Malawi 2063 Policy Brief Series Vol 2 Nov'23

Predicting the impact El Niño climatic conditions on malaria and diarrhea incidences in Malawi

James Chirombo[1] Augustine Choko[1] Andrew Jamali[2] Daniel Mwapasa[2] Henry Kamkwamba[3] ,Alick Chibanthowa[4] Jacob Mazalale[5] ,Levi Chiwaula[6] Sam Katengeza[7]

[1]Malawi Liverpool Welcome Trust, [2] National Planning Commission, [3]International Food Policy Research Institute (IFPRI), [4]Department of Climate Change and Meteorological Services, [5]University of Malawi, [6]MwAPATA Institute, [7] Lilongwe University of Agriculture and Natural Resources

Key message

- Climatic factors play a significant role in transmission and spread of diseases, as they provide conducive environment for growth of pathogens.
- The temperature and rainfall alterations caused by predicted El Nino conditions in the 2023/24 cropping season have implications on health outcomes, as such changes could flourish growth of pathogens that cause diseases, incapacitating productivity, disrupting households livelihoods and fuelling poverty.
- Analysis shows that overall, there will be no *drastic* changes in Malaria and diarrhoea cases resulting from the 2023/24 El Nino conditions, possibly due to robust interventions on Malaria and diarrhoea control measures i.e., insecticide treated nets and the rota vaccines in reducing the incidences of diarrhoea.
- However, efforts are required to sustain and augment these interventions, whilst ensuring access to clean and safe water sources during floods and drought periods.

Context

Research has established that climatic conditions influence transmission of many infectious diseases such as malaria and diarrhea in many parts of the world. The role of climate change and variation in health outcomes is particularly important as Malawi continues to experience adverse climatic changes which enhances the risk of diseases.

Evidence suggests that the risk of malaria transmission is shifting in response to changes in climatic patterns. Likewise, climate change will also exacerbate diarrhea outbreaks across the developing world. As such, efforts to control climate-sensitive infectious diseases require integrating climatic information into disease surveillance.

El Niño is a climate phenomenon that occurs in the tropical Pacific Ocean,and can significantly impact weather patterns and climate worldwide. These changes can in turn affect the prevalence and distribution of climate-sensitive diseases. El Niño is often associated with increased rainfall in certain regions.

The increase in rainfall can lead to flooding with creation of stagnant water pools, providing ideal breeding conditions for disease vectors such as mosquitoes that can result in a higher incidence of diseases like malaria and dengue fever.

On the other hand, El Niño can also bring about prolonged periods of heat and drought in certain areas. Higher temperatures can lead to the proliferation of disease vectors and the survival of pathogens. Drought can force people to rely on limited water sources, increasing the risk of waterborne diseases due to poor water quality. In this analysis, the the possible impacts of El Niño on disease outcomes in Malawi were analysed, with a focus on malaria and diarrheal, diseases well-known to be sensitive to climatic conditions.

Methodology

Routine monthly malaria data was obtained from the Health Management Information System (HMIS) covering January 2012 to December 2022 from DHIS 2; 132 months of malaria data. Monthly diarrhea case data was obtained from the District Health Information Systems (DHIS) covering January 2017 to December 2022, amounting to 72 months of diarrhea data.

To get a better idea of past historical trends in climate, 20 years of climate for the whole country (Temperature and Rainfall) were obtained from weather stations through the Department of Climate Change and Meteorological Services (DCCMS). Both disease and climate data were first checked and cleaned in readiness for analysis, then merged to obtain a single dataset.

Analysis was performed at national and district levels, with a focus on the central and southern regions, whose forecast indicated as hardest hit areas for 2023/24 El Nino. A variety of statistical methods, both descriptive and inferential statistics were employed to analyse the data. Descriptive statistics were presented using graphical tools to allow visualization of patterns of disease outcomes over time. Time series analysis was used to explore the history of infections and their association with climatic variables. Seasonal patterns were also analysed.

An interrupted time series (ITS) model was applied on the data to detect the changes in the disease burden after the previous El Niño. In this regard, the 2015/16 El Nino event was used to compare levels of malaria before and after this interruption. An Autoregressive Integrated Moving Average (ARIMA) model was fitted to predict future disease burden based on past disease burden.

Results

Malaria incidence

Figure 1 shows the changes in malaria cases over the period 2012-2022. Overall, a seasonal pattern is evident. An increase in malaria was observed in 2015/2016 during the previous El Niño episode. However, the jump in malaria levels was not sustained and largely returned to pre- El Niño levels. The shaded regions shows the expected trajectory of malaria during this and next year's El Niño conditions.

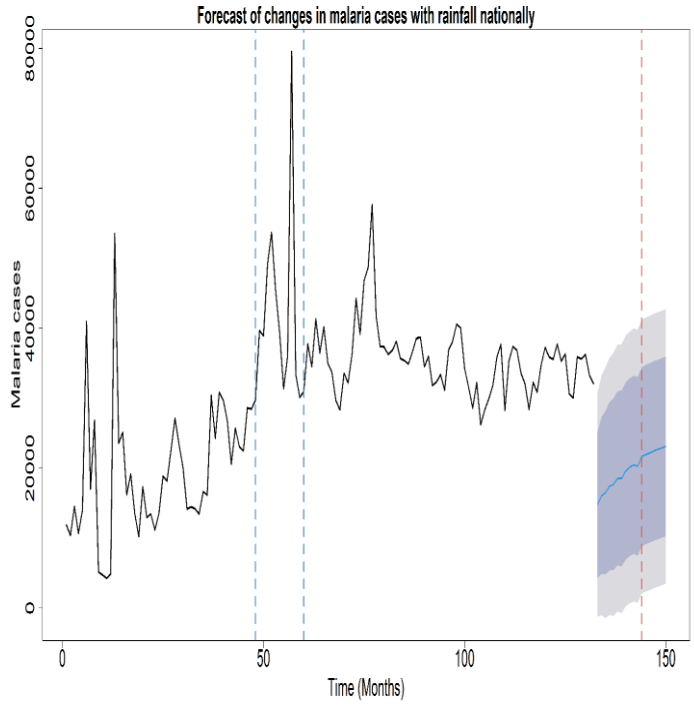

Figure. 1 Time series of malaria cases in Malawi from January 2012 to December 2023

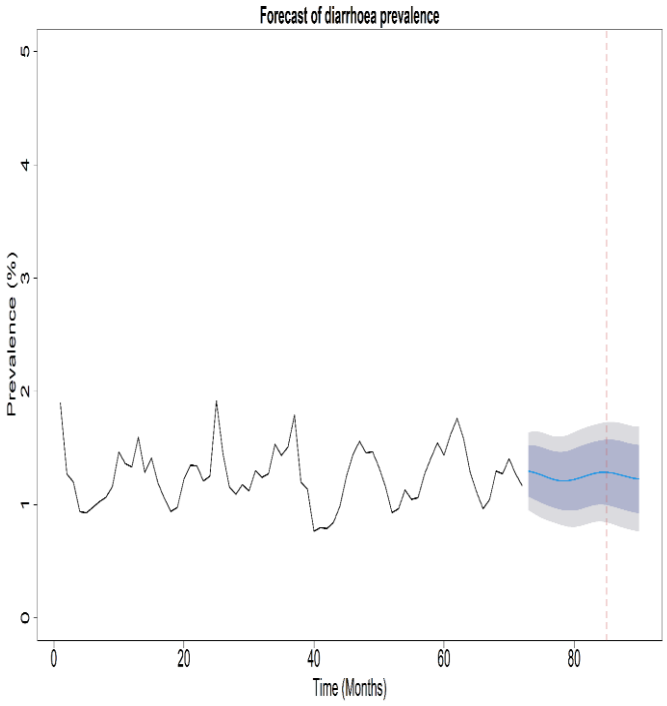

Figure 2: Time series of diarrheal disease prevalence from Jan 2017 to December 2022.

NB: The grey-shaded area shows the diarrhea forecast in 2024.

It can be noted in figure 1 that the malaria burden will not exceed the current levels. The expected malaria burden will be within the bounds that have been noticed in recent years. The shaded area shows the forecast of the malaria burden.

Diarrheoa Incidence

Results in figure. 2 shows changes in diarrheal disease and the predicted direction beyond 2023. In general, it can be observed in the forecast a similar pattern of diarrhea moving ahead. Since 2017, the prevalence of diarrheal diseases has been hovering between 1-2% and this pattern will likely to be sustained in the coming year.

