

Enhancing agricultural growth & diversification

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MwAPATA Institute, NPC, LUANAR

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Zomba**

Presentation outline

- ❑ **Importance of the agriculture sector**
 - ❑ **Understanding Productivity & diversification, Challenges**
 - ❑ **Benefits of diversification**
 - ❑ **Practical strategies including policy**
 - ❑ **Conclusion**
-

Importance of the agriculture sector : where to transform within & without , Limits to growth

- ❑ contributes about **22.4%** of the Gross Domestic Revenue (**GDP**) (GoM, 2022a)
 - ❑ **64%** of the total employment (World Bank, 2023)
 - ❑ Supplies most of manufacturing sector's raw material (GoM, 2022b)
 - ❑ Provides **88%** of total income of the rural people (NSO, 2020)
 - ❑ Contributed more than **90%** of the foreign exchange earnings (Tuni et al, 2022)
 - ❑ Main livelihood option of the rural people (**93%**) (NSO, 2020)
-

What is agricultural diversification?

[https://www.sciencedirect.com/topics/earth-and-planetary-](https://www.sciencedirect.com/topics/earth-and-planetary-sciences/agricultural-diversification)

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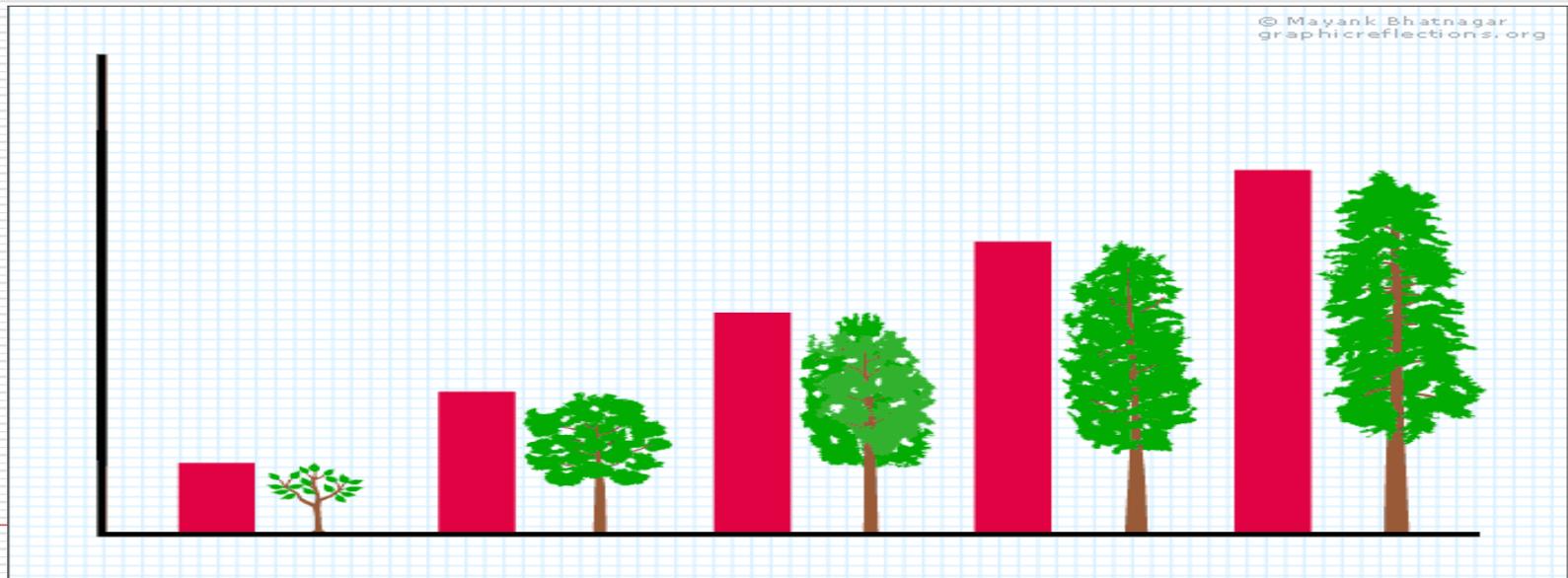
- **Holistic** integration of different crops, livestock & fish in agricultural **systems** & farm enterprises
- To enhance production by **leveraging** diversity from genetic to ecosystems at landscape level
- Aligned to markets through value addition
- **Enabled** by suitable policy support at national & international level.
- **Integrates** traditional skills of local farmers for practicability & large-scale adoption

Agricultural growth: beyond incremental to transformative

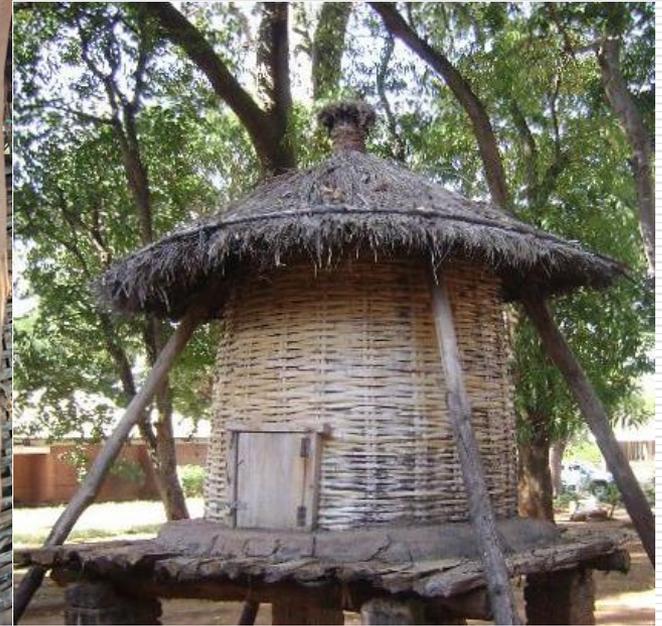
- high productivity(crop, livestock, fisheries)**
 - To improve livelihoods & Wealth creation**
 - Enhance food security and nutrition**
 - Enhance labor and land productivity:**
 - Increased investment**
 - Increased fertilizer consumption**
 - Addressing yield gap**
 - Increasing area under irrigation**
 - sustainability**
-

Sustainable development meets the needs of the present without compromising the ability of future generations to meet their own needs”.

Current generations should add value and reduce livelihood options of future generations.



Mwana alirenji philosophy: enhanced productivity & diversification rooted in IK(cereal, legume, tuber) production & storage. "Sundwe" producing & safely storing enough beyond one year to cover future uncertainty.



Chankhuntha village July 2019 an example of enhanced agriculture growth and diversification: apiculture, aquaculture, orchard. Included in best practice book for Africa asia and Latin America. Pullannikkatil & Shackleton 2018



Chankhuntha Village March, 2020: diversified to PES & NBS approaches, youth employment & empowerment etc



Chankhuntha case study Growth & diversification: Nzotheka

- ❑ **Diversified away from tobacco**
 - ❑ **Grows maize, legumes, vegetables, tubers(rain fed & irrigated)**
 - ❑ **increased area under irrigation & aquaculture, onsite infrastructure**
 - ❑ **orchard-mangoes, oranges, bananas, guavas etc**
 - ❑ **Harvests honey & fish twice/year**
 - ❑ **youth employment/empowerment(Including graduates)**
 - ❑ **Innovative local PES, NBS**
-



challenges



Water scarcity: Chinsamba Village Trend Analysis/PRA July 2019.

