Regional Workshop:

“Advancing satellite-based crop monitoring to increase resilience in the face of global food insecurity.”

2-5 July, 2024, Abuja Nigeria

Country Profile: CAMEROON

Minader
Ministère de l'Agriculture et du Développement Rural

UNITED NATIONS
UNCTAD

Crop Monitoring: Cameroon AgriCulture

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Plan

- Overview: Basics on Agriculture Development
- Crop phenology of main food crops
- Existing remote sensing agricultural projects
- Current Problem
- Requirements and Expectations
- Conclusion/Recommendation

Country and AgriCulture statistics

SN	Agro-ecological Zone
1	Sudano- Sahelian Savannah
2	High Guinea Savannah
3	Western highlands unimodal rainfall
4	Humid forest unimodal rainfall
5	Humid Forest Bimodal Rainfall

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Agro-ecological Zones-Characteristics

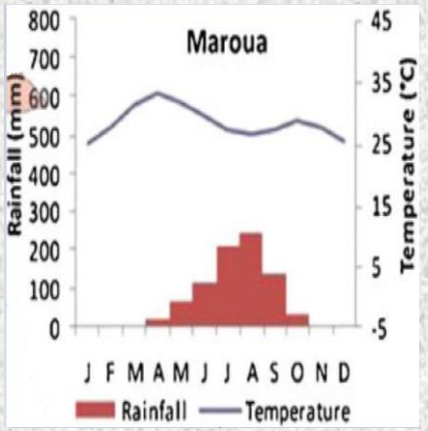
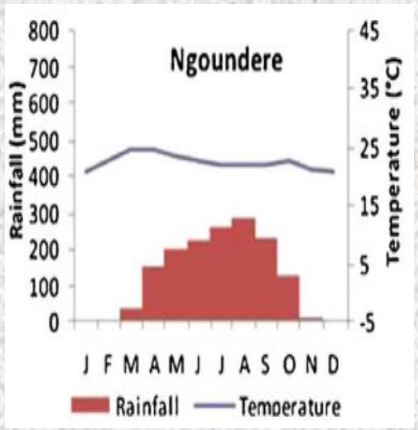
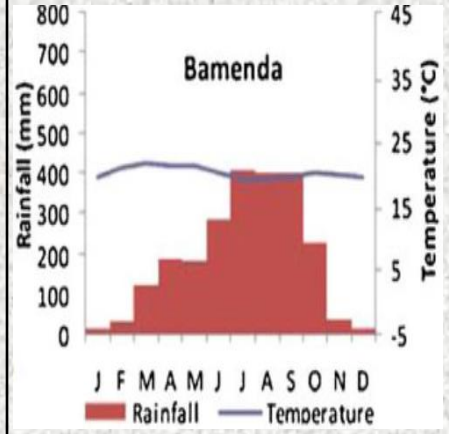
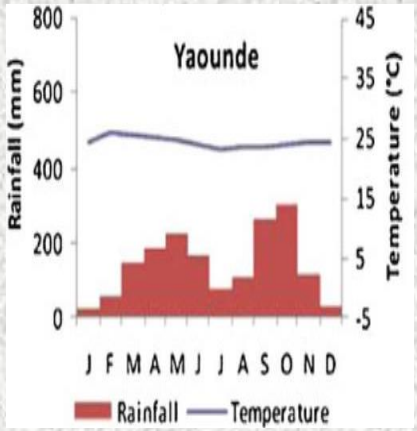
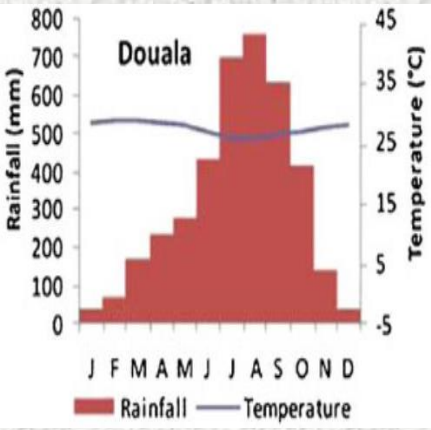
SN	Sudano Sahelian Savannah	High Guinea Savannah*	Western highlands unimodal RF*	Humid forest unimodal rainfall**	Humid Forest Bimodal Rainfall *
Area km2	10,0353	12,3077	31,192	45,658	16,5770
Rainfall mm/year	400-1200	1500 rainy days: 150	1500- 2000 Rainy-days: 180	2500-4000 Mono-modal	1500-2000 Distinct wet season
Soil type	Ferrogeneous vertisoils, lithosoils, Alluvial, hydromorhpic	Porous to water moderate retention, ferralic / hydromorhpic	Young soils on slopes,-prone to erosion, very fertile	Volcanic slopes, coastal sediments	Ferralitic, acidic, clayed, low water retention
Crops	Cotton, millet, sorghum, onion	Maize, cotton, Yams, Irish, Sorghum	Coffee, Maize, Irish beans, Garden crops	Tree crops, White pepper, Cassava,	Tree crops, Maize, Pineapples
Major Towns	*Maroua*	*Ngoundere*	*Bamenda*	*Douala*	*Yaoundé*

