2.4.4 Supporting the implementation of NAPs with Earth observation solutions

Cyber hour

28 March 2023

16:00 – 17:30

GEO GROUP ON EARTH OBSERVATIONS

NAPEXPO CHILE 2023

Sara Venturini, GEO Secretariat

Sara Venturini is the Climate Coordinator at the Group on Earth Observations (GEO) Secretariat.

At GEO she promotes access and the use of Earth observation data and solutions to inform and accelerate climate action by member countries.

She has 15 years' professional experience collaborating with UN agencies and advising governments and organisations around the world on developing and implementing climate change policies, and participating in multilateral climate negotiations.

She holds a PhD in Climate Change Science and Management from Ca’ Foscari University of Venice, Italy.

GEO: the single largest global partnership focused on Earth observations for impact

Evidence-based activities to support policy

GLOBAL POLICY

Earth observations for climate action under the UNFCCC. Disaster risk reduction under Sendai Framework. Land degradation neutrality with UNCCD. Nature-based solutions with CBD. Mercury monitoring under Minamata Convention for Mercury.

NATIONAL IMPLEMENTATION

Capacity development and projects. Agriculture monitoring for adaptation, flood early warning systems, impact of wildfires, coastal areas and ocean health, etc. Supplementary Technical Guidance to integrate Earth observations into National Adaptation Plans (NAPs).

Agenda

Presentations and demos:

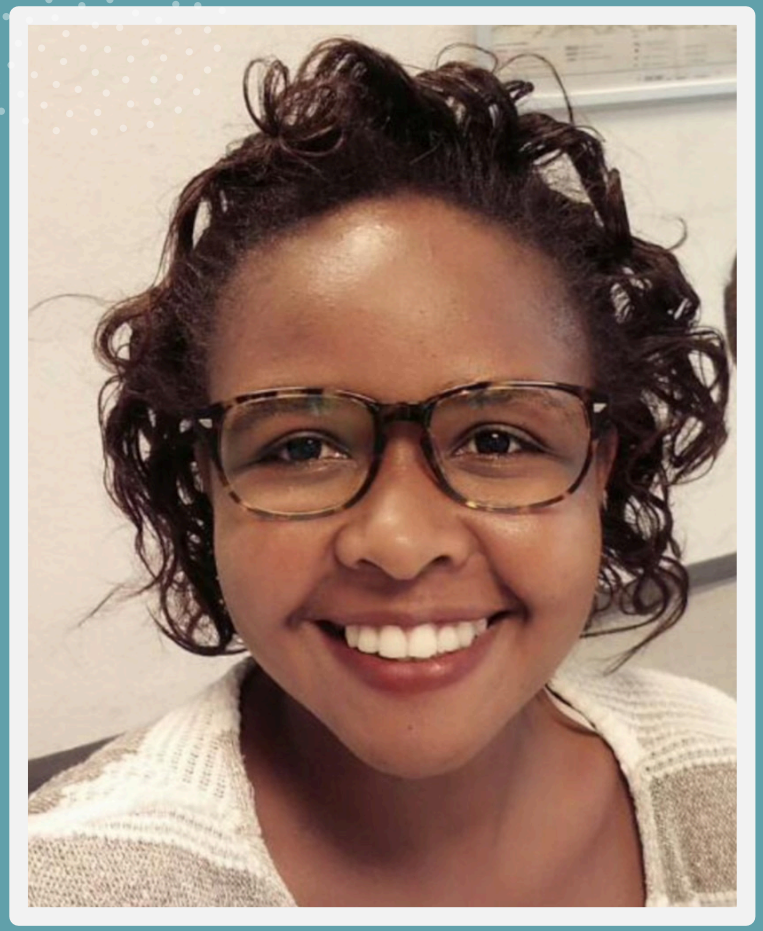
- Esther Makabe, Capacity Development Coordinator, GEOGLAM
- Kenneth Mwangi, Climate Monitoring and Early Warning Expert, IGAD - ICPAC, Kenya
- David Ongo, Digital Earth Africa focal point, RCMRD, Kenya
- Jorge Luis Vazquez-Aguirre, WMO

Q&A and open discussion (30 min)

Esther Makabe, GEOGLAM

Makabe is an information management professional with over 6 years of hands-on experience in geospatial information technology and knowledge management in emergency and development contexts.

She is currently Capacity Development Coordinator at the GEOGLAM Secretariat.



GEOGLAM - Earth Observations for National Adaptation Plans (EO4NAPs)

Esther Makabe,
GEOGLAM Secretariat

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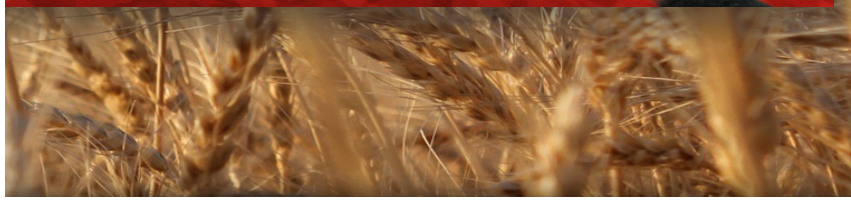
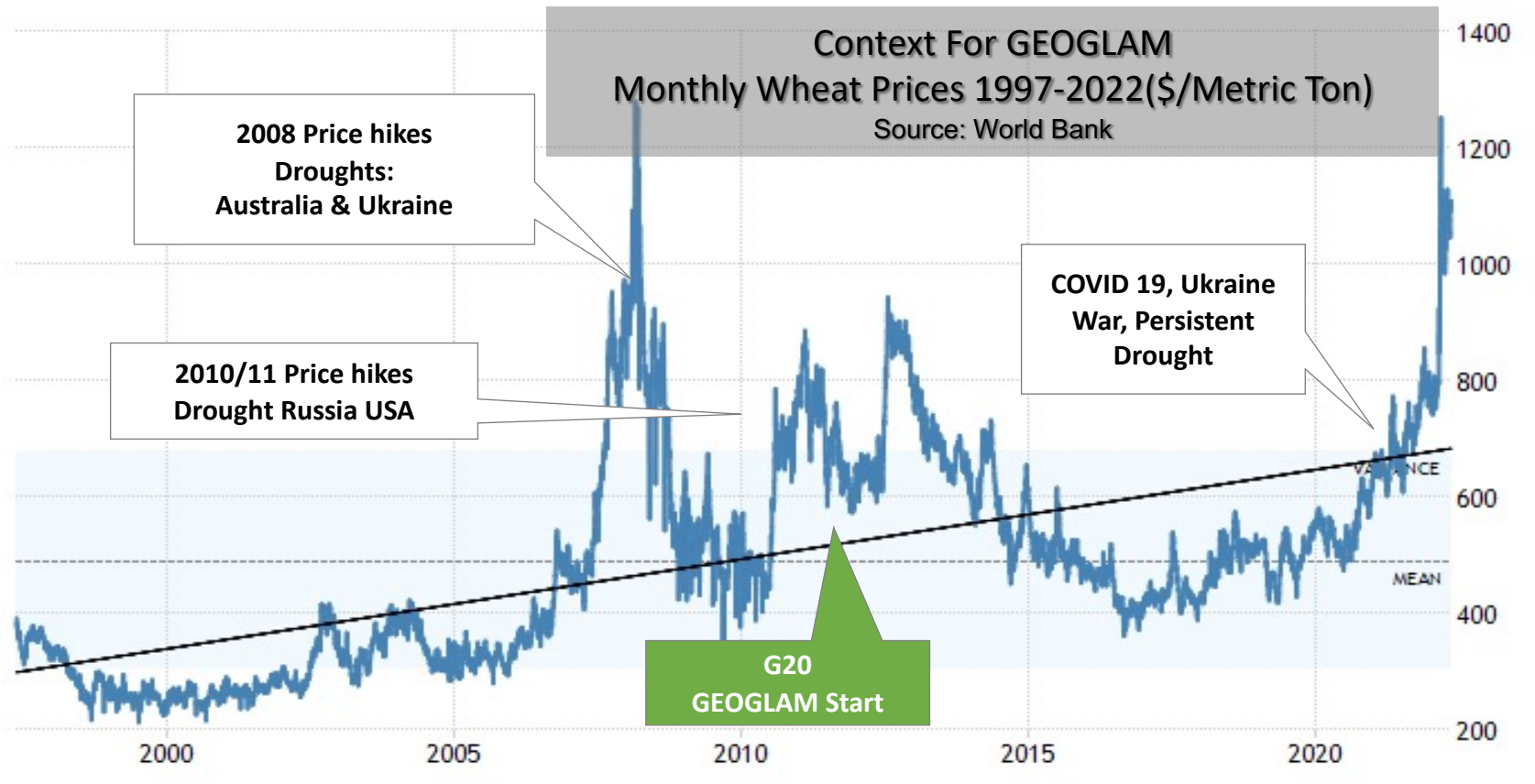
GEOGLAM Launched by the G20 Agriculture Ministers in 2011



Context For GEOGLAM
Monthly Wheat Prices 1997-2022($/Metric Ton)
Source: World Bank



G20 Final Declaration

44. We commit to improve market information and transparency in order to make international markets for agricultural commodities more effective. To that end, we launched:

- The "Agricultural Market Information System" (AMIS) in Rome on September 15, 2011, to improve information on markets ...;
- The **"Global Agricultural Geo-monitoring Initiative" (GEO-GLAM)** in Geneva on September 22-23, 2011. This initiative will coordinate satellite monitoring observation systems in different regions of the world in order to enhance crop production projections and weather forecasting data.

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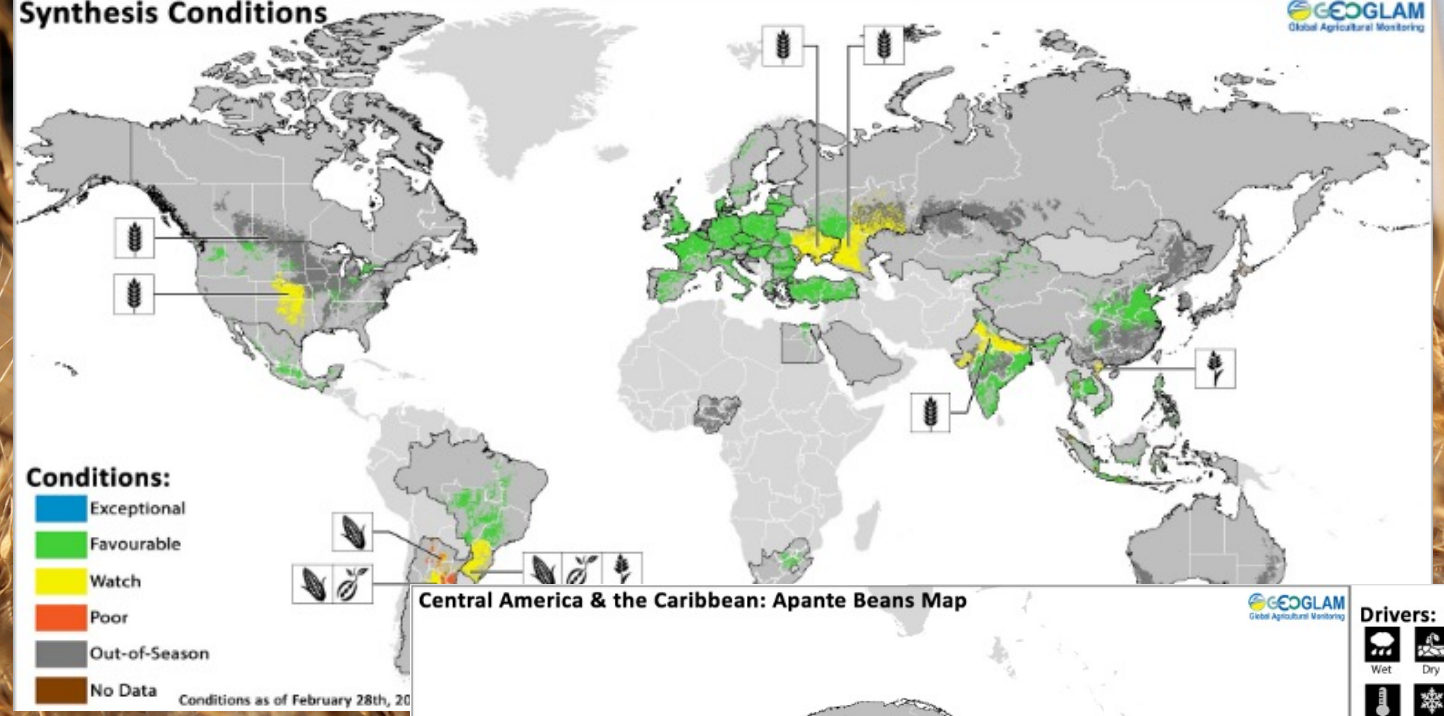
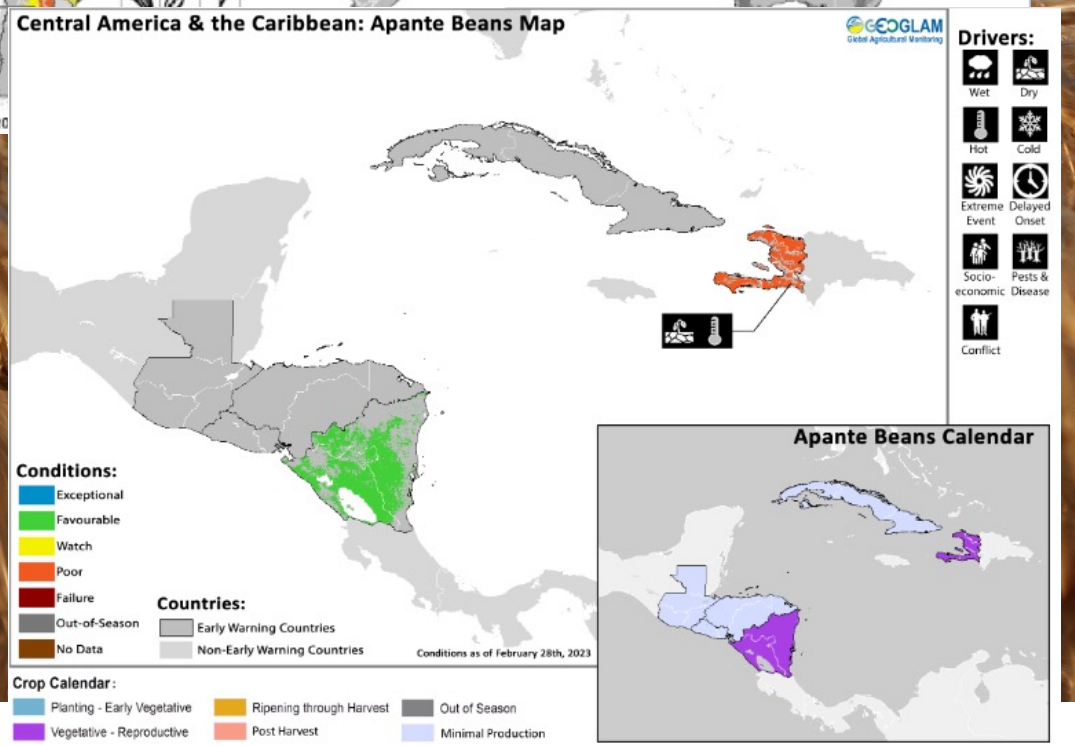
Crop Monitor
a geoglam initiative

Responding to the Challenge Since 2013:

Expanding the Food Security Mandate 2016:

…. and further





SUSTAINABLE DEVELOPMENT GOALS · UNDRR UN Office for Disaster Risk Reduction · SENDAI FRAMEWORK · PARIS20

GEOGLAM Global Agricultural Monitoring

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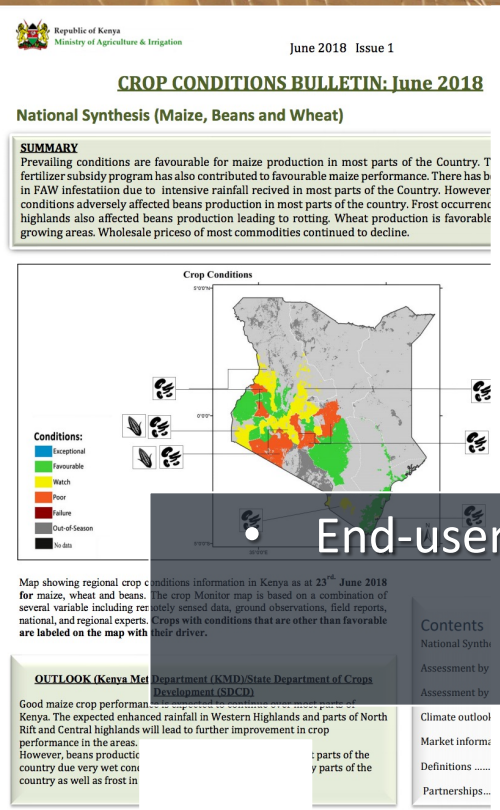
National & Regional Owned & Operated Crop Monitors

Co-Developed, Replicable and Adaptable


Republic of Kenya
Ministry of Agriculture & Irrigation

June 2018 Issue 1

CROP CONDITIONS BULLETIN: June 2018

National Synthesis (Maize, Beans and Wheat)

SUMMARY

Prevailing conditions are favourable for maize production in most parts of the Country. T fertilizer subsidy program has also contributed to favourable maize performance. There has b in FAW infestation due to intensive rainfall recived in most parts of the Country. However conditions adversely affected beans production in most parts of the country. Frost occurrenc highlands also affected beans production leading to rotting. Wheat production is favorable growing areas. Wholesale priceso of most commodities continued to decline.