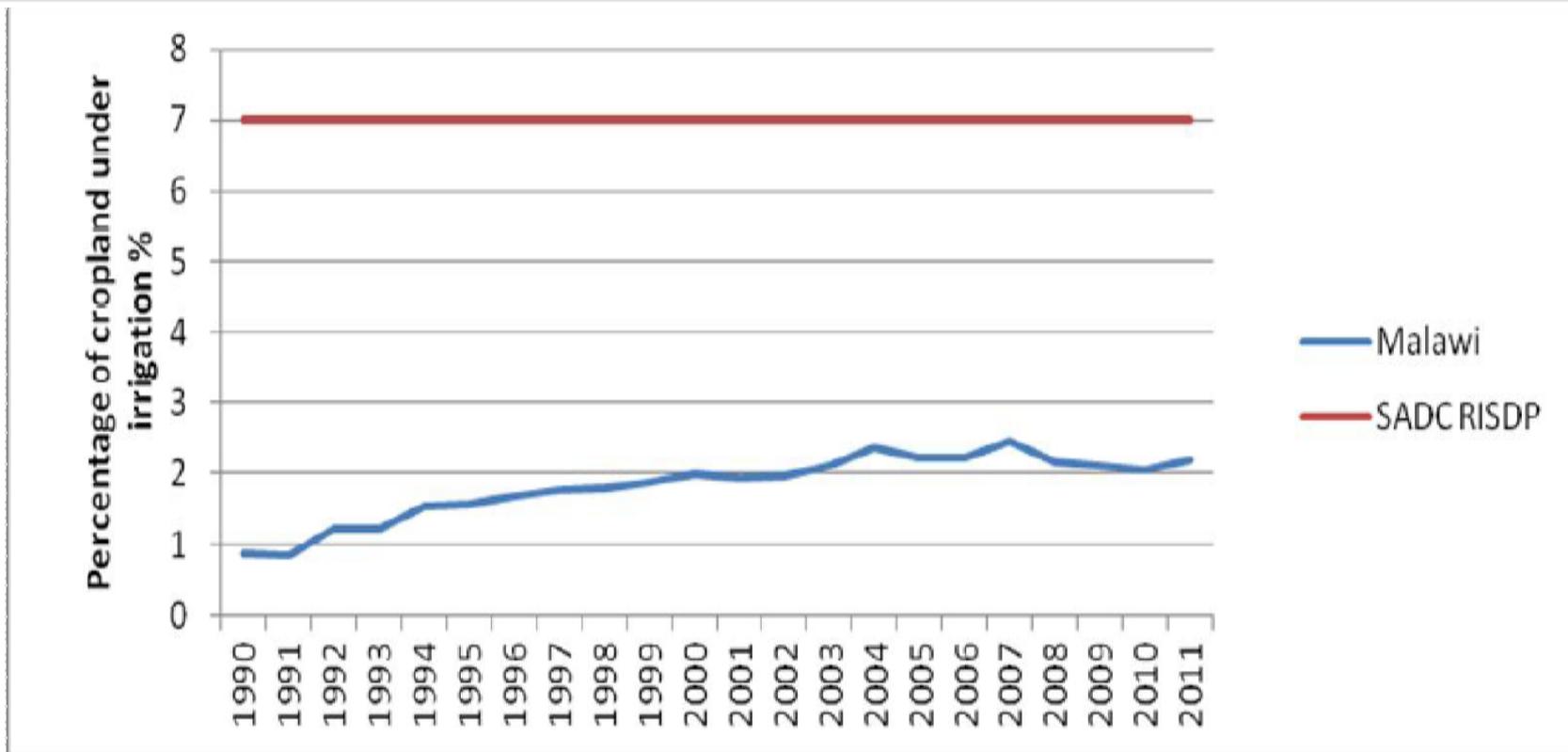


Fish ponds in Chisamba(mitundu) reduced to one season harvest(rain season) : these changes are reversible through ecosystem restoration through proper land use planning.



Area under irrigation slow growth, satellite validation 2023. an area for greater intensification to achieve growth and diversification

MATCHAYA, Greenwell et al. 2014



Source, Authors calculations based on ReSAKSS data, 2013

Population issues (density/sq KM) ■

need for operationalization of land use plan for Malawi to optimize land use.

□ Zambia: 28

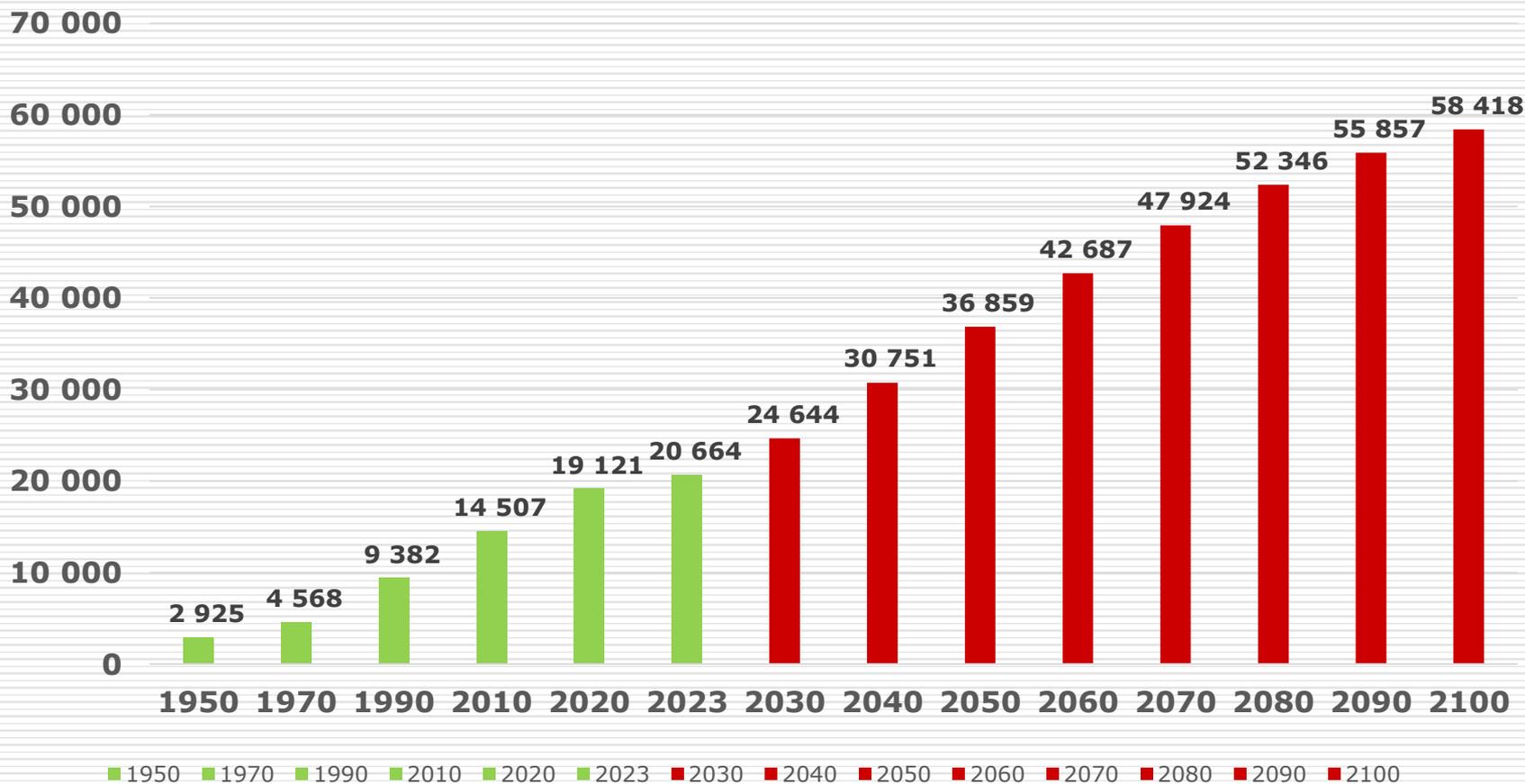
□ Mozambique : 40

□ Zimbabwe: 43

□ Malawi : 222

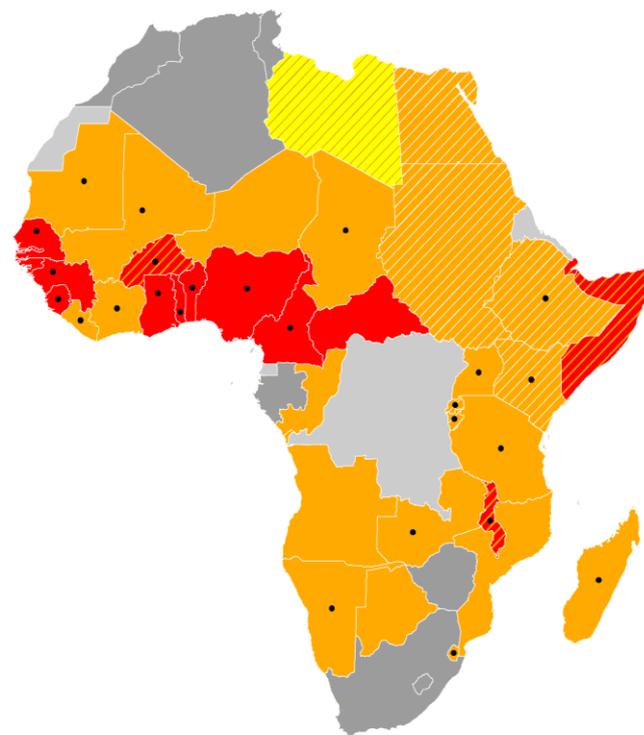
Malawi Population Growth (Historical) and Projections) – Millions.