*__Tree crops:__ Banana, cocoa, Plantains, oil Palms, Mangoes, Pear

*: Agro-zones best suited for maize/rice crops

**: Agro-zones well suited for cassava crop

Agro-ecological Zones-crops cultivated

Sudano- Sahelian Savannah	High Guinea Savannah	Western highlands unimodal rainfall	Humid forest unimodal rainfall	Humid Forest Bimodal Rainfall
				
- *Cereals/Grains - Oil seeds - Garden crops(onion)	- Cereals/Grains - Oil seeds - *Roots/Tubers -Fruits: Mango, cashew Nut, citrus	- Cereals/Grains - Roots/Tubers - *Garden crops(.greens - Beverages -Fruits: Mango, Pear, citrus, pineapples, Plantain/Banana, wild fruits	Cereals/Grains - *Roots/Tubers - Beverages -*Fruits: Mango, Pear, citrus, pineapples, plantain/banana, oil palms, wild fruits	Cereals/Grains - Roots/Tubers - Garden crops - *Beverages -Fruits: Mango, Pear, citrus, pineapples, White pepper, Papaya, oil palms, wild fruits

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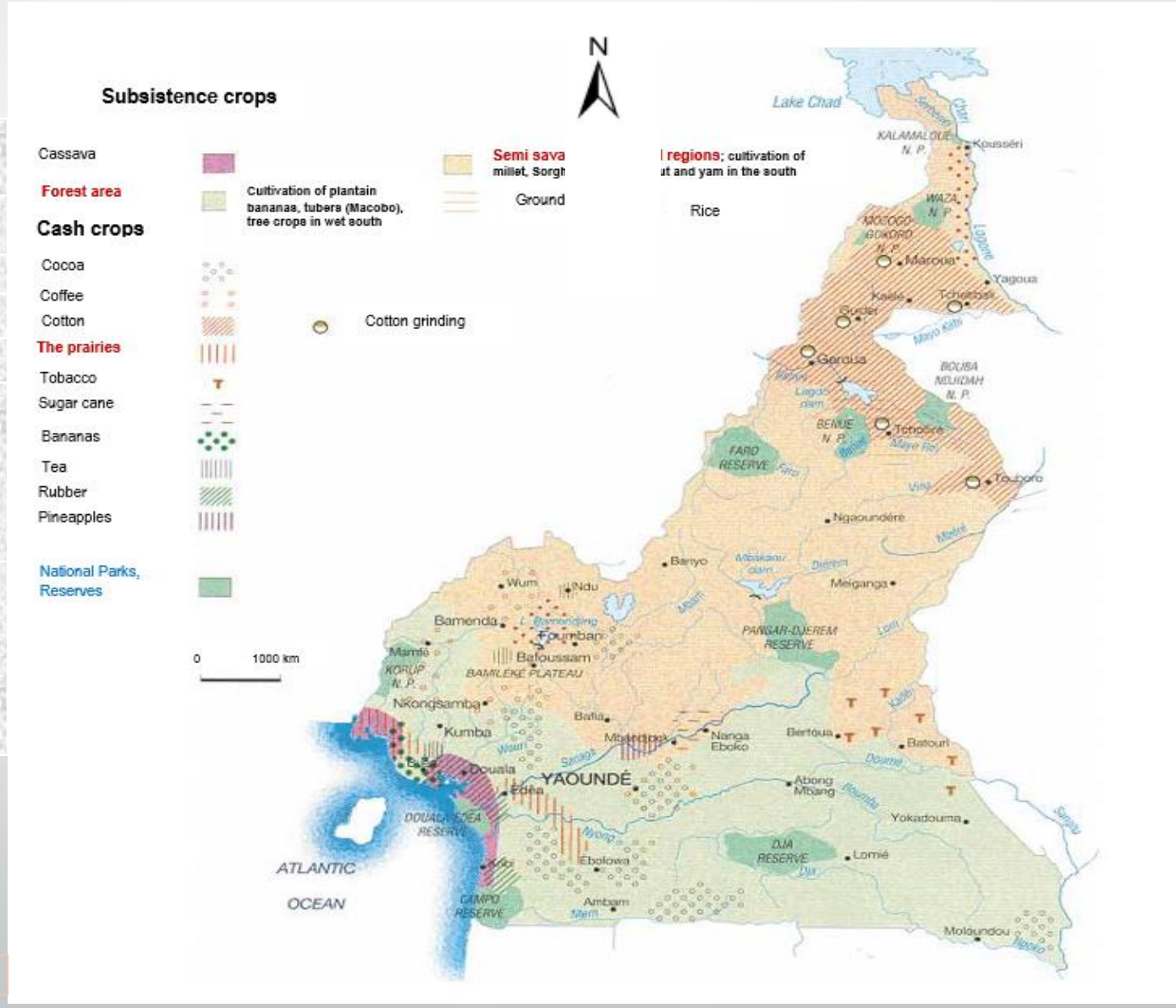
Major Food crops cultivated

Legumes/grains	Beans, Groundnuts, soya beans, cowpea, sesame seeds
Roots	*Cassava, potatoes, cocoyam/taro,
Tubers	Potatoes, Yams
Cereals	Maize, Sorghum, Rice, millet
Oils	oil palm , cotton,
Others: Fruits, Beverages..	Plantains/Bananas, Coffee, Cocoa, White pepper, coconuts, Papaya, Sugar cane, pineapples, oranges, Mangoes, plums, Cashew nuts
Garden crops(Vegetable green species	Tomatoes, Cabbages, Carrots, Watermelons/ Melons, Onion, huckleberry, Vernonia amydalina (bitter leaf, water leaf, okra, chilli, pumpkin, egussi, bell peppers….



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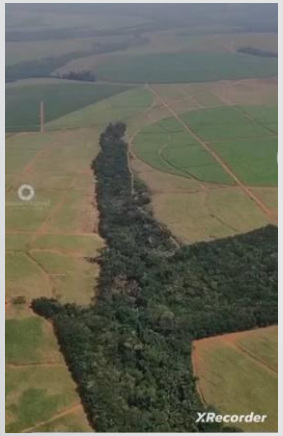
Source: Adopted from IRAD