Conclusion

Overall, the trajectory of malaria and diarrheal diseases in the year ahead will not deviate too much from the current levels. Malaria is already declining in Malawi. Universal coverage of Insecticide Treated Mosquito nets (ITN) has influenced reduction of the prevalence to 10.5 % from 24% as of 2017.

The resilience to short-term shocks such as El Niño could be explained by this investment. Based on the last El Niño episode in 2015/16, malaria prevalence quickly stabilized in the year after the El Niño. Therefore, a similar pattern over the coming year is expected.

As for diarrhea, general improvements in water and sanitation and the introduction of the Rota vaccine are responsible for the relatively low and stable prevalence over the past 6 years, a pattern likely to prevail in the coming year.

Recommendations

The Ministry of Health Scale-up the distribution of iinsecticide treated mmosquito nets to reduce malaria infections rapidly.

The roll-out of diarrhoea diseases vaccine in the season in order to continue the downward spiral of diarrhoea infections especially now that Malawi is officially experiencing El Nino climatic conditions that could precipitate high transmission and infections of climate sensitive pathogens.

The Ministry of Health should make efforts to integrate climate data in District Health Management Information Systems to enable easy access of both climatic and diseases data for use in tracking climatic conditions sensitive diseases and infections.

In collaboration with the Ministry of Water and Sanitation, Water Boards and the private sector, the Ministry of Health should scale up access to portable water to prevent use of unsafe water especially in high-density urban residences.

Ministry of Health to collaborate with Ministry of Education and Ministry of Local Government to intensify sanitation messages in schools, market places and communities to prevent spread of water borne diseases during the season

Research institutions to continue monitoring the trends of diarrhoea and malaria infections and disease through-out the 2023/24 cropping in consideration of the El Nino conditions, so as to timely sound an appropriate alarm bell in case of incidence of these diseases abnormally rising, so as to trigger appropriated and matched response

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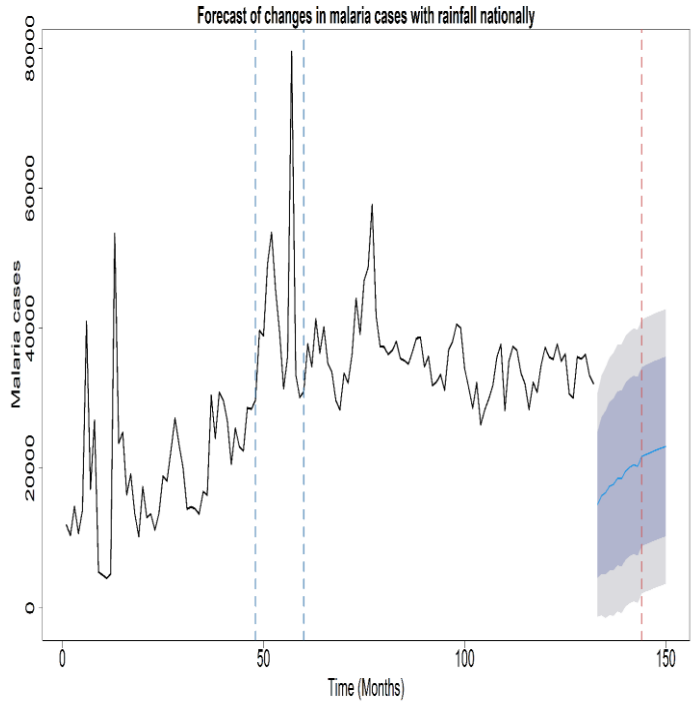

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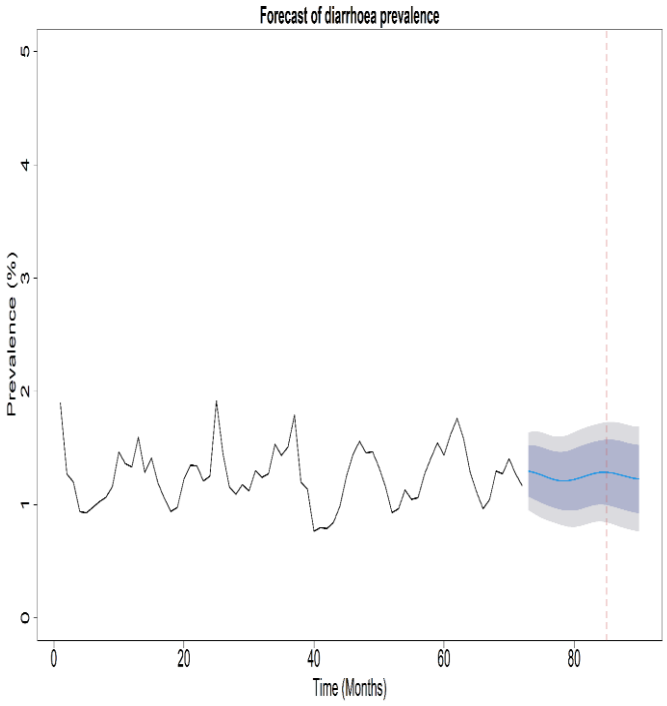

Figure 2: Time series of diarrheal disease prevalence from Jan 2017 to December 2022.

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Malawi 2063 Policy Brief Series – Vol 2. Nov 2023

El Nino Forecasts on Malawi : Hint on Response Measures

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[1]Department of Climate Change and Meteorological Services, (DCCMS) [2]National Planning Commission, [3] Malawi Liverpool Welcome Trust (MLW) [4]International Food Policy Research Institute (IFPRI), [4]University of Malawi, [5]MwAPATA Institute, [6]Lilongwe University of Agriculture and Natural Resources (LUANAR)

Key message

- Malawi's 2023/2024 rainfall season is characterized by high variations in temperature and rainfall patterns influenced by El Nino conditions, resulting from warming of waters in the Eastern-Central Equatorial Pacific Ocean.
- Forecasts show that from October to December 2023, the country will experience normal total rainfall amounts with high likelihood of below-normal rainfall in November, particularly in southern and northern Malawi.
- From January to March 2024, Malawi will experience normal to below-normal total rainfall amounts, with the possibility of above-normal rainfall in January and prolonged dry spells in February.
- Early planting for southern and central regions and use of early maturing varieties for cereals is recommended in the season.
- Social protection programs must plan for targeted food support in central and southern region, where the El Nino conditions will be rife

Context

Malawi often suffers from adverse climatic conditions that result in either droughts or floods. Apart from naturally occurring unfavorable climatic and weather events, climate change has exacerbated these abnormal conditions, with high intensity and magnitude in recent times. Current ElNino forecasts indicate a significant departure from a normal cropping season, with wider spatial-temporal variations of significant varying impact in the country.

Global climate models project moderate to strong El Niño conditions in the 2023/2024 rainfall season, caused by unusual warming of waters in the Eastern-Central Equatorial Pacific Ocean, which typically leads to drier conditions over Southern Africa, including southern Malawi.

Historical seasons analogous to the 2023/2024 season which the El Niño conditions prevailed include 1982/1983, 1997/1998, 2009/2010, and 2015/2016.

Methodology

Data – Historical temperature and rainfall data was collected from all meteorological stations and cleaned for inconsistencies and outliers as recommended by the World Meteorological Association,

Prior to model fitting, data gaps in the temporal series were filled by figures obtained from remote sensing techniques, following careful technical examination.

Model fitting – The model used operation statistics which are guided by model performance to determine skills and reliability. Once statistically proven, the models are utilized. Validation of the results was done by comparing with observed data. If a model shows high skills or performance during the analysis, it was judged as an excellent to perform predictions. A lower skills indicated low potency to provide accurate forecasts. Weather and climate forecasting process was improved by bringing together the predictions created by each individual model. This combined forecast, often referred to as an "ensemble forecast," to reduce errors and enhance the accuracy of predictions

Seasonal forecasts - Once the climate outlook models are run and a technical consensus reached, the forecasts were analyzed to examine effects on different sectors at different levels. This enabled packaging of sector specific forecast products, for appropriate and requisite action. In this analysis, forecasts products were also downscaled to district and TA level to obtain area specific variations of climatic outlook. This forecast takes into account the unique weather patterns and conditions in each of the country's regions, ensuring that predictions are as accurate and region-specific as possible.

Sub-seasonal rainfall forecasts

October, November and December (OND) Sub-season

During the October to December sub-season, Malawi is expected to receive normal to above-normal rainfall (indicated by cyan on the map). However, there may be pockets of normal to below-normal rainfall amounts (indicated by yellow) particularly in the southern areas of the country (Figures 1 and 2).