Crop Conditions

Conditions: Exceptional, Favourable, Watch, Poor, Failure, Out-of-Season, No data

Map showing regional crop conditions information in Kenya as at 23rd June 2018 for maize, wheat and beans. The crop Monitor map is based on a combination of several variable including remotely sensed data, ground observations, field reports, national, and regional experts. Crops with conditions that are other than favorable are labeled on the map with their driver.

OUTLOOK (Kenya Met Department (KMD)/State Department of Crops Development (SDCD)

Good maize crop performance is expected in southern most parts of Kenya. The expected enhanced rainfall in Western Highlands and parts of North Rift and Central highlands will lead to further improvement in crop performance in the areas. However, beans productic parts of the country due very wet cond parts of the country as well as frost in

Contents

National Synthe

Assessment by

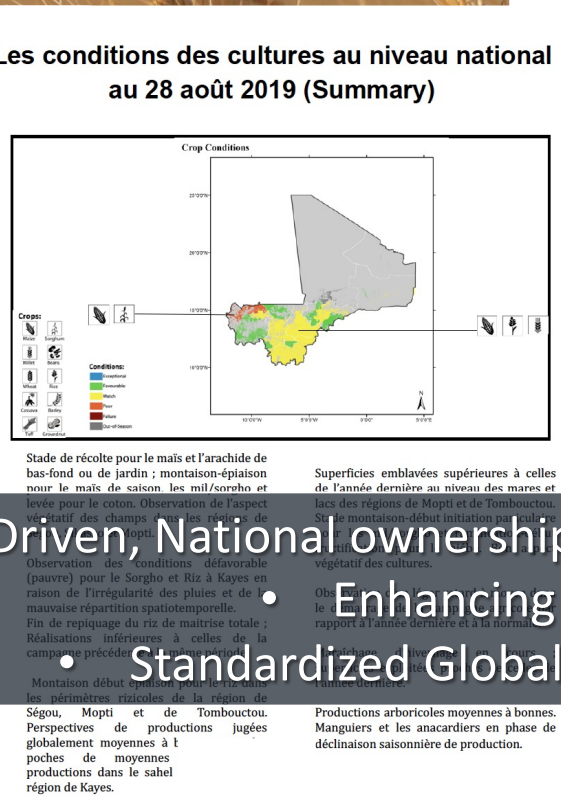
Assessment by

Climate outlook

Market informa

Definitions .....

Partnerships...


Les conditions des cultures au niveau national au 28 août 2019 (Summary)

Crop Conditions

Crops: Maize, Sorghum, Beans, Rice, Wheat, Cassava, Barley, Cowpea, Groundnut, Teff

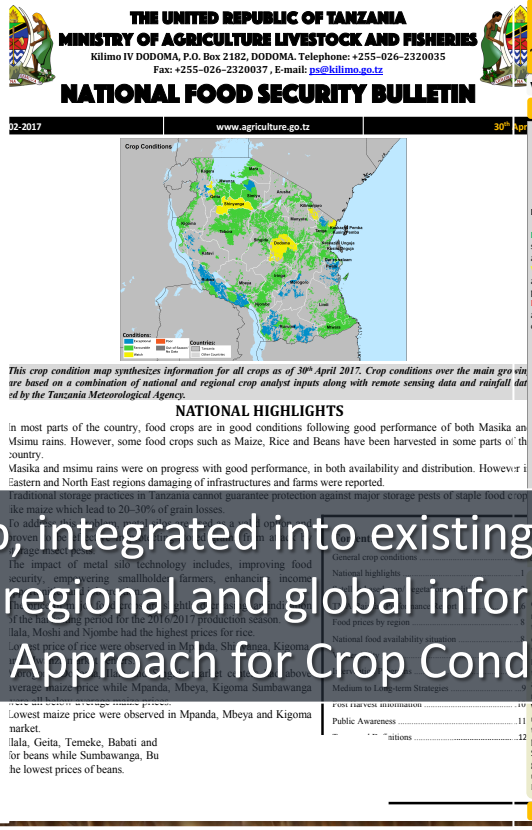
Conditions: Exceptional, Favourable, Watch, Poor, Failure, Out-of-Season

Stade de récolte pour le maïs et l'arachide de bas-fond ou de jardin ; montaison-épiaison pour le maïs de saison, les mil/sorgho et levée pour le coton. Observation de l'aspect végétatif des champs dans les régions de Observation des conditions défavorable (pauvre) pour le Sorgho et Riz à Kayes en raison de l'irrégularité des pluies et de mauvaise répartition spatiotemporelle. Fin de repiquage du riz de maitrise totale ; Réalisations inférieures à celles de la campagne précéden

Montaison début épiaison pour le riz dans les périmètres rizicoles de la région de Ségou, Mopti et de Tombouctou. Perspectives de productions jugées globalement moyennes à b poches de moyennes productions dans le sahel région de Kayes.

Superficies emblavées supérieures à celles de l'année dernière au niveau des mares et lacs des régions de Mopti et de Tombouctou. Stade montaison-début initiation paniculaire végétatif des cultures.

Productions arboricoles moyennes à bonnes. Manguiers et les anacardiers en phase de déclinaison saisonnière de production.


THE UNITED REPUBLIC OF TANZANIA
MINISTRY OF AGRICULTURE LIVESTOCK AND FISHERIES
Kilimo IV DODOMA, P.O. Box 2182, DODOMA. Telephone: +255-026-2320035
Fax: +255-026-2320037 , E-mail: ps@kilimo.go.tz

NATIONAL FOOD SECURITY BULLETIN

02-2017 www.agriculture.go.tz 30th Apr

Crop Conditions

Conditions: Exceptional, Favourable, Watch, Poor, Failure, Out-of-Season, No data

Countries: Tanzania, Other Countries

This crop condition map synthesizes information for all crops as of 30th April 2017. Crop conditions over the main gro are based on a combination of national and regional crop analyst inputs along with remote sensing data and rainfall dat ed by the Tanzania Meteorological Agency.

NATIONAL HIGHLIGHTS

In most parts of the country, food crops are in good conditions following good performance of both Masika an Msimu rains. However, some food crops such as Maize, Rice and Beans have been harvested in some parts of th country.

Masika and msimu rains were on progress with good performance, in both availability and distribution. However i Eastern and North East regions damaging of infrastructures and farms were reported.

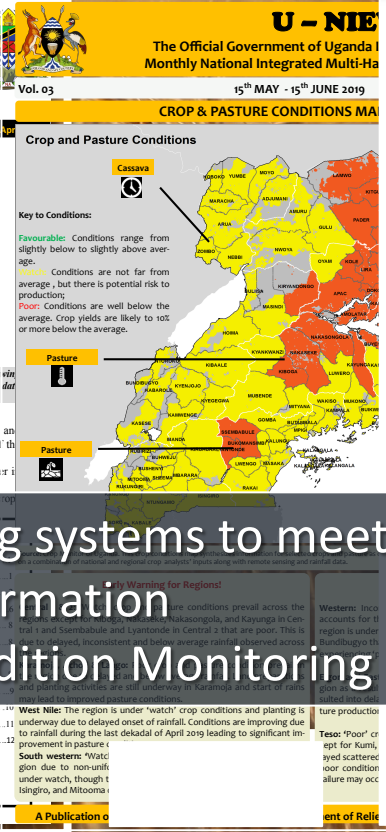
Traditional storage practices in Tanzania cannot guarantee protection against major storage pests of staple food crop like maize which lead to 20–30% of grain losses.

The impact of metal silo technology includes, improving food security, empowering smallholder farmers, enhanced income

ilala, Moshi and Njombe had the highest prices for rice.

Lowest maize price were observed in Mpanda, Mbeya and Kigoma market.

llala, Geita, Temeke, Babati and for beans while Sumbawanga, Bu he lowest prices of beans.


U – NIE

The Official Government of Uganda

Monthly National Integrated Multi-Ha

Vol. 03 15th MAY - 15th JUNE 2019

CROP & PASTURE CONDITIONS MA

Crop and Pasture Conditions

Cassava

Key to Conditions:

Favourable: Conditions range from slightly below to slightly above aver- age.

Conditions are not far from average , but there is potential risk to production;

Poor: Conditions are well below the average. Crop yields are likely to 10% or more below the average.

Pasture

Pasture

Warning for Regions!

West Nile: The region is under 'watch' crop conditions and planting is underway due to delayed onset of rainfall. Conditions are improving due to rainfall during the last dekadal of April 2019 leading to significant im- provement in pasture

South western: 'Watc gion due to non-unif under watch, though t Isingiro, and Mitooma

Teso: 'Poor' cr ept for Kumi, ayed scattered oor condition ailure may occ

A Publication o

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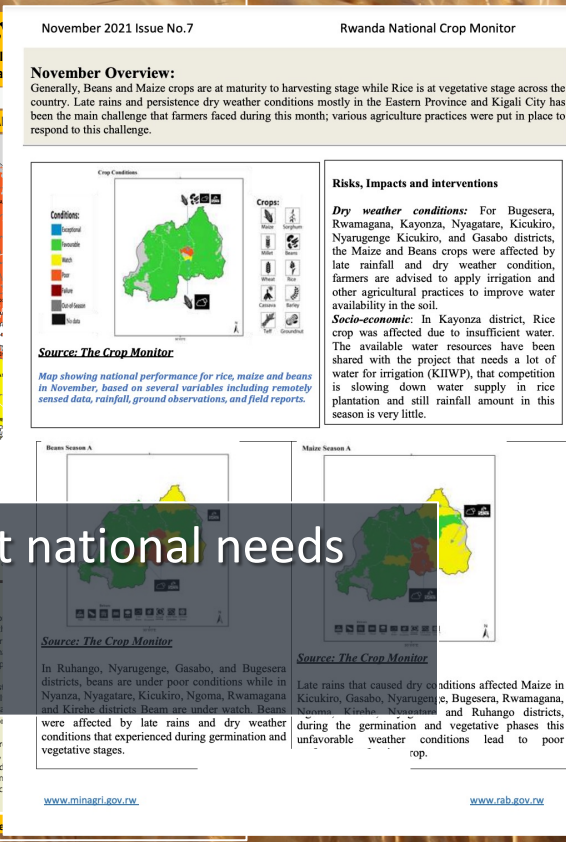

November 2021 Issue No.7 Rwanda National Crop Monitor

November Overview:

Generally, Beans and Maize crops are at maturity to harvesting stage while Rice is at vegetative stage across the country. Late rains and persistence dry weather conditions mostly in the Eastern Province and Kigali City has been the main challenge that farmers faced during this month; various agriculture practices were put in place to respond to this challenge.

Crop Conditions

Conditions: Exceptional, Favourable, Watch, Poor, Failure, Out-of-Season, No data

Crops: Maize, Sorghum, Beans, Rice, Wheat, Cassava, Barley, Cowpea, Groundnut, Teff

Source: The Crop Monitor

Map showing national performance for rice, maize and beans in November, based on several variables including remotely sensed data, rainfall, ground observations, and field reports.

Risks, Impacts and interventions

Dry weather conditions: For Bugesera, Rwamagana, Kayonza, Nyagatare, Kicukiro, Nyarugenge Kicukiro, and Gasabo districts, the Maize and Beans crops were affected by late rainfall and dry weather condition, farmers are advised to apply irrigation and other agricultural practices to improve water availability in the soil.

Socio-economic: In Kayonza district, Rice crop was affected due to insufficient water. The available water resources have been shared with the project that needs a lot of water for irrigation (KIIWP), that competition is slowing down water supply in rice plantation and still rainfall amount in this season is very little.

Beans Season A

Maize Season A

Source: The Crop Monitor

In Ruhango, Nyarugenge, Gasabo, and Bugesera districts, beans are under poor conditions while in Nyanza, Nyagatare, Kicukiro, Ngoma, Rwamagana and Kirehe districts Beam are under watch. Beans were affected by late rains and dry weather conditions that experienced during germination and vegetative stages.

Source: The Crop Monitor

Late rains that caused dry conditions affected Maize in Kicukiro, Gasabo, Nyarugenye, Bugesera, Rwamagana, Nyanza, Kirehe, Nyagatare and Ruhango districts, during the germination and vegetative phases this unfavorable weather conditions lead to poor crop.

www.minagri.gov.rw

www.rab.gov.rw

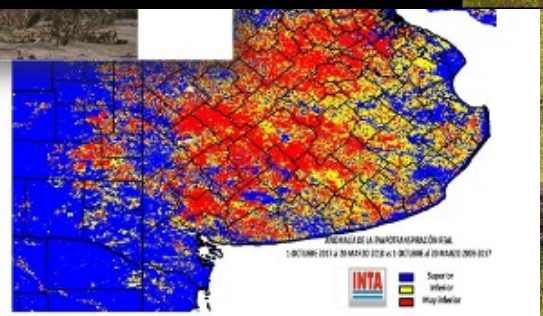
- End-user Driven, National ownership, integrated into existing systems to meet national needs
- Enhancing regional and global information
- Standardized Global Approach for Crop Condition Monitoring

National Impact Examples

National Impact Stories, Major Producer - Ar

Argentina Drought 2017-2018

- Argentina suffered one of the **worst droughts** in its history in 2018
- Agriculture Ministry needed **objective scientific evidence** of drought to enact policy
- Working with INTA (GEOGLAM national partner) the government was able to declare an "**agricultural emergency**" with great spatial precision, **triggering financial safety net programs**

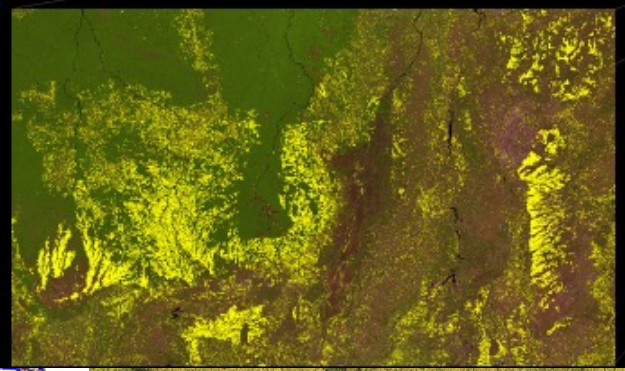


National Scale Cropland Mapping

- National capacity to operationally use EO for within-season monitoring
- Sparking international coordination (Mexico, Brazil, Chile, Argentina)
- Developing state-of-science baseline products

Conab SIAP INIA Ministerio de Agroindustria Presidencia de la Nación

2017 national cropland extent with 30m spatial resolution
80% initial accuracy



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GLOBAL AGRICULTURAL MONITORING

GEO GROUP ON EARTH OBSERVATIONS

GEO Supplement to integrate Earth observations into NAPs

Key steps to establish a National Agriculture Monitoring System and support the implementation of NAPs with timely and accurate EO-based information for food security programmes and policies

Aug 2022

Validation and demos at NAP Expo 2022

Oct-Nov 2022

Launch at GEO Week 2022 and COP27

Feb 2023

Dissemination and capacity development started at LEG writing workshop, Comoros

March 2023

Follow-up dissemination and training at NAP Expo 2023

Countries can access the GEO guidance, as well as technical assistance and capacity development for project proposals generation

EO Applications in Agriculture

Rangeland Mapping
- Livestock production potential
- State and changes in land used for livestock production
- Early warning for food security

Cropland Mapping
- Food production potential
- State and changes in land used for food production

Crop Type Mapping
- Crop production potential
- State and changes in land used for food production
- Farm support programs
- Greenhouse gas reporting

Field Boundary Delineation
- Food production estimation
- State and changes in land used for food production
- Farm management and support

Crop Condition Assessment
- Early warning for food security
- Crop pest and disease surveillance
- Inform markets and trade
- Targeting mitigation measures

Crop Yield Forecast/ Estimate
- Early warning for food security
- Inform markets, trade and humanitarian activities
- Targeting potential mitigation measures

