CLIMATE CHANGE IN SOUTHERN AFRICA

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June 2021

OVERVIEW FROM REGIONAL DIRECTOR

Lola Castro

The WFP Regional Bureau in Southern Africa is proud to present our first climate change position paper to all our stakeholders. This is a critical moment that we take stock of and discuss the global challenge of climate change and its impact on our region.
As we all know, climate change is having a significant growing impact in Southern Africa. It is hitting the most vulnerable the hardest. The recurrent impacts of climate change are contributing to food insecurity and displacing populations. Increasingly, water resources are becoming scarce due to rainfall variability and droughts. Climate change acts as a risk multiplier for development, making the root causes of existing challenges much worse. In addition, COVID-19 has exacerbated matters in some contexts and makes the situation very difficult. Amidst existing inequalities in the region, which are some of the highest globally, we see how these climatic factors amplify the existing social tensions.

In recent years, we have seen prolonged droughts, such as in Madagascar or Angola. The devastating floods that have been taking place due to cyclones and locusts in Namibia and Zambia have affected the food security and nutrition of millions of people in this region.

The 2021 Global Report on Food Crisis found that the COVID-19 pandemic, protracted conflicts and climate change - the three C's - have created an untenable situation for almost 155 million people, and probably more. This year, the number of hungry will reach a five-year high. Unfortunately, the worst is yet to come. According to a recent report by the Norwegian Refugee Council, climate disasters in Southern Africa in 2020 have displaced almost half a million people. In 2019, we had millions displaced due to climate disasters.

We all also know that climate change does not only become a problem for food security and food systems as a whole, but also it has enormous implications in making development outcomes reachable and attaining, and impossible for the countries to reduce the problems related to root causes of poverty and food insecurity. Thus, the SDGs are farther ahead to reach with climate change impact as we see every day.
I am grateful to the International Center for Tropical Agriculture (CIAT) – CGIAR and their scientists for their contribution to this position paper to underpin scientific observations and future climate projections to help our work in the region.

In the future, the development community in Southern Africa needs to think differently, and we need to think far ahead and respond to the situation of tomorrow, today. We need to adapt to climate change on a massive scale and provide innovative solutions and technologies to match the needs that are out there. We must invest in long programming to address this long-term challenge. This year, we see between 40 to 51 million people who are food insecure in the region. This food insecurity is mostly related to climate change and economic factors related to COVID-19.

I hope that as we face these increasing adverse conditions, we are responding with dedicated efforts to improve resilience of livelihoods and work with governments and all partners to increase the capacities to adapt to the effects of climate change. But we know and acknowledge that we cannot do all this by ourselves - that we need all the stakeholders to come with the same idea to the table. I am confident that we can take climate action today to support all our national partners and rural and urban communities of Southern Africa.

Lola Castro
Regional Director
WFP Regional Bureau in Southern Africa

CLIMATE CHANGE IN SOUTHERN AFRICA

A position Paper for the World Food Programme in the region

Based on the technical paper Ramirez-Villegas J, Ghosh A, Craparo A, Thornton P, Manvatkar R, Bogart B, Läderach P . 2021. Climate change and its impacts in Southern Africa: A synthesis of existing evidence in support of the World Food Programme's position paper. CCAFS Working paper No. 358. CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS)

Regional Leaders spoke during the online climate change symposium organized by WFP Regional Bureau in Southern Africa on May 25, 2021:

Climate change has also emerged as undoubtedly one of the major developmental challenges of our time. There is increased scientific knowledge and evidence to illustrate the current potential future social, economic and environmental impacts of climate change. Although the SADC regions contribution to increasing concentrations of greenhouse gases is small, in proportion compared to other regions, the region is highly vulnerable to several impacts arising from climate change. These challenges are further exacerbated by the pressure and the pressing socio-economic challenges and the low adaptive capacity of the region. The impacts of climate change are and will continue to impede on regional economic growth and development prospects, including its effort to reduce poverty, achieve food security and attain Sustainable Development Goals." ***– Dr. Stergomena Tax, Executive Secretary, Southern African Development Community (SADC)***

Regional Leaders spoke during the online climate change symposium organized by WFP Regional Bureau in Southern Africa on May 25, 2021:

A lot has been said about the relationship between a pandemic and climate change. What I would like to say simply is both are in many ways, quite similar, because they are manmade catastrophes, they are manmade cataclysms. The speed with which we react to both of them is dramatically different, of course, because the pandemic threatens not only lives but also the livelihoods, in a more drastic and more clear way than climate change. But climate change, at the end of the day, might even be more dangerous to the survival of human civilization. And I think we can learn a lot from the reaction to the pandemic, in bringing about change to the climate, to the looming climate catastrophe that that we have to fight. Even if we managed to reach the goals set out in the Paris Agreement five years ago on limiting the rise of global average temperatures, we will have to adapt to the impact of irreversible climate change, at least for the foreseeable future, for the next generations or so. Successful climate strategies must therefore simultaneously pursue both mitigation of greenhouse gas emissions and adaptation to the impact of climate change that we will undoubtedly face. Mitigation and adaptation policies must go hand in hand and must be properly coordinated."-
- H.E. Martin Schäfer, German Ambassador to South Africa (Eswatini, Lesotho, South Africa)

Regional Leaders spoke during the online climate change symposium organized by WFP Regional Bureau in Southern Africa on May 25, 2021:

It is critical, if we're to avert an even greater humanitarian emergency, that action is taken now. And not just a small amount of action, but a massive increase in efforts to mitigate and adapt to climate change, and to reduce the risk of disasters in the period ahead." ***– Gemma Connell, Head of Regional Office for Southern & Eastern Africa, United Nations Office for the Coordination of Humanitarian Affairs (OCHA)***

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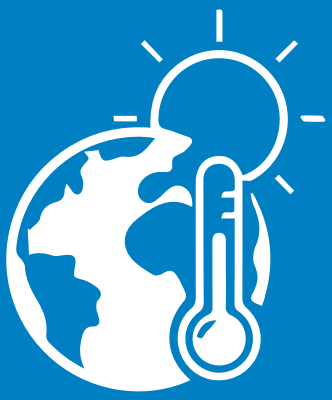
WFP/ Rafael-Campos

Regional Leaders spoke during the online climate change symposium organized by WFP Regional Bureau in Southern Africa on May 25, 2021:

Some of the things that we have noted are that our continent has a larger population of young people and these young people do not find interest in some of these things in food production, i.e. where they eat, what they eat, how it impacts to the environment. People do not care about it, yet they are the largest chunk of the continent." ***- Jean-Betrand Mhandu Earth Day - Regional Director Africa & African Youth Initiative on Climate Change Zimbabwe - National Coordinator***



Regional Leaders spoke during the online climate change symposium organized by WFP Regional Bureau in Southern Africa on May 25, 2021:

Young people want to feel the interest and see the need to participate in environmental issues. We need to start investing so that they come up with the market, they process their own projects, they add value in terms of whatever that is being produced. And they also find themselves attracted to some of these areas where production is quite key and fundamental. And they can also be part of the development agenda, determining where the country should go, where the world should go." ***- Jean-Betrand Mhandu Earth Day - Regional Director Africa & African Youth Initiative on Climate Change Zimbabwe - National Coordinator***

CLIMATE CHANGE IN SOUTHERN AFRICA

A position Paper for the World Food Programme in the region


WFP/ Rafael-Campos

EXECUTIVE SUMMARY

Climate change is a long-term threat to food security and nutrition in the Southern African region. It affects all pillars of food security including availability, access, utilization, and stability.

Climate change increases risk and uncertainty in the region which is characterized by low adaptive capacity. Impacts of changes in temperatures and rainfall patterns include increased water scarcity, pest infestations, increased frequency and intensity of droughts and floods. Observed weather patterns show that the region experienced normal rainfall in only two of the last nine cropping seasons.

Climate change is a threat multiplier, especially for the poor and most vulnerable sections of society. It can exacerbate existing vulnerabilities such as poverty, hunger, poor health and hamper progress toward the Sustainable Development Goals set for 2030.

Without adaptation, by 2050, approximately 30% of the entire SADC region will be exposed to various climate hazards. Altered weather patterns are severely affecting crop production, with detrimental effects on food and nutrition security. Over the last decade, cereal production has fallen, and the region has been recording cereal deficits ranging between 0.1 and 8.9 million metric tonnes.

Climate change-associated extreme weather events are affecting livelihoods, economies, and the environment, in turn exacerbating existing vulnerabilities in the region. In 2019, while Cyclone Idai was the deadliest storm to hit Mozambique in terms of lives taken, Cyclone Kenneth was only the second Category 4 storm ever to strike Mozambique and was, together with Eline, the strongest ever to hit mainland Africa. Southern Africa faced its worst drought in 35 years during the 2016 El Nino period. After failed 2018-19 rains, Zambia faced one of its worst droughts in decades. Southern Madagascar is currently facing severe drought conditions that have driven an estimated 1.35 million people to the brink of survival.

The interaction between food systems and the climate is complex and bidirectional. Climate change threatens to break down food systems by increasing the frequency and severity of natural hazards, with a disproportionate impact on vulnerable food-insecure households. At the same time, food systems contribute to climate change by increased greenhouse gas emissions.