El Nino Forecasts on Malawi : Hint on Early Response

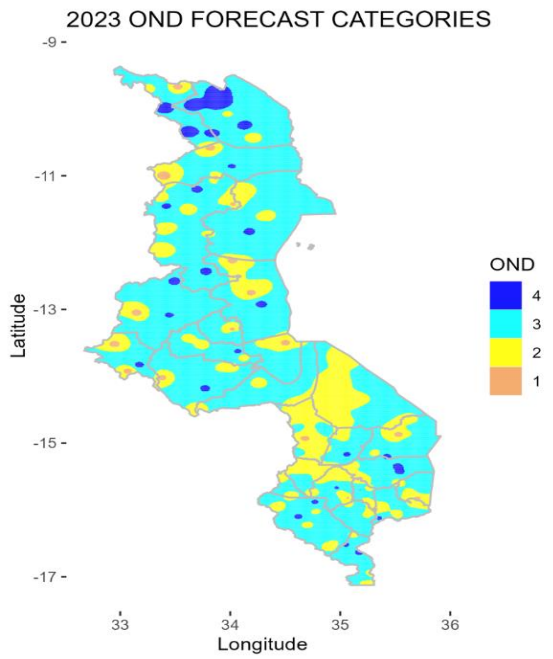

Figure 1. OND forecast categories

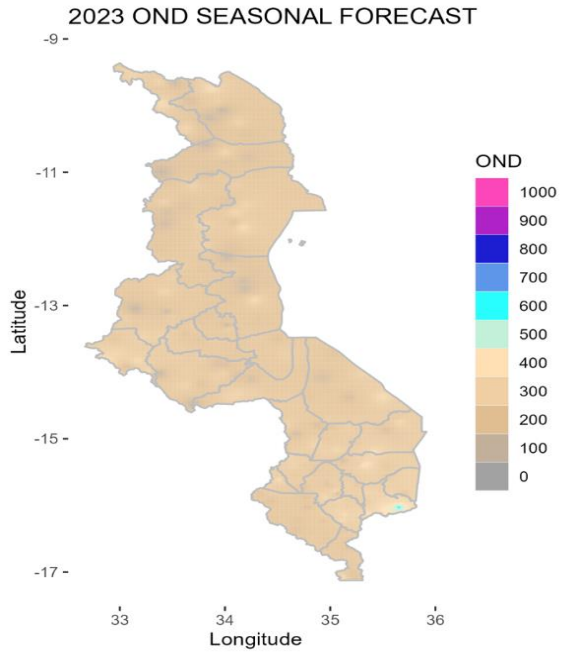

Figure 2. OND forecast rainfall amounts

November, December, January (OND) Sub season forecast

During the November to January sub-season, the lower Shire Valley, northern, and some central areas of the country are expected to receive normal to above-normal rainfall. However, there may be pockets of normal to below-normal rainfall amounts (indicated by yellow) particularly in the southern highlands and the upper Shire Valley area (Figure 3).

The highest rainfall amounts are expected in Mulanje that may reach 800mm, but the rest of the country may receive rainfall totals ranging from 400 to 700mm (Figure 4)

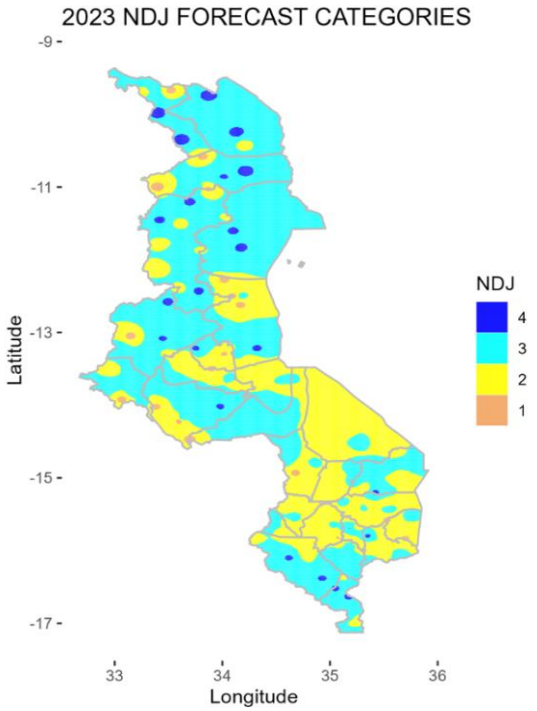

Figure. 3 NDJ forecast categories

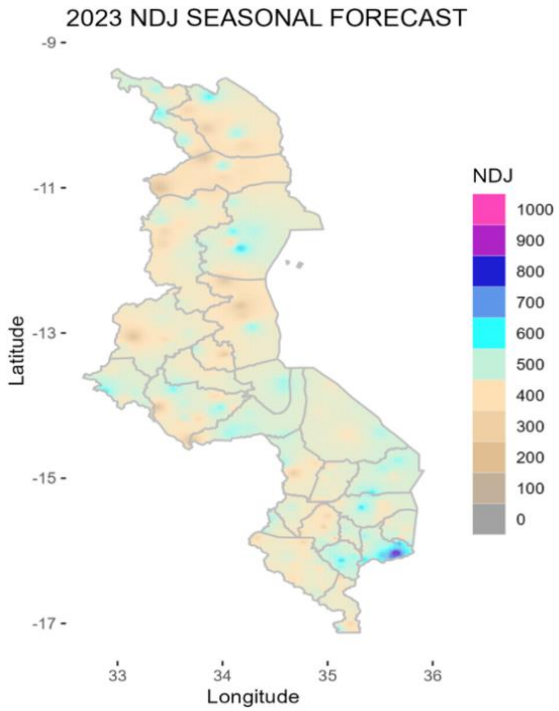

Figure 4.NDJ forecast rainfall amounts

December, January, February (NDJ) Sub season forecast

Rainfall amounts for the December to February sub-season are forecasted to be normal to below-normal over the southern and central areas of Malawi. In contrast, normal to above-normal rainfall is expected for most areas in the lower Shire Valley and northern areas of the country (Fig.5). Rainfall totals will be between 400 and 900mm across the country (figure 6).

El Nino Forecasts on Malawi : Hint on Early Response

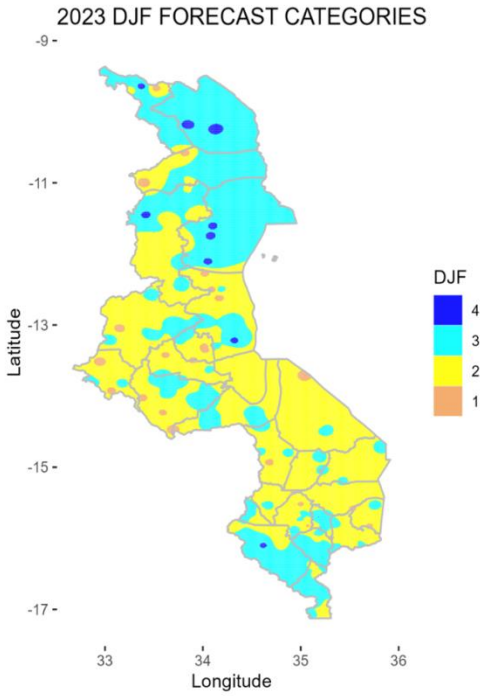

Figure 5. DJF forecast categories

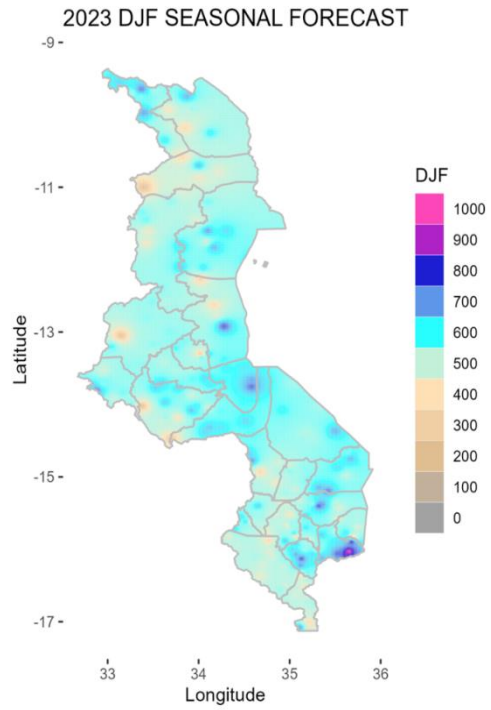

Figure 6. 2023-24 DJF Sub season forecast

January, February, March (JFM) 2024 Sub season

During the January to March sub-season, the forecast indicates normal to below-normal rainfall (yellow) for a significant portion of Malawi (Figure 7). However, there is a possibility of normal to above-normal rains in some parts of the north and the Shire Valley area (Fig.8).