Cropping System Disposition

Sugar-cane Plan. Nkoteng



1. Mono-cropping
2. Multiple cropping
3. Fallow in Rotation

Palms Plan. Limbe

1. Rice, Pineapple, carrot
2. Maize/pea
3. pepper/cassava

Banana plan. Njumbe

Farmlandscapes /Some crop associations

Home Gardens near the home

- Market Gardens use swamps in dry season
- Subsistence Rainfed

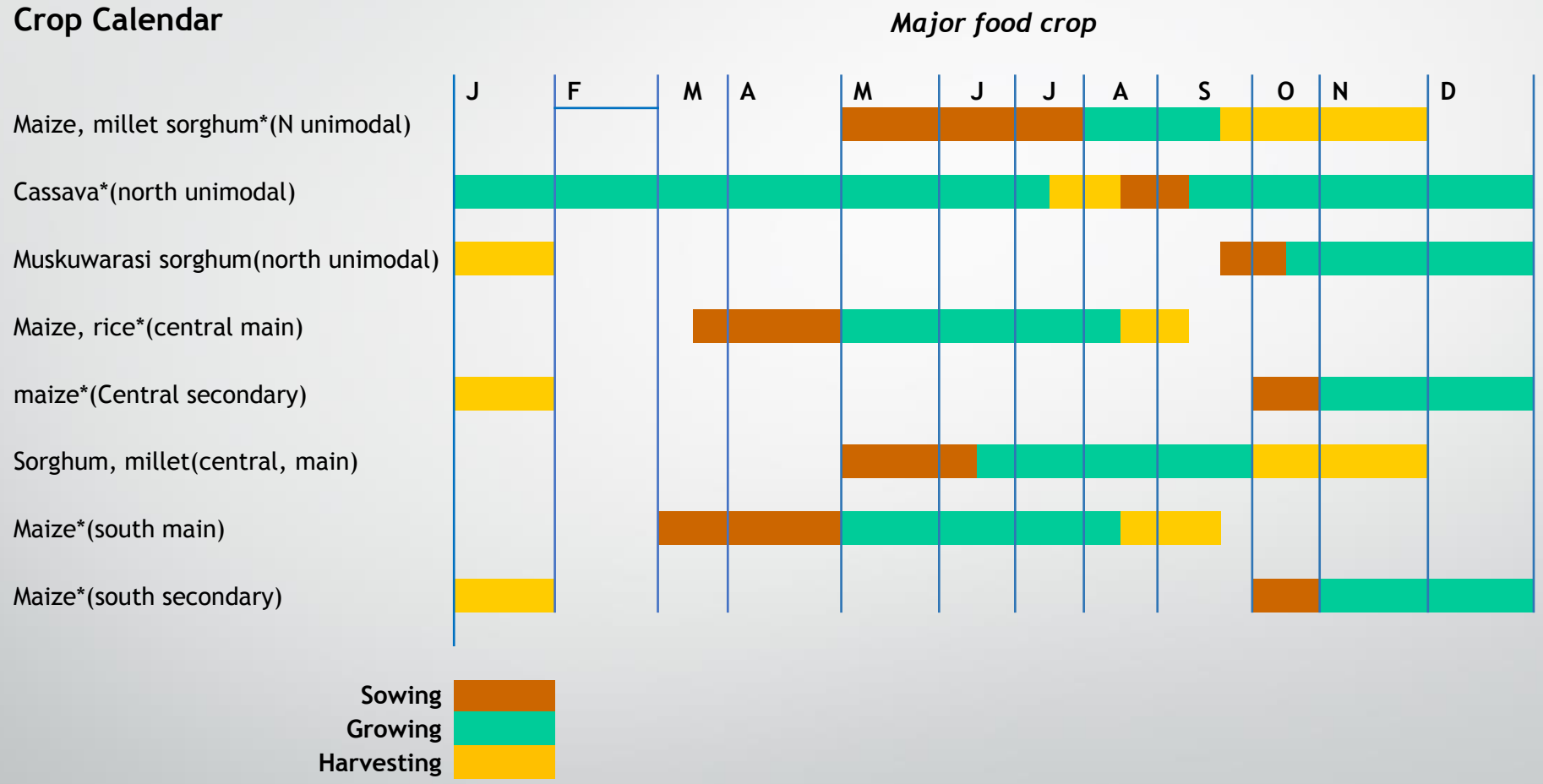
