

Agrometeorological technologies and services in support of agriculture

WTO TRADE AND ENVIRONMENTAL SUSTAINABILITY
STRUCTURED DISCUSSIONS (TESSD)

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WORLD
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Applied Climate Services Division
World Meteorological Organization (WMO)

Major drivers of food insecurity across the world

Conflicts

Climate variability and extremes

slowdowns and downturn

Low access and affordability of food

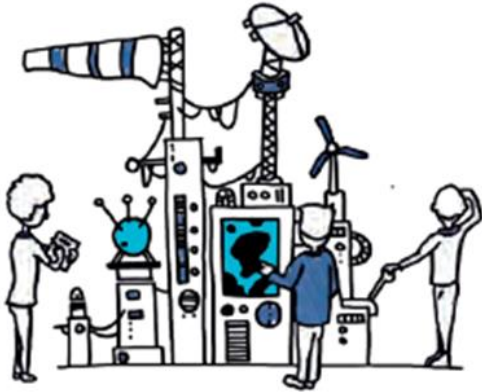
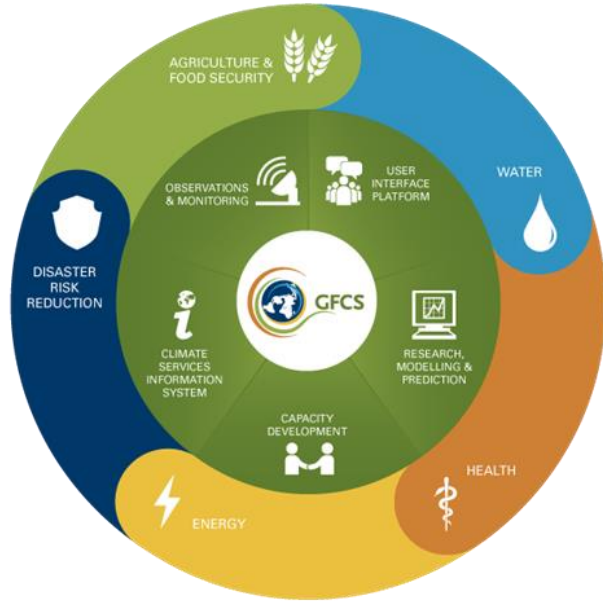
Inequality and poverty



Climate change & agriculture (IPCC findings)

- Climate change impacts are negatively affecting **agriculture, forestry, fisheries, and aquaculture**, increasingly hindering efforts to meet human needs (*high confidence*).
- Climate change will make some **current food production** areas unsuitable (*high confidence*).
- Economic losses of climate change arise from adverse impacts to inputs, such as **crop yields** (*very high confidence*), water availability (*high confidence*) and outdoor labour productivity due to heat stress (*high confidence*).
- Projected water cycle changes will impact **agriculture** (*medium confidence*).
- Compound hazards increasing with global warming include increased frequency of concurrent heatwaves and droughts (*high confidence*); dangerous fire weather (*medium confidence*); and floods (*medium confidence*), resulting in increased and more complex risks to **agriculture**, water resources, human health, mortality, livelihoods, settlements, and infrastructure.

Climate services and farmer needs



OUTPUTS

A. Weather

- Days suitable for fieldwork
- Accumulated growing degree days for season
- Heat indices for livestock
- Fire Danger Ratings
- Pest/Disease Forecasts

B. Climate Variability

- Crop-yield forecasts
- Average dates of beginning and end of rainy season
- Average first and last frost dates
- Crop-Weather Calendar
- Drought Indices/Warnings

C. Climate Change

- Maps of changes in agroecological zoning
- Maps of changes in first/last frost dates
- Analyses on future crop impacts

Do I need to
plant drought
resistant seeds
next season?



USER DECISIONS AND ACTIONS

- When to plant and harvest
- When to irrigate
- When to apply fertilizers/pesticides
- When to rotate/move live stock
- Investing in drought resilient crops and livestock
- Investing in more efficient irrigation systems

- Climate services are the provision and use of climate information to assist decision-making
- Users in agriculture could include farmers, agricultural policy makers, grain management authorities (public stockholders), agricultural planners, extension agents, agricultural research institutes, seed producers and more