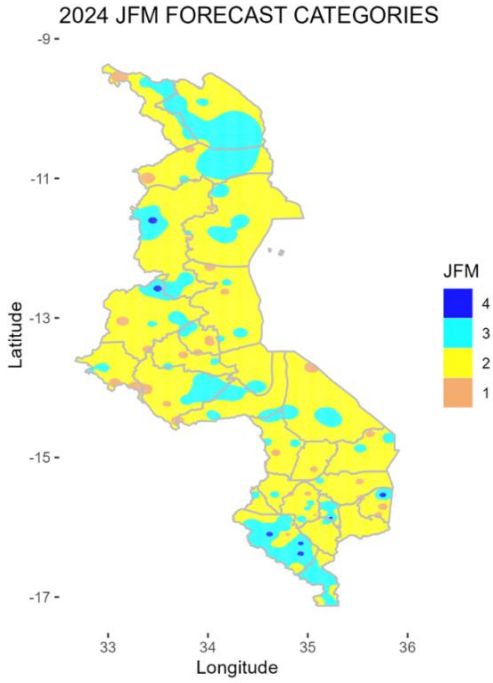

Figure 7. JFM forecast rainfall amounts

The rainfall total amounts range from 300 to 800mm)Fig. 8)

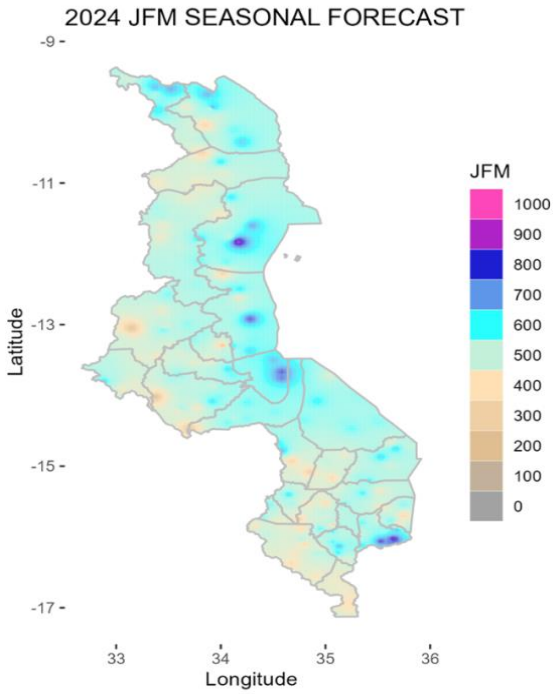

Figure 8. JFM forecast rainfall amounts

February, March, April (FMA) Sub season

During the FMA (February to April) sub-season, the forecast suggests the likelihood of normal to below-normal rainfall (indicated by yellow) in Malawi, with few areas experiencing normal to above-normal rainfall

El Nino Forecasts on Malawi : Hint on Early Response

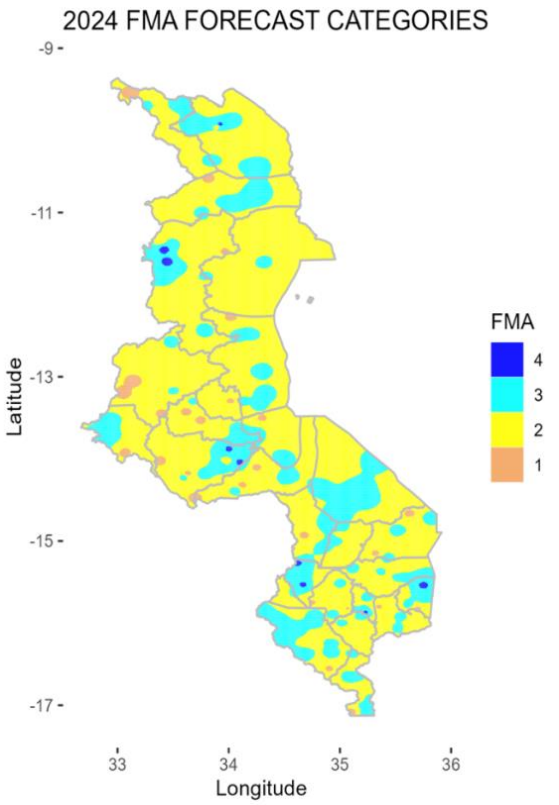

Figure 9. FMA forecast categories

The total rainfall amount is around 300 and 400mm over many places but may exceed around 600mm in some areas like Nkhatabay, Karonga and Mulanje,

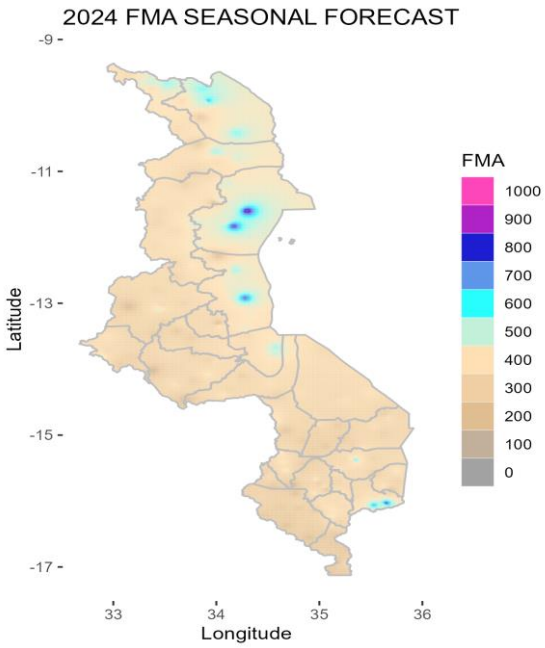

Figure 10. FMA forecast rainfall amounts

2023-2024 TEMPERATURE FORECAST

October to December (OND) 2023

Generally normal temperatures are expected in October and November while lower than normal temperatures are expected in December