Earth Observation Application

– Policy Application

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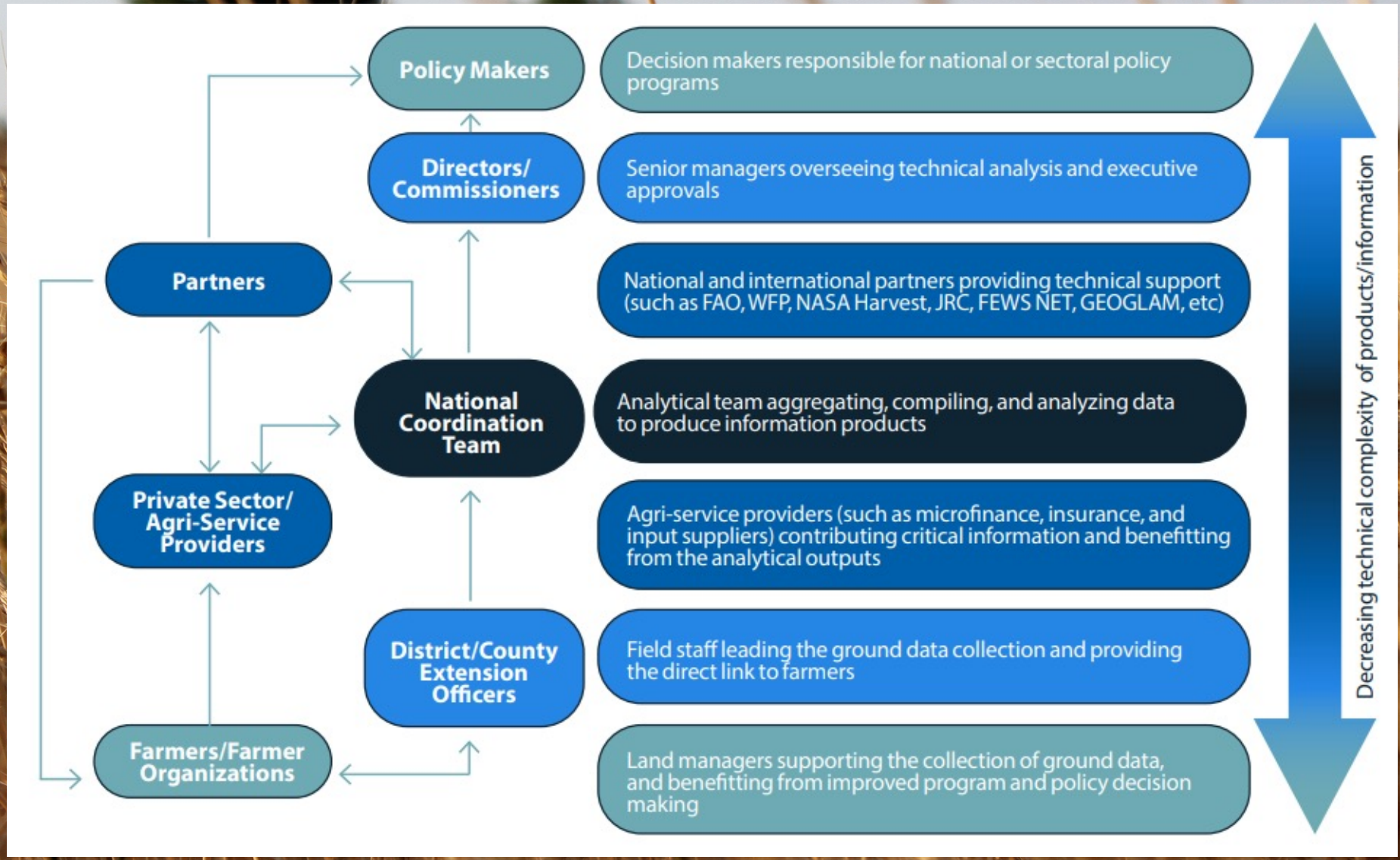
Institutional Framework



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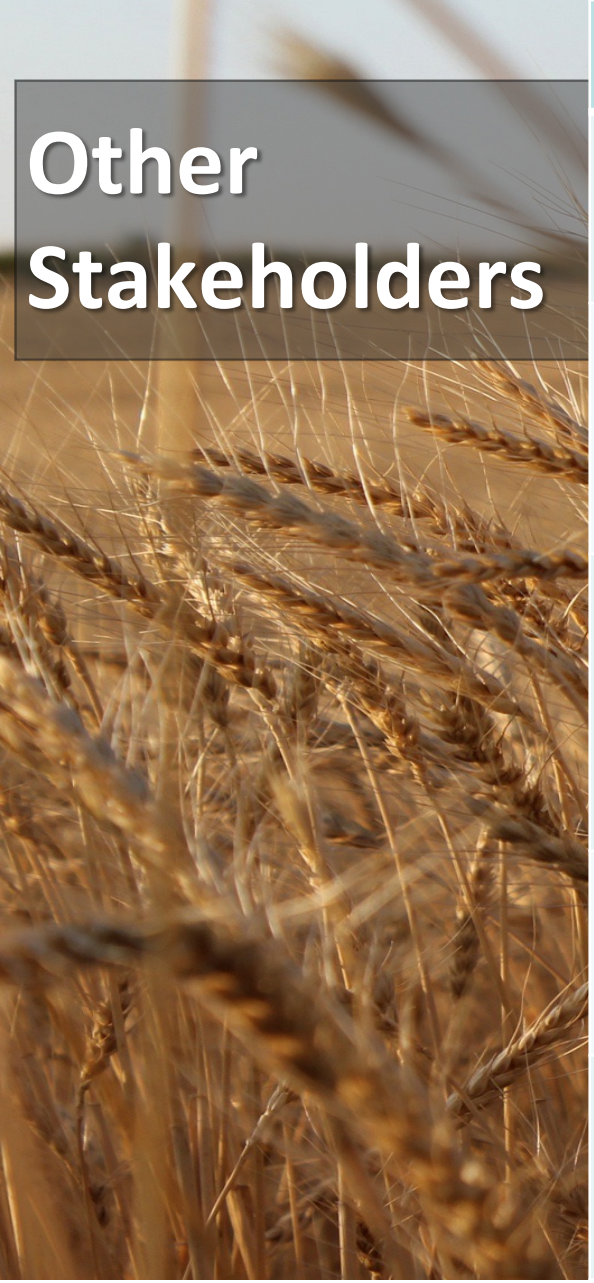
National Coordination Team

Roles	• Data compilation, aggregation and analysis • Report findings to directors/commissioners
Composition	• Multi-agency/multi-disciplinary teams • Examples: Food security, Agriculture monitoring, Statistics, Early Warning
Skills	• Crop resources/food security assessment, pest management, agro-meteorology, data analysis, GIS/Remote Sensing, etc.
Products/ Outputs	• Food Security Bulletins • Crop monitor Reports • Food Balance Sheets • Production Forecasts • etc.



Other Stakeholders

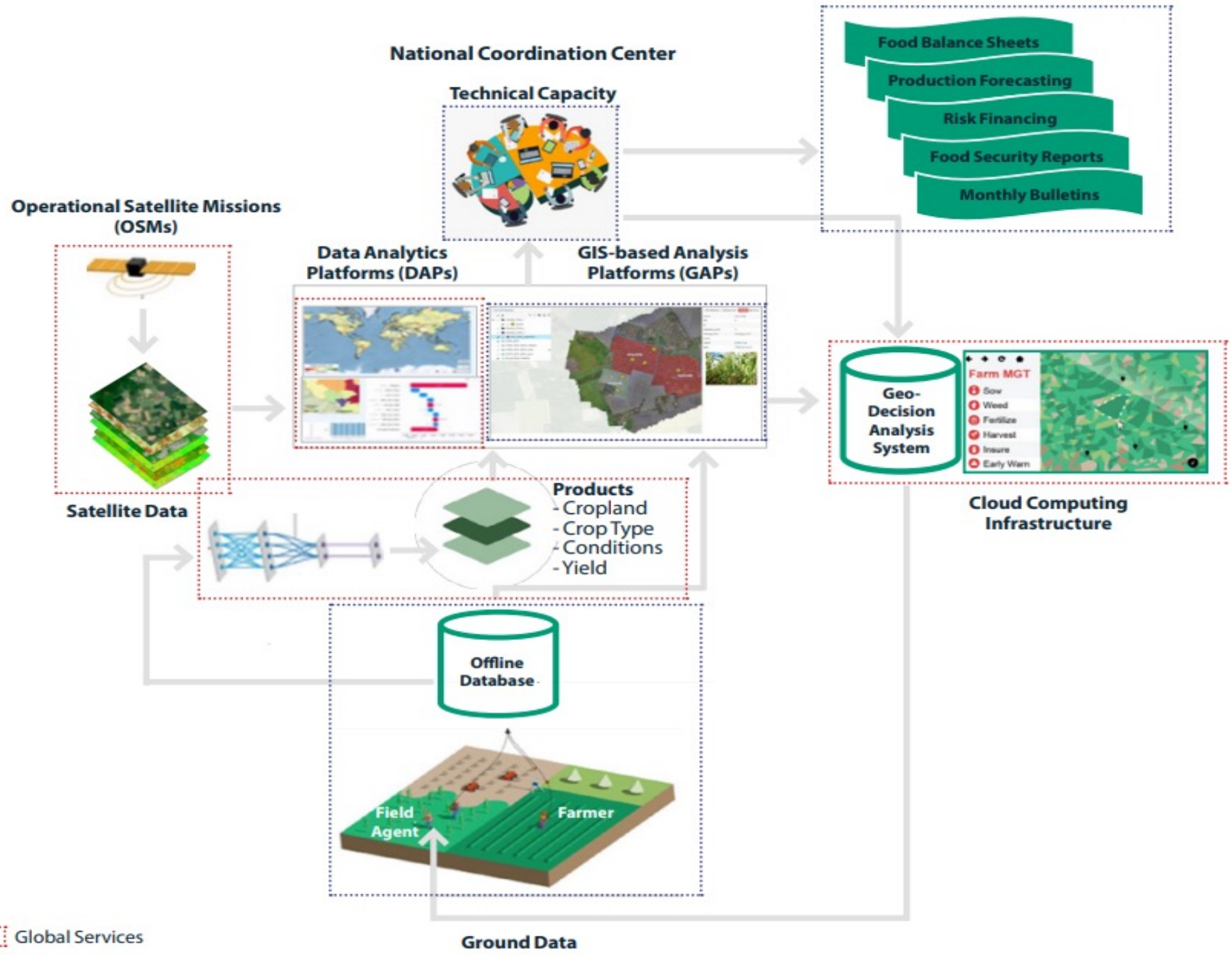
Stakeholder	Role
Policy Makers e.g., Ministers	• Provide legislation/policy direction on agriculture and related matters
Directors/Commissioners	• Provide executive oversight and direction to the National Coordination Teams/Center • Liaise/report the findings of the analysis teams to the policy makers • Provide relevant recommendations to policy makers
National and International partners e.g., FAO, WFP, GEOGLAM, FEWSNET, NASA Harvest etc. *Includes private sector service providers e.g., Agri-Insurance, manufacturers, microfinance, etc.	• Provide technical support and supplementary data and assessments to complement the national crop monitor system.
Field/Extension Officers	• Provide link between farmers and the National Coordination Team • Lead field data collection activities • Provide on-the-ground agriculture expertise/information
Farmers and/or Farmer Organizations	• Provide ground data/farm reports to be integrated into the national system • Provide critical feedback on the effectiveness of agriculture-related policies and programs

Examples

Table 2 - Current crop monitor set-up with examples from Kenya, Rwanda, Uganda and Tanzania

COUNTRY	NATIONAL COORDINATION	ANALYTICS PLATFORMS UTILIZED	GROUND DATA / TOOLS AND TEAMS	MAIN PUBLICATION / PROGRAMS SUPPORTED / ACCESS TO REPORTS
Kenya	State Department of Agriculture, Ministry of Agriculture, coordinating with County Extension Officers	GLAM, EWX, Custom-built Kenya Crop Monitor Kenya, Weather Forecasts from Meteorological Department	Via County Extension Officers	Kenya Crop Conditions Bulletin, Crop Insurance Program, Rapid Response to Pest/Disease Infestations
Uganda	National Emergency Coordination and Early Warning Center with inputs from Ministry of Agriculture, Uganda National Meteorological Authority, Ministry of Health, FAO, FEWS NET, Uganda Red Cross	Uganda Crop Monitor, GLAM, EWX, Weather Forecasts	Via District Extension Agents, rapid food security assessments, and OpenDataKit	UNIEWS Bulletin, Disaster Risk Financing
Tanzania	Ministry of Agriculture-Food Security Division coordinated with Tanzania Meteorological Agency (TMA), Ministry of Trade, National Bureau of Statistics (NBS)	GLAM, EWX, Tanzania Crop Monitor System	Via District Extension Agents, Regional Officers	Tanzania National Food Security Bulletin
Rwanda	Ministry of Agriculture and Animal Resources with Rwanda Meteorology	GLAM, EWX, Rwanda Crop Monitor System	Via District Extension Officers	Rwanda Crop Monitor Bulletin

Technical Framework



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Ground Data

Figure 9 - Ground Data System

SURVEY ON ORGANIC FARMING: AWARENESS AND WILLINGNESS TO PAY

Questionnaire

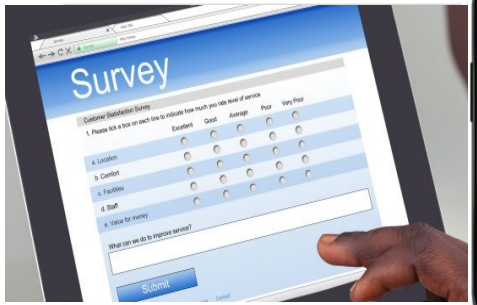
Section A: Consumer Preference for Vegetables/Ground provisions/Fruit

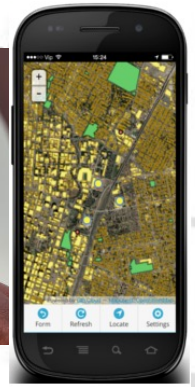
1. How often do you purchase vegetables?
   ☐ Once a week ☐ Every two weeks ☐ Other (please specify) _____
2. List the most common vegetables/ground provisions and the most common local fruits that you prefer to use regularly.
   - Vegetables/Ground provisions:
     1. _____ 2. _____
     3. _____ 4. _____
   - Local Fruits:
     1. _____ 2. _____
     3. _____ 4. _____
3. Where do you prefer to obtain your vegetables/ground provisions/fruit? (Please tick all appropriate boxes)
   ☐ Farm ☐ Wholesaler (e.g. People's Market, ShopSmart, PriceSmart)
   ☐ Supermarket ☐ Other (please specify)
   ☐ Produce market
4. Where do you currently obtain information on available agricultural produce?
   ☐ Radio ☐ Newspaper ☐ Television ☐ Family/Friend
   ☐ Internet ☐ Telephone ☐ Other (please specify) _____
5. Would you be interested in ordering your vegetables by:
   - Phone (text, calling)
     ☐ Yes ☐ No ☐ Maybe
   - Email
     ☐ Yes ☐ No ☐ Maybe
   - Online (Facebook, other websites)
     ☐ Yes ☐ No ☐ Maybe

Page 2 of 4

Paper Records

GPS Equipment

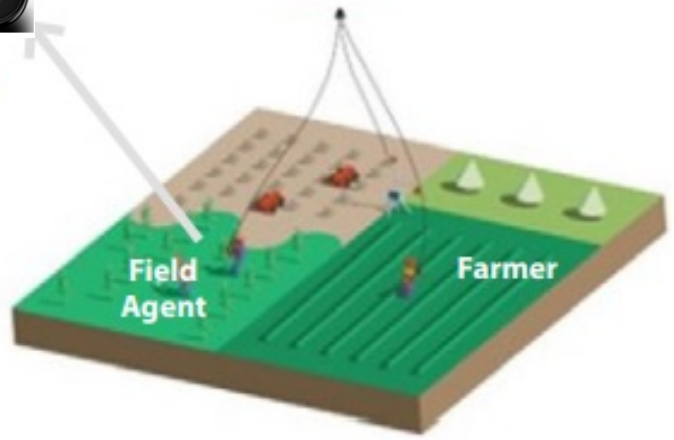




Mobile Data Collection and Relay

Data Visualization/Analysis

Offline Aggregation Database



Ground Data

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Capacity Co-Development

- Fully utilize/leverage EO capabilities in agriculture-related decision-making e.g.Reading and Interpreting Ready EO information and products
- Adapt organizational workflows to exploit or improve the use of EO in agriculture
  - Identify the best EO Data Application Platforms to use according to your needs and existing resources
  - Develop ground data collection applications and workflows (in case there are none in use)
  - Integrate and adapt your workflows for RS and in-situ data

Financial Support

GCF AT A GLANCE

GREEN CLIMATE FUND

No. of Projects

209

VIEW OUR CURRENT PORTFOLIO ›

BROWSE OUR PROJECTS ›

EXPLORE OUR DATA ›

Anticipated tonnes of CO2 equivalent avoided

2.4b

Anticipated number of people with increased resilience

676.4m

Total GCF financing committed (USD)

11.3b

gef

Least Developed Countries Fund - LDCF

Additional technical resources

- GEO Knowledge Hub Resource packages
  - Data
  - Data Analysis Protocols
  - Software
  - Expert support
  - Training/Workshops

- Leveraging EO capabilities in other sectors of national development

e.g. Biodiversity and Ecosystems, Coastal Zones DRR and Adaptation, Flood Risk Management etc.

Contacts

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emakabe@geosec.org

Twitter:

#NAPExpo #EO4Impact

@GEOSEC2025

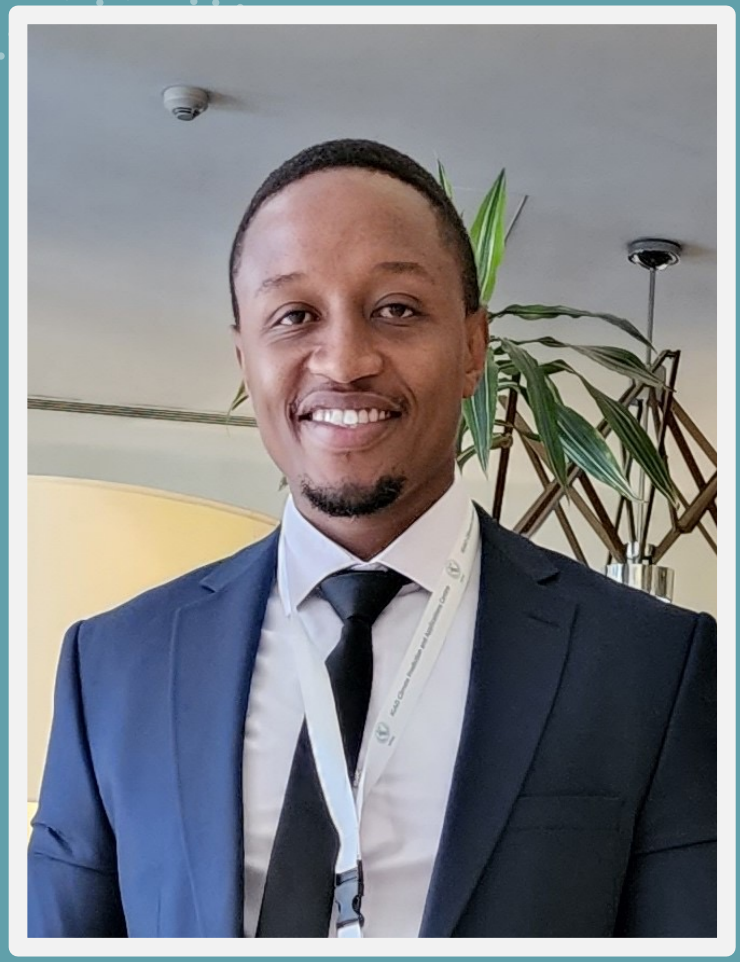
GROUP ON EARTH OBSERVATIONS

NAPEXPO CHILE 2023

Kenneth Mwangi, IGAD - ICPAC

Kenneth works at IGAD Climate Prediction and Applications Centre (ICPAC) in the East Africa region as a Climate Monitoring and Early Warning Expert. He specialises in geo-information and earth observation applied in environmental monitoring, agriculture, and climate change vulnerability assessment.

