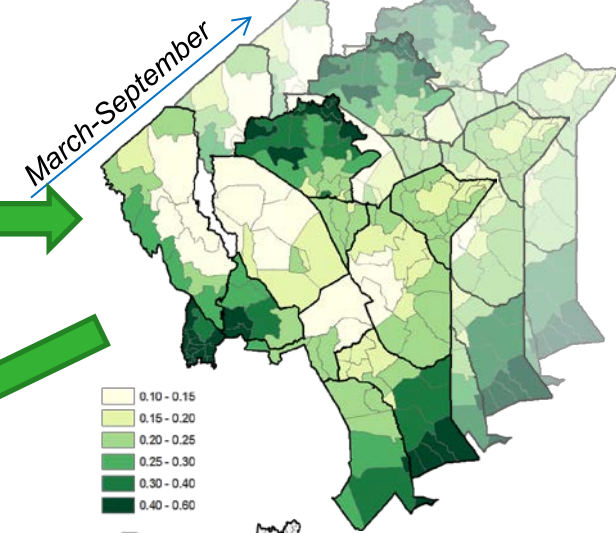


1-10 May 2011

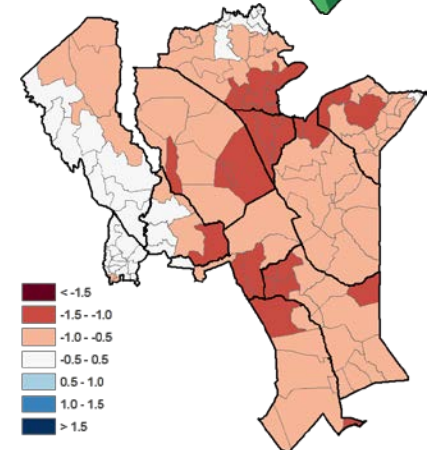
NDVI aggregated



Temporal averaging



Seasonal average NDVI (proxy for avg forage productivity in unit)

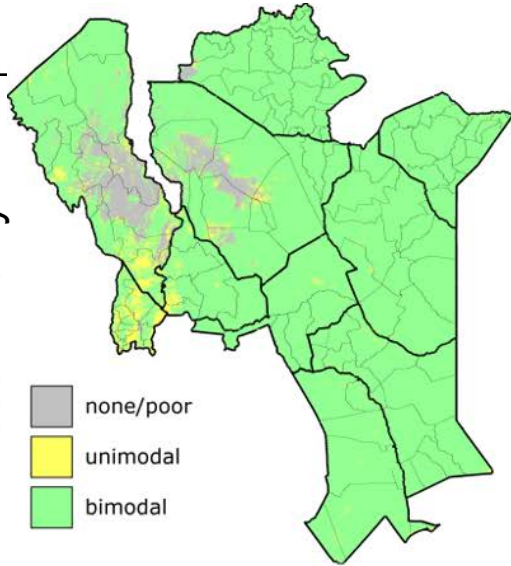
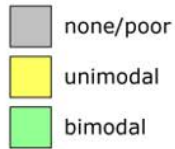


Z-scoring to get seasonal index

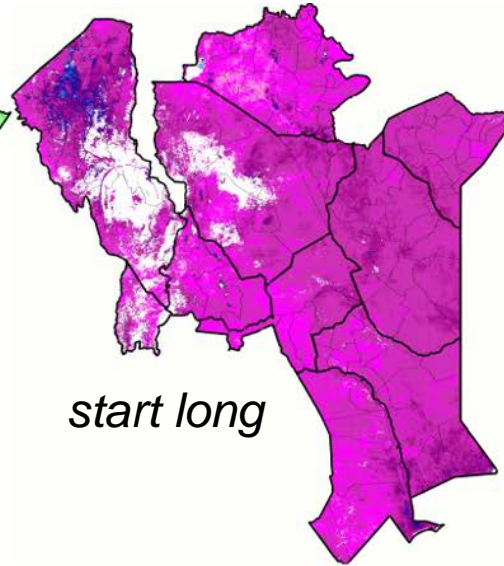


PIXEL-BASED PHENOLOGY RESULTS (2001-2014 AVERAGE)