Example: Climate services for seasonal & long-term agricultural planning

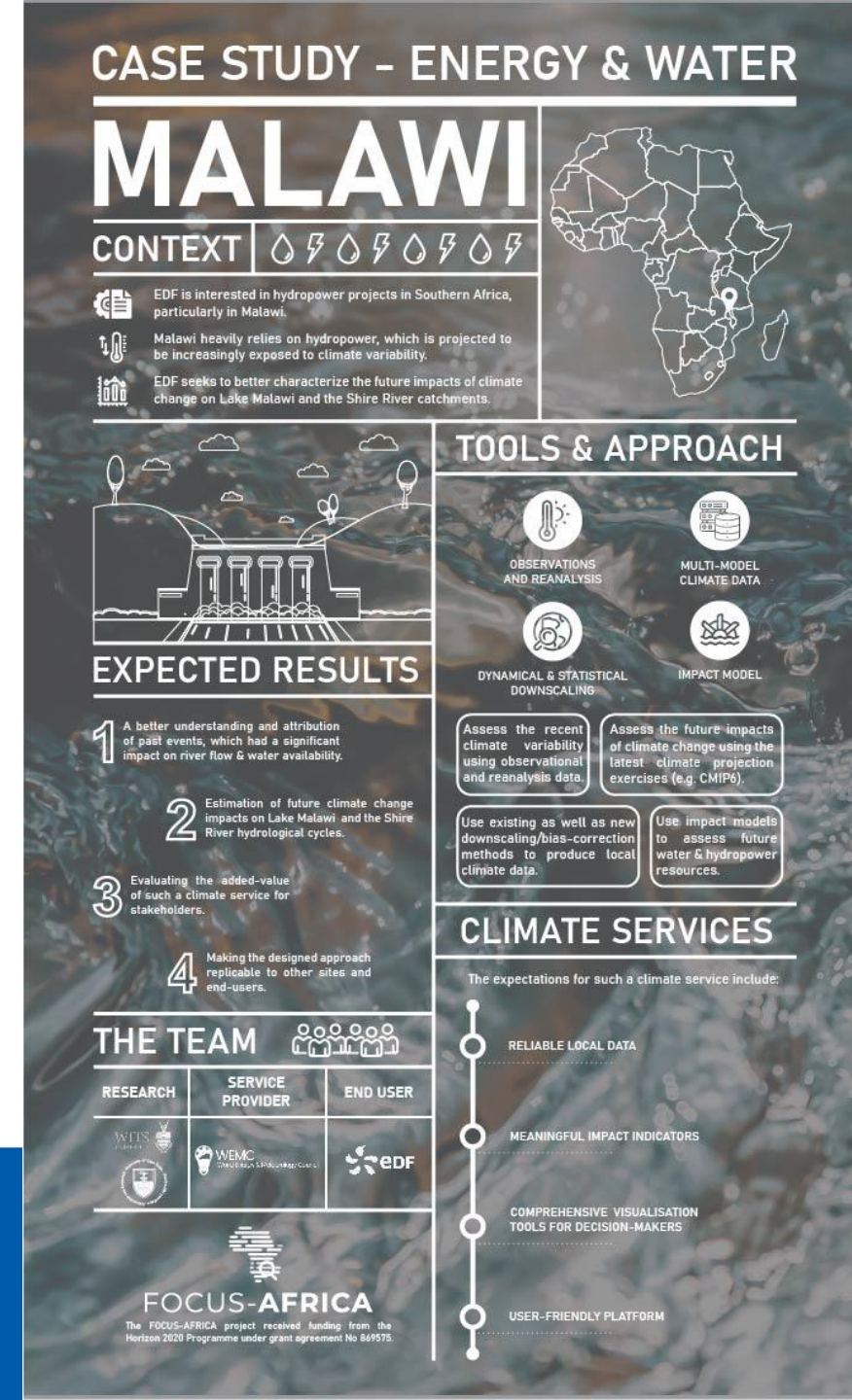
- Climate resilient cowpea (*Vigna unguiculata*) and rice (*Oryza sativa*),
- Cowpea is an understudied & underutilized climate resilient crop
- Rice is grown not only as a staple but also as a source of income.
- Multidisciplinary approach to provide climate services along two paths:
 1. development of ICT-based tools delivering improved seasonal forecasting – improve seasonal yield stability
 2. the identification, characterization and testing of climate-ready varieties of rice and cowpea (climate projections + genomics) - ultimately able to identify most climate resilient varieties for production in the long term

CASE STUDY - FOOD SECURITY MOZAMBIQUE



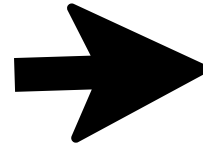
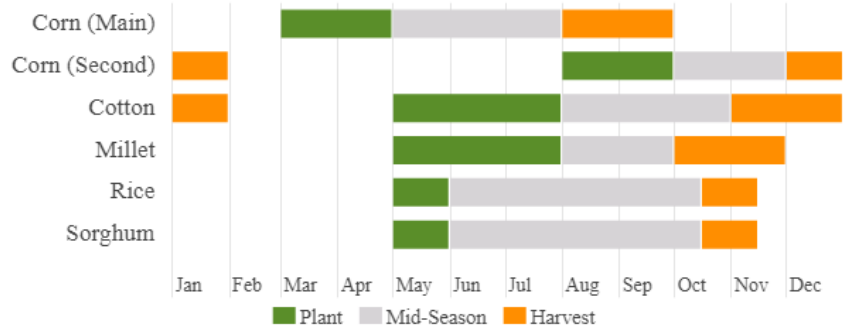
Example: Climate services for energy and water security planning