Agricultural growth should be aligned to population growth. Currently it is not at par. The 2023 population policy should complement the agriculture sector.



Malawi is among 15 population and climate change hotspots in Africa: need for integrated sectoral policy harmonization to meet this challenge

- Countries with high rates of population growth, high projected declines in agricultural production and low resilience to climate change
- Malawi is also among 4 countries (others are Burkina Faso, Djibouti, and Somalia) also experiencing water stress/scarcity

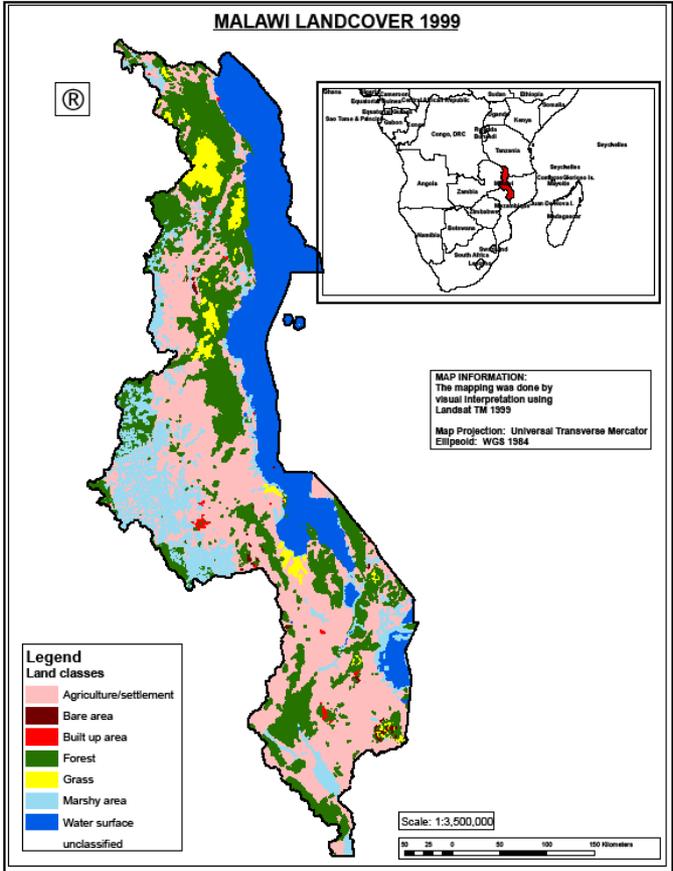
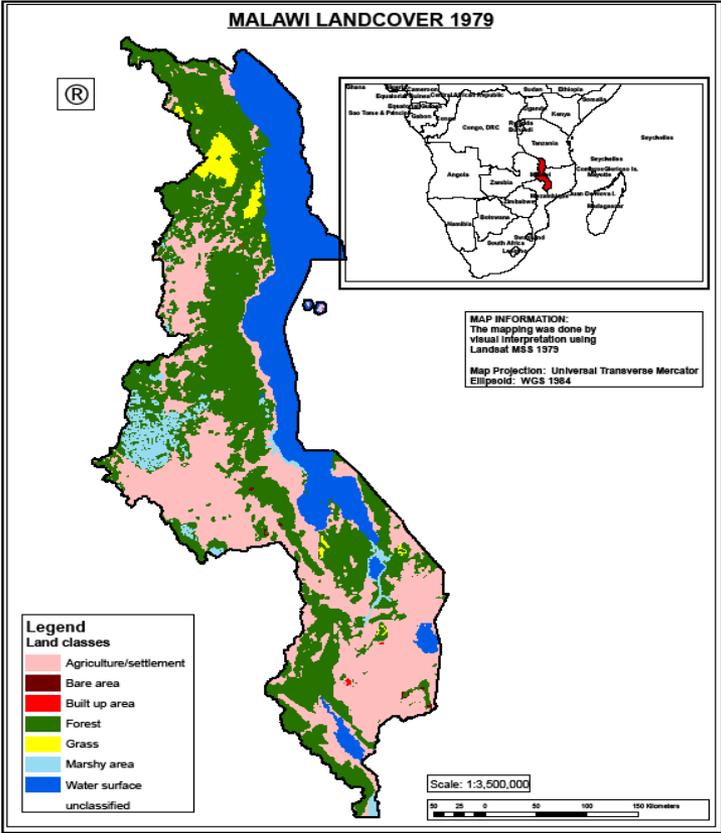


High Population Growth Rates and High Declines in Agricultural Production Plus Current Water Stress or
High Population Growth Rates and Low Resilience to Climate Change Plus Current Water Stress or
Countries Experiencing All Three Variables Plus Current Water Stress or
High Percentage of Women with Unmet Need for Family Planning No Data for One or More Variables

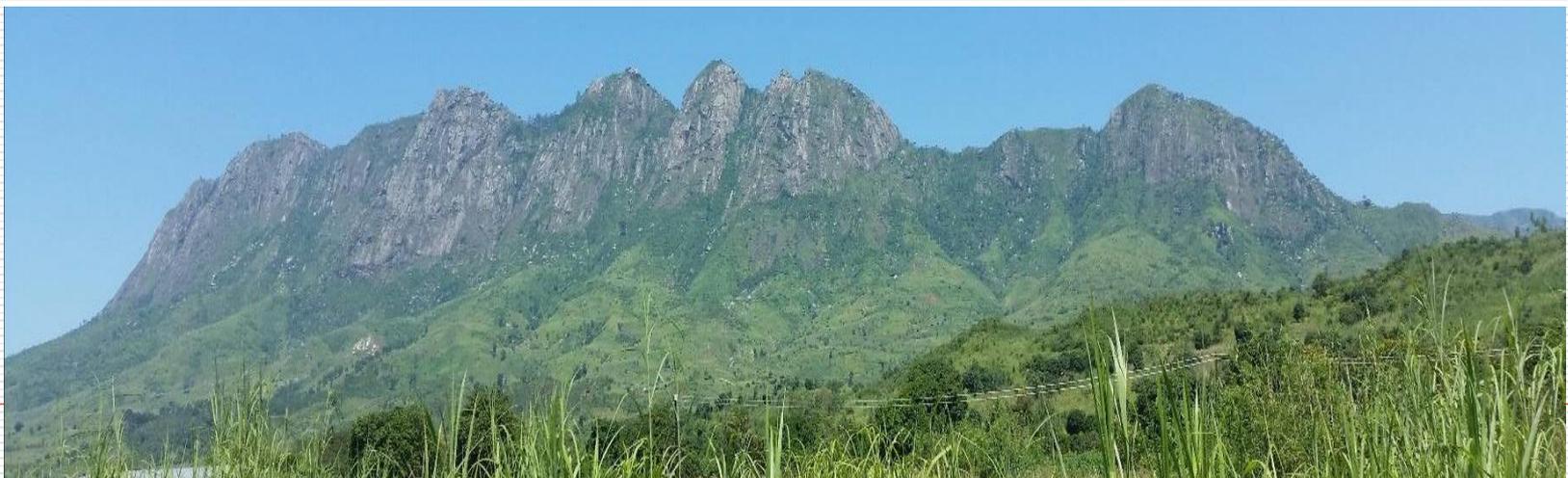
Deforestation

- ❑ **reduced forest cover 45% to 28%, 1975 -2000**
 - ❑ **due to agriculture, human settlements, biomass energy**
 - ❑ **Enhancing soil erosion, sedimentation, siltation of rivers & lakes**
 - ❑ **reduction in biodiversity & ecosystem services(flood mitigation, water availability, carbon credits)**
 - ❑ **Carbon financing, agriculture intensification, the Bonn challenge on ecosystem restoration are among the opportunities to address this challenge**
-

Deforestation (1979 to 1999)



Land cover change Zomba slopes 1994 to 2023, Crisis from loss of ecosystem services. Afforestation is not coping with forest products demand hence net decline in cover.