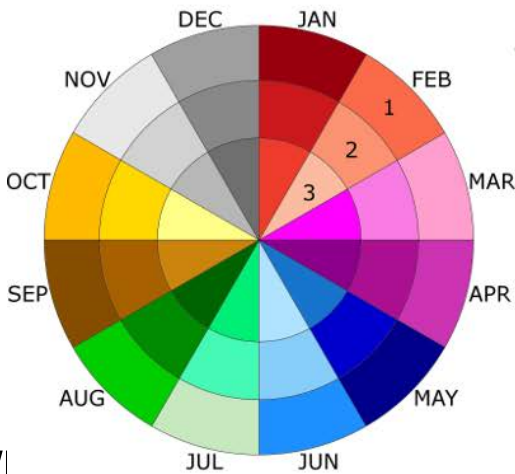
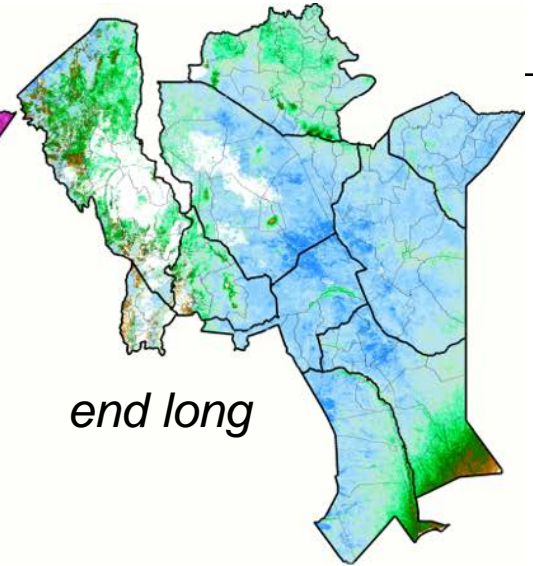
seasonality