As part of GEO Climate Change Working group Mwangi offers support to African countries in their NAP process and approaches by exploiting the potential of Earth observations for the monitoring and assessment of climate change impacts, vulnerability, risks and adaptation responses.



Demos

Demo of two crops currently on season (Maize and Wheat) in Uganda and Ethiopia:

- https://cropmonitor.org/interfaces/earlywarning/ma_batch.php

Demo of a remote sensing data source used to identify hotspots for crop rapid analysis:

- https://earlywarning.usgs.gov/fews/ewx/index.html?region=af

David Ongo Nyang’acha, RCMRD, DE Africa

David Ongo is an experienced Geospatial Expert specialized in Environmental and Natural Resources Monitoring and Management.

His experience spans from using GIS and Remote Sensing to participating in numerous multidisciplinary projects geared towards delivering services that meet international standards in industries that include, Water Resources Management, Infrastructure and Utility Mapping, Agriculture and Food Security, Mining, Forest Resources Monitoring, Urban Planning, Air Quality Monitoring, Land Administration.

He is the currently champion for the Regional Centre For Mapping Of Resources For Development (RCMRD)’s GeoHub Africa, an innovation, incubation and research. He’s also the Digital Earth Africa focal point.

Linking Agricultural Practices with Adaptation Policy and Earth Observations in Africa

David Ongo,

Regional Centre for Mapping of Resources for Development,

RCMRD

About RCMRD

The Regional Centre for Mapping of Resources for Development (RCMRD), previously known as Regional Centre for Services in Surveying, Mapping and Remote Sensing was established in Nairobi, Kenya in 1975 under the auspices of the United Nations Economic Commission for Africa (UNECA) and the then Organization of African Unity (OAU) now African Union (AU).

RCMRD is an intergovernmental organization with Head offices in Nairobi, Kenya.

RCMRD has twenty (20) Contracting member States and six (6) Non-Contracting member States

FOCUS THEMES

AGRICULTURE AND FOOD SECURITY

LAND ADMINISTRATION AND MANAGEMENT

WATER AND WATER RELATED DISASTERS

WEATHER AND CLIMATE

KNOWLEDGE MANAGEMENT

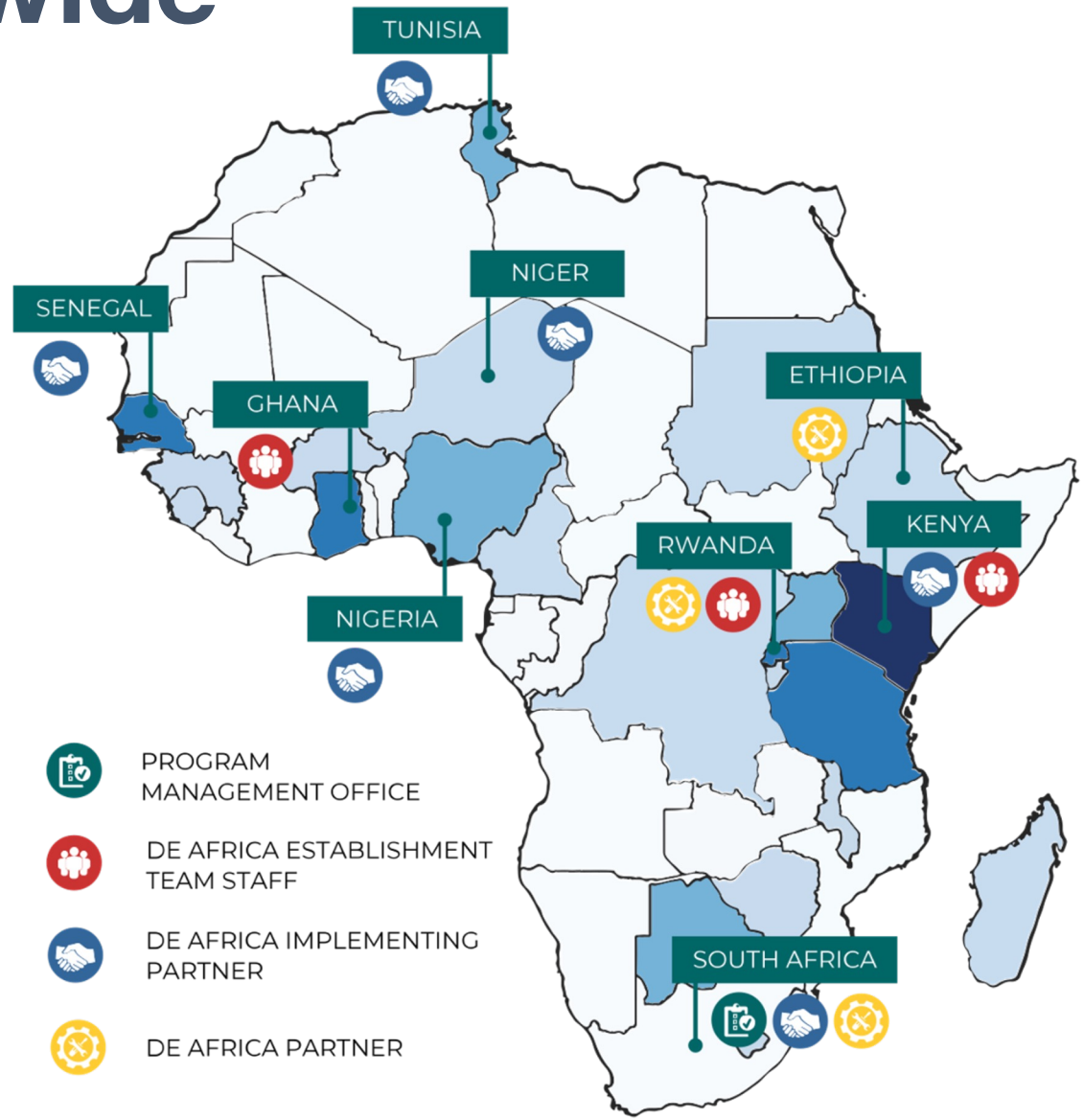
ADVISORY SERVICES

Activating a continent-wide community

Digital Earth Africa (DE Africa) is a continental-scale, not-for-profit program focused on improving access to Earth observation (EO) across sectors in Africa.

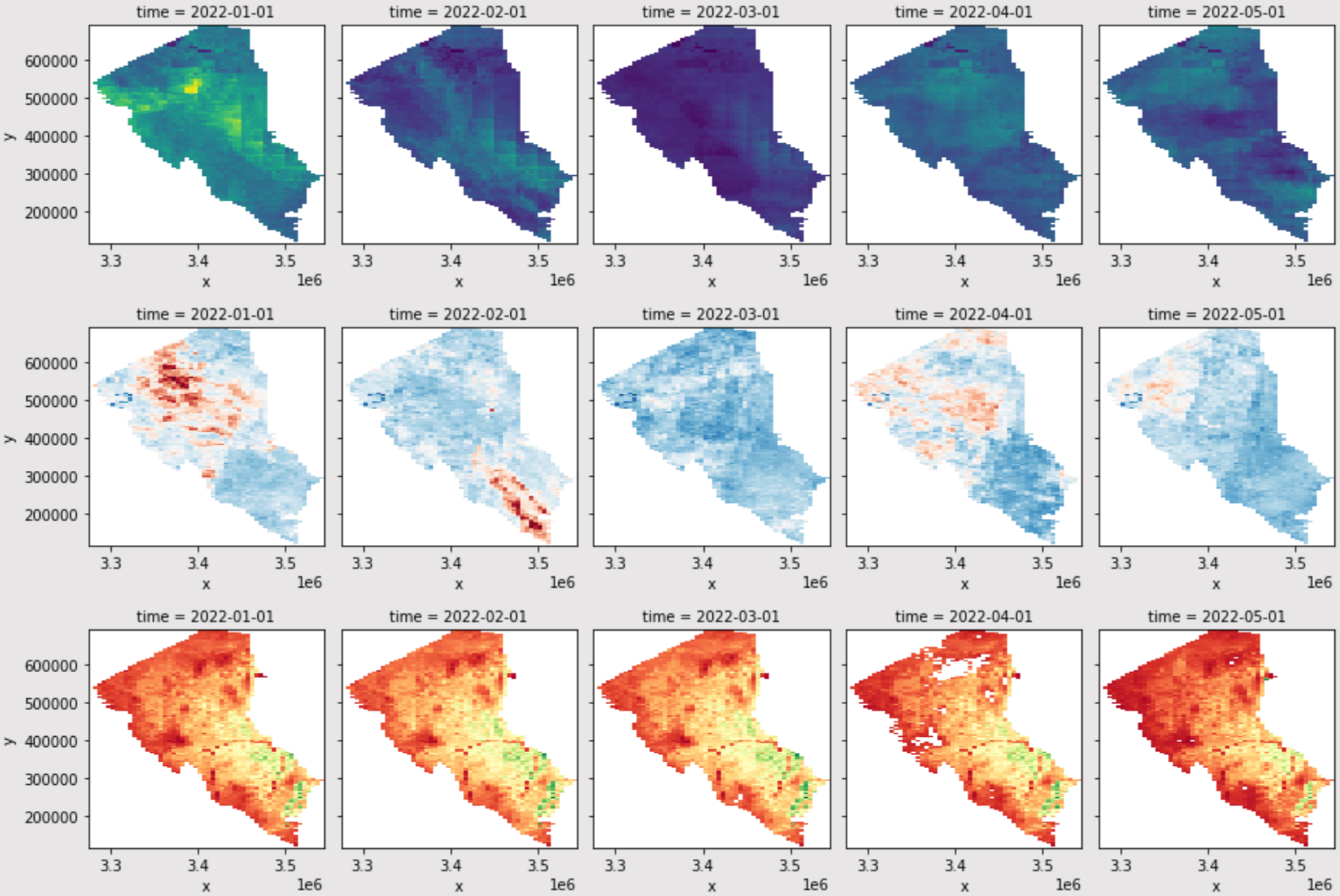
DE Africa is built on partnerships with African governance and in-country expertise to create sustained capacity development in Africa.

Platform and services provide free, open and accessible analysis ready satellite data



Digital Earth AFRICA

Agrometeorological Monitoring



When to Plough
When to plant
When to harvest

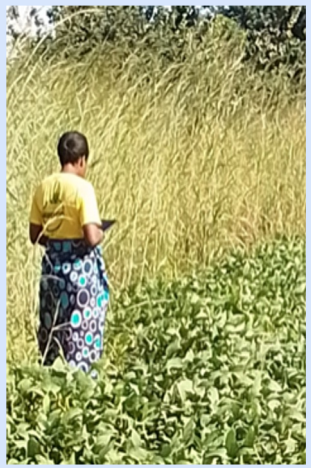
Other Components

- **Soil Moisture – ASCAT**
- **Evapotranspiration**

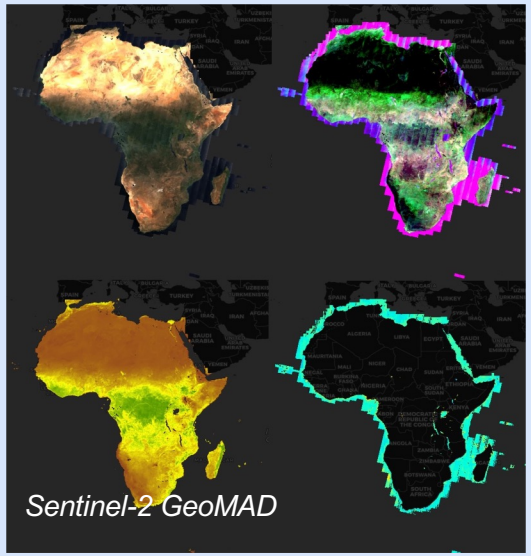
Use case 1- Agriculture and food security

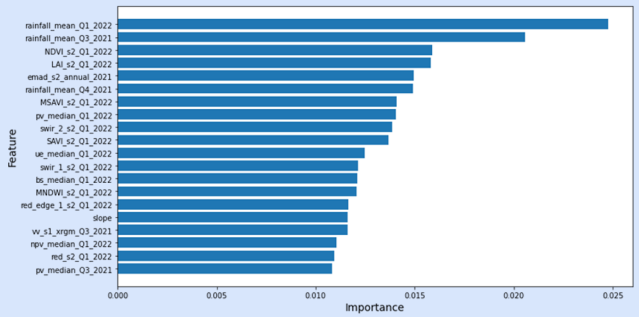
1. Sampling design - notebooks

2. Field data collection – ECAAS ODK toolkit.



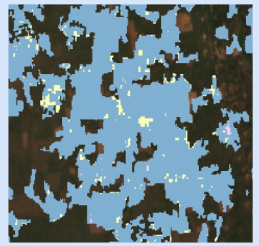
3. Data preparation - notebook 4. Feature extraction - notebook 5. Feature exploration - notebook

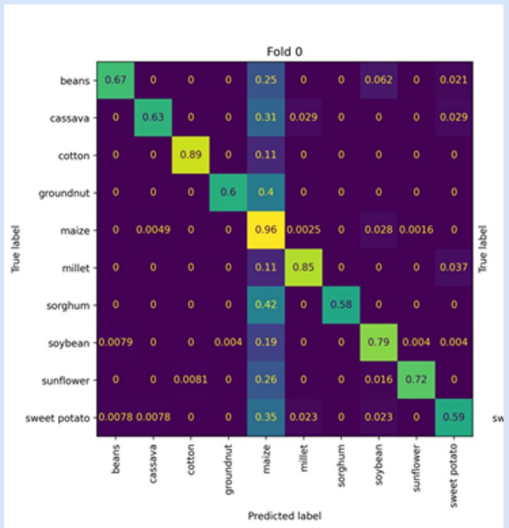




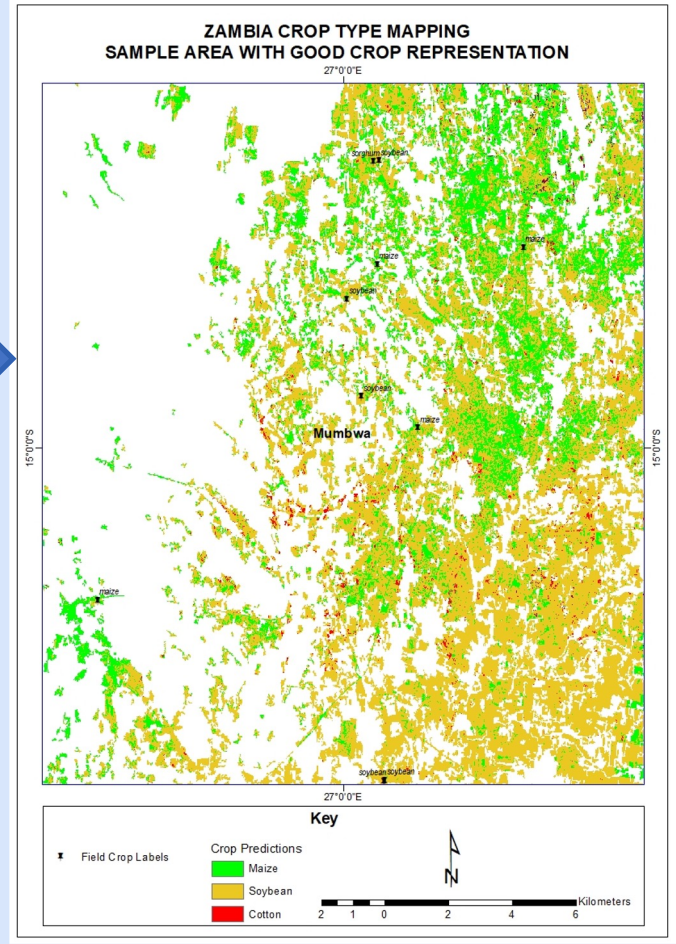
6. Machine learning training and performance estimation - notebook