Threats to biodiversity

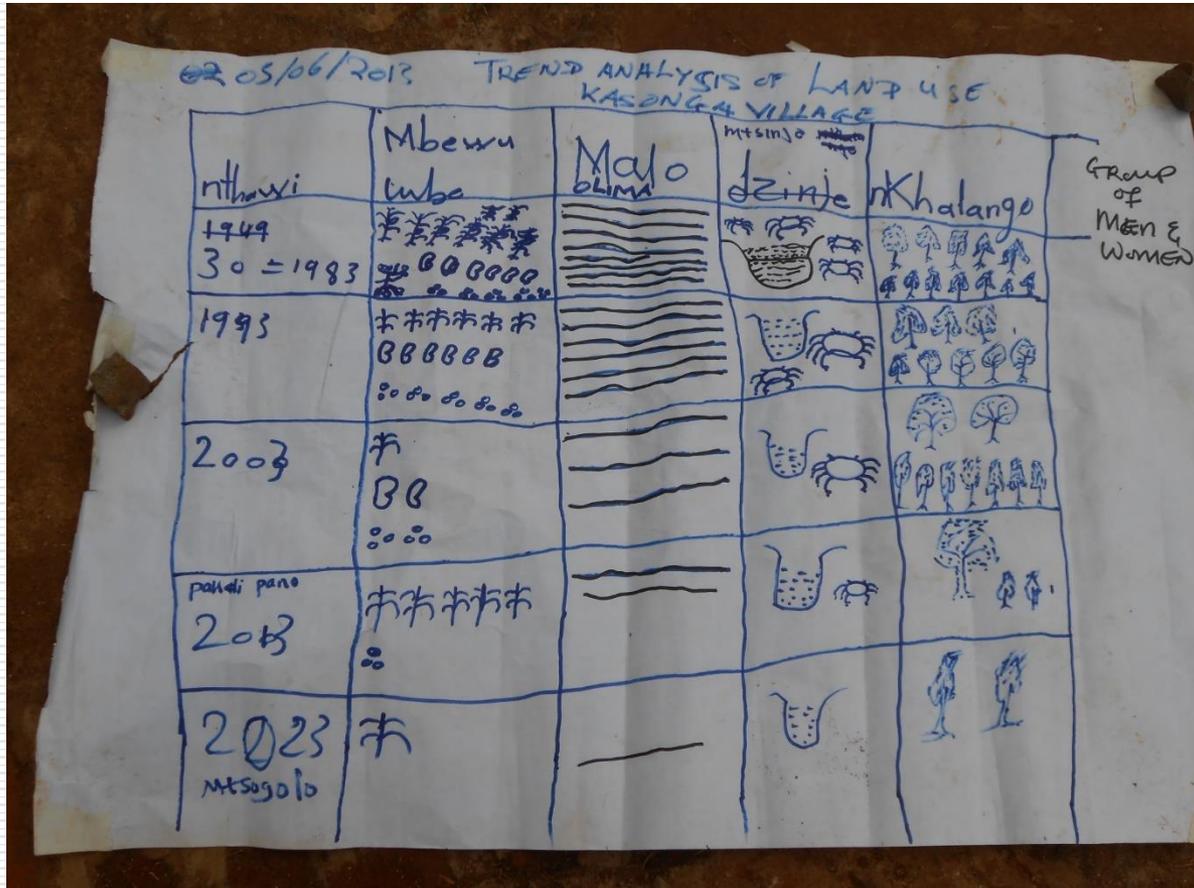
- ❑ **loss & fragmentation of species & habitats**
 - ❑ **due to unsustainable land use practices mainly**
 - ❑ **Continuous cultivation same piece of land, encroachment into wetlands, riverbanks, protected areas & mountain slopes**
 - ❑ **Invasive alien species introduction (Opinion is divided) on fast growing tree species to solve energy and timber challenges against their negative environmental impacts**
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Native Trees locally managed for fruit & Caterpillars



**THREATENED TO EXTINCTION BY TOBACCO INDUSTRY,
need for policy harmonisation**

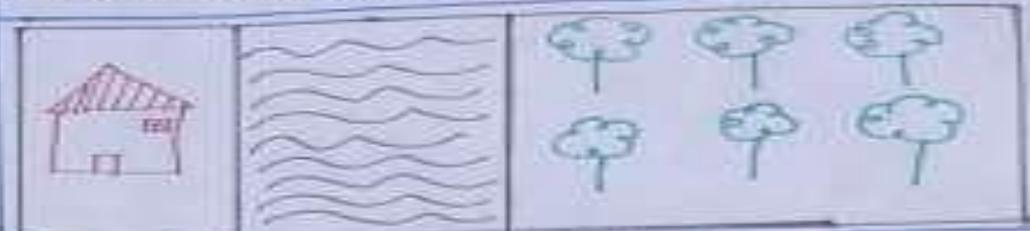
We should build on community understanding of environmental change & perception of business as usual scenarios to co-create concrete intra and cross sectoral sustainable Action



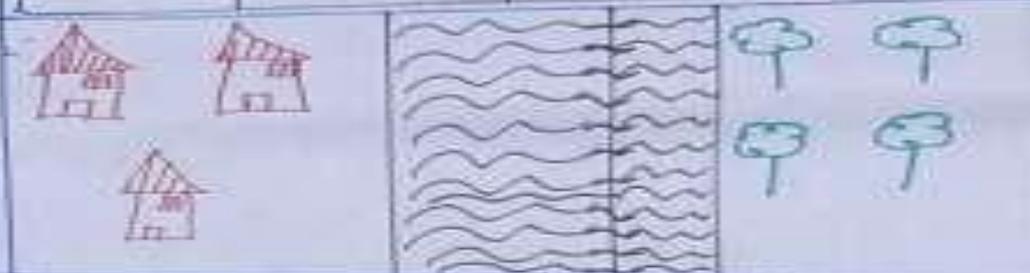
Nthawi

Malo olima, a
Nkhalango, okhala

1997



2001



2011



2021



2031



Lost landraces in Dowa and Ntchisi (GoM 2007). Potential and opportunities for growth and diversification have been lost. Need for greater farmer research interface and policy harmonisation

Crop	Lost landraces
	Kanjelenjele
	Bantam
Maize	Kachamsana
	Mtsakinya
	Mtumayani
	Kachiswe
	Mtukwa
	Mkangala
	Nyani
	Kambili
	Chalimbana
	Kalisele
Groundnuts	Makumba
	Kabayaya
	Msalatsonga
	Katambalala
	Salima
	Chimbonga