Smallholders are the backbone of regional food supply on the production side, generating 90% of total agricultural output. However, 30% of this production is likely at risk from climate hazards. The most important climate hazard in the region is heat stress, represented by high growing season temperatures. Heat stress can lower the productivity of crops, such as wheat and maize, and also of livestock. It also affects human labour and increases the risk of natural disasters and reduce the growing season. The second most prevalent hazard category identified for the SADC region encompasses several combinations of the various individual hazards such as floods, rainfall variability, reduction in growing season. In some cases, four or more of the hazards occur simultaneously.

Southern Africa epitomizes the link between climate and the water–energy–food nexus, as multiple challenges collide across a very diverse socioeconomic spectrum of countries. According to the Intergovernmental Panel on Climate Change (IPCC), major water scarcity issues are expected in the region due to ongoing exploitation and degradation, coupled with increased demand and climate change.

Climate Change is predicted to increase the number of undernourished children under 5 years by an additional 2.4 million in Sub-Saharan Africa by 2050. It is estimated that by 2050, moderate stunting will increase by up to 29% globally, while severe stunting could increase by 23% in Sub-Saharan Africa due to climate change. Increased carbon dioxide levels lead to the reduced nutritional quality of food, with the iron, zinc and protein content in maize, wheat, rice, peas and soy decreasing by up to 3-17%.

Women and girls are the most affected during climatic shocks. Throughout the region, the impact of climate change on women and girls is intrinsically linked to intersecting discriminations and violations of their human rights and dignity. Droughts and desertification can mean that women (and girls) must travel further each day searching for water and firewood (or other fuel), increasing their workload and exposing them to risks of violence.

Global warming and climate change in the SADC region already contributes to rural-urban migration. With more crop failure associated with the recurrence of droughts, more and more people, especially the subsistence farmers, abandon their land and migrate into towns and cities to seek alternative income-generating opportunities. Climate change is expected to exacerbate the environmentally induced migration patterns.

Social protection can be part of a proactive approach to managing climate-induced migration and, on the other hand, it can reduce distress migration and erosive coping strategies. In particular, public employment opportunities can create assets that enhance livelihood opportunities and explicitly address the impacts of climate change in both rural and urban areas and in places of origin and destination.


WFP/ Deborah_Nguyen

HOW DOES CLIMATE CHANGE AFFECT FOOD SYSTEMS, FOOD SECURITY AND NUTRITION?

Climate change is a long-term threat to food security and nutrition in the Southern African region. The Fifth Assessment Report by the Intergovernmental Panel on Climate change (IPCC) mentions a direct impact of climate change on food security, especially in Southern Africa,[1] a region heating up at twice the rate of the global average. This has negative implications for rural livelihoods, ecosystems, and biodiversity, with direct consequences across all dimensions of the food system. The relationship between climate change and food systems moves in two directions based on mutually reinforcing feedback loops. Food systems contribute to changing the climate through greenhouse gas emissions. In turn, climate change impacts food systems, leading to food insecurity and malnutrition as depicted in Figure 1 below.

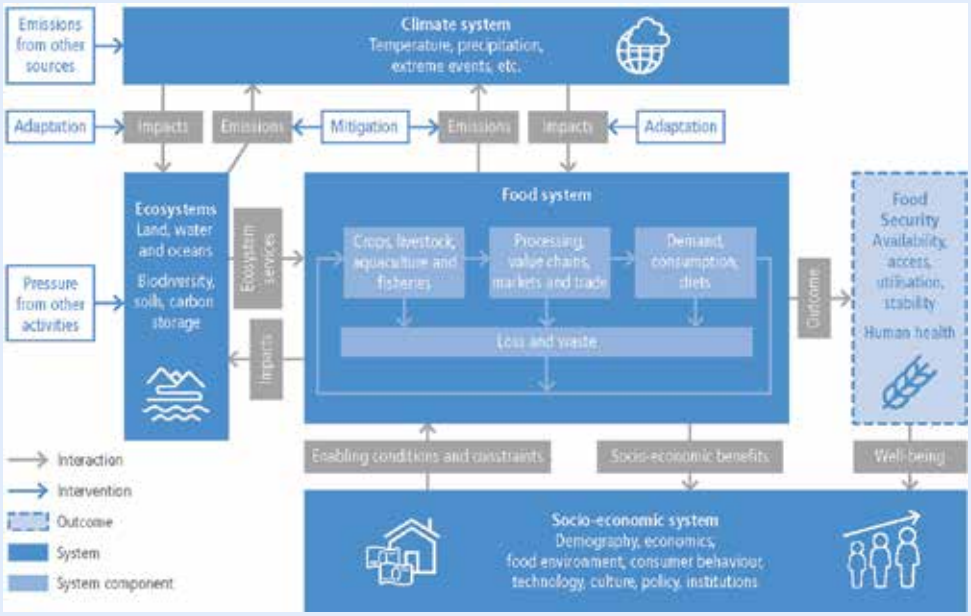


Figure 1: *Interlinkages between the climate system, food system, ecosystems (land, water and oceans) and socio-economic system. Food security is an outcome of the food system leading to human well-being, which is also indirectly linked with climate and ecosystems through the socio-economic system. Adaptation measures can help to reduce negative impacts of climate change on the food system and ecosystems. Mitigation measures can reduce GHG emissions coming from the food system and ecosystems. (Source: IPCC Fifth Assessment Report, Chapter 5)*

Food insecurity and climate change are inextricably linked due to the direct relationship between food production and climatic factors, such as temperature and precipitation.[2] Climate change impacts food production and livestock systems and, therefore, food availability through several different pathways, including the negative effects of rising temperatures on soil moisture; the destruction of crops (standing crops, storage facilities and transportation) by floods, drought, or other extreme weather events; and reduced crop yields due to rainfall variability (inconsistencies between predicted and actual seasonal rainfall); as well as pests and diseases.

However, food availability is not the only dimension of food security impacted by a changing climate. Food access is also restricted due to reduced income levels of farmers, spikes in food prices, destruction of trade and transport systems, and damage to shops and other basic infrastructure.

Stability is impacted by increased variability in the food supply, instability of incomes and food prices over long periods, as well as increased outmigration and civil unrest due to crop failures. Utilization is impacted by increased risk to food safety due to aflatoxins, declined nutritional quality of foods due to increased CO2 levels in the atmosphere [3] and increased risk of diseases.

A combination of all the above means that climate change will lead to food insecurity through increased shocks and stressors leading to food insecurity, undernourishment, increased environmental degradation combined with natural resource scarcity.

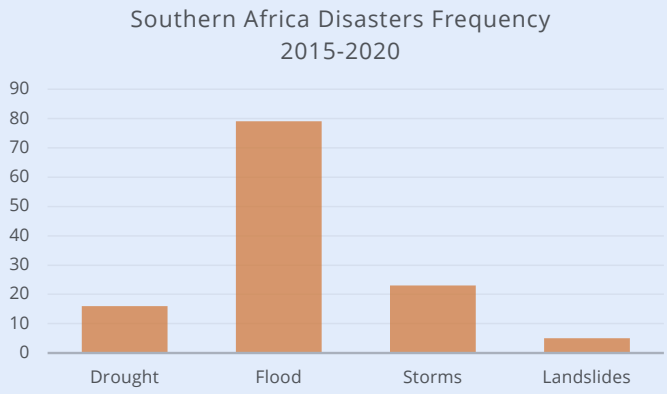
In the last five years, the SADC region has witnessed

[1] *Mbow, C., et al. 2019. Food security, chapter 5. Special Report on Climate Change and Land. IPCC: Intergovernmental Panel on Climate Change.*
[2] *Wheeler, T. and Von Braun, J., 2013. Climate change impacts on global food security.*
[3] *Van der Fels-Klerx, H.J., et al. 2019. Climate change impacts on aflatoxin B1 in maize and aflatoxin M1 in milk: A case study of maize grown in Eastern Europe and imported to the Netherlands.*

the intensification of climatic shocks leading to historic levels of vulnerability and reversing progress in efforts to reduce undernourishment.

According to the 2020 Global Nutrition Report, there has been slight progress towards achieving global nutrition targets in Southern Africa. The global targets for overweight among children under 5 years of age and wasting among children under 5 years of age each have three countries on course to meet them. Stunting among children under 5 years of age and exclusive breastfeeding among infants aged 0 to 5 months each have one country on course.

"Food security exists when all people, at all times, have physical and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life" (World Food Summit, 1996). This definition gives rise to four dimensions of food security: availability of food, accessibility (economically and physically), utilization (the way it is used and assimilated by the human body) and stability of these three dimensions.



However, not a single country in the subregion is on course to meet the targets for anaemia in women of reproductive age (aged 15 to 49 years), low birth weight, diabetes among men, diabetes among women, obesity among men, and obesity among women. Three countries in the subregion have insufficient data to assess their progress towards these global targets comprehensively. The latest data shows that anaemia affects an estimated 25.9% of women of reproductive age. Some 14.2% of infants have a low weight at birth in the Southern Africa subregion. The estimated average prevalence of infants aged 0 to 5 months who are exclusively breastfed is 33.5%, which is significantly lower than the global average of 44.0%. The Southern Africa subregion experiences a malnutrition burden among children aged under 5 years. The average prevalence of overweight is 12.7% - the highest compared to other subregions in Africa with sufficient data. The prevalence of stunting is 29.0%, which is higher than the global average of 21.3%. Conversely, the Southern Africa subregion's prevalence of wasting is 3.3%, which is lower than the global average of 6.9%. The Southern Africa subregion's adult population also faces a malnutrition burden: an average of 12.3% of adult (aged 18 and over) women live with diabetes, compared to 9.4% of men. Meanwhile, 38.2% of women and 14.4% of men live with obesity.