- Use of climate services to design climate-resilient water and energy infrastructure – in this case a large dam for hydropower and other uses (e.g., agricultural irrigation, fisheries)
- Look at climate projections, likelihood of having water levels below certain thresholds, return rates of major hazards (droughts and floods), among others..
- Similar case study looking at design of transport infrastructure in Tanzania - i.e., how can transport infrastructure be made more resilient in the face of increasing frequency & occurrence of heavy rainfall events.
- Other case studies looking at how climate services can inform agricultural financing decisions

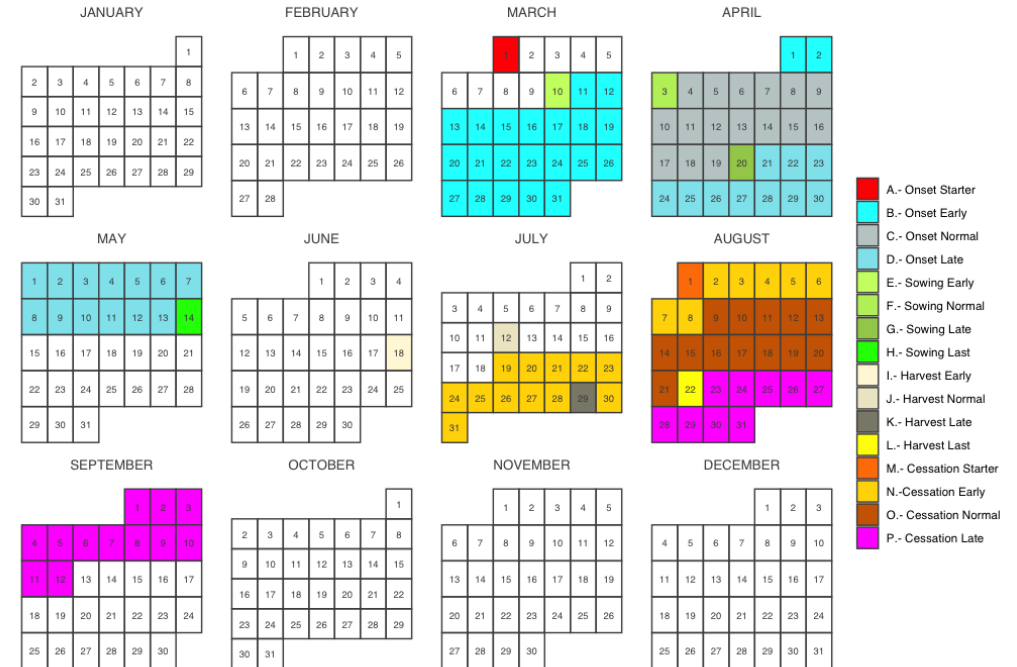


Weather-based crop calendars

Togo — Crop Calendar



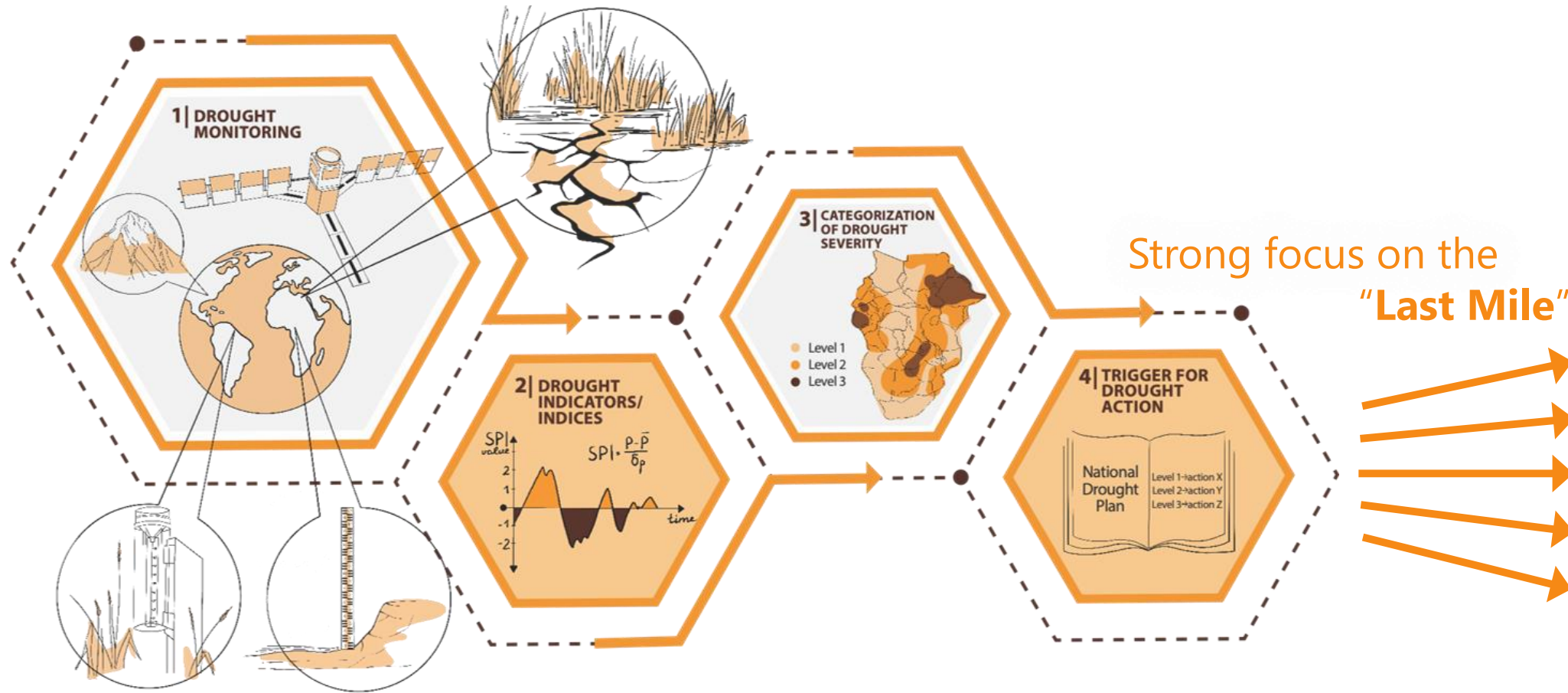
CROP CALENDAR LOME. CORN-1



- Integrate historical climate data into traditional information on the timing of certain cropping actions
- Determine early/normal/late start of the season. The same is done for cessation (not shown)
- Can support enhanced resilience of agriculture
- Can also aid provision of information on markets (e.g. when is corn likely to be harvested and hit the market)

Long rains March-August → Corn (Main)

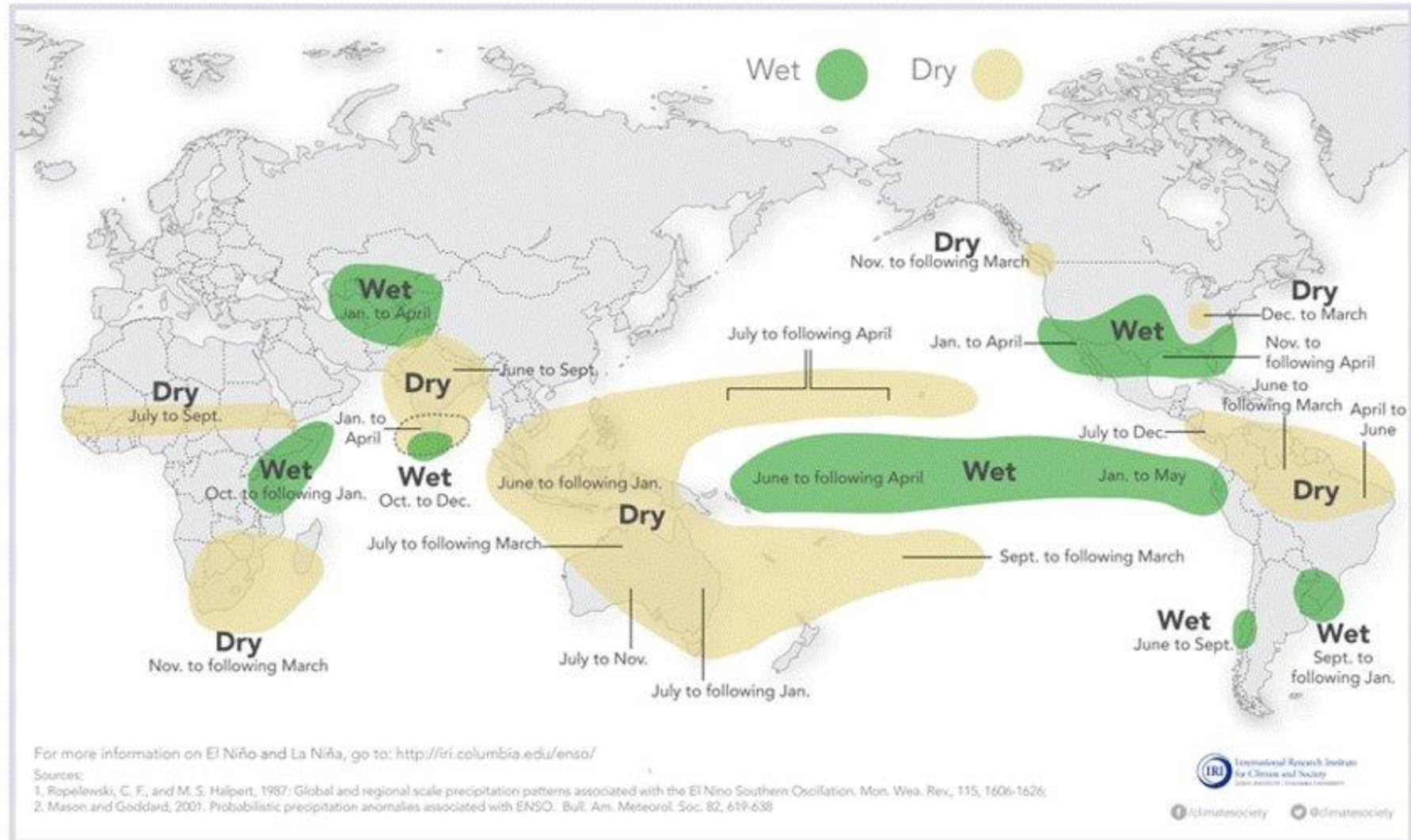
Drought monitoring for Integrated Drought Management