Perennial Plantations greater distance

- Agro-business farms non-use of hills/Mts.
- Producers organization Rainfed

Shifting Cultivation away from dwelling

- Sequential-multiple, multi-storey rainfed
- Fallow

Cropping Calendar of major Food crops



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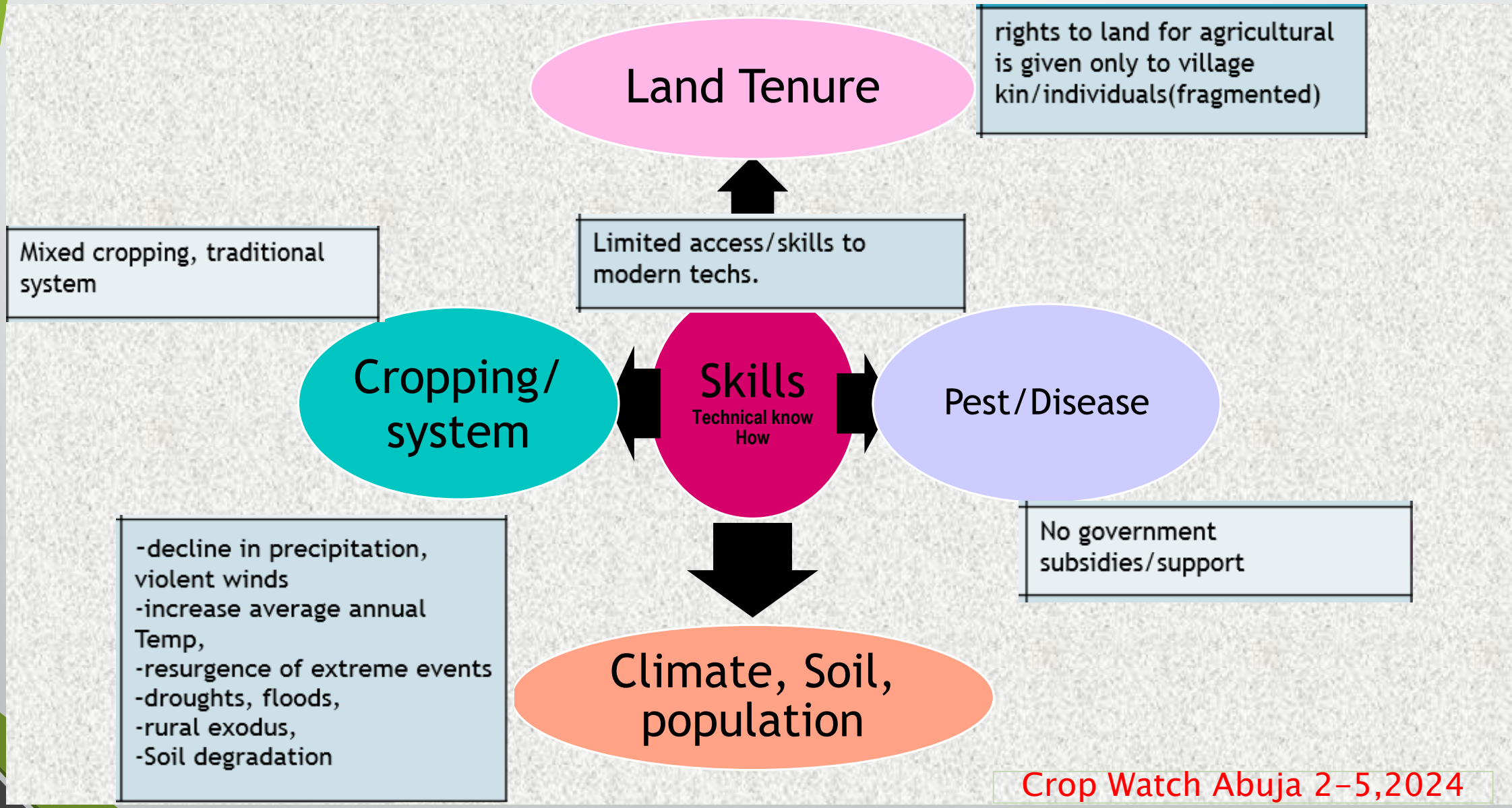
Source: Adopted FAO/GIEWS 2023