7. Review of trained model on test areas - notebook

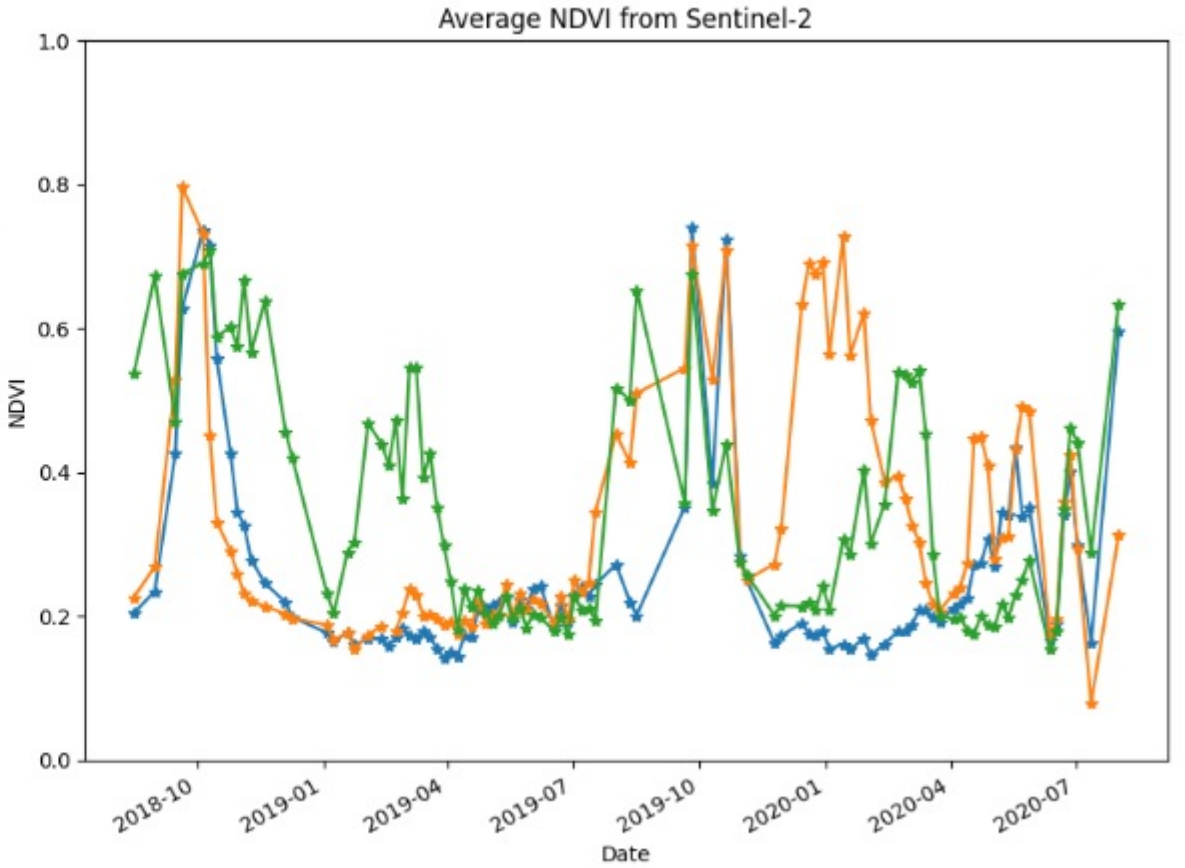




8. Production of crop type map for area of interest – notebook



Use case 2- Crop Health
Crop Health Monitoring



Use case 3- Hydrology and Water Resources (Fresh Water Resources)

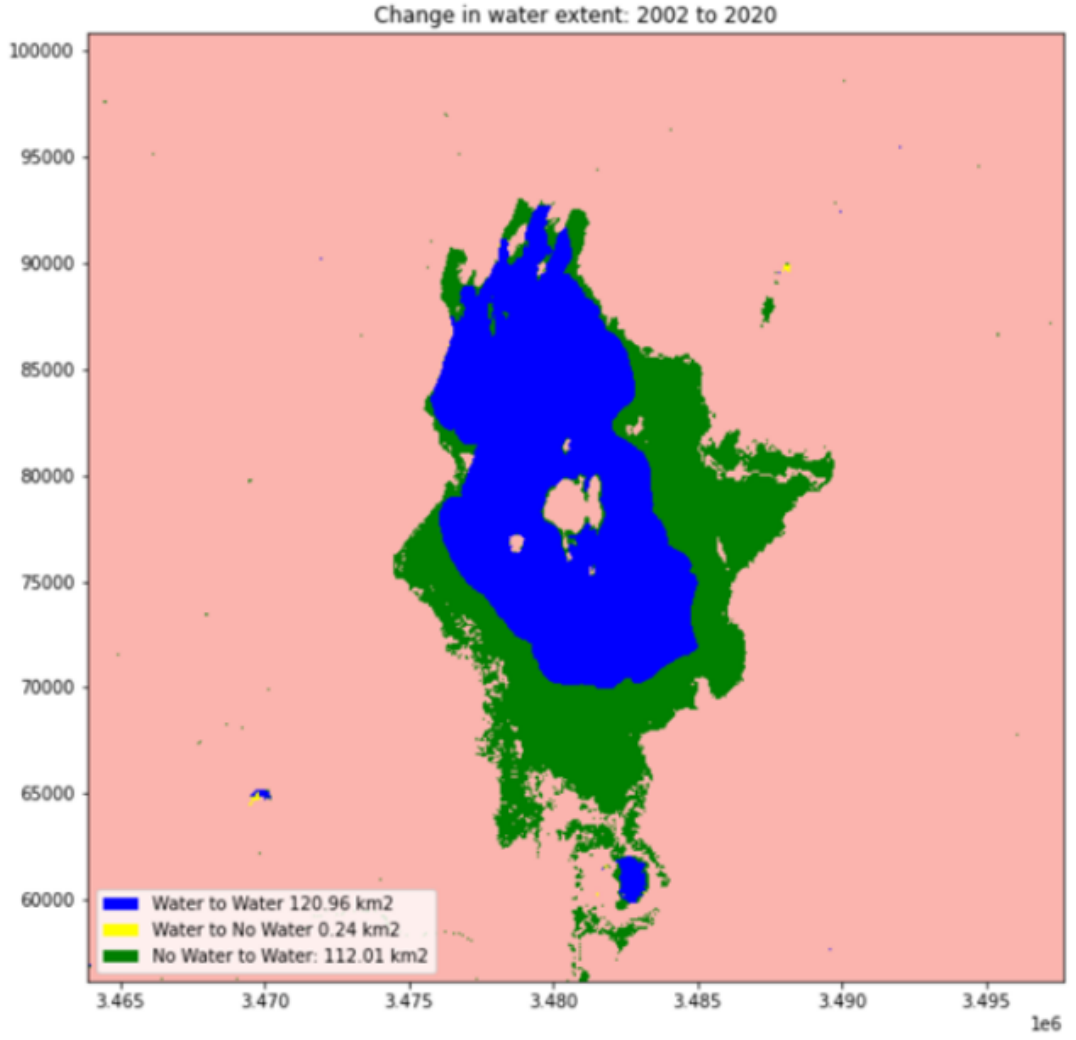


Figure 1: Change analysis of the lake water extent between 2002 and 2020, the lake has expanded by 112.01km2.

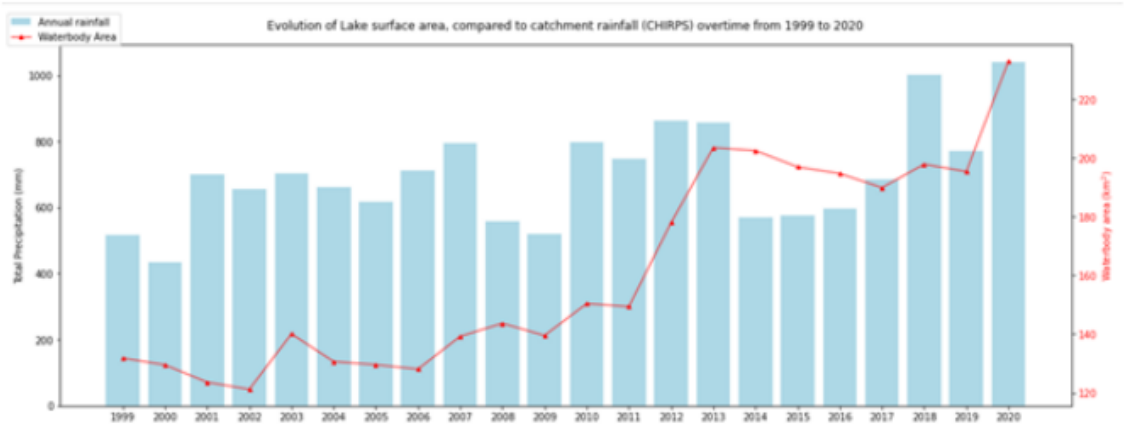


Figure 2: A gradual increase of rainfall is observed during this period, however, to fully understand the cause of the expansion, this analysis should be expanded to cover other rift valley lakes.

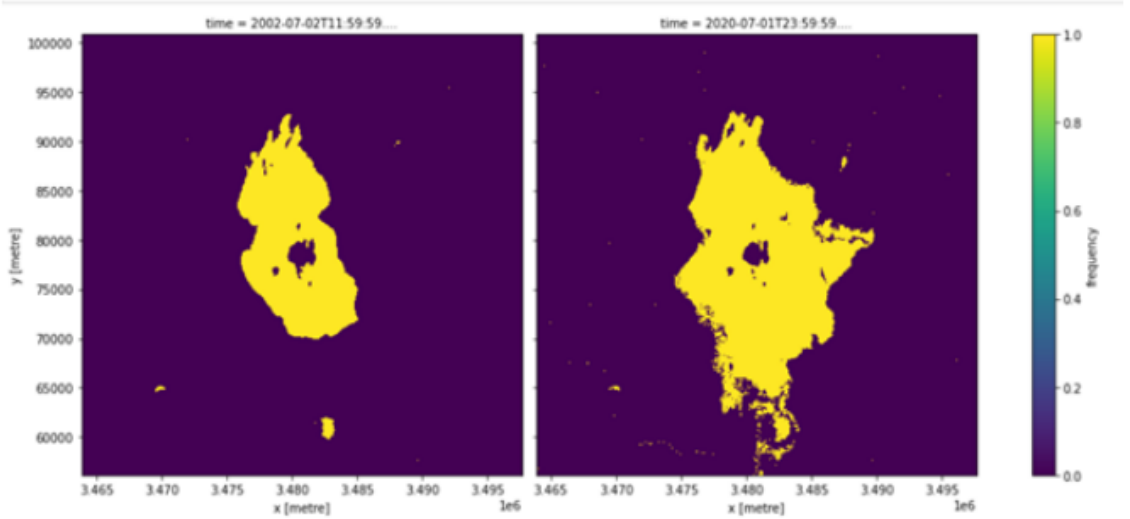
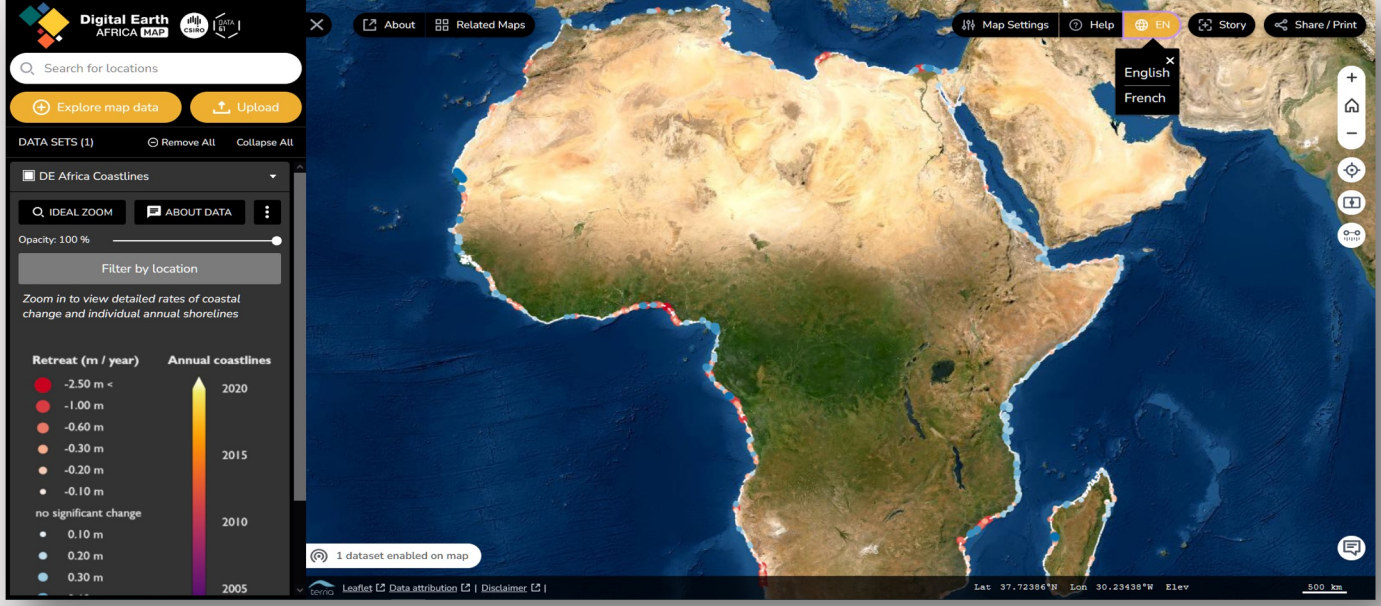


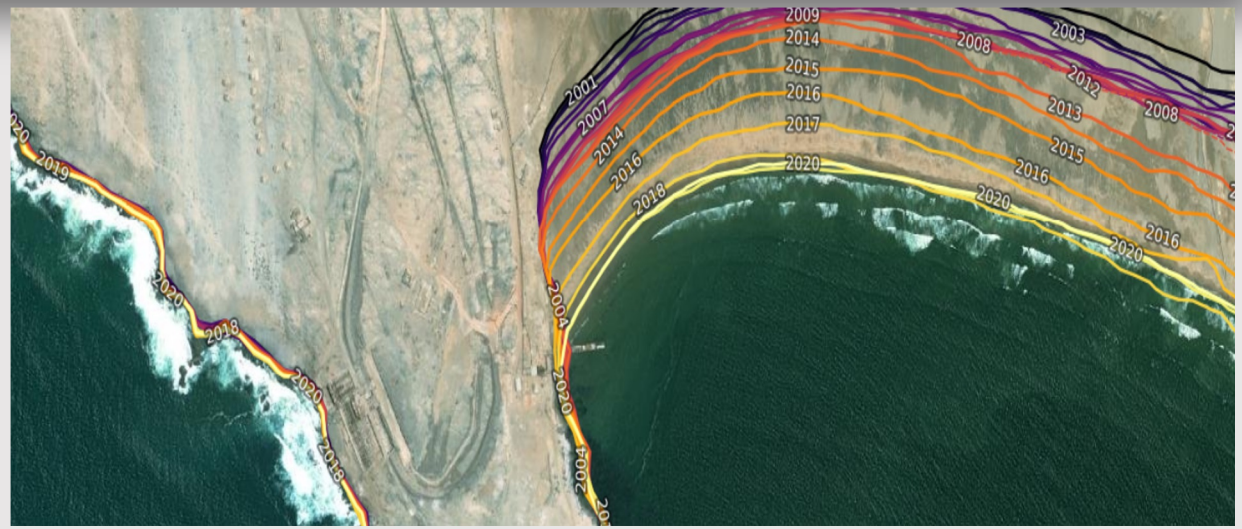
Figure 3: Plotted water classified pixel for the two dates where we have the minimum and maximum surface water extent.

Use case 4-Coastal Erosion & Blue Economy

Coasts serve as major socio-economic hubs for 38 African countries:

- ❑ Africa's coastal areas host half of the 15 African megacities which are fast expanding due to rural-urban migration and population growth
- ❑ The African blue economy is expected to be worth $405 billion and employ more than 57 million people by 2030
- ❑ Coastal communities and the blue economy are vulnerable to the impacts of climate change





- ❑ Scenarios
- ❑ Mangroves
- ❑ Infrastructure
- ❑ Agriculture

Useful links for more information

Malawi Hazards and Vulnerability Mapping

https://apps.rcmrd.org/disaster/malawi-hazards-and-vulnerability-mapping-project

Digital Earth Africa

https://www.digitalearthafrica.org/

AfriGEO
Earth Observations for Africa

Digital Earth AFRICA

REGIONAL CENTRE FOR MAPPING OF RESOURCES FOR DEVELOPMENT

Partners


Digital Earth
AFRICA


Afri
GEO
Earth Observations
for Africa


NASA


UNDP


European Union


United Nations
Economic Commission
for Africa


IUCN


AFRICAN UNION


german
cooperation
DEUTSCHE ZUSAMMENARBEIT
giz


AUDA-NEPAD
AFRICAN UNION DEVELOPMENT AGENCY


esri


Food and Agriculture Organization
of the United Nations


CIFOR


ALPC
AFRICAN LAND POLICY CENTRE


United Nations
Educational, Scientific and
Cultural Organization
CNRU
RWANDA
National Commission
for UNESCO