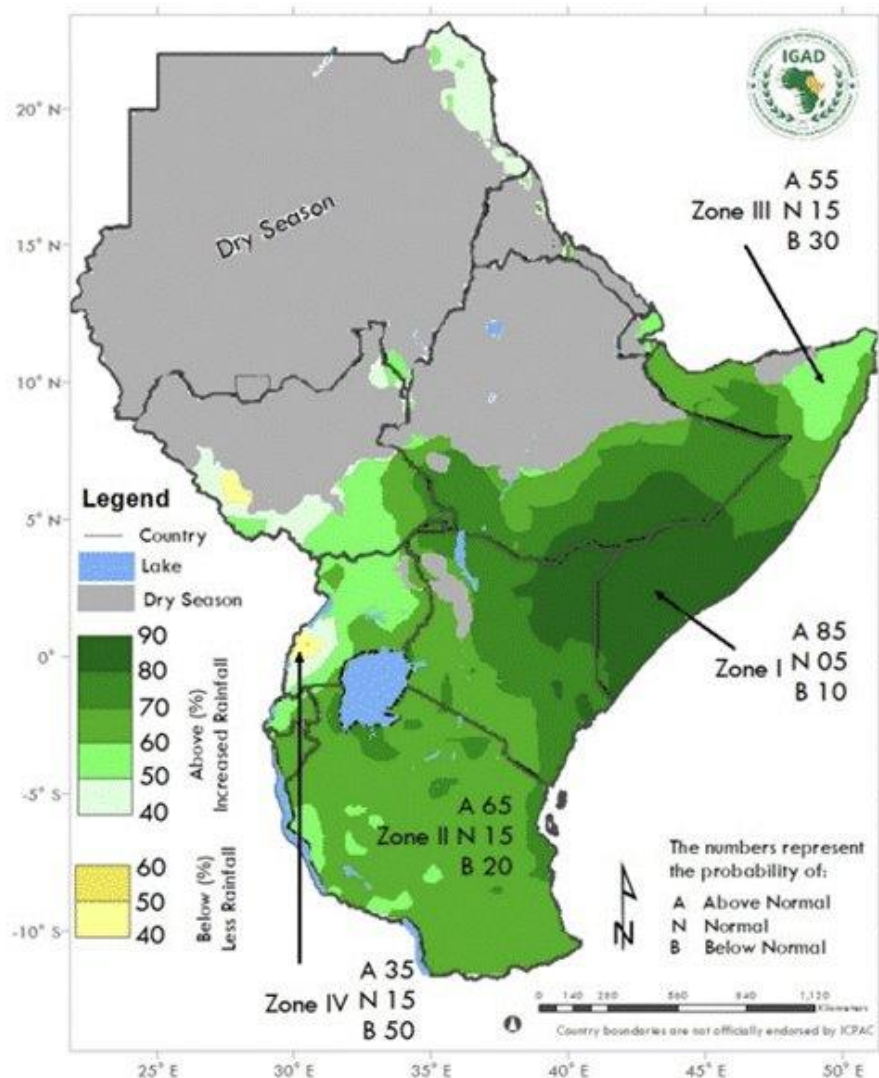
El Niño/La Niña Updates

El Niño and Rainfall

El Niño conditions in the tropical Pacific are known to shift rainfall patterns in many different parts of the world. Although they vary somewhat from one El Niño to the next, the strongest shifts remain fairly consistent in the regions and seasons shown on the map below.



Seasonal forecasts and food security updates



Beyond May, the food security situation will depend on the performance of the 2022 March-May rainfall season. However, regardless of whether the next season's rainfall performance is good or poor, high levels of food insecurity are expected to continue in drought-affected areas through at least September 2022.