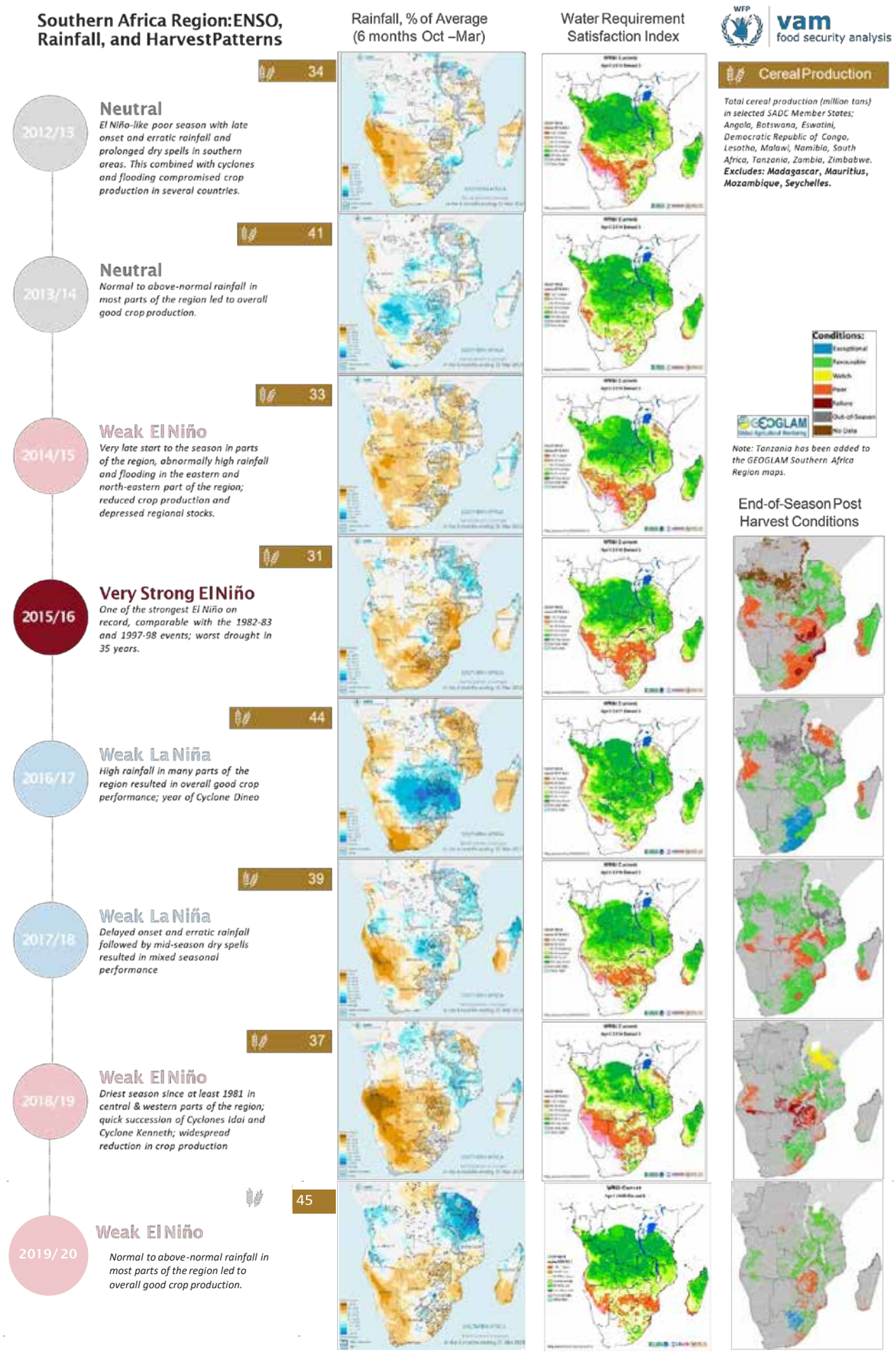
Figure 2: *Number of climate related disaster events in Southern Africa in the past 5 years (Source: EM-DAT, CRED / UCLouvain, Brussels, Belgium; Thu, 06 May 2021 11:08:15 CEST)*

REGIONAL RECORDED CLIMATE TRENDS

Extensive evidence points to the shift in global climate with pronounced manifestations of climate change noted in increased temperatures, frequency of storms, and alterations in rainfall patterns and extreme weather events. Global mean annual temperatures have increased by 0.85°C since 1880 and are projected to increase by 0.3 to 2.5 °C by 2050.[4] Consistent with global climatic shifts, Southern Africa has been warming significantly over the last century, and trend analysis of the temperatures across the region indicate that temperatures have increased at a rate of 0.4 °C per decade between 1961 and 2014.[5] Temperatures are expected to continue warming, and rainfall patterns are projected to continue changing. This increases risk and uncertainty in a region with low adaptive capacity. Impacts of changes in temperatures and rainfall patterns are already evident in Southern Africa. These include increased water scarcity, pest infestations (the frequency in armyworm and locusts invasion), increased frequency and intensity of droughts and floods. Observed weather patterns show that the region experienced normal rainfall in only two of the last nine cropping seasons (Figure 4).

[4] *Davis, C.L.; Vincent, K. Climate Risk and Vulnerability (2017): A Handbook for Southern Africa, 2nd edition; CSIR: Pretoria. South Africa*
[5] *Ibid*

Figure 3: *Southern African Region: ENSO rainfall and Harvest patterns (2012-20) (Source: WFP VAM)*



Altered weather patterns are severely affecting crop production, with detrimental effects on food and nutrition security. Over the last decade, cereal production has fallen, and the region has been recording cereal deficits ranging between 0.1 and 8.9 million metric tonnes [6] The weather-related effects of the 2015/2016 El Niño alone had a significant negative impact on cereal production. Cereal production decreased by 24% to 33 million metric tonnes, down from 41 million metric tonnes in 2014, inducing an overall cereal deficit of 7.9 million metric tonnes.[7]

Reduced crop production correlates significantly with elevated food insecurity in the region. Food insecurity has been following an upward trend increasing from an estimated 23 million in 2011/2012 to 51 million in 2020/2021 (see Figure 5). We observed the highest food insecure caseloads following the worst rainfall seasons (2015/2016 and 2018/2019)[8]. In the last five seasons, the lowest annual food insecurity was recorded following two rainfall seasons of 2013/2014 and 2016/2017.

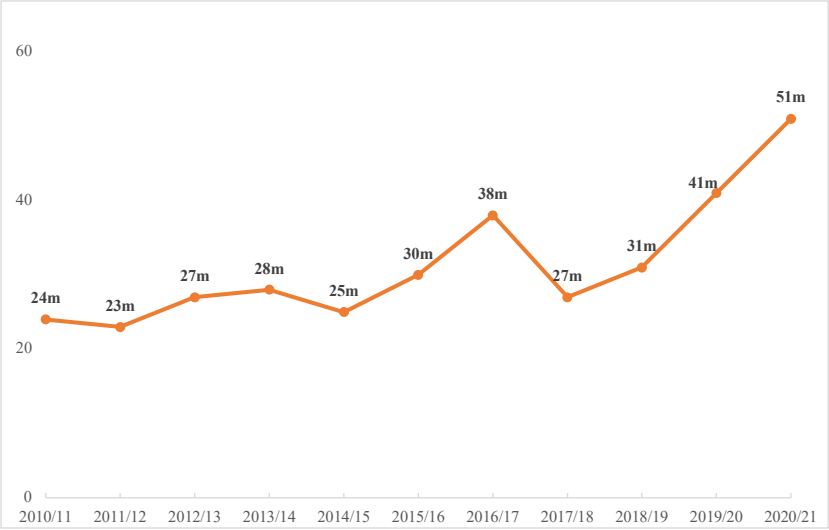


Figure 4: *Trend in food insecure population, 2010-2021 (Source: WFP VAM)*

Climate change-associated extreme weather events are affecting livelihoods, economies, and the environment, in turn exacerbating existing vulnerabilities in the region. For example, in 2019, tropical cyclones Idai and Kenneth hit Comoros, Malawi, Mozambique, and Zimbabwe, destroyed schools and clinics disrupting access to basic services and caused the displacement of 2.2 million people. Tropical cyclone Idai destroyed more than 800 000 hectares of cropland, crops and seed stock in Malawi, Mozambique, and Zimbabwe in the 2019/2020 season.[9] While Cyclone Idai was the deadliest storm to hit Mozambique in terms of lives taken, Cyclone Kenneth was only the second Category 4 storm ever to strike Mozambique and was, together with Eline, the strongest ever to hit mainland Africa. Category 5 tropical cyclones, the strongest category of storms, have only recently emerged in the South Indian Ocean. Since 1989, their frequency of occurrence has increased. This increase poses a heightened risk of storm damage for the South Indian Ocean Island States and the southern African subcontinent countries due to the strong winds, heavy rainfall and storm surges associated with these storms, and the large radial extent at category 5 strength.