NELGA
Network of Excellence
on Land Governance in Africa


TAHMO


USAID
FROM THE AMERICAN PEOPLE

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+254726613962

Twitter: @davieongo

#NAPExpo #EO4Impact

@GEOSEC2025

GROUP ON EARTH OBSERVATIONS

NAPEXPO CHILE 2023

Jorge Luis Vazquez Aguirre, WMO

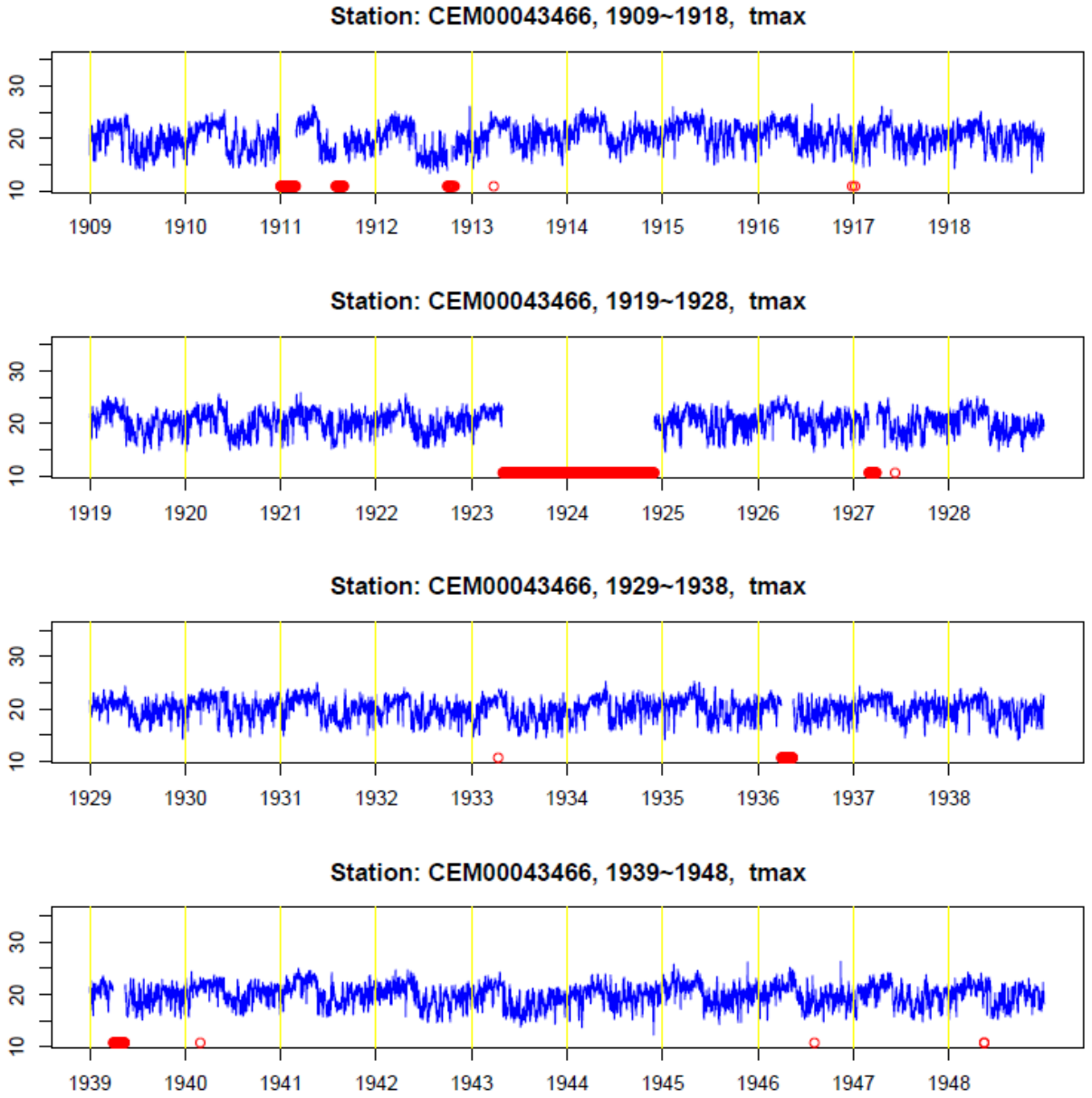
Jorge Vazquez is a Deputy Project Officer (short-term) at the Climate Services Branch, Services Department of the World Meteorological Organization. His background is in atmospheric science (B.Sc., M.Sc.) and climatology. He has been collaborating with WMO for more than a decade as part of Expert Teams in Technical Commissions including ET on Climate Change Detection and Indices, Sector-specific Climate Indices and Climate Information for Decision-making.

Integrating climate information from remote sensing and other sources into adaptation project proposals

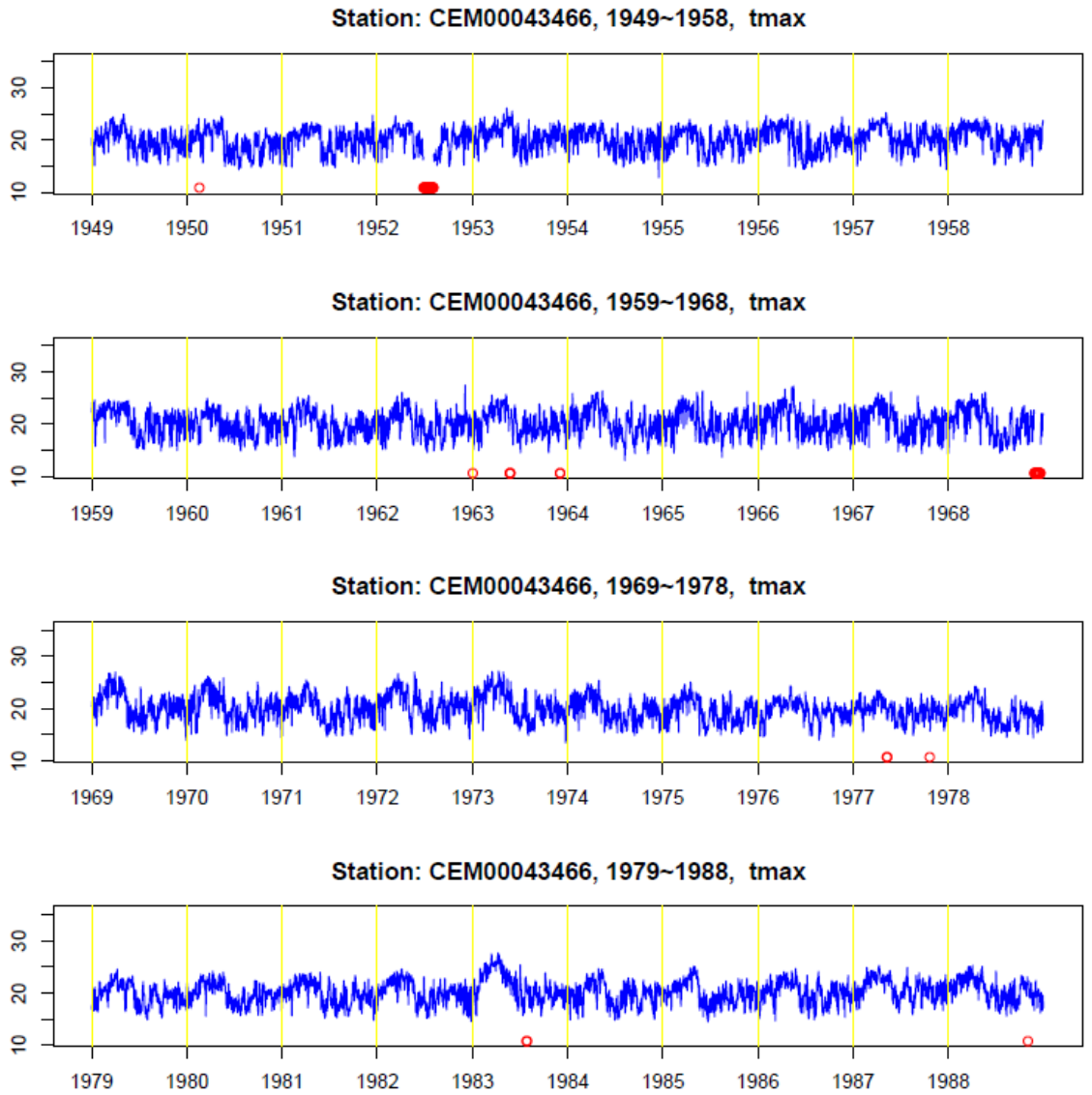
Jorge Luis Vazquez Aguirre

WMO

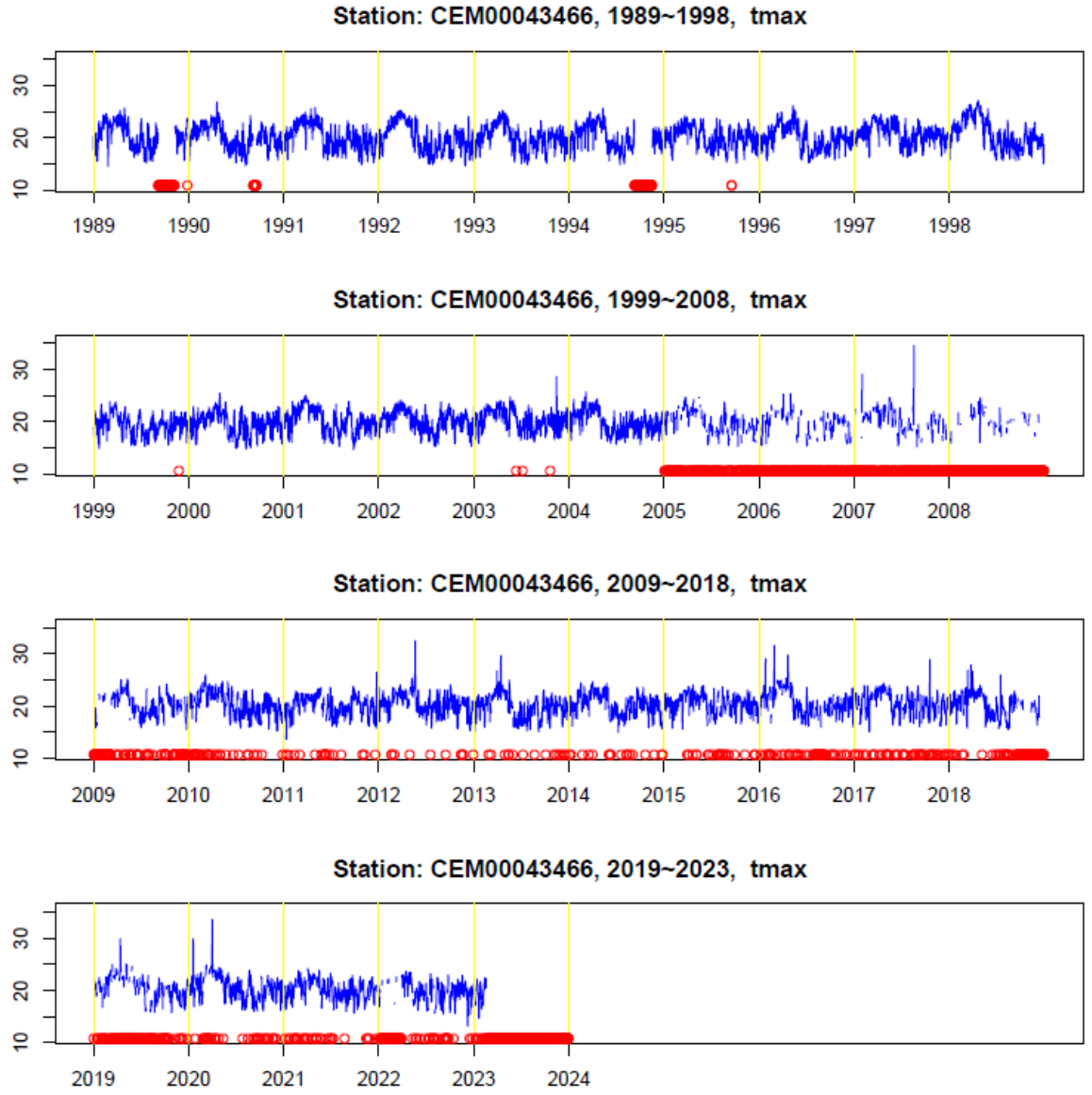
Instrumental climate records

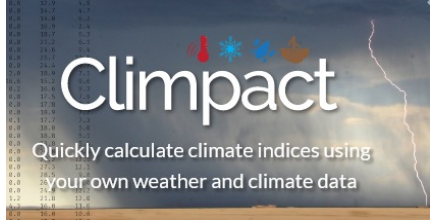


Instrumental climate records



Instrumental climate records





Climpact (UNSW)

https://www.climpact-sci.org

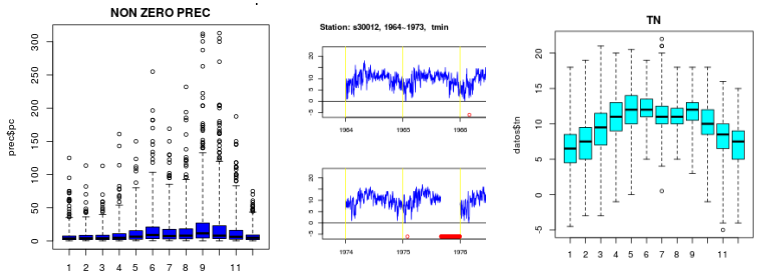
Climpact indices included in National Adaptation Plans GCF project proposals

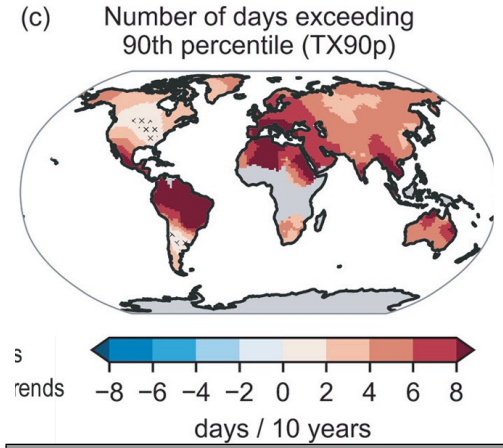
27 ETCCDI indices + 45 ET-SCI indices

From daily precipitation, max temp, min temp.

Climpact is based on RClimdex PCIC software

Climpact calculates indices using your own data





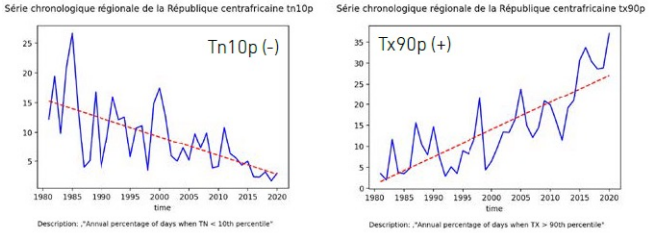
IPCC AR6. Fig. 11.9 Trends 1960-2018

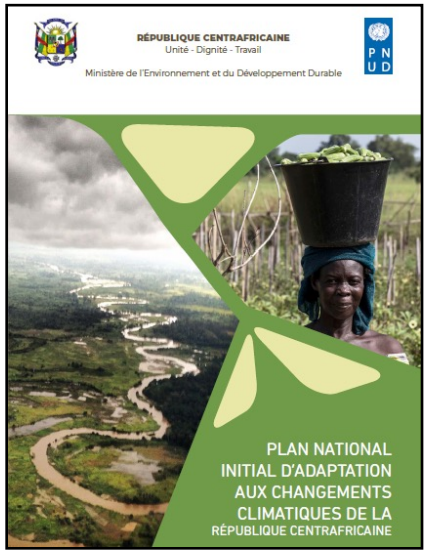
Quality Control of climate data:

- Plots of each index over time
- Files storing indices data
- Trend and threshold calculation
- Diagnostic file and plot to identify outliers and common errors in timeseries
- Correlations with sector data

FIGURE 10 : SÉRIE TEMPORELLE RÉGIONALE DES INDICES CLIMATIQUES POUR LA RÉPUBLIQUE CENTRAFRICAINE 1981-2019 PAR RAPPORT À LA MOYENNE 1981-2010

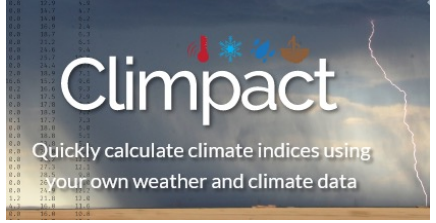
(+/-) indiquent des tendances (positives/négatives).