FSNWG January 2022 Update

FSNWG¹ Food Security and Nutrition Update

Key messages

- Parts of the region are experiencing moderate to severe drought conditions, largely driven by consecutive seasons of below-average rains. Southern and south-eastern Ethiopia, northern Kenya and most of Somalia are the worst affected, with certain areas recording some of the driest conditions since 1981. FSNWG's in-depth analysis of the drought situation can be found [here](#).
- Beyond May, the food security situation will depend on the performance of the 2022 March-May rainfall season. However, regardless of whether the next season's rainfall performance is good or poor, high levels of food insecurity are expected to continue in drought-affected areas through at least September 2022.
- According to the IPC Global Support Unit (IPC-GSU)

for East and Central Africa, an estimated 5.6 million people in FSNWG are in need of 2022. Of the eight...

- The nutritional situation is concerning, particularly in ASALs of multiple humanitarian crises. Further action is threatened by malnutrition.

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Food insecure population estimates, as of January 2022

Country	Stressed (IPC Phase 2)	Crisis (IPC Phase 3)	Emergency (IPC Phase 4)	Catastrophe (IPC Phase 5)
Djibouti	389,000	167,000	27,000	
Ethiopia ^a	5,998,068	4,550,479	2,434,519	40
Kenya	5,241,474	1,998,688	367,549	
Somalia ^b	3,712,900	2,824,960	640,730	
South Sudan ^c	3,138,000	4,668,000	2,413,000	10
Sudan	15,007,696	4,631,480	1,324,529	
Uganda	470,610	159,930	27,725	
IGAD Total	33,957,748	19,000,537	7,235,052	50
Burundi	3,938,184	1,059,233	0	
CAR	1,652,643	1,475,713	619,565	
DRC	47,830,924	20,463,608	5,415,900	
Total	87,379,499	41,999,091	13,270,517	50

Source: IPC Global Support Unit

^a The East and Central Africa Food Security and Nutrition Working Group (FSNWG) is a multi-stakeholder network that provides timely information on food security and nutrition to relevant stakeholders for improved decision-making.
^b The Integrated Food Security Phase Classification (IPC) is a set of standardized tools used to classify the level of food insecurity in a country. The IPC is divided into five phases: Phase 1 (Stressed), Phase 2 (Crisis), Phase 3 (Emergency), Phase 4 (Catastrophe), and Phase 5 (Famine).
^c Figure represents estimates from September 2021, and includes findings from the IPC update on Tigray and the Government of Ethiopia.

^d Source: Food Security Review (FSR) 2021, The 2021 World Food and Nutrition Survey.

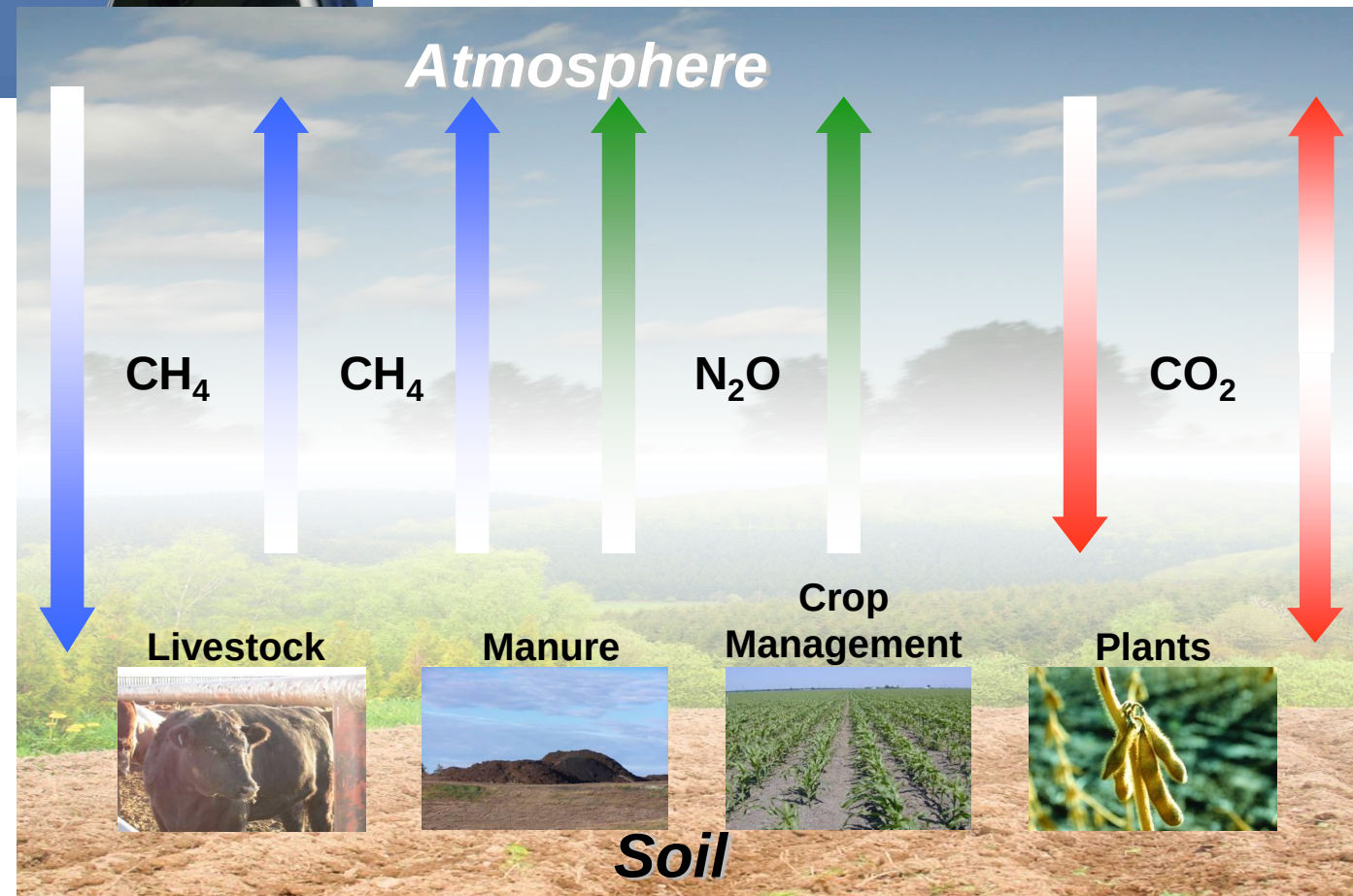
^e New food insecurity estimates for February 2022 can be found [here](#).