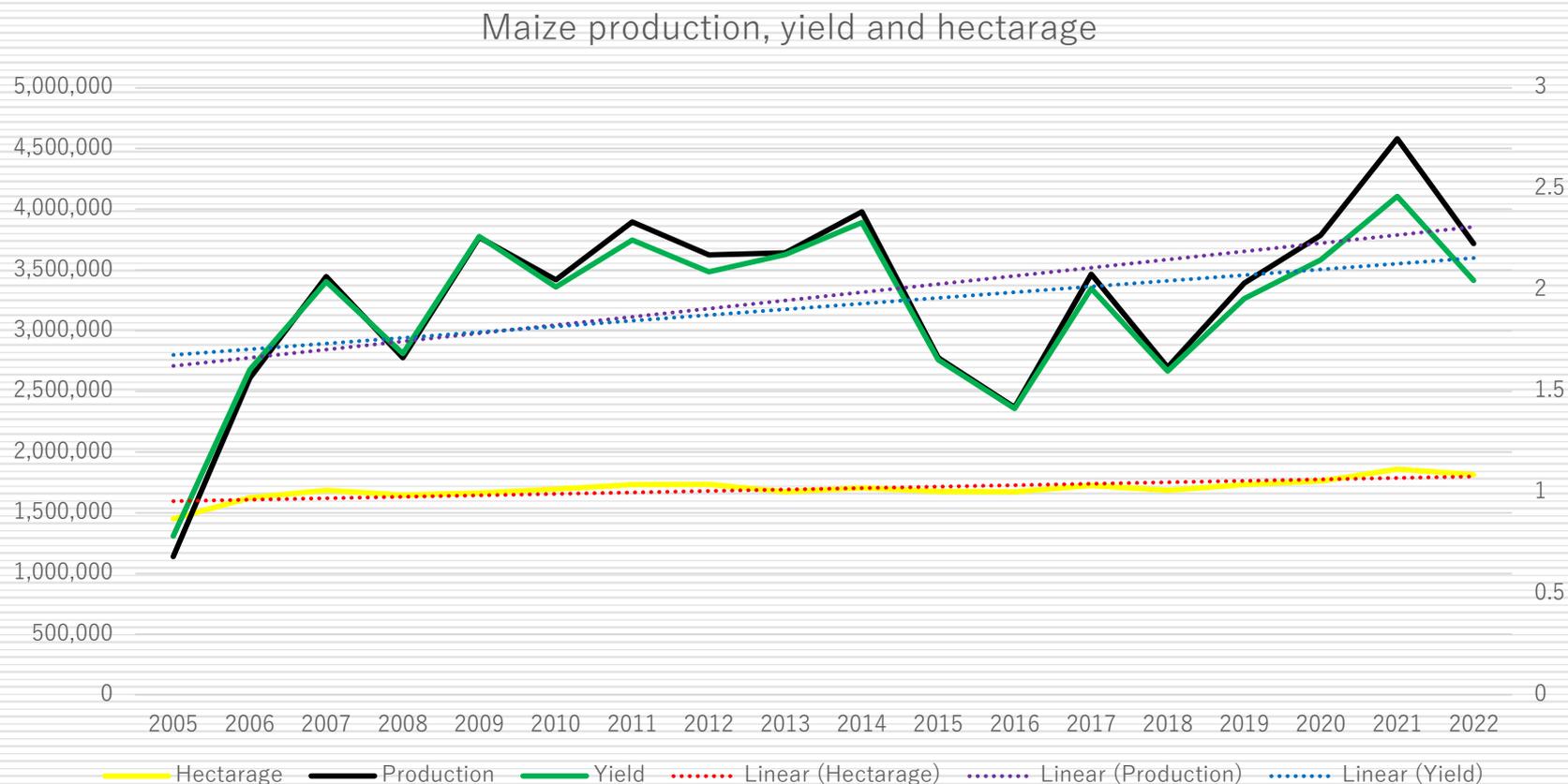
Crop	Lost landraces
	Nanyati
	Msinkha
	Napilira
Beans	Chitsika
	Saopa alendo
	Nkhalatsonga
	Kholombe
	Mazira ampheta
	Naligonkho
	Chizama
Cow peas	Chiphonongo
Sorghum	A white
Pumpkin	Mwangsira
	Tanje
Sweet potatoes	Kamchiputu, joni
Cassava	Gwalangwa Mawaya

Low cereal Production 2023

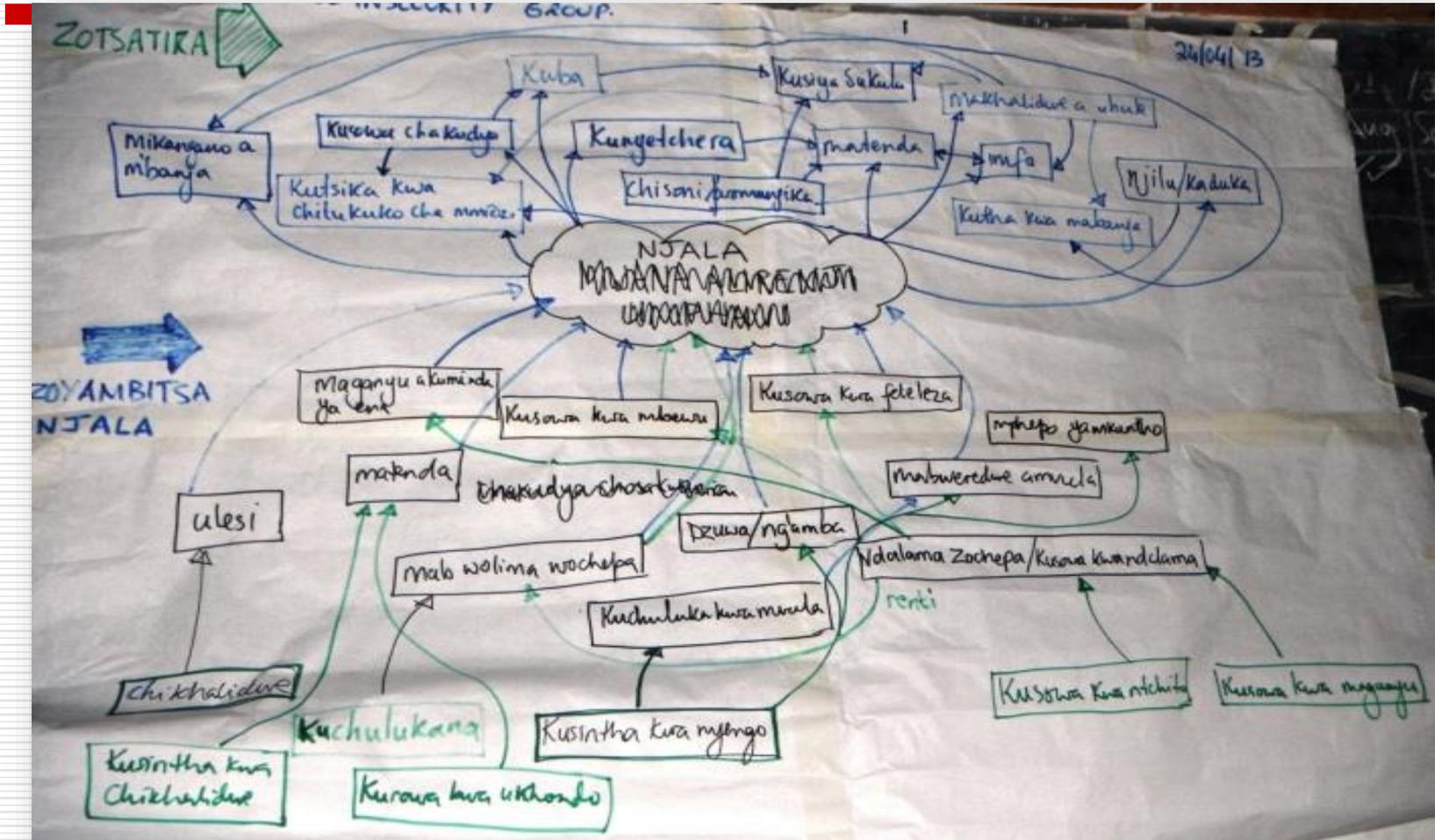
Production(Maize, Rice, wheat, Sorghum)

- ❑ **about 3.8 million tonnes, 3% down from the previous five-year average.**
- ❑ **Mostly maize at 3.5 million tonnes**
- ❑ **4.4 million people risk acute food insecurity-10/2023 & 03/2024 (lean period),**
- ❑ **Because agriculture is dominated smallholder farmers**
- ❑ **Characterized by limited landholding, manual labour/low tech, low-input, low-output,low-capital production practices.**
- ❑ (<https://www.fao.org/giews/countrybrief/country.jsp?code=MWI>),
book