Constraints of Cameroon agriculture sector



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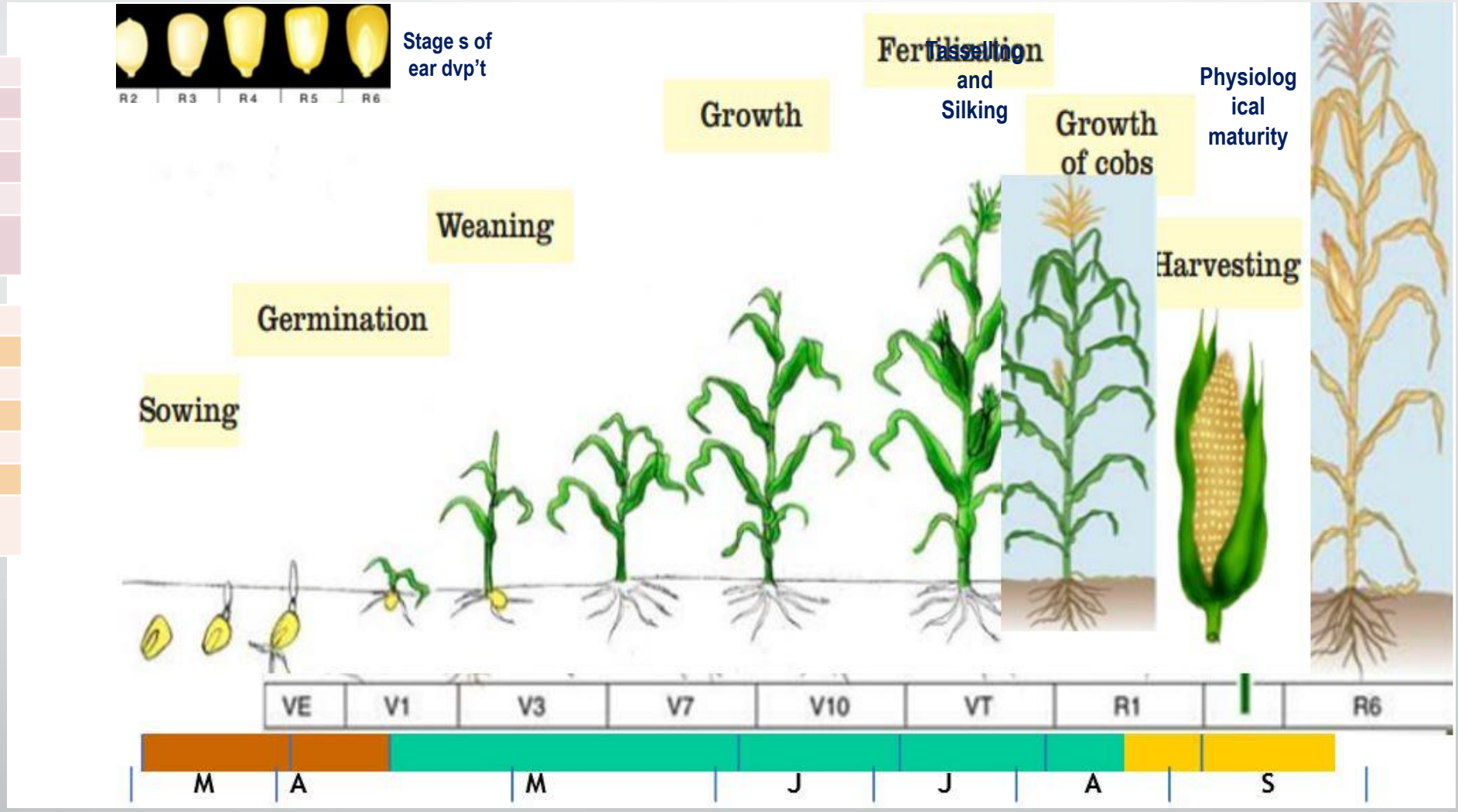
Phenology for major Food crops

Cereals(Maize crop phenology)south main Maize, rice*(central main) *Ng'dere, Bamenda, Y'dé*

R1	Silking
R2	Kernel blister
R3	Kernel "Milk"
R4	Kernel "Dough"
R5	Kernel "Dent"
R6	Physiological maturity