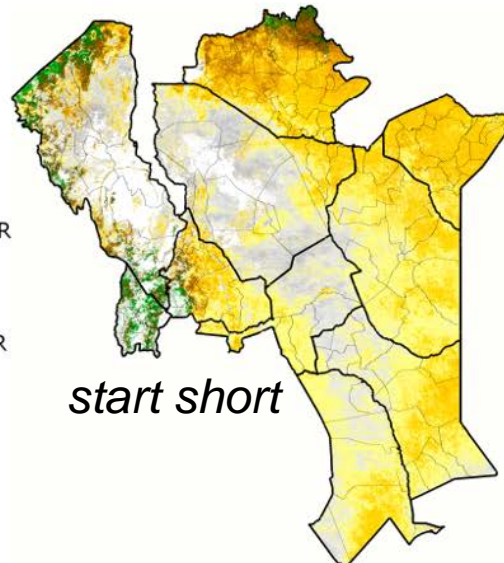
start long



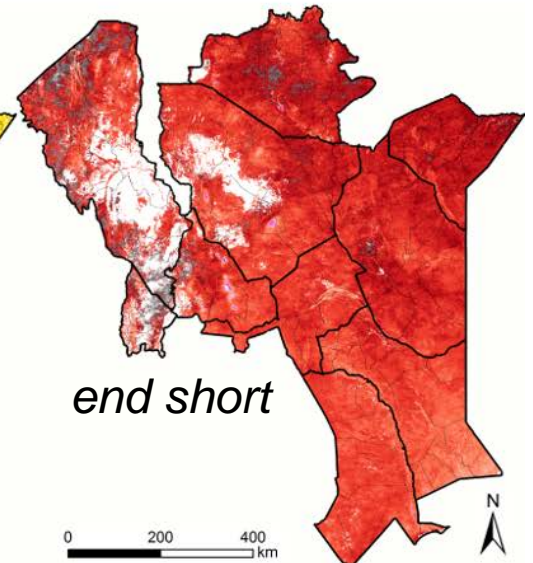
end long



start short

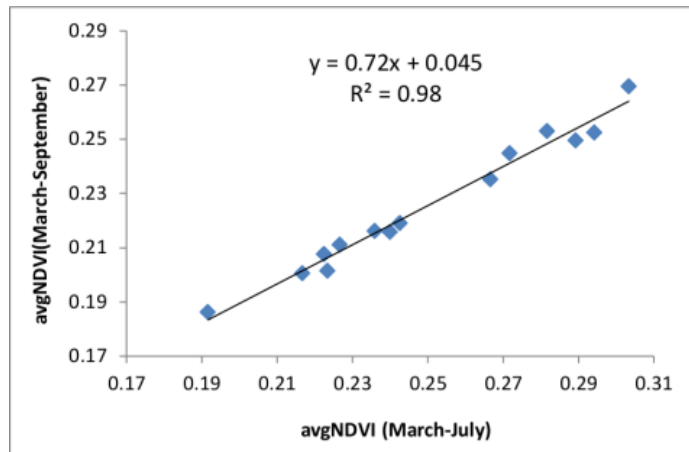


end short



CAN WE PREDICT CUMNDVI VARIABILITY BEFORE EOS?

	MAR			APR			MAY			JUN			JUL			AUG			SEP			avgNDVI
	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	FULL
2001																					0.208	
2002																						0.270
2003																						0.253
2004																						0.245
2005																						0.211
2006																						0.216
2007																						0.219
2008																						0.252
2009																						0.200
2010																						0.250
2011																						0.186
2012																						0.216
2013																						0.235
2014																						0.201



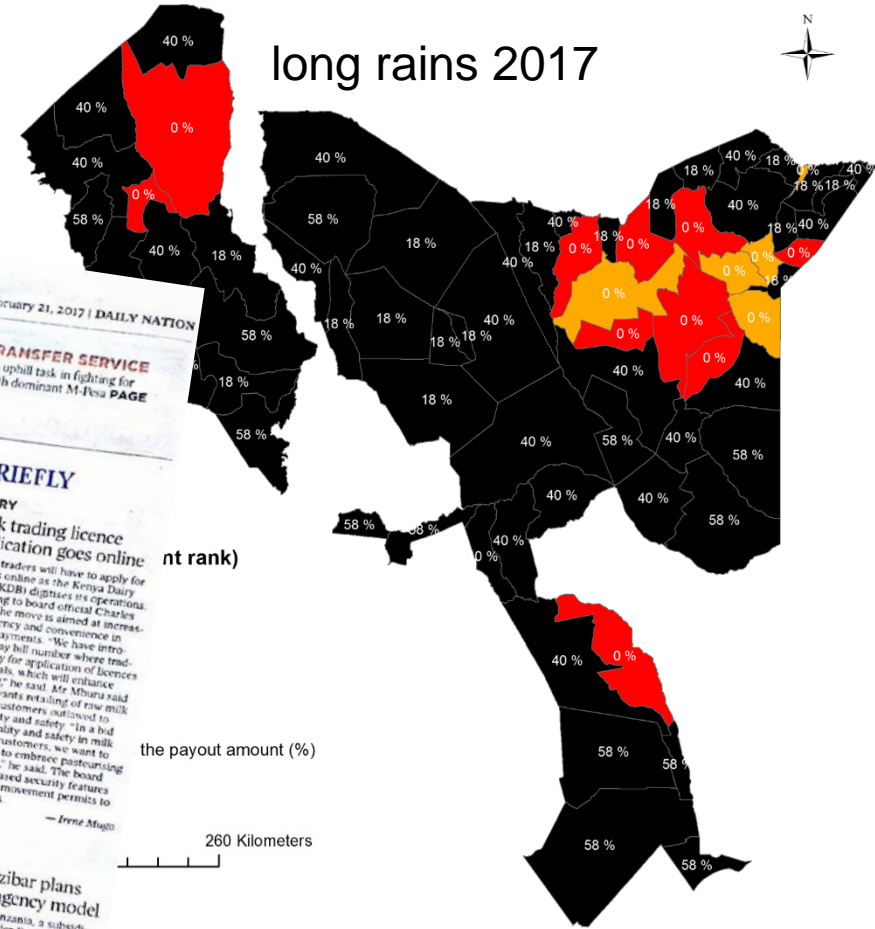
R^2

what is the latest end-date for which R^2 still exceeds 0.90 ?