Climate change increases the frequency of extreme El Niño events, leading to intensifying droughts, worsening floods, and shifting cyclone patterns. Southern Africa faced its worst drought in 35 years during the 2016 El Nino period. After failed 2018-19 rains, Zambia faced one of its worst droughts in decades. Due to the deleterious consequences of three consecutive poor rainfall seasons on the livelihoods and coping capacities of highly vulnerable populations, Southern Madagascar is currently facing severe drought conditions that have driven an estimated 1.35 million people to the brink of survival. Projections suggest that the 2021 crop harvest is expected to be less than 40% of the five-year average, pointing to a longer and more severe lean season (from October 2021 to March 2022).[10]

The southern African region faces some of the worst locust outbreaks after extended dry conditions followed by rainfall. In South Africa, the records of outbreaks date back to 1797, and these are used to study environmental change patterns in time and space. The analyses of these records indicated that brown locust outbreaks track large-scale exogenous phenomena such as climatic variations.[11]

[6]Southern Africa Development Community (SADC), 2020. Synthesis Report on the State of Food and Nutrition Security and Vulnerability in Southern Africa.
[7]Ibid
[8]Ibid
[9]FAO, 2019. Early Warning Early Action Report on Food Security an Agriculture (July–September 2019). Rome.
[10]WFP, 2021. Madagascar Internal Situation Report.
[11]Henschel, J.R., 2015. "Locust times–monitoring populations and outbreak controls in relation to Karoo natural capital. Transactions of the Royal Society of South Africa"

Regional Leaders spoke during the online climate change symposium organized by WFP Regional Bureau in Southern Africa on May 25, 2021:

We have to be ready that the emergencies we are going to face as we have seen in the region, just in the last couple of years, they will be bigger, they will impact more people, more countries, they will be devastating. And we have to be ready to respond to them as and when they happen. So, this is not either/ or. This is both, absolutely both, because mitigating will ultimately never stop the fact that disasters will happen, they will still happen. And we will need to still respond to them" ***– Gemma Connell, Head of Regional Office for Southern & Eastern Africa, United Nations Office for the Coordination of Humanitarian Affairs (OCHA)***

WFP/ Tsiory-Andriantsoarana

FUTURE PROJECTED CLIMATE CHANGE IMPACT AND GEOGRAPHIC DISTRIBUTION OF CLIMATE HAZARDS

This segment of the position paper has been developed as part of the CGIAR – World Food Programme partnership, directly supported by the WFP Regional Bureau in Southern Africa, Johannesburg. We also acknowledge the support of the CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS), which is carried out with support from the CGIAR Trust Fund and through bilateral funding agreements.

The research team[12] mapped out a total of five different climate hazards through the 2050 period under a business-as-usual emissions trajectory (Representative Concentrations Pathway, RCP 8.5) (Figure 6). These hazards included drought, flood, climate variability, growing season reductions, and high growing season temperatures. All these hazards can occur alone or in combination in the same geographic area, either simultaneously or at different times during the cropping season. The analysis suggests that approximately 30% of the SADC region's physical area is projected to be exposed to climate hazards. According to observations, the most important climate hazard in the region is heat stress, represented by high growing season temperatures. High growing season temperatures affect approximately 11% of the SADC region. Heat stress has been highlighted in several studies as an significant hazard in Southern Africa. Heat stress can lower the productivity of crops, such as wheat and maize, and also of livestock. It also affects human labour, and increases the risk of natural.
The second most prevalent hazard category identified for the SADC region encompasses several combinations of the various individual hazards explored. In some cases, four or more of the hazards occur simultaneously. These combinations of hazards likely affect 8.6% of the region and, in many cases, include high temperature and drought, together with growing season reductions and high climate variability. The high share of these hazard combinations underscores the complexity of hazards and risks that agricultural producers are projected to experience due to climate change. Growing season reductions, drought, and climate variability together account for 7.7% of the area in the region, whereas the combination of high variability and heat stress accounts for another 3% of the area. According to our analysis, the least important hazard in the region is flooding.

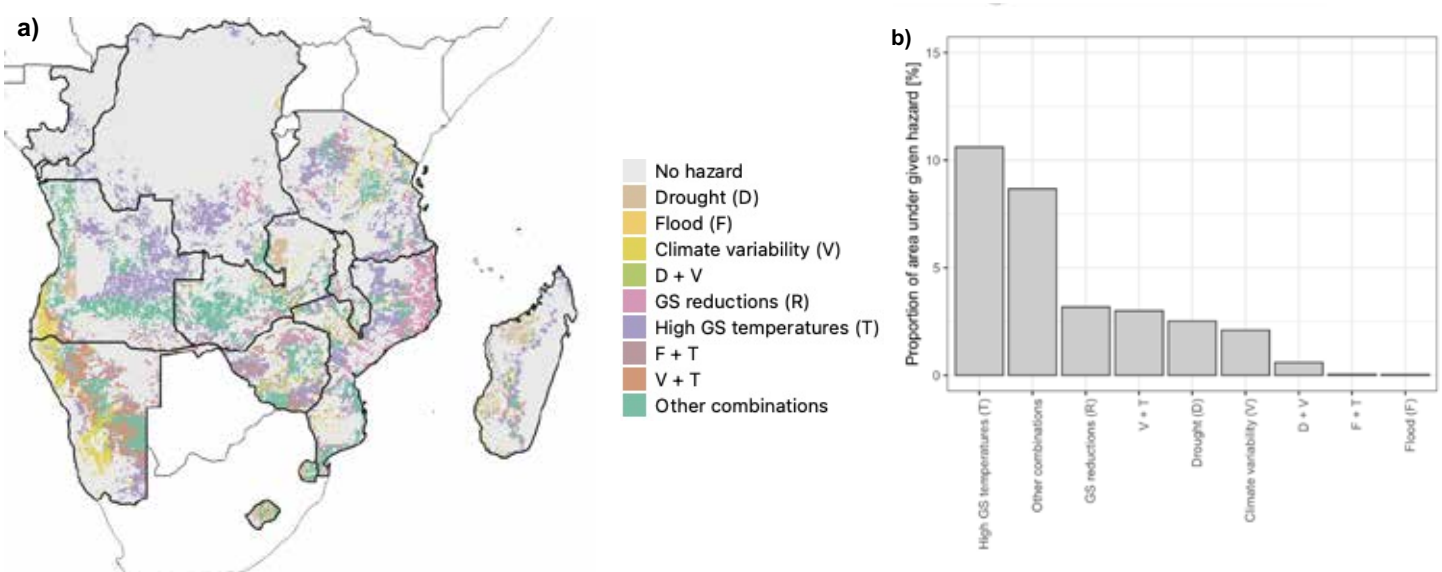


Figure 5: *Geographic distribution of climate hazards in the SADC region (a) and proportion of physical area in the region under each climate hazard or hazard combination. All hazards are calculated for the period 2050 under RCP 8.5. GS: growing season. Note that in most areas of 'other combinations' this category includes drought and high growing season temperatures.*

[12] *Julian Ramirez-Villegas; Aniruddha Ghosh; Sandro Craparo; Philip Thornton; Peter Läderach*

Southern Africa epitomizes the link between climate and the water–energy–food nexus, as multiple challenges collide across a very diverse socioeconomic spectrum of countries. According to the World Bank Classification, of the 13 countries that comprise the SADC; six are defined as low income, three as lower-middle income and four as upper-middle income. Agriculture's contribution to regional Gross Domestic Product (GDP) is 17% for the whole SADC region and up to 28% for the low-income countries. At the same time, ca. 75% of the land in SADC is either arid or semi-arid, and agriculture is estimated to consume 70% of the renewable water resources of the region.

According to the Intergovernmental Panel on Climate Change (IPCC), major water scarcity issues are expected in the SADC region due to ongoing exploitation and degradation, coupled with increased demand and climate change. With 27 million food-insecure people, the 2015/16 El Niño-induced drought provides an example of how increased water demand for agriculture can aggravate water, energy, and food insecurity. As evident from the impact of climate hazards within and amongst farming systems presented here, unless adaptation actions are implemented at scale, climate variability and climate change are projected to affect agriculture in many of these regions. This will likely result in effects on food and water insecurity, incomes and the national and regional economies.

The nexus between the agricultural and water resources exists largely due to the high spatial interdependence of many of the countries in the region. For instance, multiple river basins and aquifers span regional and national boundaries. This requires international water and sanitation agreements and the integration of climate variability into water framework policies.

Smallholders are the backbone of regional food supply on the production side, generating 90% of total agricultural output. However, 30% of this production is likely at risk from climate hazards. Smallholder farmers largely rely on their own agricultural activity for survival on the consumption side, as their farms generate the principal income and/or food source for consumption. However, there are significant contrasts across the SADC region. For instance, the cereal import dependency ratio indicates the importance of imports for the volume of grains available for consumption in a country is particularly high for the small countries of Swaziland (79%) and Lesotho (85%), and more strikingly so for larger nations such as Botswana (90%) and Namibia (65%). Dependency ratios are lowest in Zambia (5%) and Malawi (6%). Therefore, focusing on agricultural production and closing yield gaps to increase food security may not be as effective as improving market access and trade connectivity.