Low production in maize, urgent need for transformation, addressing limiting factors. Ideally produce more from less land to allow diversification that is compromised by maize dominance. Need to align production to population growth



Food insecurity cause and effect: community perception



Large portions of nsima. There is some contribution from the wild but declining. Other than tomato, fruits intake negligible clear case on the need for diversification not just for nutrition and health but also for market opportunities



Climate change: rainfall onset inconsistencies

Songani, Zomba

**17 December,
2017**

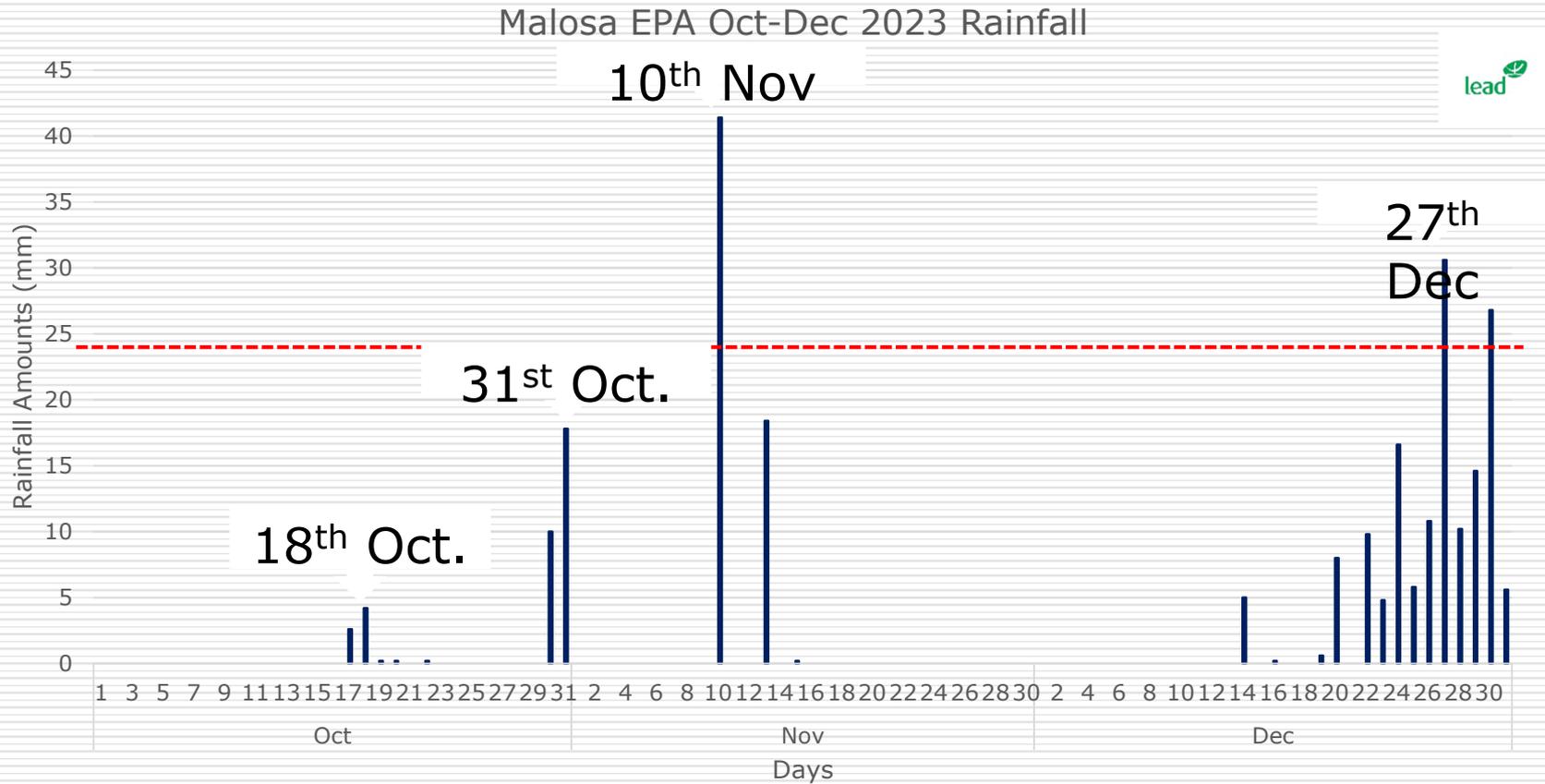
**17 December,
2022**



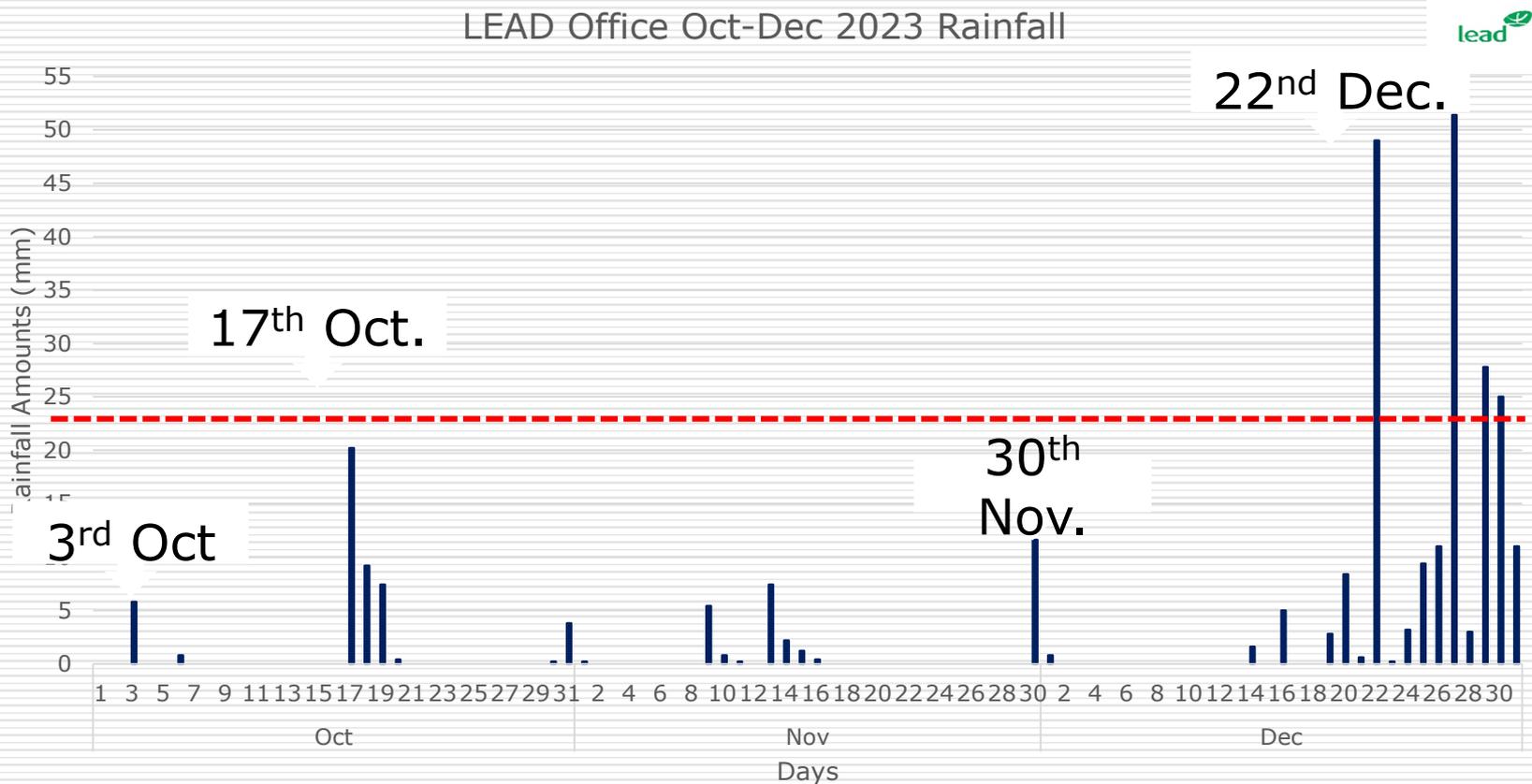
Maize uprooted December 2023 in Zomba. Has been observed every year in the last 12 years in different locations in Malawi. Need for CSA scaling up in general (by addressing low adoption and dis-adoption) & in particular water harvesting to irrigate during dry spells. DCCMS and Ministry of agriculture need to go to the drawing board on how localized messaging about onset could have been better.