GREEN CLIMATE FUND

UNSW SYDNEY



Climpact (UNSW)

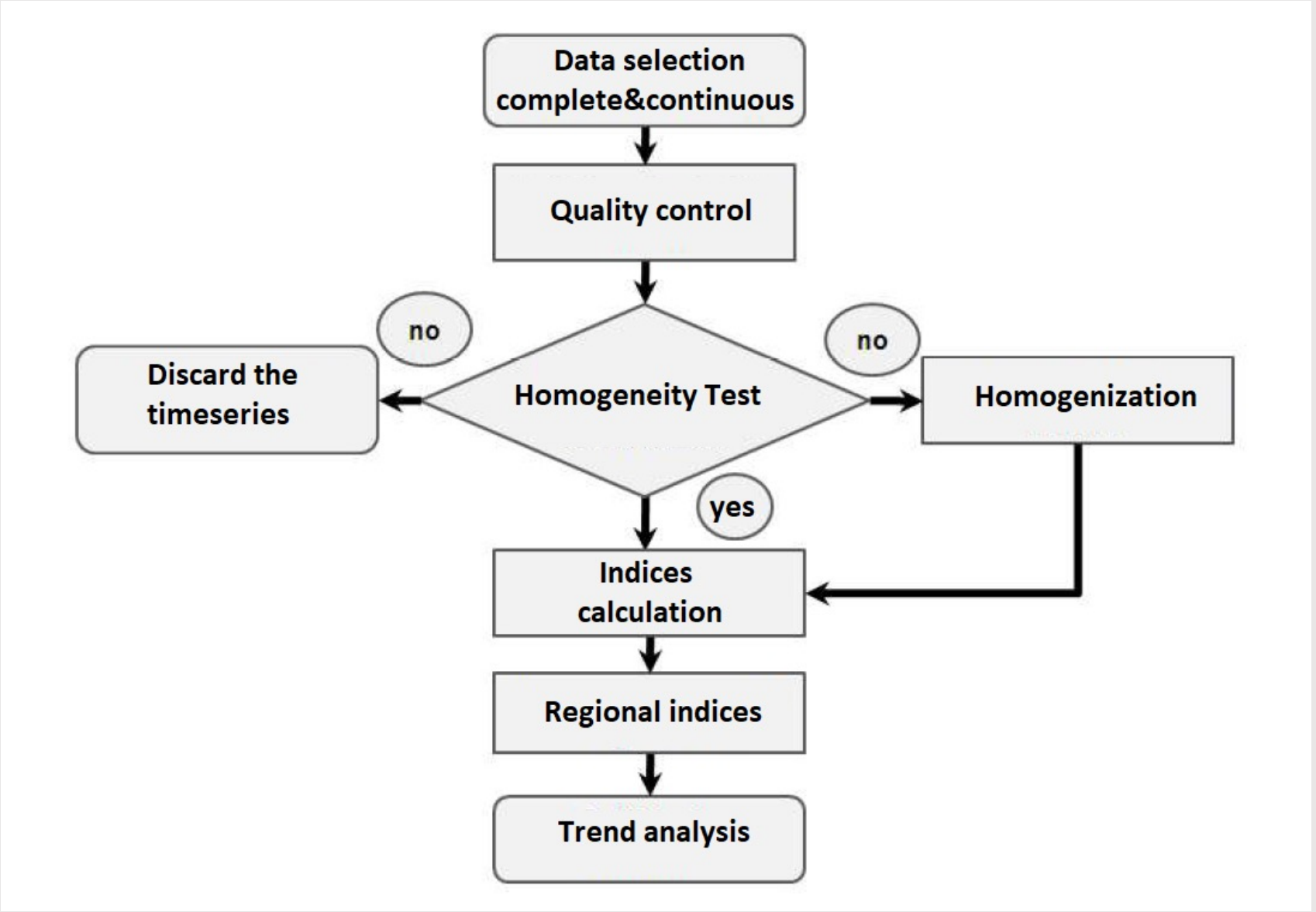
https://www.climpact-sci.org

Climpact users by country (markers) and Climpact-related ET-SCI workshops (yellow boxes) and WMO/GCF workshops (green boxes)

GREEN CLIMATE FUND

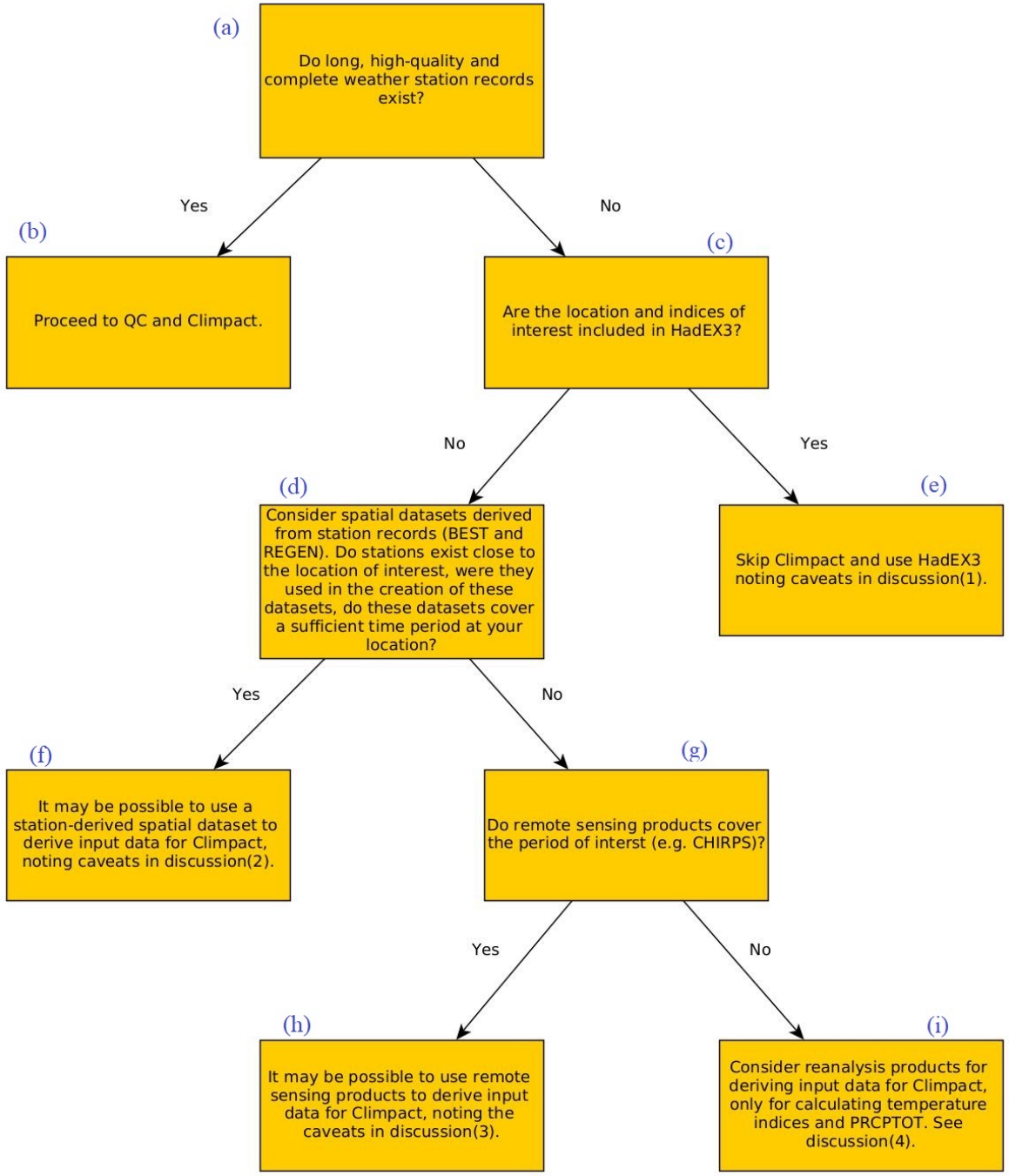
UNSW SYDNEY

Climate indices from instrumental data

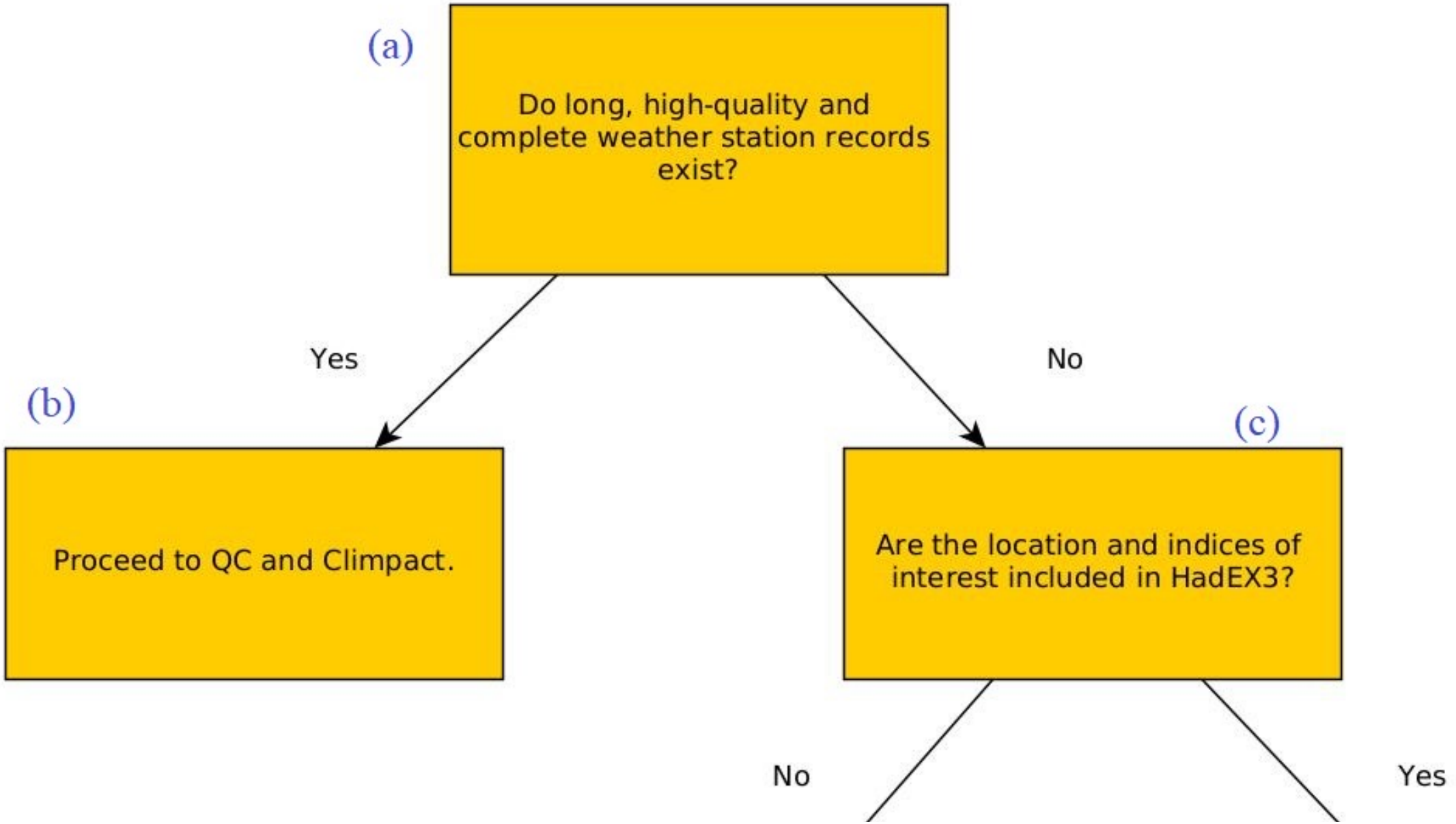


Herold et al. 2022. Pers. Comm.

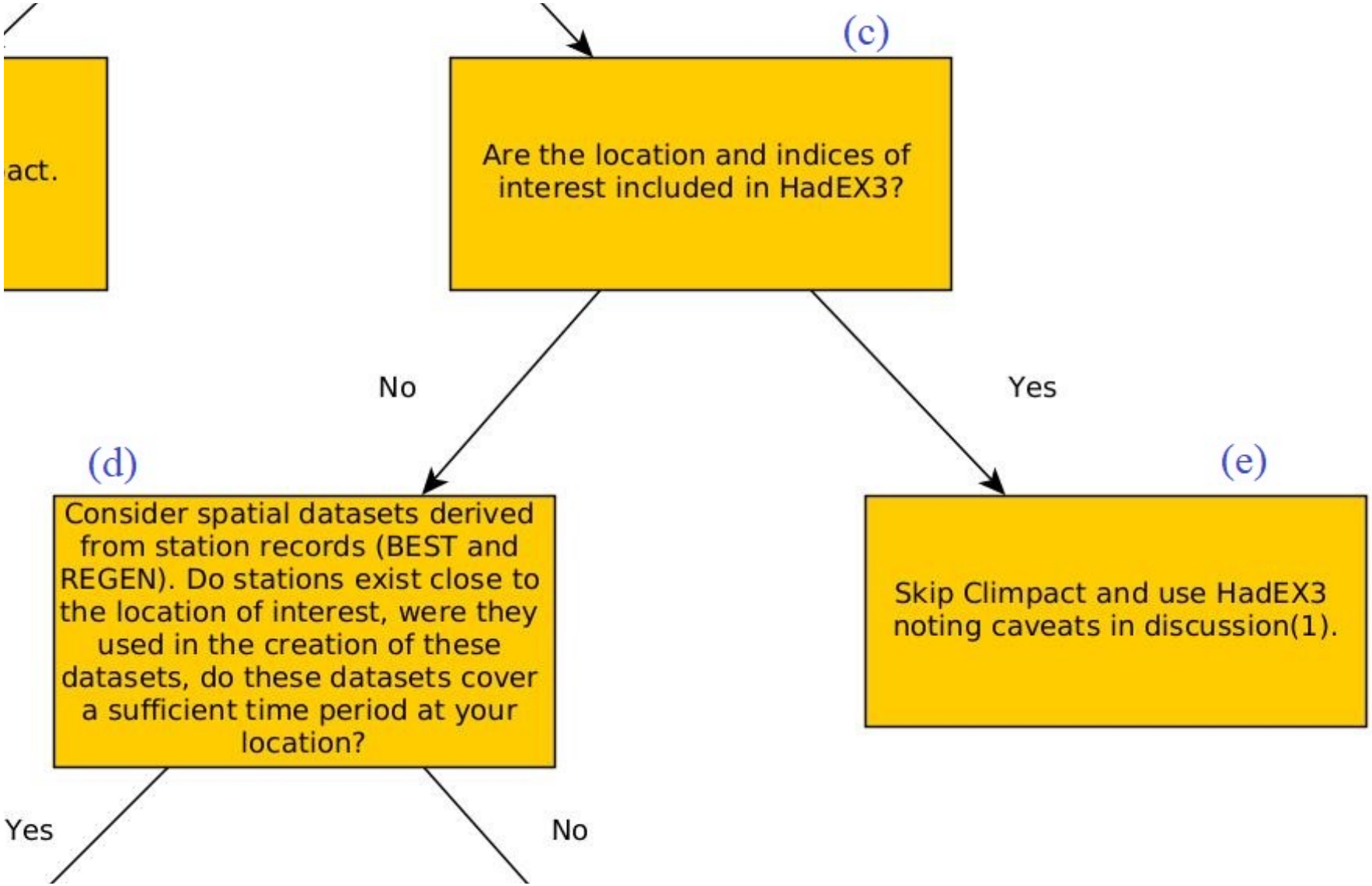
Climate indices when no good observed instrumental data (station level) exist



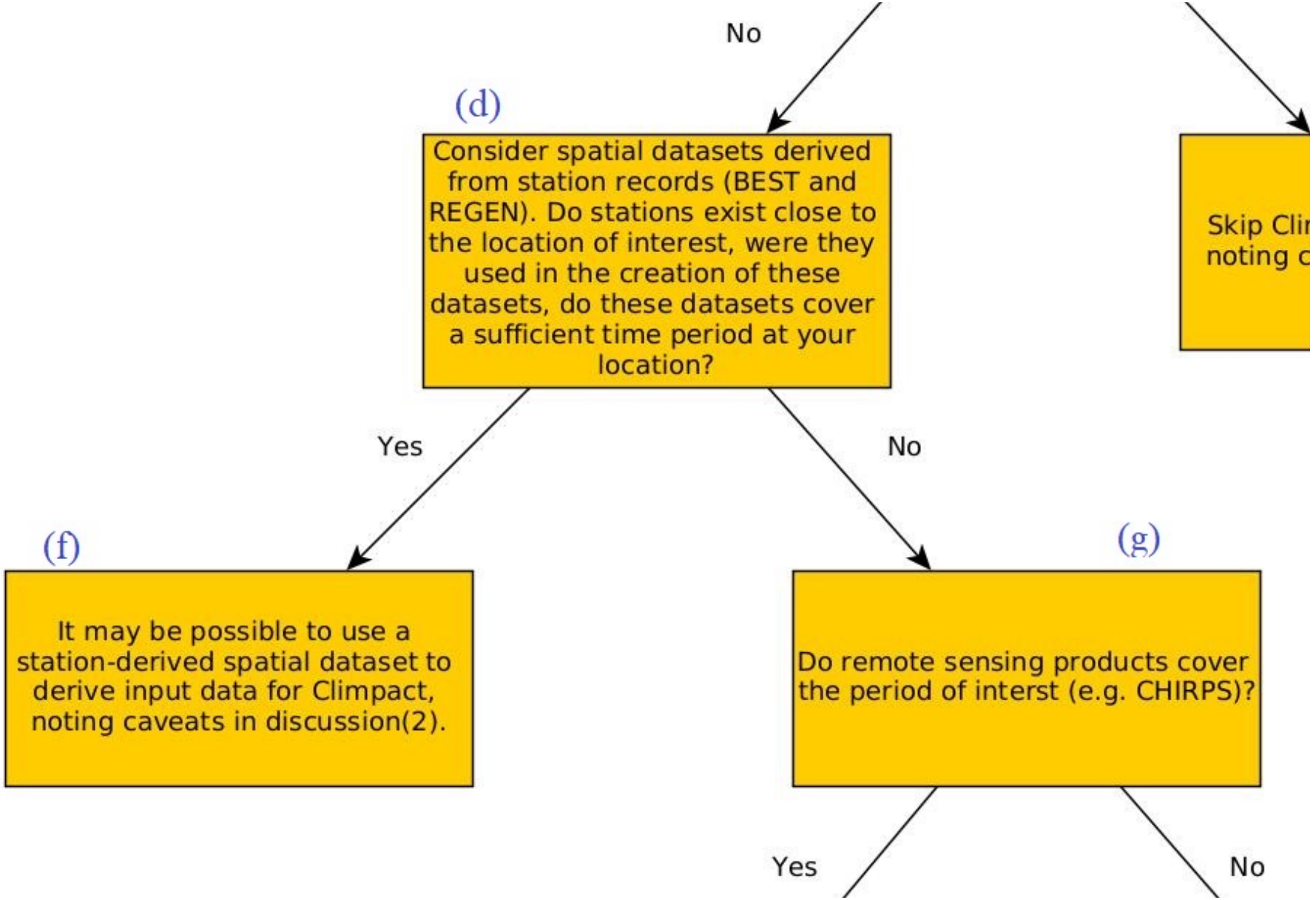
(1)


(a)
Do long, high-quality and complete weather station records exist?
Yes
No
(b)
Proceed to QC and Climpact.
(c)
Are the location and indices of interest included in HadEX3?
No
Yes