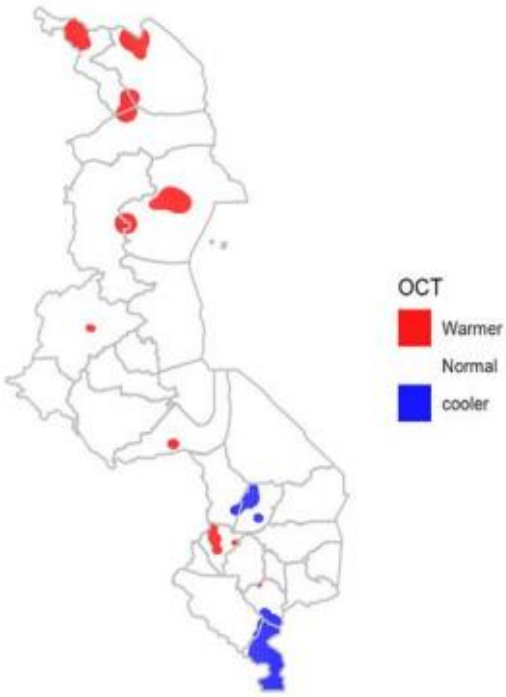

Figure 11. October 2023 temperatures

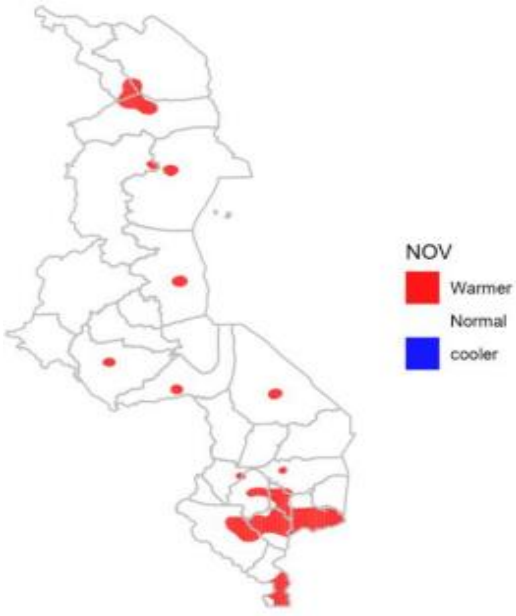

Figure 12. November 2023 temperatures

El Nino Forecasts on Malawi : Hint on Early Response

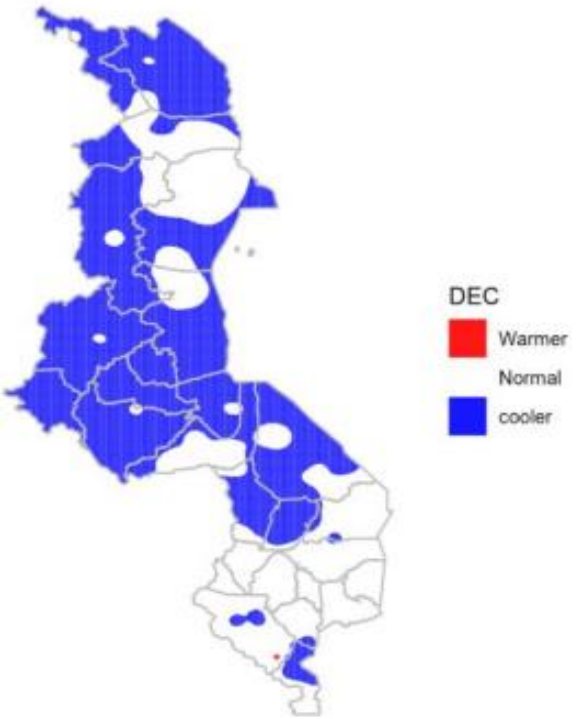

Figure 13. December 2023 Temperatures

January to March 2024:

High temperatures are expected, particularly in February and March in the southern and central.

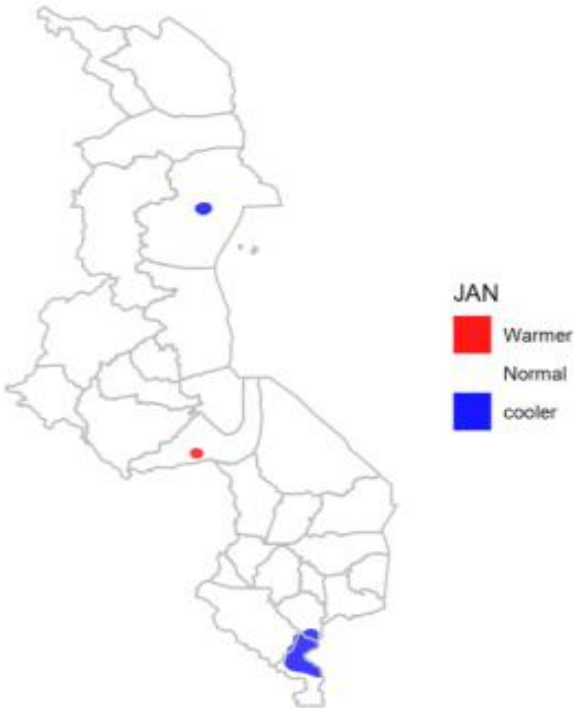

Figure 14. January 2023 Temperatures

2023-2024 TEMPERATURE FORECAST

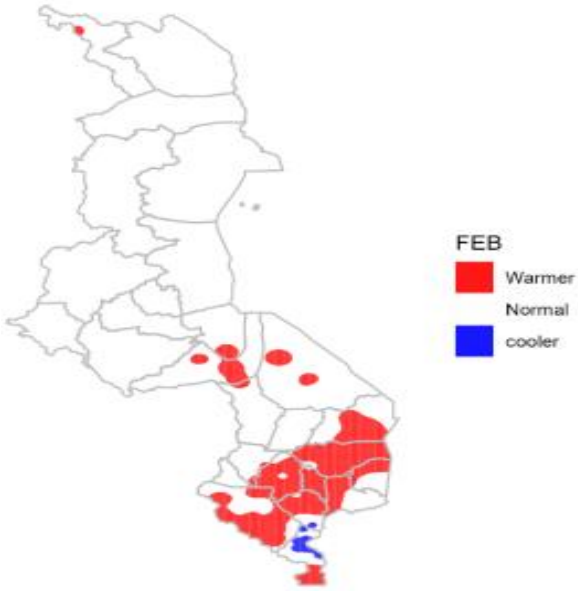

Figure 15. February 2023 Temperatures

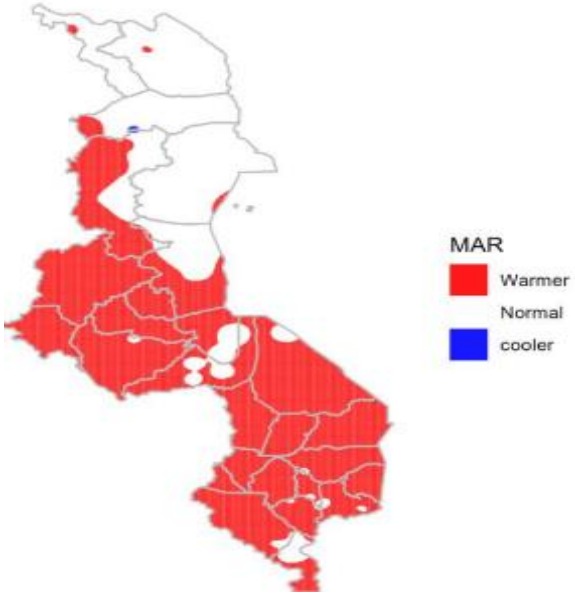

Figure 15.Mardch 2023 Temperatures

Conclusion

- Generally, there is a high chance of normal to below normal rainfall over most parts of Malawi.
- Climate analyses on analog years show that the country had Delayed onset over most areas except for Southern Highlands and Early cessation over most of the northern areas while late cessation over some areas within central and southern regions.
- Generally high temperatures are expected particularly in February and March over the southern and central areas while lower than normal temperatures are expected in the month of December.

Acknowledgements

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Effects of El Nino condition on Malawi's economy - 2023/24

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Key messages

- Malawi is no stranger to adverse climatic conditions, but the frequency and magnitude of the conditions has recently intensified, with 11 El Nino cycles recorded from 1987, seven (7) of which had economy-wide negative effects;
- Global and local meteorological forecast show 95% likelihood of El Nino conditions in the 2023-24 production season, characterized by normal to below normal precipitation and record high temperatures, mostly in central and southern Malawi.
- A Rural Investment and Policy Analysis (RIAPA) scenario model output shows reduction in maize production by 8.3% from normal in scenario 1, and a 20% in scenario 2, on account of the forecasted El Nino conditions.
- The 2023/24 Gross Domestic Product (GDP) contracts by -4% in scenario 1 and -8.6% in scenario 2, largely influenced by the shrunk agriculture GDP -9.2% in scenario 1 and -18% in scenario 2. In nominal terms, Malawi's 2023/24 GDP will drop from $645 to $620 in scenario1 and $592 in the conservative scenario 2.
- There is a 3.4% reduction in household consumption capacity in scenario 1 and a 6.7% drop in scenario 2, with eroded consumption capacity more pronounced in urban than rural areas; 2% against 2.6 % in scenario 1, 5.3% against 12.2% for urban and rural households respectively in scenario 2.
- Social protection measures must be target specific considering the spatial and temporal differentials in production capacities among households.
- Ministry of Agriculture should facilitate irrigation focused farming among cooperatives and estate farmers in affected areas, which could off-set the food deficit and lower food inflation, on account of food shortages.

Context

Malawi's 2023/24 production season has already signified departure from normal patterns, characterised by changes in spatial-temporal commencement and distribution of rainfall, amid rising temperatures. Global and local meteorological forecasts show a 95% probability of unusual rainfall patters in the season, with November recording normal to below normal rainfall, particularly in the northern and southern region.

January 2024 has a higher likelihood of above normal rainfall in southern and central regions.

Delays in onset of cropping season rainfall, an early cessation and subsequent shorter duration are already essential characteristics of drought for most part of the season, especially over central and southern Malawi.

Historical seasons analogous to the 2023/2024 cropping season in which El Niño conditions prevailed include 1982/1983, 1997/1998, 2009/2010 and 2015/2016. All were characterized by crop failure, food shortages, households poverty and reduction in economic growth as measured by GDP.