VE	Emergence
V1	First leaf collar
V3	Third Leaf collar
V7	Seven Leaf collar
VT	Tasselling
R1	Silking
R6	Physiological maturity



maize Plant (*Zea mays*) dvp't of late variety

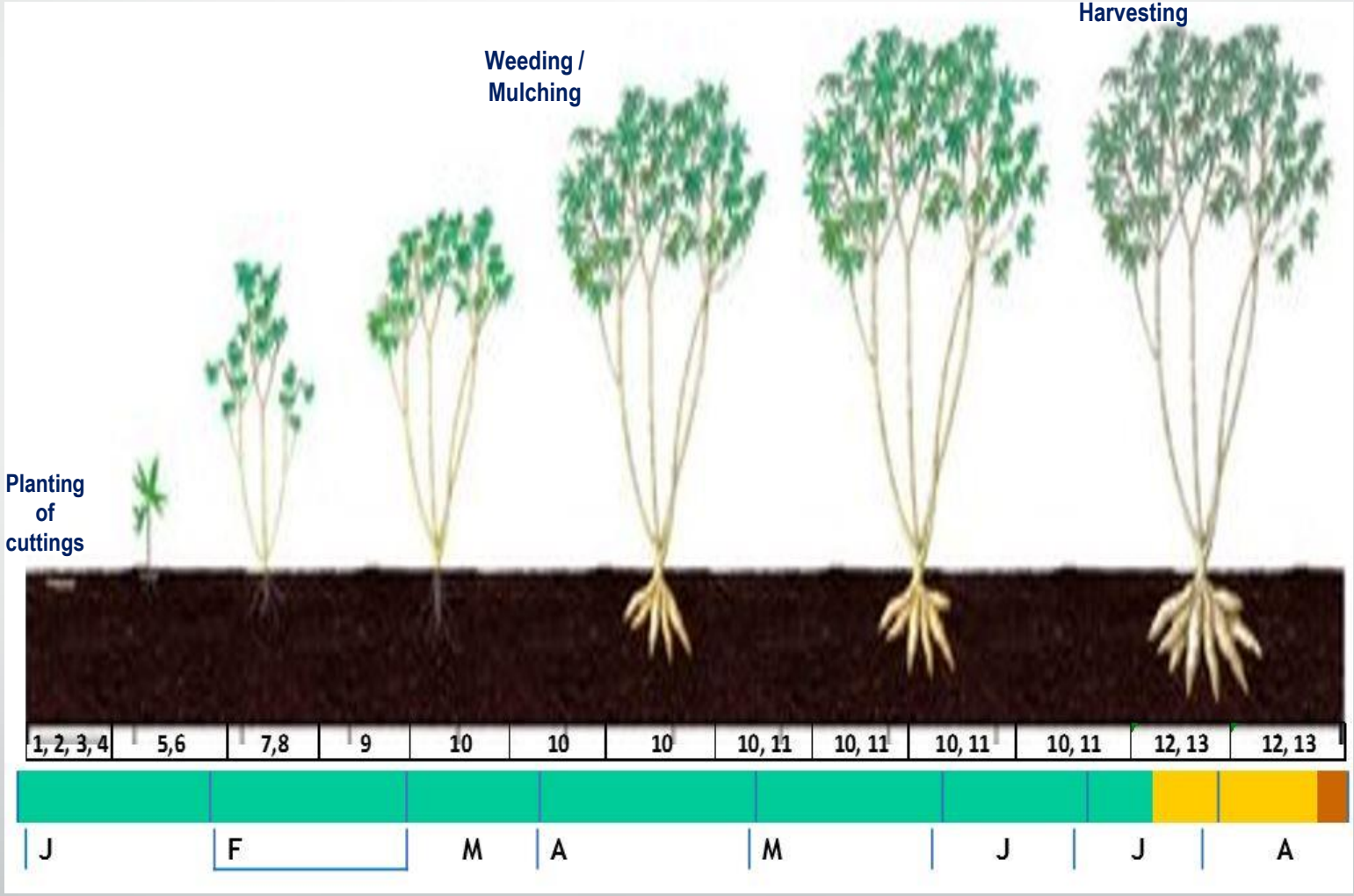
Source: Adopted FAO/GIEWS 2023

Phenology for major Food crops

Root/tubers–Cassava crop

Phenology *north unimodal (Douala)