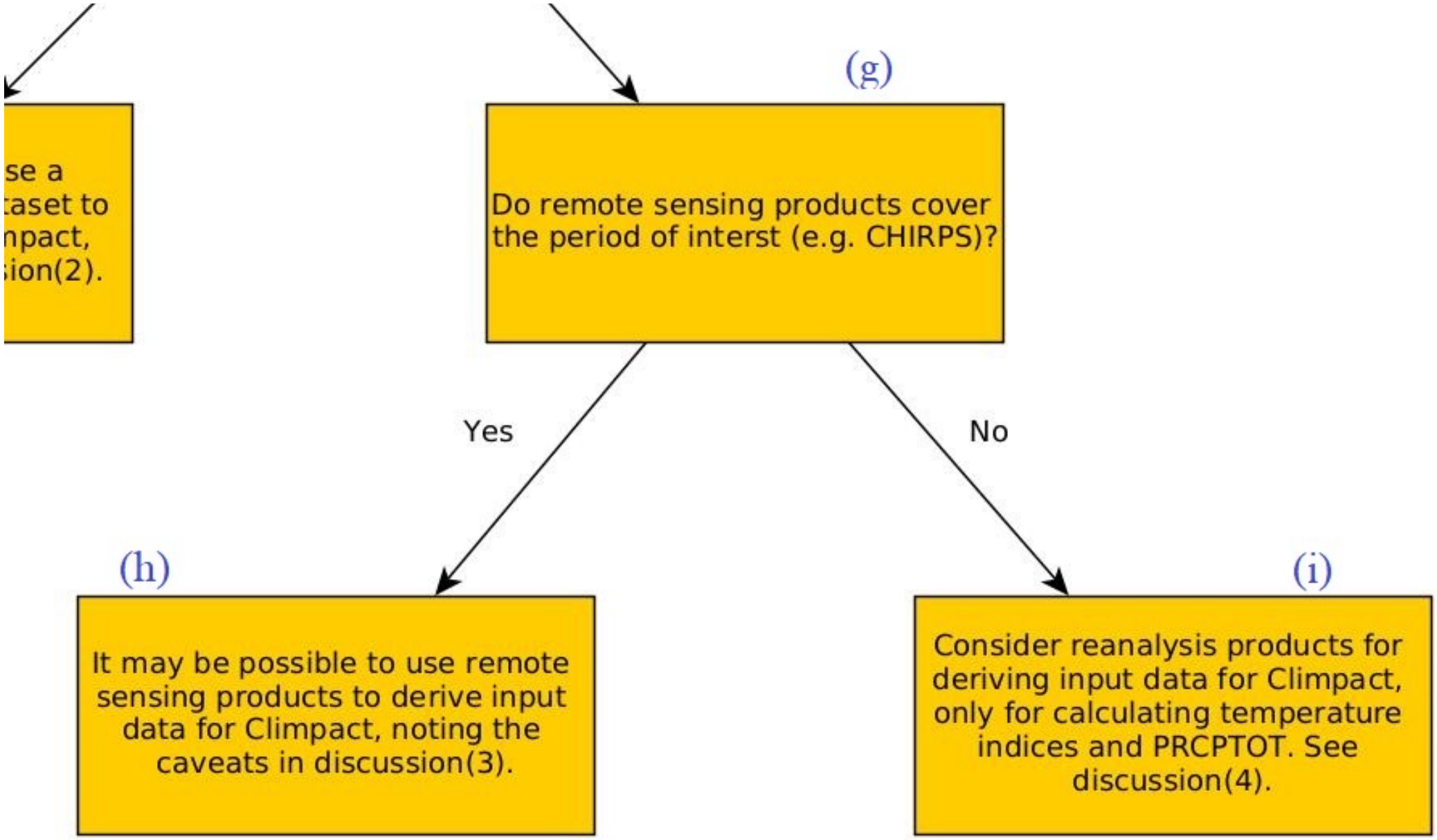
(2)


act.
(c)
Are the location and indices of interest included in HadEX3?
No
Yes
(d)
Consider spatial datasets derived from station records (BEST and REGEN). Do stations exist close to the location of interest, were they used in the creation of these datasets, do these datasets cover a sufficient time period at your location?
(e)
Skip Climpact and use HadEX3 noting caveats in discussion(1).
Yes
No

(3)


No
(d)
Consider spatial datasets derived from station records (BEST and REGEN). Do stations exist close to the location of interest, were they used in the creation of these datasets, do these datasets cover a sufficient time period at your location?
Skip Cli
noting c
Yes
No
(f)
It may be possible to use a station-derived spatial dataset to derive input data for Climpact, noting caveats in discussion(2).
(g)
Do remote sensing products cover the period of interst (e.g. CHIRPS)?
Yes
No

(4)


se a
taset to
npact,
sion(2).
(g)
Do remote sensing products cover the period of interst (e.g. CHIRPS)?
Yes
No
(h)
It may be possible to use remote sensing products to derive input data for Climpact, noting the caveats in discussion(3).
(i)
Consider reanalysis products for deriving input data for Climpact, only for calculating temperature indices and PRCPTOT. See discussion(4).

Climdex (UNSW)

https://www.climdex.org

Climdex plots can be easily cited They have been included in the IPCC reports and many other publications

Climdex

Explore, download and analyse indices of observed and modelled climate extremes.

27 ETCCDI indices (calculated with Climpact)

From station data, or gridded observational data

Summing up climate extremes

27 different indices describe changes in heat, cold, rainfall and drought over time—the hottest day each year, for example, or the amount of rainfall in the rainiest 5 day stretch each year.

Learn more

For any dataset

The Climdex indices are already available for a number of global climate datasets: we host several right here, and more are available from our partners. Find a dataset that suits your needs.

Browse datasets

Plots and data, ready to go...

We provide trend maps, average maps, time series plots and raw data of the indices for our hosted datasets right here. Choose the dataset, the index, the timespan and the location.

Access data

Name	Description	Resolution	Years	Reference	Access
HadEX3	HadEX3 is a gridded analysis using approximately 7,000 stations for temperature and 17,000 stations for precipitation to cover the period 1901-2018. Two versions of HadEX3 are available, one using a reference period of 1961-1990 and another using a reference period of 1981-2010 (this latter dataset only contains indices dependent on the reference period, i.e. it only contains percentile-based indices). Robert Dunn maintains a blog about the the HadEX3 dataset here and the United Kingdom Met Office homepage for the HadEX3 dataset can be found here.	1.875°×1.25°	1901–2018	Dunn et al. 2020	Get data

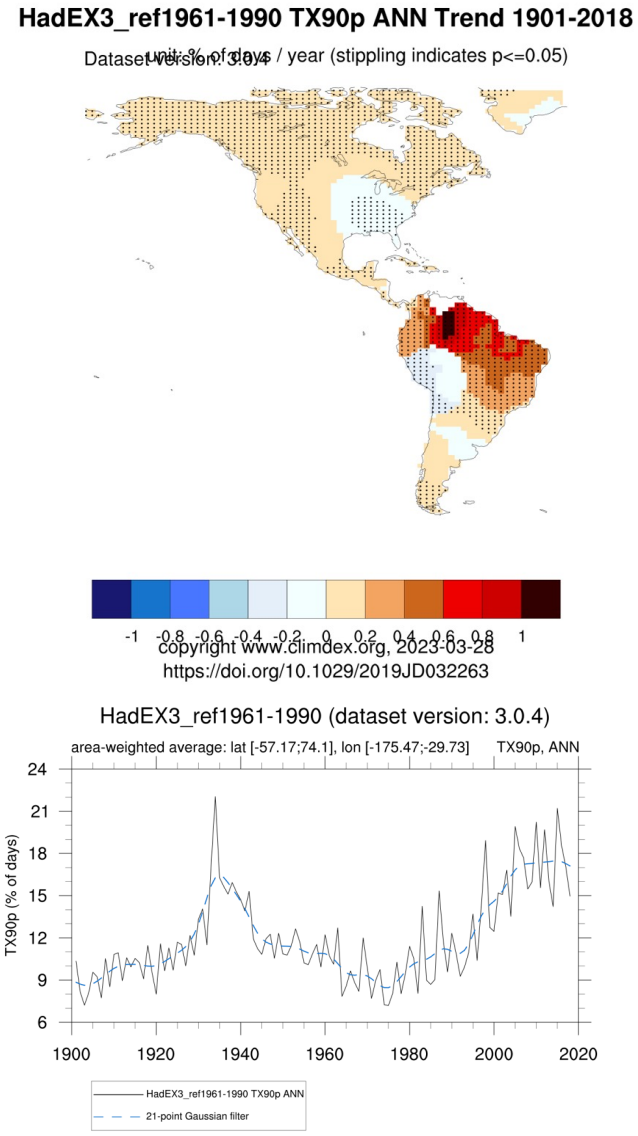
Output options

Average map | Trend map | Time series | Raw Data

Plot (PNG) | Text (ASCII) | NetCDF

Pease remember to cite the **relevant paper** when publishing work that uses this data!

Download

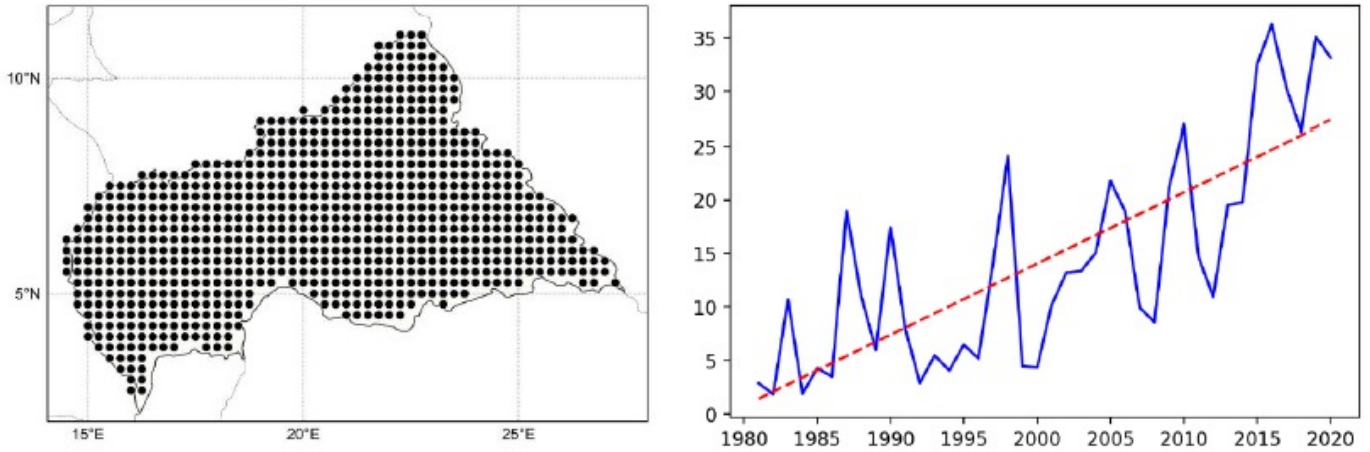


UNSW SYDNEY

Example: Climate change indices for CAR from *ERA5 reanalysis*

ETCCDI indices (temperature) calculated from ERA reanalysis (proxy)

Central African Republic
A regional time series covering all country



Left: Individual locations of 812 ERA5-reanalysis temperature timeseries withing the Central African Republic
Right: CAR regional timeseries of the (Tn90p) warm nights index (average of 812 individual timeseries): annual percentage of days when minimum temperature is greater than the 90th percentile

Challenges for using this type of information for DRR:

Translation of climatic patterns into impacts

Plans to prevent and prepare for impacts as part of DRR

Translate global/regional projections into national/local impacts

Long-term adaptation goals vs short/medium term actions

A. Kumar (per. comm)

Climate Information Platform (SMHI)

https://climateinformation.org

Example: Gaborone, BWA (-24.66 / 25.92)

Site-specific report

Get an instant climate change overview for any location world-wide.

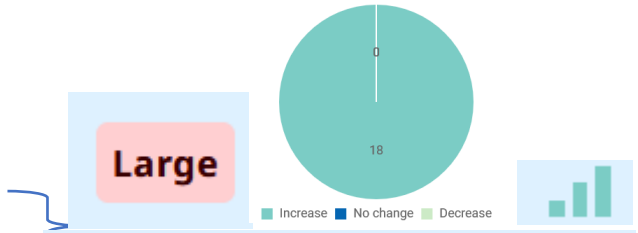
+4◦C

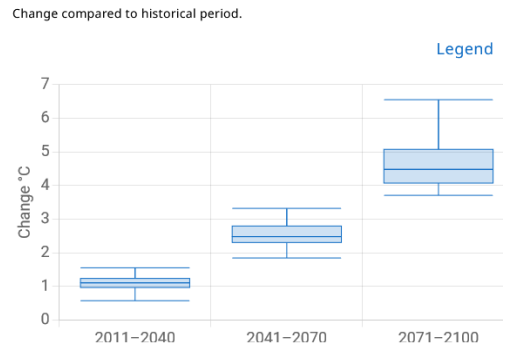
Temperature (annual mean)

Large Change is more than 2 °C

Medium Change is 1.5-2 °C

Small Change is less than 1.5 °C

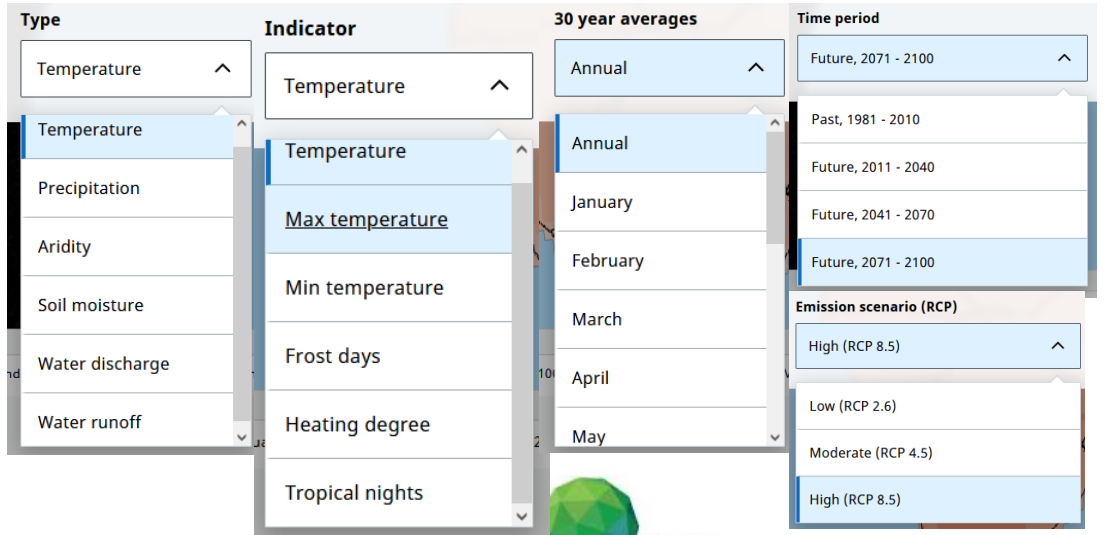


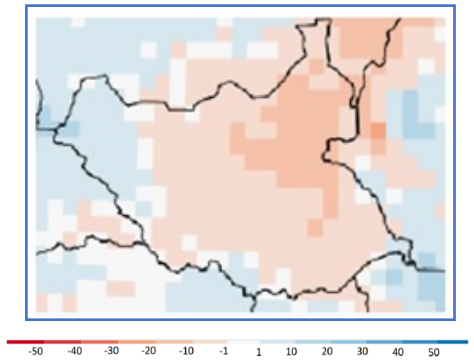


Future change in top indicators

Data Access Platform

Download pre-calculated climate indicators and explore interactive maps and graphs.





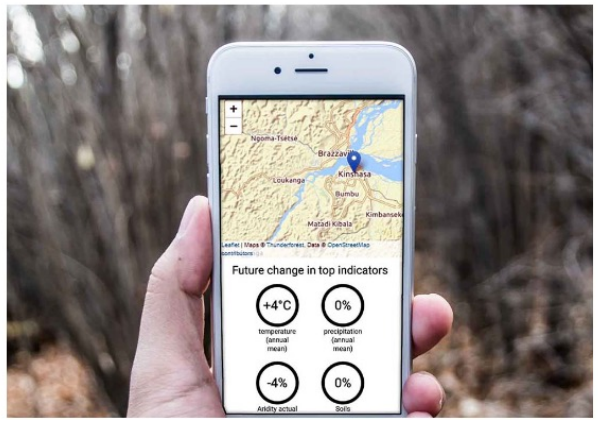
Annual Precipitation. RCP 8.5
2041 – 2070
% change vs 1981-2010

GREEN CLIMATE FUND

SMHI

Demos

CLIMATE INFORMATION

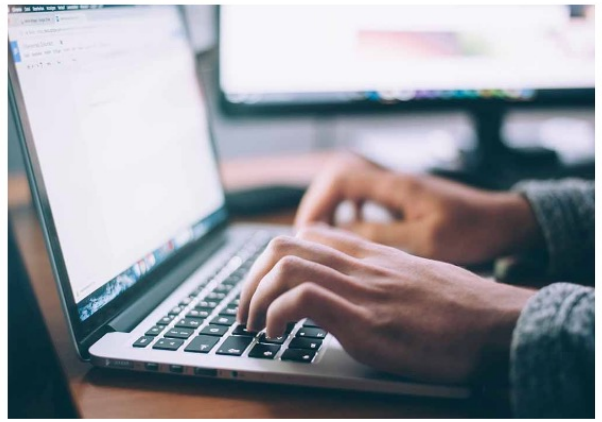


Site-specific report

Get an instant climate change overview for any location world-wide.

Data Access Platform

Download pre-calculated climate indicators and explore interactive maps and graphs.



Climpact

Calculate climate indicators using your own weather and climate data.

GREEN CLIMATE FUND

WORLD METEOROLOGICAL ORGANIZATION

WCRP World Climate Research Programme

SMHI