The pivotal placement of crop production in Malawi's food systems and overall economic productivity places the 2023/24 cropping season in the spotlight, in view of its El Nino predictions. This policy brief highlights likely impacts of the 2023/24 El Nino conditions on selected socio-economic indicators and sectors, suggesting programmatic considerations to address the impact.

Methodology

This analysis used a Rural Investment and Policy Analysis (RIAPA) model to assess the impact of El Nino climatic conditions on crop yield and ripple effects on household consumption capacities, poverty and growth as measured by gross domestic product (GDP). Temperature, rainfall, and cereal production data for El Nino years between 1984 and 2016 were matched to measure the difference between actual and trend yields for each year.

These were used to mimic and predict impact of the forecasted El Nino conditions in the 2023/24 season and three more years. For purposes of the analysis, El Nino years were identified based on sea-surface temperatures in October to December and El Nino harvests were those occurring in the austral fall after the peak of El Nino (October to December plus one).

El Nino impact on maize yield at the national level were aggregated from its impact at district level, weighted by maize areas across district based historical yield data. A simple mean approach was used to define cut-off points in figures.

Historical trends and impact of El Nino Conditions in Malawi

Malawi has had 11 El Nino affected years; 1998, 2003, 2005, 2007, 2010, 2015, and 2016 in 1987—2016. The 7 negatively affected years are 1987, 1992, 1995, 1998, 2005, 2015, and 2016.

El Niño impact differs across districts, and the impact in the south seems to be larger, where maize yield could be more than 30% lower than expected in the most seriously affected districts, e.g., Mangochi, Mulanje, Mwanza in darker red color (Fig. 1) or less than 10% lower , e.g., in Lilongwe, Karonga in yellow color (Figure 2).

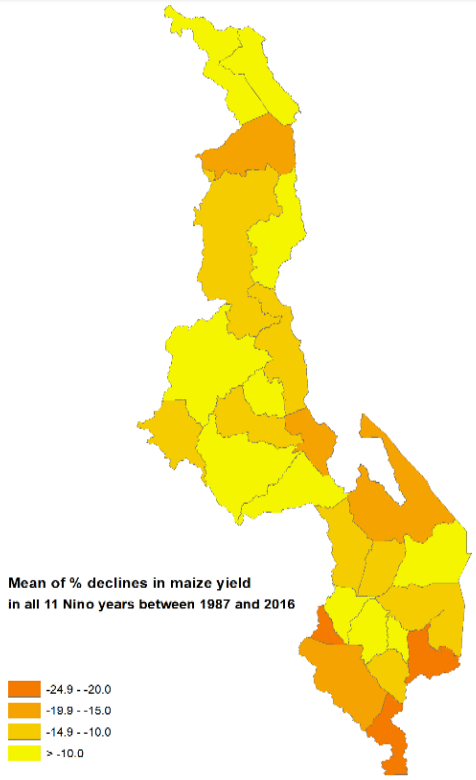

Figure 1. Mean declines in maize yield by district in 11 El Nino years

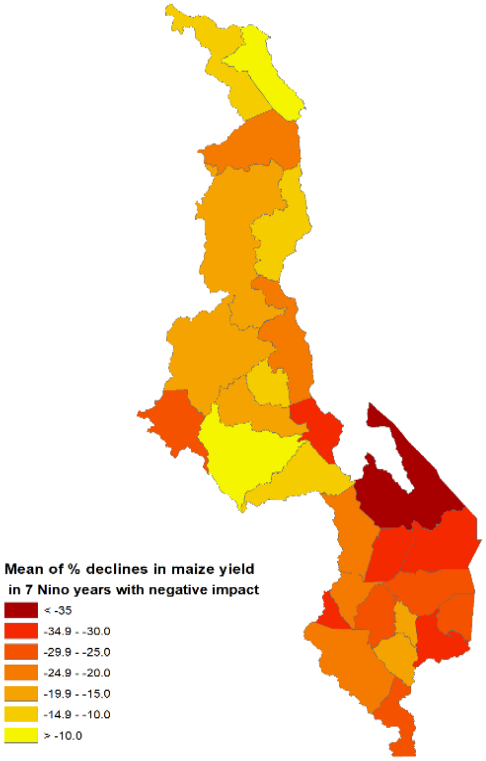

Figure 2. Mean declines in maize yield by district in 11 El Nino years

Distribution of El Nino affected rural population in Malawi – average over 7 El Nino years with Negative yield impact

Analysis further reveals that 57% of Malawi's rural population live in 15 districts where maize yield lowered by 15—30% due to El Niño impact in the past (Fig 3).

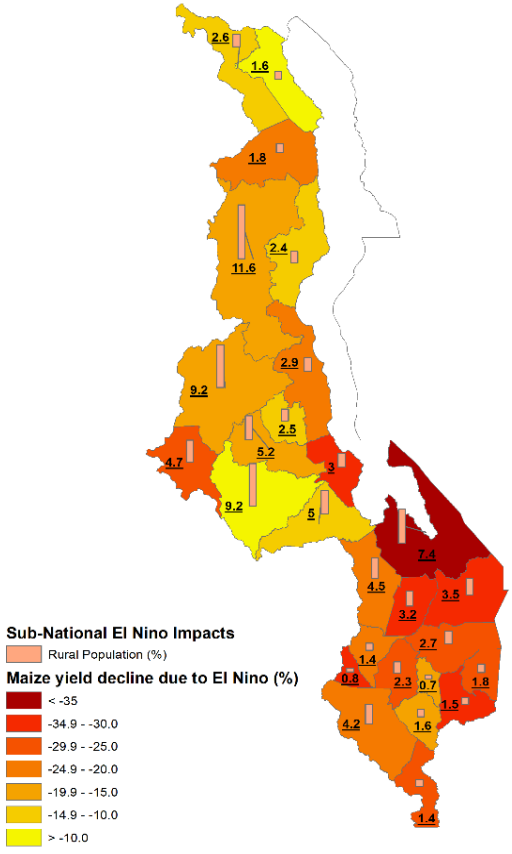

Figure 3. Distribution of El Nino affected population by district

Further, 20% of rural population affected are in Mangochi (in darkest red color in the map), Salima, Balaka, Machinga, Mulanje, and Mwanza (in second darkest red color in the map) with reduced maize yield (Figure 3).

Note: The colors in the map for districts reflect the differential average impacts of the seven El Niño years in which maize yield fell from its trend level across districts. Numbers shown in the map for individual districts are percentage of national total maize areas affected by El Niño

Distribution of El Nino affected maize areas in Malawi – average of over 7 El Nino years with negative yield impact

Analysis shows that El Niño will affect maize production in the entire Malawi and 60% of maize areas are in the districts that were affected with low maize yields (15—30%) in the past El Niño years. Analysis shows that 15 districts fall in this group (Figure 4).

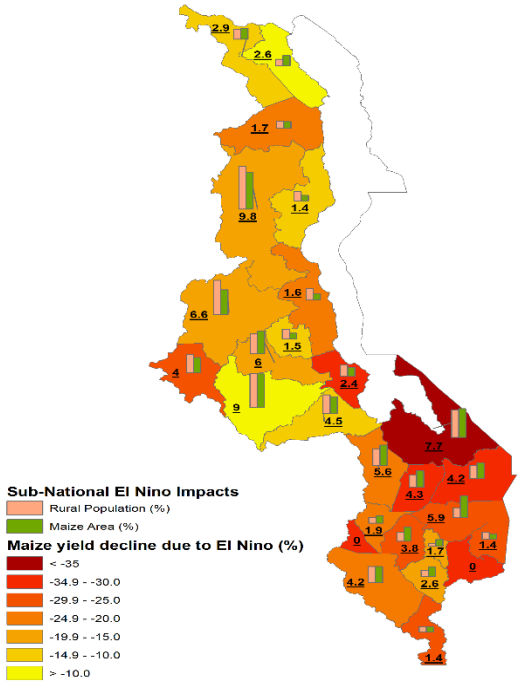

Figure 4. Maize yield decline due to El Nino in most affected areas, Malawi

Nearly 20% of maize areas are in Mangochi (in darkest red color), Salima, Balaka, and Machinga (in second darkest red color) with past maize yields lowered by more than 30% lower in the past El Niño years.

Distribution of El Nino affected crop areas in Malawi, average over 7 year El Nino years with negative impact

More than 55% of Malawi's crop areas are in the districts with maize yield 15—30% lowered in the past El Niño years. Analysis shows that 15 districts fall in this group. Further, more than 20% of crop areas are in Mangochi (in darkest red color), Salima, Balaka, Machinga, Mulanje, and Mwanza (in second darkest red color) with maize yield more than 30% lower in the past El Niño years (figure 5).