LEAD has 7 automated weather stations in the Lake Chilwa basin. It helps in ground truthing forecasts from DCCMS but to contribute to future modeling and forecasting and improved onset messaging



Having several stations in the basin demonstrates great local area rainfall variability hence the need for robust downscaled forecasts and extension messages for farmer action especially in an el nino year



Scotched tea due to a heat wave Oct 2019, localised cushion of trees demonstrates importance of nature based solutions to climate



Hailstorm damage in Sokola village, Misuku, Chitipa. Demonstrates why diversification is important because not all crops are affected in similar way to climate extremes. Here is also a case of loss and damage and climate insurance in the basket id soultions.



Courtesy Victor Phiri

2023/2/15 16:53

Pest resurgence – Red locust outbreak – 2014 (regional implications) induced by alternating drying and flooding of wetlands; new emerging pests – fall army worms wilting (2018). Robust surveillance, integrating communities and rapid response are key. Community alert in 2014 brought about response to avert regional locust outbreak. The wilting maize could have been saved with minimal irrigation bridging the dry spell



Preparation in flood plain, usually good rice production, serious flooding reduced production in 2015, 2023: where ordinary climate smart approaches fail, there is need for interventions such as climate insurance, loss and damage.



Policy framework issues

- ❑ **Maize major food crop, main focus of Malawi's policy agenda,**
- ❑ **tobacco still dominant cash crop.**
- ❑ **marketing & associated regulatory framework** (Price shocks due to both poor and bumper harvests, Unpredictable restrictions on trade)
- ❑ **limited domestic and international marketing opportunities**
- ❑ **conflicting knowledge systems eg seed policy**

Pushing yield gap to the extreme. Soil enrichment would improve production alternatively cassava and sweet potatoes would yield better with little effort. Transforming subsistence agriculture is key to enhancing growth and diversification



Need to transform the Dual agricultural system to unlock potential

- ❑ **smallholder sub-sector on 4.8 million ha of customary land contributing 80% of Malawi's food and 10% of exports**
- ❑ **The estate sub-sector concentrates on tobacco, tea and sugar, accounting for 80% of all agricultural exports.**
- ❑ **Transformation is urgent, the smallholder being mostly subsistence can not meet the national food requirements, significant burden needs to go to the estate subsector including the mega farm initiative.**
- ❑ **With the burden of food production eased the smallholder subsector can increase the contribution for export.**
- ❑ **Follow up action needed to operationalize the Green Climate Fund Mission to Malawi (13-17 February, 2023); Responding to a meeting between GCF ED & H.E Dr L, Chakwera at UNGA & COP 27**
- ❑ **on need for GCF to support Malawi transition from Subsistence to Commercial Farming.**

Lack of seriousness: equipment for value addition & reduce post harvest loss of tomatoes at mvera not installed (since 2008), substandard building. Need to enhance and oversight accountability



Agriculture input subsidy

- **Has contributed to increased maize productivity but can achieve more**
 - **some argue subsidy also contributed to overall low production by narrowing diversity**
 - **Should be transformed & better managed (not abandoned) to unlock potential of the whole sector**
-

Benefits of diversifying

Value of Local landraces extensive genomic diversity

- colorful maize :black, purple, red, yellow, white, mixed varying ear lengths etc**
 - Similar diversity other cereals, legumes**
 - Diverse traits to withstand environmental challenges :disease/pest resistance, drought tolerance, period to maturity, nutritional quality,**
 - wide range of products(health & food supplements)**
 - Diverse marketing opportunities**
 - treasure for breeders & future generations**
-

Some maize phenotypes



Marketing opportunities for women linked to diversity & IK. Inclusivity & Leaving no one behind



Opportunity from the Number of released varieties within and between crops (GoM 2007). Same efforts to be scaled in livestock including fish. Incentive for innovations such as one time MASTA award for MASTA award (MH18) should be reintroduced

Crop	Number of released varieties
Maize (Hybrid)	29
OPV	10
Rice	6
Pearl millet	2
Sorghum	2
Ground nuts	10
Beans	15
Cassava	6
Sweet potato	9
Pigeon peas	2
Soya bean	12
Cow peas	3

On farm & landscape diversity should be scaled up through proper land use planning

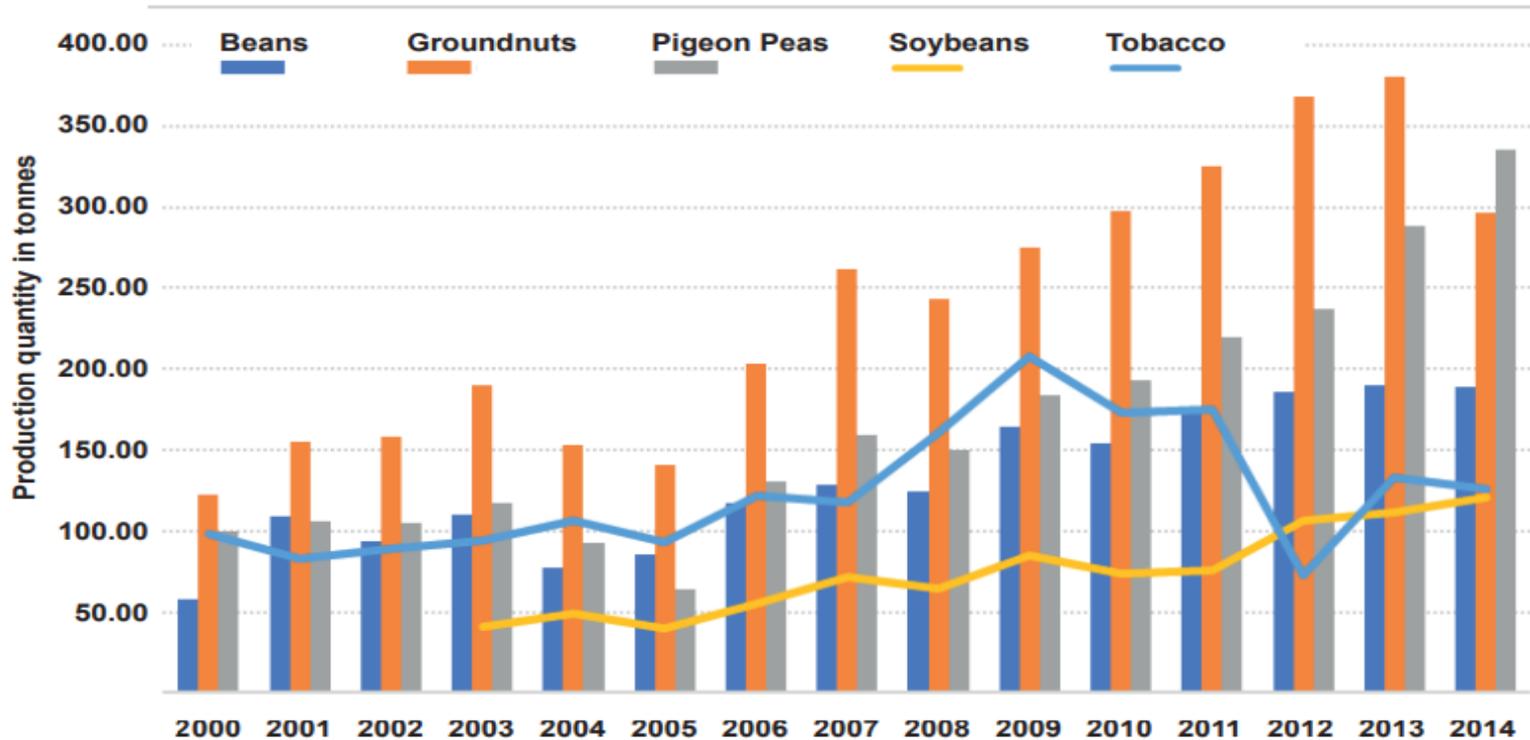
- providing habitat for beneficial insects (bees, butterflies, edible caterpillars)**
 - reducing pest numbers by rendering host crops less apparent for colonization by pests**
 - Agroforestry opportunities**
 - Economic stability (by reducing financial risk, stabilizing farm income, & increasing choice of farm practices.)**
 - Allows for better integrated livestock & crop production**
 - Other ecosystem services (reduced soil erosion, flood mitigation etc)**
-