1	Planting of cuttings
2/3	Development of primary adventitious roots/bud
4	Emergence
5/6	Leaf development, root system formation
7/8	Photosynthesis, leaf growth
9	Replacement of adventitious roots
10	Maximum Growth Rate
11	Translocation
12	End of vegetative growth
13	Beginning of dormancy



Sowing
Growing
Harvesting

Ag. Calendar

Cassava Plant (*Manihot esculenta)*

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Source: Adopted FAO/GIEWS 2023

Existing remote sensing agricultural projects

Trend of Remove sensing

Agriculture Sector:

- Crop monitoring technologies in Cameroon is still in its infancy phase in Cameroon Agriculture:
  - As Banana, Palms plantation farming is limited to the use of aerial images for monitoring
- Others Sectors:
  - *Trichechus senegalensis* (sea mammal) Monitoring at Lake Ossa by African Marine Mammal Conservation Organisation(AMMCO-NGO)
  - Surveillance at distance by the aid of drones in the national forestry parks.
  - Monitoring of mount Cameroon for volcanic eruption: University of Buea

Current status of Crop Monitoring: Problems

Prospects

Opportunities

Strengths (to leverage)	Weaknesses (to correct)
1. Diversity data set: different crops produced in all five agro-ecological zones	1. Limited access to High tech technologies resources for crop monitoring.
2. Existing research potential: Evenly distribution of research stations	2. No existing, Regulations, Legislations and appropriate policies on crop monitoring techs.
3. Existing Monitoring skill and techs in the Agro-plantation farm system.	3. Little research/infrastructure investments/funding in new technologies
4. The existing Agriculture development strategic document encourages innovative, second generation agriculture.	4. Only Spatial variable data outcomes for agro-plantation monitoring techs.
Obstacles (turn into opportunities	**Threads (to mitigate)**
1. Crop production-remains traditional/rainfed, mixed crop whereas current monitoring techs remains highly capital concentrated and mechanised farming.	1.Climate variability(5 zones-soils for specific crops): makes large scale tech adoption complex.
2. Most agricultural actors face limitations to explore monitoring techs which requires some competence.	2. Agriculture is mostly subsistence thus requires monitoring techs that incorporates such complexities simultaneously.

SWOTANALYSIS

Requirements and Expectations

Requirements

Considering that crop monitoring in the Cameroon Agriculture sector is still at infancy stage, there is need for:

- Policy/Legislation-Regulations support in crop monitoring
  Capacity Building
- Market Access
- Stakeholder engagement
- Environmental protection

Requirements and Expectations

Expectations

Through this workshop training expectation are the acquisition of skills and knowledge in domains :

- Customize sustainable crop monitoring tech for Cameroon cropping system
- Access/ and explore some crop monitoring technologies;
- Application of crop monitoring results to make decisions that inform Cameroon food security policies;
- Adoption of crop monitoring techs.
- Collaborative partnership in remote sensing micro-projects to response to specific requirements of the diverse agriculture landscape

Conclusion and Recommendation

Conclusion: it is clear that crop monitoring technologies in Cameroon is New;

- At *infancy stage*, but research suggests a *need for a revolutionized agricultural engineering industry;*
  - *The first adopters are more likely Agro-Plantations enterprises* to boost agribusiness, competitiveness opportunities;
    - *Capacities building* on crop monitoring Apps *remain preliminaries for* all *agricultural actors.*

Conclusion and Recommendation

Recommendations: Since crop monitoring presents a useful Farm management tool now and the near future, it is a necessity to provide:

Access

- Maps: yield, soil grid treatment, pest/disease for evident decision-making
- Market access-to boost Cameroons' Crop monitoring sector

Invest

- For Research and Development
- For Policies, legislation, Regulatory Reforms

Partnership

- For Technology transfer
- To boost Food insecurity

Thank You !

Merci !