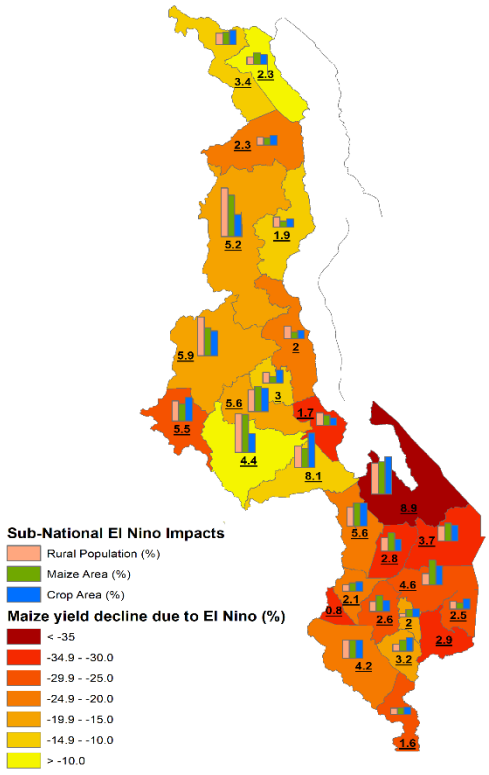

Figure 5. El Nino affected crop areas in Malawi by district over the 7 years with negative impact

NB: The colors in the map for districts reflect the differential average impacts of the seven El Niño years in which maize yield fell from its trend level across districts. Numbers shown in the map for individual districts are percentage of national total crop areas affected by El Niño

Economywide impacts of 2023 El Niño in Malawi — RIAPA model simulation analysis

Economy wide impacts of El Nino conditions were based on two scenarios created from historical El Niño impacts on maize yield. Analysis shows that exogenously El Nino conditions will shock maize productivity in 2024 with declines in maize production.

Scenario 1: maize productivity shock based on the average impact of all past El Niño years (average over 11 El Niño years) and size production falls by 8.3%

Scenario 2: maize productivity shock based on the 6 and 7 El Niño years with negative yield impacts in Malawi, maize production falls by 20.1%.

Foresight & Rapid Response Modeling System (FARRMS)

The Foresight and Rapid Response Modelling System (FARRMS) was applied on the crop and climate data to model impacts of El Nino conditions based on global models (trade and world commodity prices), infrastructure (roads water and power) biophysical (crops and livestock).

These fed into the dynamic economywide model which had investment tools, (non-food policies and investments), value chain tools (policy priorities value chains -PPVC, demography and macroeconomy).

Outputs of the analysis were agri-food systems; GDP, Jobs, Water use, Resilience and Green House Emissions, while Household level outputs included income, poverty, hunger, inequality, gender and diets (Figure 6).

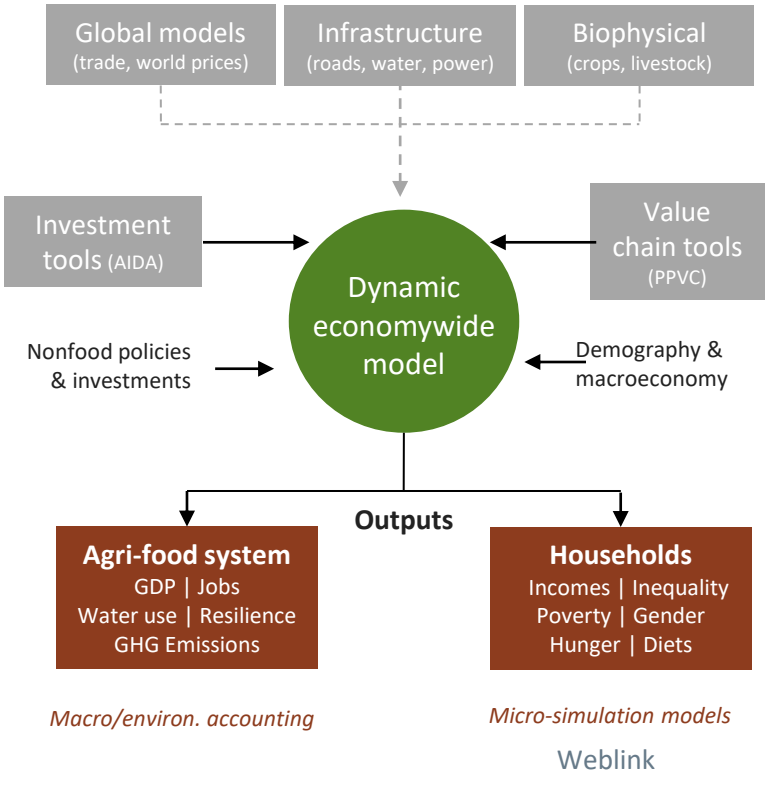

Figure 6. fforesight & Rapid Response Modeling System (FARRMS) framework

Analysis results in figure 7. show that the 2023/24 Gross Domestic Product will contract by 4 percent in scenario1, worsening in scenario 2, where it contracts by 8.5%. The agriculture-food system GDP contracts by 7.2 percent and the agriculture GDP contracts more; 9.2 percent in scenario1

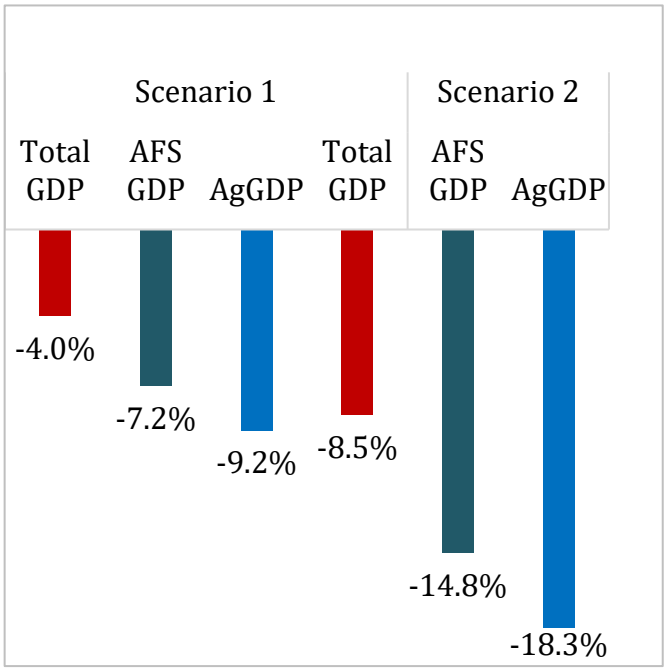

Figure 7. The 2023/24 El Nino impacts on Gross Domestic Produce (GDP)

The estimates are much more bigger in the conservative scenario 2; where the agri-food systems GDP will contract by 14.8 percent, while the agriculture GDP contracts by 18.3 percent (Figure 7).

Further, in scenario 1, the 2024 GDP will be reduced from the base of $645 in 2023 to $620 in 2024 and $592 in scenario 2. In 2025, the GDP will be reduced from the base of $646 to $644 in scenario 1, and $642 in scenario 2. (Figure 8).

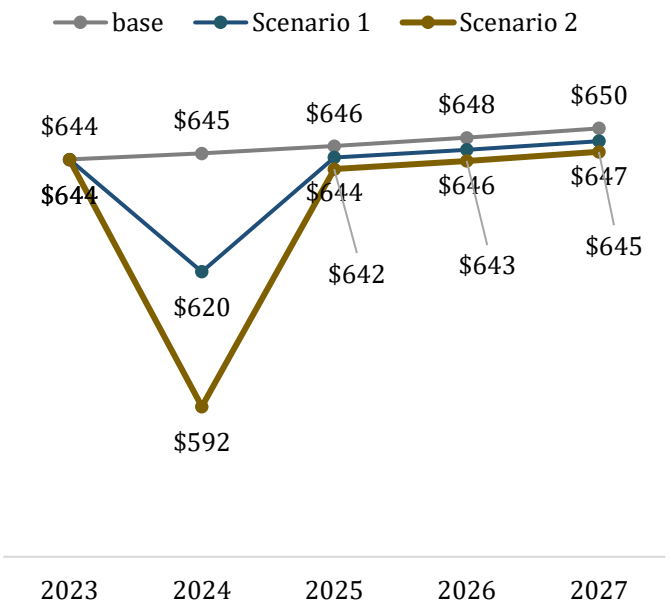

Figure 8. Impact of the 2023/24 on per-capita GDP over time

Model results further show that in 2026, the GDP will be reduced from $648 baseline to $646 in scenario 1 and $643 in scenario 2.