Practical strategies

**Policy & technical:
opportunities for capacity
building, investment,
research**

Diversification efforts on legumes commendable, more needs to be done to further increase production by area and volume

Tobacco declining



Legumes and Tobacco in Malawi 2000-2014 (Source: FAOSTAT)

Lifuwu pump capacity enhanced great opportunity for growth plenty of water, large number of available farmers, large area for irrigation, but need to resolve grid tariff issues. Innovative engineering could include mountain top reservoir, and mini grid generation on irrigation, hybrid solar and ESCOM system etc



Expanding small holder capacity through Water Energy Food System(WEF)innovation aligned to SADC policy. community- private sector as the case of PresCane. Small holder land and communities in intensive production through irrigation &share holding arrangements gong beyond seasonal production fraught with input and climate challenges



—

pushing the boundaries of production & diversification

Mr. N. Dzombe



Leveraging Carbon markets

- ❑ **Upscale ethanol production under existing infrastructure and future expansion**
- ❑ **Increase area under sugarcane production through mega farms & smallholder to meet new ethanol demand**
- ❑ **Expand irrigation programme to meet the sugar cane production & upscale food production**
- ❑ **Expanding irrigation requires improved water management(eg drip irrigation) & new dams(co benefiting flood mitigation, fish farming, wetland & catchment management)**

Koko Ethanol stove 60 % cheaper than charcoal(Kenya), yet to be introduced in Malawi. This should stimulate investment in sugarcane production & ethanol production. Apart from addressing deforestation the rollout would create jobs in its value chain and also access to carbon financing. Policy bottle necks should be addressed for roll out of ethanol vehicle(2012) as part of net zero transition



Upscale agricultural production through technology application such as IT applications to optimize water use in drip irrigation as in Salima green belt.



REDMI NOTE 9 PRO
AI QUAD CAMERA

Landscape mosaic to optimise ecosystem services for crops, livestock , caterpillars, mitigate soil erosion and flash floods, human settlements. Case of Msakambewa Dowa East.



fresh caterpillars and processed ready for household use or sale



Communal optimal land use planning: upstream dam sustains river flow downstream (constructed by private sector CSR). Crop production happens through out the year hence growth through time optimization. Dams store excess water and for later use also mitigate flooding dam catchment management essential to reduce siltation

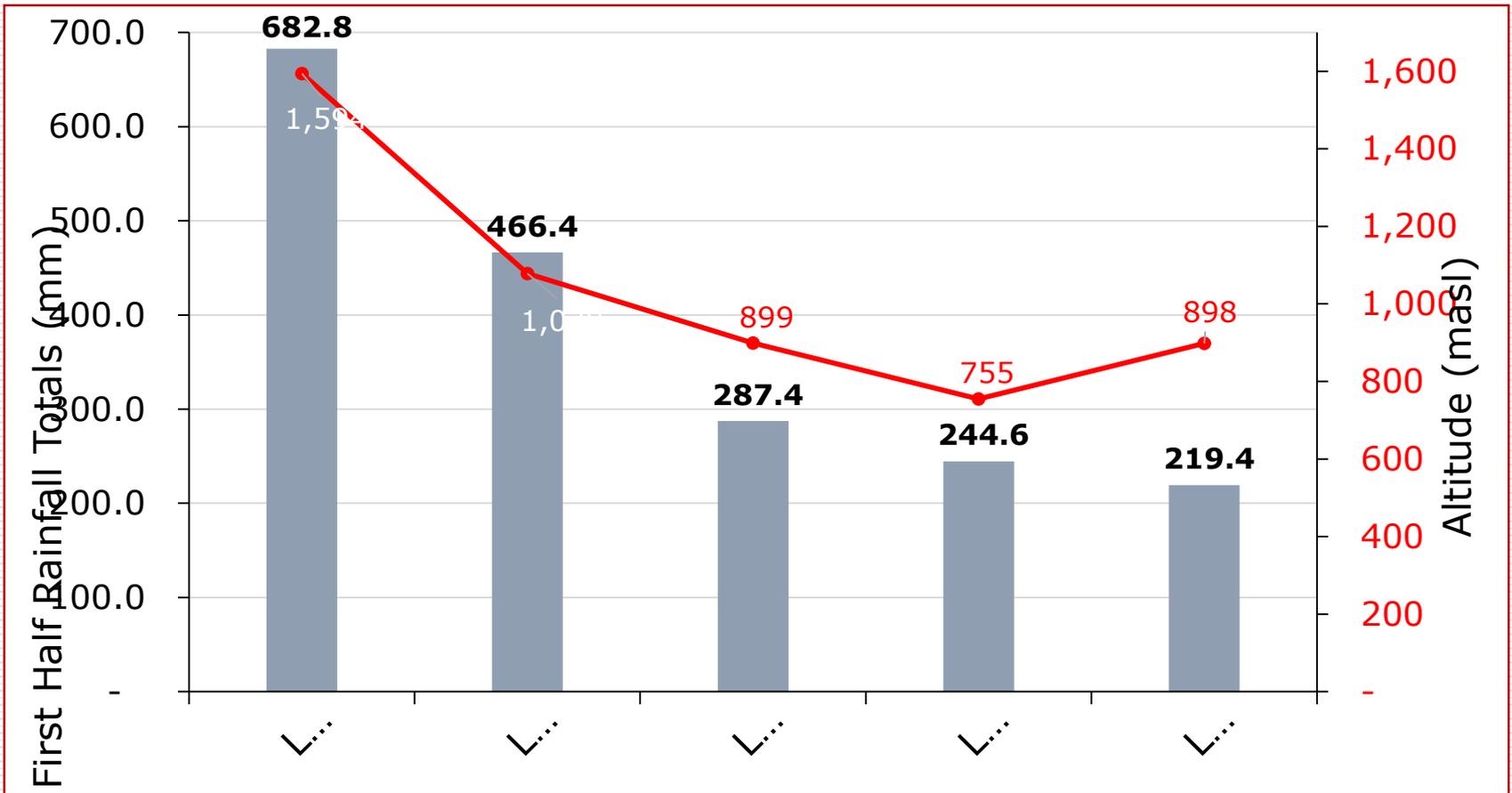


Recommendations & conclusion

Align agricultural grow & diversification agenda to Agro-ecological climatic Zones in

- Total land area of 119140 km² (11.78 million ha),**
 - 20% surface water resource dominated by Lake Malawi**
 - 34% is arable land**
 - the remainder is forest land.**
 - Growth and diversification should leverage Zonation by climatic conditions & altitude: shire Valley, Southern Highlands, Central areas, Lake Shore areas, Northern areas -used by DCCMS),&**
 - Zonation based on physiography and weather conditions (as by 8 ADDs)**
 - Fixating on planning by district may miss out opportunities for growth and diversification on the basis of above zones**
-

**Site matching is critical for diversification and growth.
Seasonal variation from LEAD automated weather stations
(October- December 2023). Pattern is the same year in year
out.**



Transformations can also be at Food Systems (Katharine Vincent FOSTA)

- 1. Transformations within and out of maize production**
 - 2. Transformations of land and water use**
 - 3. Transformations from domestic to export markets**
 - 4. Diet diversification and transformations**
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Thank you