Climate change is expected to impact agricultural production in SADC in multiple ways. Foremost, a variety of climate hazards critically exposes 30% of the region. Our analysis also demonstrates that climate change is projected to reduce the amount of suitable land for cropping, especially for key farming systems which sustain the vast majority of rural livelihoods. Furthermore, previous studies suggest that, without adaptation, crop productivity is also projected to decrease, especially for cereals.

Negative impacts from climate change are also expected for livestock production systems, mediated through reduced pasture productivity and direct heat stress effects on animals. Decreased suitable land for cropping and reduced crop and livestock productivity would exacerbate water scarcity and insecurity, decrease national self-sufficiency ratios, and impact food availability locally, with devastating effects on food insecurity in the region.

Water, energy and food are thus inextricably linked across multiple scales in SADC and are heavily interdependent. Therefore, actions to address climate change need to be regionwide. Furthermore, **addressing existing and emerging water-energy-food issues requires understanding and shaping ongoing food systems transformations in the region.** These transformations include growth in per capita incomes that increase purchasing power, changes in consumption patterns (dietary transformation), rapid changes in post-farm systems, and the regulatory aspects of food systems, rising rural factor markets for agricultural services, and changes in agricultural technologies and the size of farms.

Projected impacts on crop suitability

This section explores the possible impacts of climate change on agricultural crop suitability using a niche-based model approach. Our analysis suggests that, without adaptation, by 2050 (RCP 8.5) ca. 35% of the currently suitable area for cropping is projected to reduce its climatic suitability. Consistent with the hazard exposure analysis of Section 2, and with

previous literature, the analysis shows that maize mixed (88 million ha projected to become less suitable) and agro-pastoral (48 million ha) systems will face the most significant reductions in suitable cropping area. In these areas, bean, wheat, sorghum, and maize are all projected to reduce their climatic suitability significantly. Wheat and beans, in particular, are very hard hit, with virtually all of their currently suitable areas projected to become less viable. Suitability is also projected to reduce in forest-based systems, with some 5 million ha projected to become less suitable for cropping for crops such as banana, plantain and cocoa.

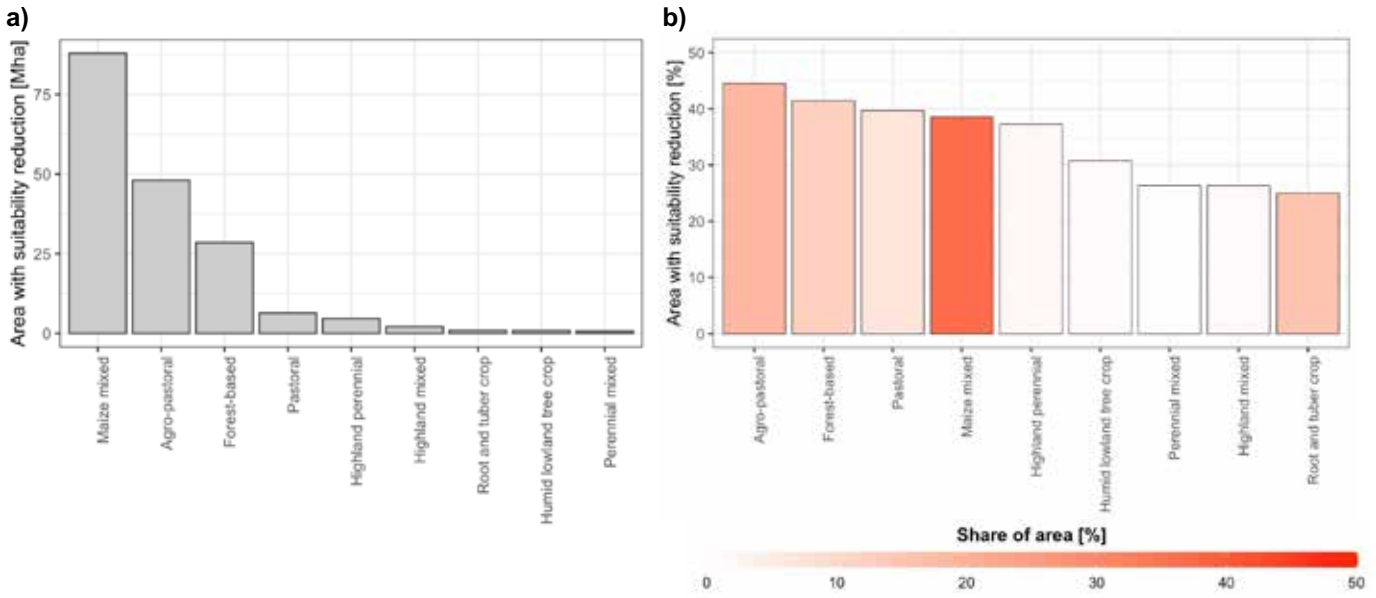


Figure 6: *Projected reductions in absolute (a) and relative (b) suitable area for crops across all rainfed farming systems in the SADC region by 2050 (RCP 8.5). In panel (b) the color scale is used to show the share of area for each farming in the SADC region (Source: CGIAR: CCAFS / Alliance BVI-CIAT / ILRI)*

Occurrence of climate hazards within and across farming systems

Hazard occurrence varies significantly across the geography of the SADC region, which implies differences in hazard exposure for the variety of farming systems that sustain Southern African livelihoods. Figure 8 shows the absolute and proportional amounts of physical area for the farming systems of the SADC region projected to be exposed to climate hazards. In absolute terms, the greatest exposure to climate hazards is likely to be in the maize mixed farming system (114 million ha), followed by agro-pastoral areas (61 million ha), and the pastoral system (31 million ha). In the maize and agro-pastoral farming systems, around 40 out of every 100 hectares are exposed to climate hazards in relative terms. However, the pastoral system shows greater exposure, with up to 60% of its area exposed to hazards, only below perennial mixed systems (ca. 81% area exposed to hazards). On the other hand, forest-based systems have the smallest share of area as well as a small amount of absolute area (360 thousand hectares) exposed to climate hazards. Irrigated systems show the smallest absolute physical area exposed to hazards, although proportionally, hazards cover ca. 30% of this farming system. However, the total share of regional area under these two latter systems is very small (12% for forest-based, and less than 1% for irrigated).

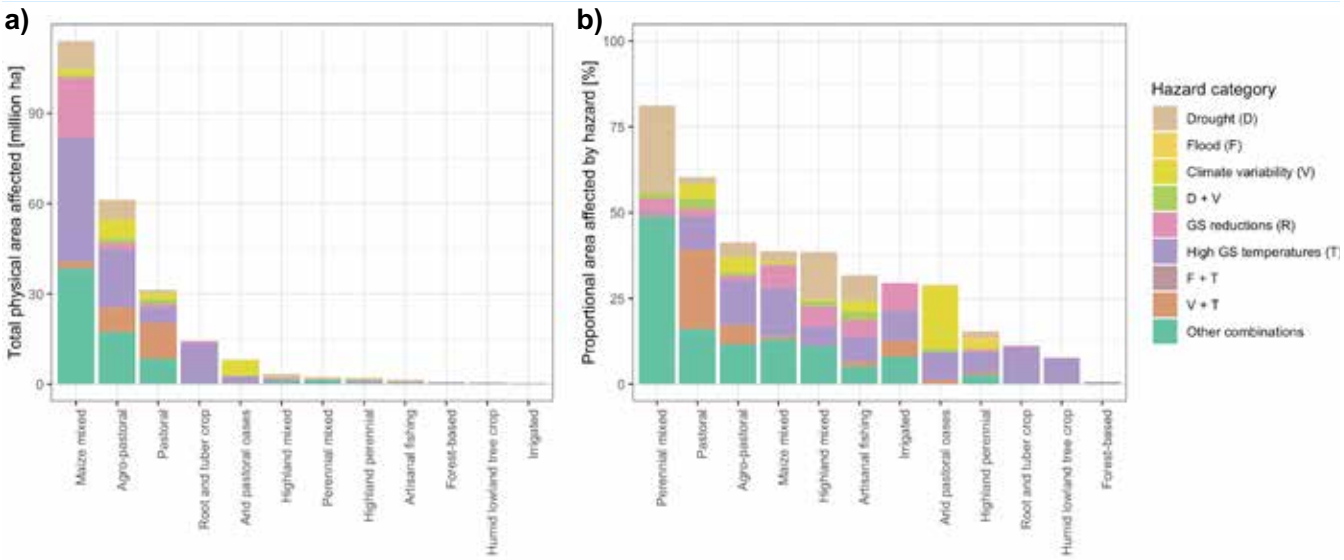


Figure 7: *Absolute (a) and proportional (b) physical area affected by climate hazards in the farming systems of the SADC region by 2050 (RCP 8.5) (Source: CGIAR: CCAFS / Alliance BVI-CIAT / ILRI)*

Variations in the distribution of climate hazards within the SADC region and its farming systems also mean that the amounts of rural population and agricultural production value vary significantly across the different systems (Figure 3). Generally, as with the physical area, the farming systems with the greatest rural population and agricultural production value exposed to climate hazards are the maize mixed and the agro-pastoral systems. In these two systems alone, approximately 44 million rural people and 18 billion USD in production value per year are likely exposed to climate hazards. The third most affected system in terms of rural population is the root and tuber mixed system (4.6 billion people), whereas, in terms of production value, it is the highland mixed (1.8 billion USD per year). Growing season reductions, high temperatures, and drought account for most of the value and rural individuals exposed to climate hazards in these systems.