PAYOUTS KLIP 2017

short rains 2016/2017

long rains 2017



- Legend**
- KLIP**
- Percent R: 0 - 20
 - 21
 - 31
 - 46
 - 66
- Payout**
- 0
 - 21
 - 31
 - 46
 - 66

Bett says 12,000 households from arid and semi arid zones to benefit from the plan by insurers and State

BY GERALD ANDAE
ganda@ke.nationmedia.com

The Kenya Livestock Insurance Programme will pay pastoralists in six counties affected by drought a total of Sh214 million to cover loss of their herds.

Announcing the payout plan yesterday, Agriculture Cabinet Secretary Bett said 12,000 pastoral households, mainly from arid and semi-arid areas, will benefit from the plan which was initiated by the government in 2015 in partnership with selected insurance firms, is aimed at averting losses that might occur in grazing fields.

"We will today embark on payment of Sh214 million to farmers whose livestock are faced with imminent drought," said Mr Bett.

The programme is targeted at vulnerable pastoralists who receive drought insurance for five tropical livestock units (TLU), which is an equivalent to five cattle, or 50 goats.

to measurements of forage conditions will range from Sh1,450 per pastoral modest losses to Sh29,400 in areas where drought is severe.

The minister said average payout



Cabinet Secretary Ministry of Agriculture, Livestock and Fisheries Willy Bett (centre), State Department for Livestock Principal Secretary Andrew Tumur (left) and Mr Ashok Shah, the APA Insurance group CEO during a press conference at Kilimo House, Nairobi, yesterday. DENNIS OCHENDO / NATION

BRIEFLY

DAIRY
Milk trading licence application goes online

Milk traders will have to apply for licences online as the Kenya Dairy Board (KDB) digitises its operations. According to board official Charles Mburu, the move is aimed at increasing efficiency and convenience in making payments. "We have introduced a pay bill number where traders and renewals, which will enhance the board's retailing of raw milk to assure quality and safety. "In a bid to assure quality and safety in milk handling to customers, we want to allow traders to embrace pasteurising before selling," he said. The board in licence and movement permits to eliminate fakes.

— Irene Mugo

BANKING
Equity Zanzibar plans to employ agency model

Equity Bank Tanzania, a subsidiary of Kenyan lender Equity Group plans to replicate its agency banking model in Tanzania as it seeks to gain a toehold in the neighbouring country. The lender started operation of its new branch in the coastal town of Zanzibar last Monday. Equity Bank Tanzania Managing Director Joseph Iba said it would embrace the agency banking model adopted by its parent bank as it seeks to firm its operations there. "We are committed to broadening financial inclusion and footprint through branches, agency banking, ATMs and mobile banking."

>3m USD to 14000 beneficiaries





SO HOW DOES THIS HELP?

- Phenological analysis provides better seasonal definitions
 - Forage scarcity index relates to when forage is developing
 - Large spatial variability
 - Needed if moving to new areas
- Insurance payments can be made 1-3 month earlier
 - considering also season predictability (overall similar payout)
 - accounting for NDVI filtering important (rainy season likely more clouds)
 - location-dependent
- Earlier payment may allow protection livestock
 - purchase of forage, water, medicines OR movement livestock

Some slides from the ADPC work





POINTS FOR DISCUSSION?

- EO and market development: stimulating entrepreneurships
- ITC will train students in entrepreneurial skills and support setting up their own business as professional
- Expanding our collaboration: from ADPC to other Hubs

ACKNOWLEDGING MY COLLEAGUES!

- ITC vision 2020, Tom Veldkamp (Dean ITC) – a.veldkamp@utwente.nl
- Crop yield, Kees de Bie, c.a.j.m.debie@utwente.nl
- STARS program, Rolf De By, r.a.deby@utwente.nl
- Insurance based livestock, Anton Vrieling, a.vrieling@utwente.nl

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