^f [IPC and FSNWG: Somalia Food Security Alert December 2021](#).

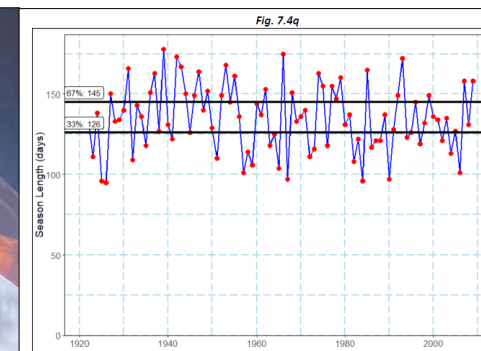
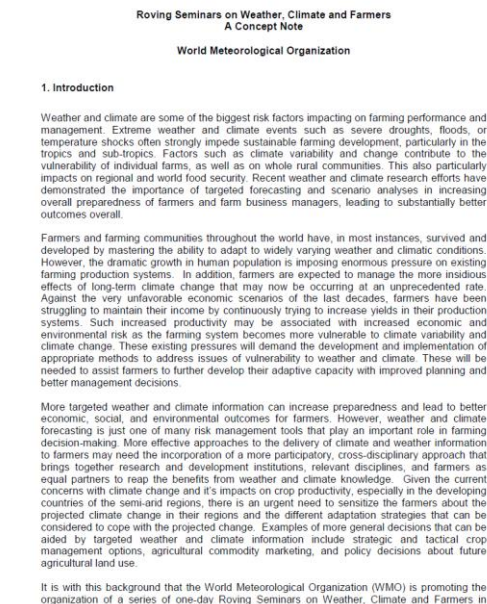
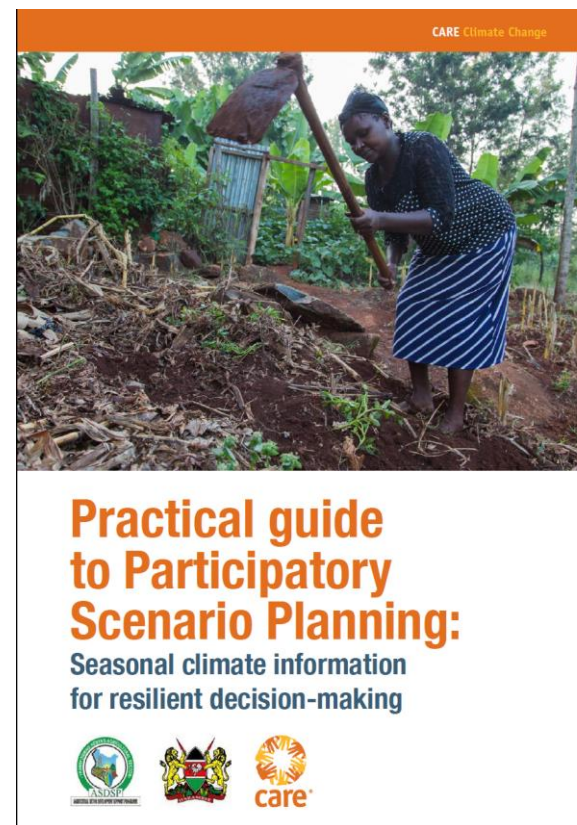
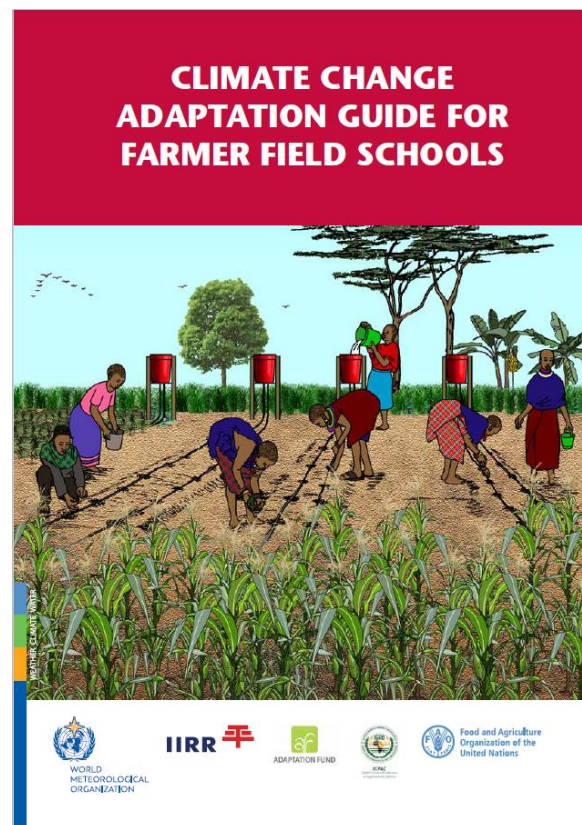
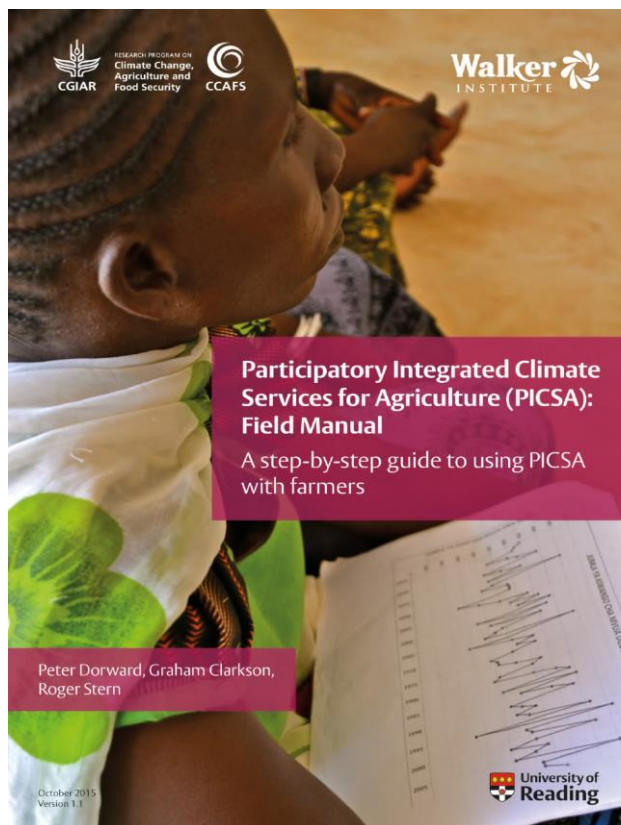
^g Figure represents estimates from July 2021, and is based on IPC Global Support Unit's consolidated findings from external reviews (Phase Review and Quality Review), following a breakdown in technical consensus in the estimation of populations in Catastrophe (IPC Phase 5) in six countries. According to the South Sudan IPC Technical Working Group, 8,344,000 people were in Stressed (IPC Phase 2), 4,718,000 in Crisis (IPC Phase 3), 2,417,000 in Emergency (IPC Phase 4) and 10,000 in Catastrophe (IPC Phase 5).

Global Database on agricultural flux tower sites

- Metadata of locations and measurements of agricultural flux towers
- Understanding GHG fluxes on agricultural land are important in understanding low-emissions agriculture
- Aligned with WMO **Global Greenhouse Gas Watch (G3W)**



Participatory process for climate services in agriculture



Climate services are crucial for implementing **adaptation** – e.g. **resilient varieties, timing of activities based on weather and climate info**

Climate services are also crucial for supporting **mitigation responses in agriculture** (e.g. reducing wastage of inputs and loss of harvests,

Climate services can play a key role in **understanding global food security** and global, regional & national **food markets** – **thereby informing trade & subsidies**.

Climate services inform **anticipatory action & food security planning** by various organizations , e.g., governments, WFP

Climate services are also key for research and innovation into aspects like **resilient seed varieties**

Climate services also being integrated into **agricultural finance & insurance**

ICT for communication of climate and other agricultural information

Participation and engagement of farmers and other agriculture stakeholders is key

Thank you.



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