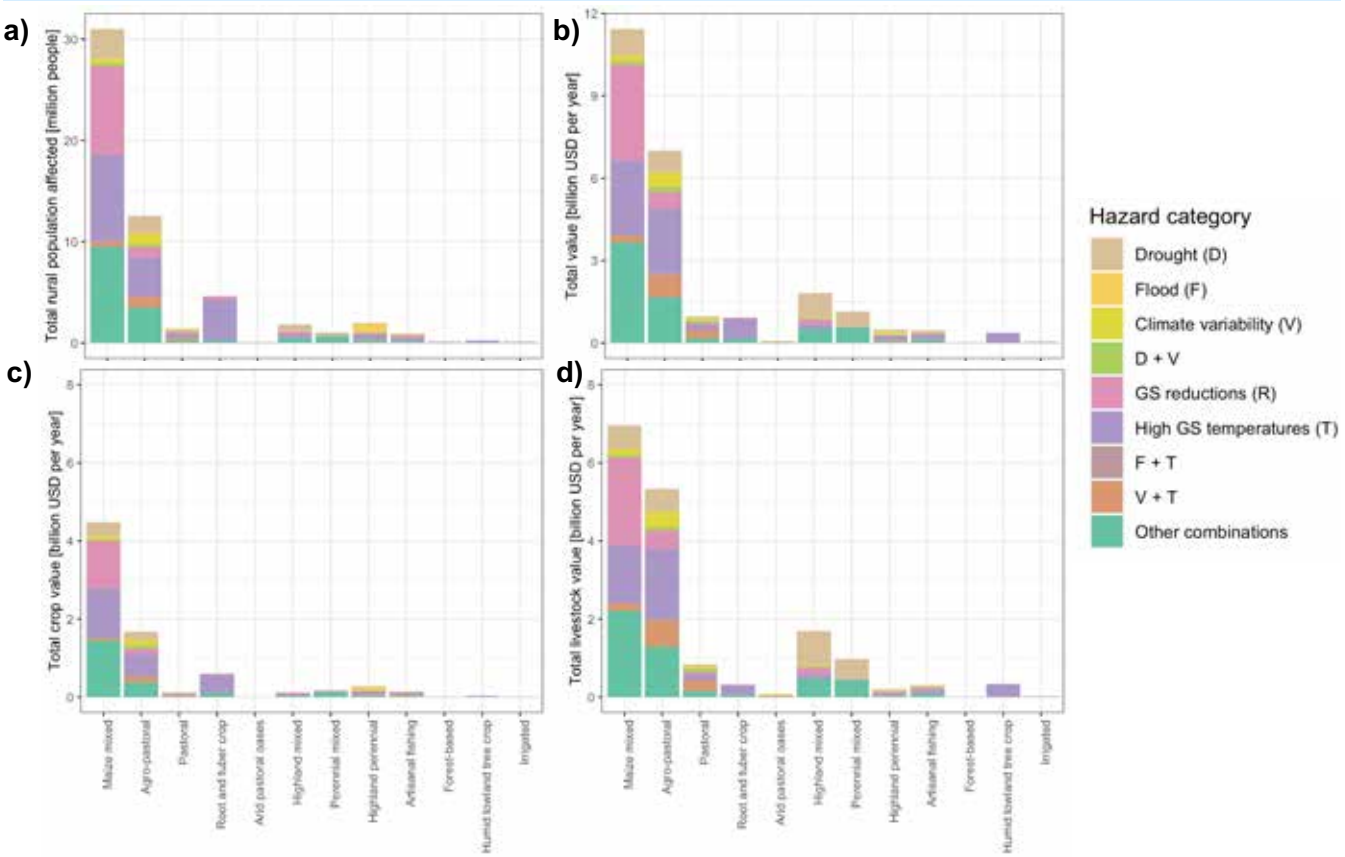


Figure 8: *Exposure of rural population (a), total crop and livestock production value (b), total crop value (c), and total livestock value (d) to climate hazard for all farming systems in the SADC region by 2050 (RCP 8.5). Note that the value of crop production is based on the 42 crops and crop categories of the MapSPAM 2017 dataset (IFPRI, 2020). Value of production is given per year.*

Regional Leaders spoke during the online climate change symposium organized by WFP Regional Bureau in Southern Africa on May 25, 2021:

Even if we managed to reach the goals set out in the Paris Agreement five years ago on limiting the rise of global average temperatures, we will have to adapt to the impact of irreversible climate change, at least for the foreseeable future, for the next generations or so." - ***H.E. Martin Schäfer, German Ambassador to South Africa (Eswatini, Lesotho, South Africa)***

WFP/ Alexis_Masciarelli

Without adaptation, by 2050, approximately 30% of the entire SADC region will be exposed to various climate hazards. The occurrence of multiple hazards simultaneously underscores the complexity of climate risks that rural communities are projected to experience due to climate change. Growing season reductions, high temperatures, and drought account for most of the value and people exposed to hazards in these systems. As of June 2021, an estimated 42 million people are at risk of food insecurity. This figure could go up to 51 million.

IMPACT OF CLIMATE CHANGE ON HUMANITARIAN AND DEVELOPMENT COMMUNITY'S WORK IN THE REGION

Current trends in climate, conflict and health-related crises risk are increasing the number of people living in hunger, and indicate that it will remain necessary for WFP to continue to maintain a strong focus on saving lives and livelihoods in emergencies if it is to help countries achieve the 2030 Agenda. Climate change threatens to break down food systems by increasing the frequency and severity of natural hazards, with a disproportionate impact on vulnerable food-insecure households. The global community cannot and should not keep saving the same lives every year. Climate justice and the 2030 Agenda calls for collective responsibility to perform the adaptation and mitigation work to help build the resilience of marginalized people living in vulnerable places.

The vulnerability of people and food production systems to climate change will require greater efforts and capacity strengthening in early warning systems, emergency preparedness, comprehensive risk assessment and management, climate risk insurance, and resilience-building of communities, livelihoods and ecosystems. Safety nets and social protection systems are among the best options for empowering the most vulnerable people so that they can start adapting to climate change and building resilience. Whilst a lot is being done across the region regarding climate change adaptation, this is still not sufficient to meet the challenge. A shift from a reactionary to an anticipatory approach is needed along with long term adaptation to climate change. While this is happening, extreme weather events will continue to impact the region. As such, the humanitarian and development communities need to work hand-in-hand to address both these challenges. Whilst WFP in southern Africa will continue

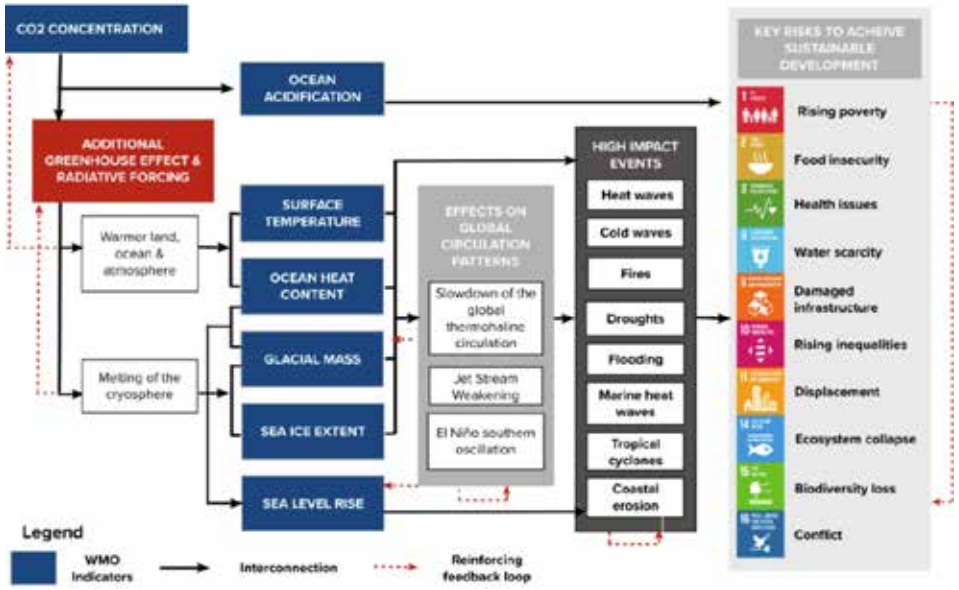


***Figure 9**: Key risks to achieving the SDGs (Source: IPCC, WMO)*

to respond to humanitarian crises by delivering food assistance; it will also increase its focus on food assistance for developing enabling governments and communities through increased adaptive capacities and resilience.

are reached, concerted efforts are necessary. This means that WFP will partner a wide range of actors in the development, humanitarian and – as appropriate – peace and security communities.[13]