In 2027, the GDP will be reduced from the baseline of $650 to $647 in scenario 1 and $645 in scenario 2 (Figure 8).

2023/24 El Nino Impacts on Household Consumption

Owing to the critical bearing crop production has on household livelihoods, analysis has revealed that the 2023/24 El Nino conditions will erode household consumption capacities by 3.4% in scenario 1 and 6.7% in scenario 2 (Figure 9).

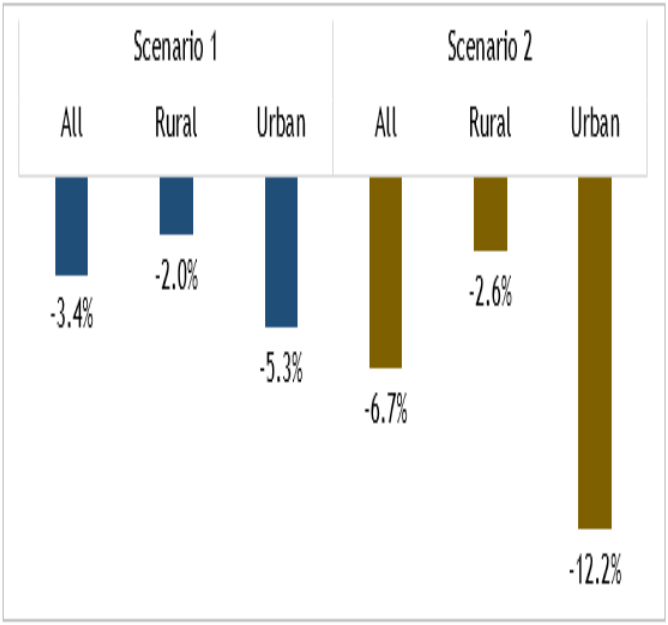

Figure 9. Reduction in household consumption capacities by residence.

Urban residents will experience more loss in their consumption capacities than rural areas in both scenarios - 5.3% and 12.2% in scenarios 1 and 2 respectively, while rural residents will experience a 2% and 2.6% reduction in their consumption capacities in scenarios 1 and 2 respectively (Figure 9).

2023/24 El Nino Impacts on Household Poverty

The erosion of household production and livelihood capacities by the forecasted El Nino conditions has a direct link to its poverty impact. Analysis shows that the forecasted El Nino conditions will augment household poverty levels in the country by a higher magnitude in the urban than rural areas. Scenario 1 of the analysis shows that nationally, household poverty will be increased by 1.6%, while the conservative scenario 2 shows an El Nino conditions poverty increase by 2.6% (Figure 10) .

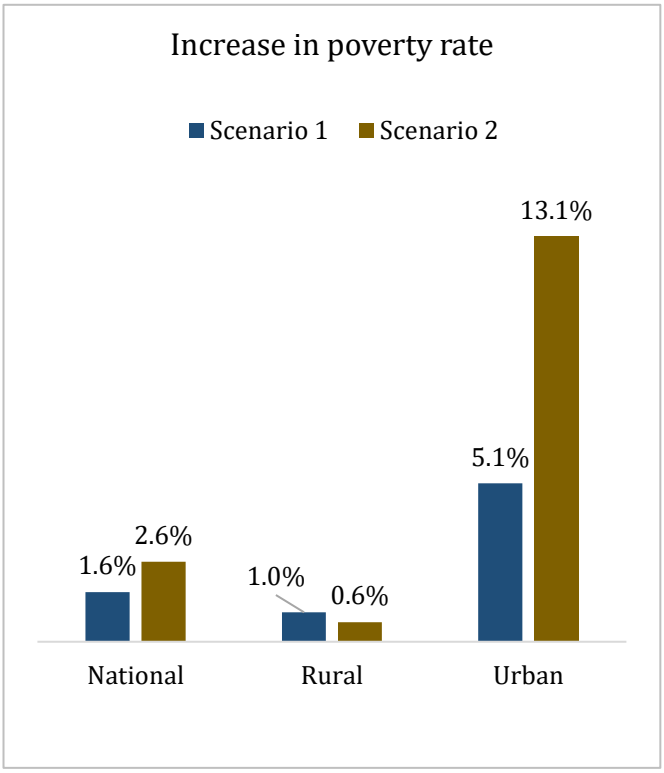

Figure 10. El Nino induced household poverty rate increase by households

In 2024, there will be 690,536 more hungry people in the country (scenario 2), more in the rural; 531,408 than urban; 221,687 respectively. This indicates a 3.2% increase from the 2024 baseline (scenario 2) nationally and a 3.3% increase in rural areas, against a 2.7% increase in urban areas (scenario 2).

Among urban residents, household poverty rate will increase by 5.1% in scenario 1 and 13.1% in scenario 2, while among rural households, scenario 1 household poverty increase is 1% and 0.6% in the rural areas. This result indicates that urban households are likely to experience the brunt of increased poverty induced by the forecasted El Nino conditions.

Across the productive sectors; the 2023/24 El Nino conditions will have varied negative impacts; with the agriculture sector experiencing the highest of losses. Results show a 6% loss in agriculture GDP in 2024 in scenario 1, while scenario 2 shows a 14.3% loss in agriculture GDP (Figure 11)

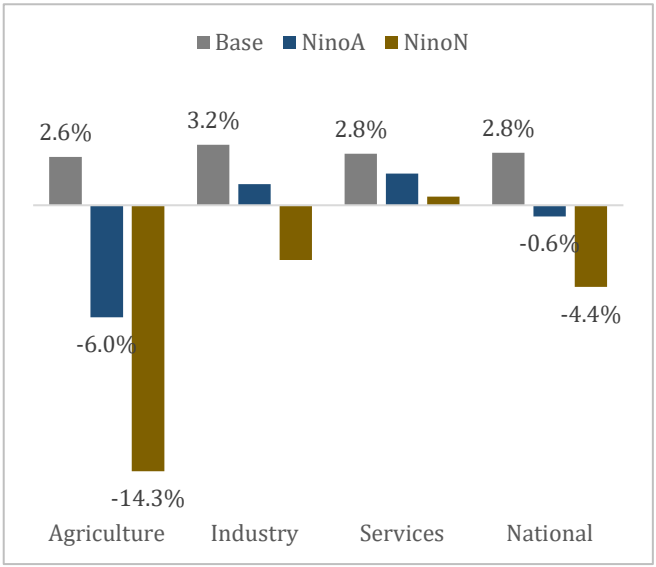

Figure 11. El Nino induced GDP loss by productive sector

The industry sector will experienced no loss in GDP in scenario 1, while the conservative scenario 2 shows a GDP loss of 2.9%. The services sector shows no loss in GDP attributed to El nino, but mild increases in both scenarios; 1.7% in scenario 1 and 0.5% in scenario 1.

Conclusion

- Malawi will experiencee El Nino conditions, with wider economic impacts.
- The agriculture sector is hugely affected, seconded by the industry sector.
- Household food availability and consumption capacity will be eroded, more in urban than rural areas.
- The prevalence of hunger will increase in rural than urban areas
- There will be increases in population falling into a poverty trap.

Recommendations

- Ministry of agriculture should encourage production of drought-tolerant, higher value crops, i.e., legumes, tubers and roots, with more support targeting cooperatives.
- DoDMA should plan and provide for relief provision in areas likely to be affected by El Nino, to build survival capacities, especially among urban residents.
- Ministry of Finance and Economic Affairs should scale-up the targeted social-cash transfers so as to build household productive capacities especially in rural areas.
- Commercial farming through mega-farms should be hastened to improve food production through irrigation. This entails the K50bn funds required to operationalize the investment should be prioritized.

Acknowledgements

Special thanks and appreciation goes to collaborating authors and institutions in this policy briefs series for unreservedly and positively working on the call to analyze the impacts of forecasted El Nino conditions in the 2023/24 production season within a short space of notification namely; The National Planning Commission, Ministry of Agriculture, Ministry of Health, the Department of Climate Change and Meteorological Services (DCCMS), the Malawi-Liverpool Welcome Trust, the International Food Policy Research Institute (IFPRI), Lilongwe University of Agriculture, the University of Malawi and the MwAPATA Institute.