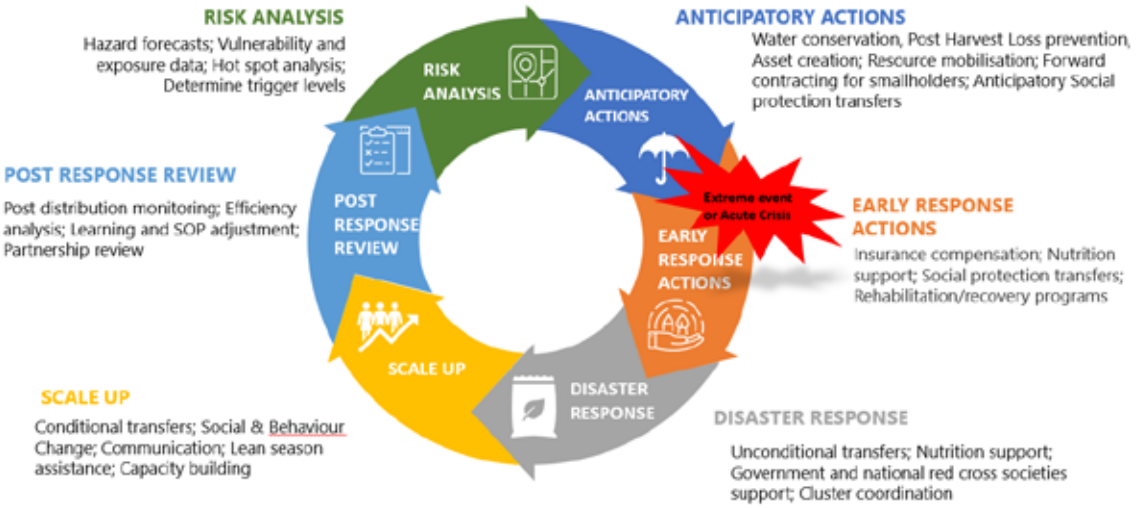


Figure 10: *The need to shift from a reactionary approach to an anticipatory model (Source: WFP)*

As we enter the decade of action toward achieving the SDG goals, WFP Regional Bureau for Southern Africa will strive to Restore, Anticipate and Protect lives and livelihoods through its humanitarian and development interventions in the region together with its partners and stakeholders.

It is our aim that by 2030, WFP and its partners can ensure sustainable food production systems and implement resilient agricultural practices that increase productivity and production, that help maintain ecosystems, that strengthen capacity for adaptation to climate change, extreme weather, drought, flooding and other disasters, and that progressively improve land and soil quality.

Managing crisis-related risks and reducing vulnerability must be viewed as both a humanitarian imperative for saving lives more effectively and a development necessity in ensuring progress towards achieving the SDGs. "Leaving no one behind" in the fight against hunger means reaching everybody – women, men, girls and boys – with special attention to people living in extreme poverty, those facing discrimination, refugees, internally displaced persons (IDPs), people living with disabilities, the infirm, the elderly and people affected by complex and protracted humanitarian crises, extreme violence and climate-related and other disasters. To ensure that the people in greatest need

Building resilience to climate change - Shocks and stressors have substantial negative effects on people's state of well-being, assets, livelihoods, safety and ability to withstand future shocks. In response, WFP aims to improve resilience by enhancing the capacities of households and communities to better absorb and adapt to idiosyncratic or covariate shocks. To ensure the sustainability of resilience outcomes, WFP and partners also aim at transforming food systems and other systems by strengthening the capacities of stakeholders to improve the enabling environment.

- At the community level, through its integrated resilience-building programmes, WFP will help prevent predictable food crises is by building people's ability to prepare for and withstand shocks and stressors. Climate change adaptation interventions will integrate trainings to support individuals and households to adapt livelihood strategies and diversify their income to withstand shocks and meet essential needs. Resilience capacities will be further strengthened by access to early warning and climate information systems, as well as pre-positioned financing that can be released ahead of impending climate impacts.
- At the systems level, WFP will support governments in developing innovative financial instruments for enhancing resilience, deepening financial inclusion, and promoting food security and improved nutrition at the household, community, national,

[13] *WFP Strategic Plan 2017-2021*

and regional levels. WFP has rich experience in bulk procurement in markets for food products and food system services in the southern African region. This provides us with extensive knowledge about conditions, opportunities and challenges in markets for various financial products and services, including credit, insurance and foreign exchange. Over time, WFP has gained deep experience through its broad cash-based transfer portfolio.

A region with low adaptive capacity - Adaptive Capacity is "the ability of a system to adjust to climate change, including climate variability and extremes, to moderate potential damages, to take advantage of opportunities, or to cope with the consequences.[14] " Adaptive capacity is a function of wealth, technology, education, information, skills, infrastructure, access to resources (including irrigation), stability and management capabilities[15] . Factors important in shaping the adaptive capacity of individuals, households and communities include access to and availability of natural, human, social, physical and financial resources (including rural credit and market access).

The region's vulnerability to climate change and climate variability is aggravated by low adaptive capacities, high dependency on rainfed agriculture and, within that, on staples like maize. Southern Africa's population is growing exponentially. It increased from 318.9 million in 2015 to 327.2 million in 2016 (2.6% annual growth). Two-thirds of the population are below the age of 35, and women makeup at least half of the rural workforce. Southern Africa's major economic sectors are vulnerable to current climate sensitivity, with substantial economic impacts. Existing developmental challenges such as poverty, governance; limited access to capital, including markets, infrastructure and technology; ecosystem degradation; and complex disasters and conflicts exacerbate the situation. All these challenges together have contributed to the region's weak adaptive capacity, increasing the continent's vulnerability to projected climate change.

Climate Change as a threat multiplier

Climate change is a threat multiplier, especially for the poor and most vulnerable sections of society. It can exacerbate existing vulnerabilities such as poverty, hunger, poor health and hamper progress toward the Sustainable Development Goals set for 2030. A recent report from the World Bank indicates that climatic change will drive between 68 million and 135 million people into poverty by 2030.[16] Urban and rural populations in Southern Africa are exposed to climate risk. A vast majority of the rural poor do not have the means and conditions to adapt. As climate change threatens to undo more than fifty years of development work in the region, the development stakeholders must expand their programs and partnerships to respond by helping vulnerable households and communities build resilience-by identifying risks, adapting livelihoods, planning for emergencies, and working together.

Food Systems and Climate Change

A food system includes "all the elements (environment, people, inputs, processes, infrastructure, institutions, etc.) and activities that relate to the pre-production, production, processing, distribution, preparation, and consumption of food and the outputs of these activities, including socio-economic and environmental outcomes"[17]. Food systems incorporate the inputs needed and outputs generated at each of these steps. Food systems operate within and are influenced by socio-cultural, economic, political, and environmental contexts. Furthermore, a sustainable food system delivers food and nutrition security for all so that the economic, social, and environmental bases to generate food security and nutrition for future generations are not compromised. Food systems require human resources (productive and technical labor) along the entire food production process, and human resources for research, education, management, and regulation [18].

[14]Working, I.P.O.C.C., 2001. Climate Change 2001: Synthesis Report: Third Assessment Report of the Intergovernmental Panel on Climate Change. Cambridge University Press.
[15]McCarthy et al., 2001." Climate change 2001: impacts, adaptation, and vulnerability: contribution of Working Group II to the third assessment report of the Intergovernmental Panel on Climate Change (Vol. 2)."
[16]World Bank, 2020. Poverty and Shared Prosperity 2020: Reversals of Fortune. The World Bank.
[17]Losses, H.F., 2014. Waste in the Context of Sustainable Food Systems. A Report by the High Level Panel of Experts on Food Security and Nutrition of the Committee on World Food Security, pp.1-6.
[18]Ericksen 2007; Cornell University 2013." Conceptualizing Food Systems for Global Environmental Change Research. Environmental Change Institute."

The primary indicator of success for any food system is providing a population with an abundant supply of affordable, safe, high quality and nutritious food all the time and which allows a sustainable functioning of the ecosystems it is based in. Perhaps the principal concern for food systems under climate change is their reduced capacity to assure food security to poor populations vulnerable to hunger and malnutrition. Food systems in the region present the clearest view of the current realities of climate change. This is evidenced in countries, such as Madagascar, where recent crop failures and resulting famine-like conditions represent a snapshot of regional futures. These events are not simply the result of climate change and changing weather conditions but

emissions are related to this system and the decisions that take place in how we produce and consume a limited amount of commodities. In Sub Saharan Africa, approximately 0.4 gigatonnes CO2 equivalent are related to the production and consumption of livestock.[19]

Within Southern Africa, the conversion of forest land for agricultural use is the key driver of deforestation. Deforestation and land degradation through agricultural activities interact with food security and nutrition in many ways, directly impacting the extent of forest available to harvest of fruit and other forest- and tree-based diets. In particular, deforestation and forest degradation affect biodiversity and the variety of food available through habitat loss and

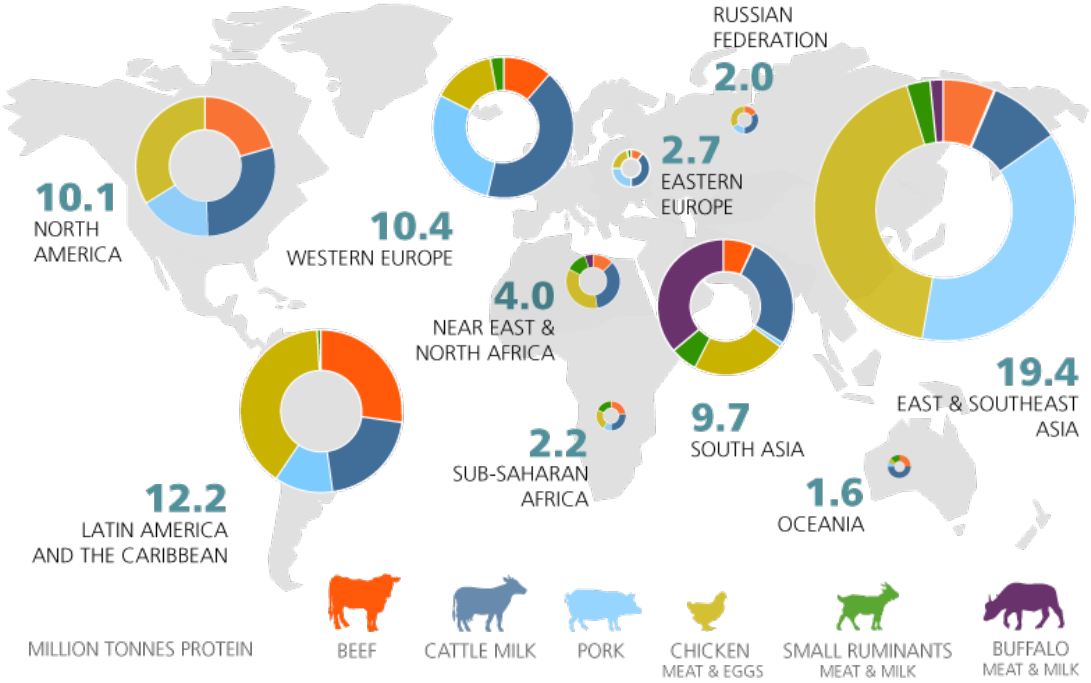


Figure 11: *Regional total livestock production and their profile by commodity (Source: FAO GLEAM).*

the complex interaction of political, economic and social processes requiring more than simple linear problem-solving approaches to food systems and food and nutrition security. A sustainable food system approached require a system thinking approach.

The interaction between food systems and the climate is complex and reinforcing. Firstly, food systems are a major driver of climate change through emissions related to the production, processing's, distribution and consumption of food. About a third of GHG

forest transformation affecting regional climates and vulnerability to climate-induced disasters.

Increasing demand for food, population growth and shifting dietary preferences have caused intense pressure to expand agricultural land. The conversion of forestland for the production of commercial commodities such as beef, soy, palm oil, cocoa, coffee and subsistence food crops make up an estimated 73% of deforestation in tropical countries.

[19] *FAO GLEAM 2.0 - Assessment of greenhouse gas emissions and mitigation potential*

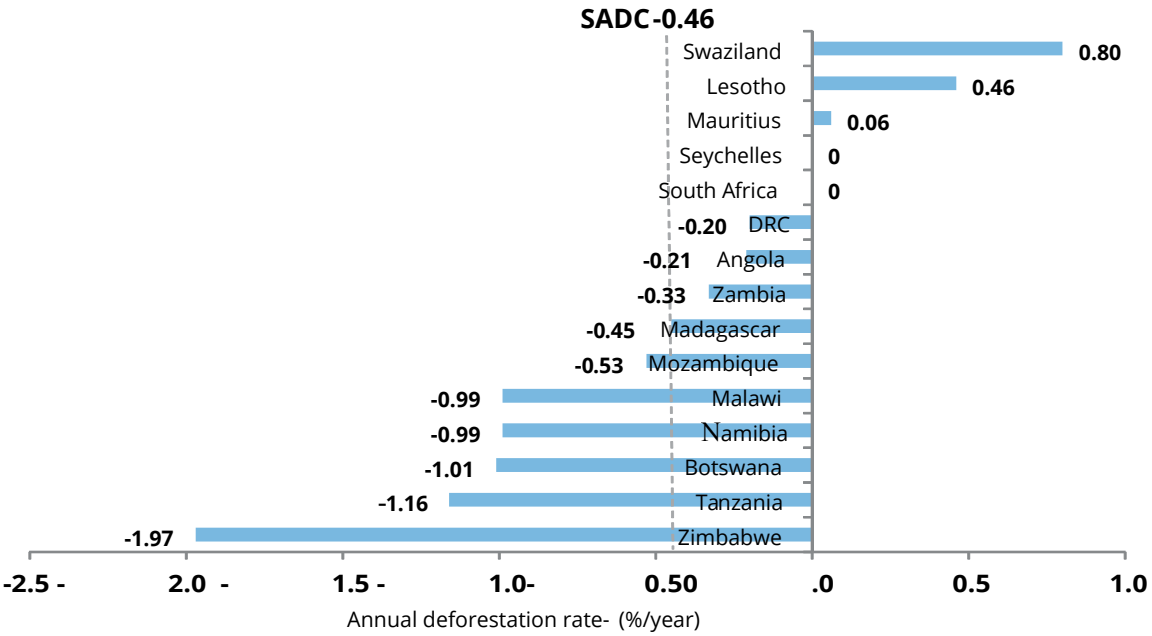


Figure 12: *Annual deforestation rate in the SADC region 2005-2010 (Source: FAO 2010)*

This is a vicious cycle as forests provide essential ecosystem services that can ensure agricultural productivity and contribute to climate change resilience of production SSA accounts for 26 % of the global total annual cost of land degradation. However, the region's land area and population respectively account for only 18 and 13 % of the global land area and population. In most of the SSA, land degradation potentially undermines efforts towards sustainable agricultural production and poses a major threat to the future of sustainable food systems within the region.

Restoring and preserving natural resources through its asset creation programmes – through its integrated risk management programmes which combine activities that reduce farmers' vulnerability to shocks, such as the restoration of degraded soils and the establishment of water conservation infrastructure, with energy access initiatives, WFP will continue to support households and communities restore or create natural and physical assets, including soil and water conservation structures, water storage and irrigation infrastructure (e.g. micro-dams, ponds, channels or micro-irrigation) that enhance the supply of water during dry spells or erratic rainfall, as well as storage, transportation and marketing assets (e.g. warehouses, silos, access roads and marketplaces) that reduce post-harvest loss and enhance opportunities for marketing produce.

Food consumption choices are also driving the production and processing of a limited number of high-value crops leading to ill health and a rising obesity trend in the region. Maize, rice, wheat, and soybean—currently produce nearly two-thirds of global agricultural calories. Food systems interaction with the climate means that yields in these crops, which form a key part of calorie inputs within the region, are expected to decline over time. Yields in these top four crops are increasing at 1.6%, 1.0%, 0.9%, and 1.3% per year, which is less than the 2.4% per year rate required to double global production by 2050. At these rates, global production in these crops would increase by 67%, 42%, 38%, and 55%, respectively, which is far below what is needed to meet projected demands in 2050[20].

As demand for food has grown, the food system has responded by producing as much of this food as cheaply and conveniently as possible. This has led to intensive and unsustainable farming methods and increasing pressure to produce more with the limited resources available. These unsustainable agricultural activities give rise to increased vulnerability to climate and weather-related shocks.

Food systems in the region are composed of local production and food imports. Sub-Saharan Africa's top agricultural imports are consumer-oriented products, namely prepared foods, dairy, poultry, wine/beer, and

[20] *Deepak K. Ray et al. 2013 "Yield Trends Are Insufficient to Double Global Crop Production by 2050"*

vegetables. As the region's population grows and gets richer, the demand for food, especially high-value crops and livestock products, will continue to grow. Wealthier urban populations consume more animal-based and processed products which call for more industrialised and lengthy food supply chains. Even with food produced locally, external market factors and global trade decisions impact the methods used for its production, the investments made in certain food commodities and the prices charged. Market price impacts globally on staple products can have very localised price impacts. E.g., Indian pigeon pea demand and import bans and the impact on prices in Mozambique.

As climate change increases the risk of extreme events within the region and the regions food systems become more resource heavy and co-dependant through global connections and unsustainable production patterns, the potential for reinforcing risks and impact within the food system increased. Increasing pressure on the food system and interaction with other sectors such as global trade, water and energy makes the system more fragile and vulnerable to shocks. Shifting biomes and reduced suitability of maize, as well as agro-pastoral areas, could affect approximately 44 million rural people, 35% of the current cultivated area, and risk 18 billion USD in production value per year by 2050. Limited access to adaptive technology, volatile markets, and little to no access to social protection means that smallholder farmers are vulnerable.

Food losses and waste is yet another inefficiency in the food system. Roughly one-third of the edible parts of food produced for human consumption gets lost or wasted globally, which is about 1.3 billion tons per year. Food is wasted throughout the food supply chain, from initial agricultural production down to final household consumption. In medium- and high-income countries, food is to a great extent wasted, meaning that it is thrown away even if it is still suitable for human consumption. Significant food loss and waste do, however, also occur early in the food supply chain. In low-income countries, food is mainly lost during the early and middle stages of the food supply chain; much less food is wasted at the consumer level.

Solutions that focus only on agriculture or sustainable agriculture practices risk a limited focus on one sector and may cause us to miss the complex feedback loops and environmental trade-offs that are made. This might lead to inappropriate solutions or even to missed opportunities for sustainable development within our food systems. The conceptualization of food systems has important implications for how wide to cast the net when trying to determine the vulnerability of those food systems to stresses such as climate change. A better way of conceptualizing vulnerability to climate change as a form of global environmental change is to look at food systems as a coupled social-ecological system, thereby integrating factors across the multiple facets of the food system. A food systems approach is also useful as it provides the space for recognizing the multiple drivers that play a role in bringing about a situation of food security or insecurity in any given place at any given time, and also analysis of the interactions and feedbacks operating between these factors.

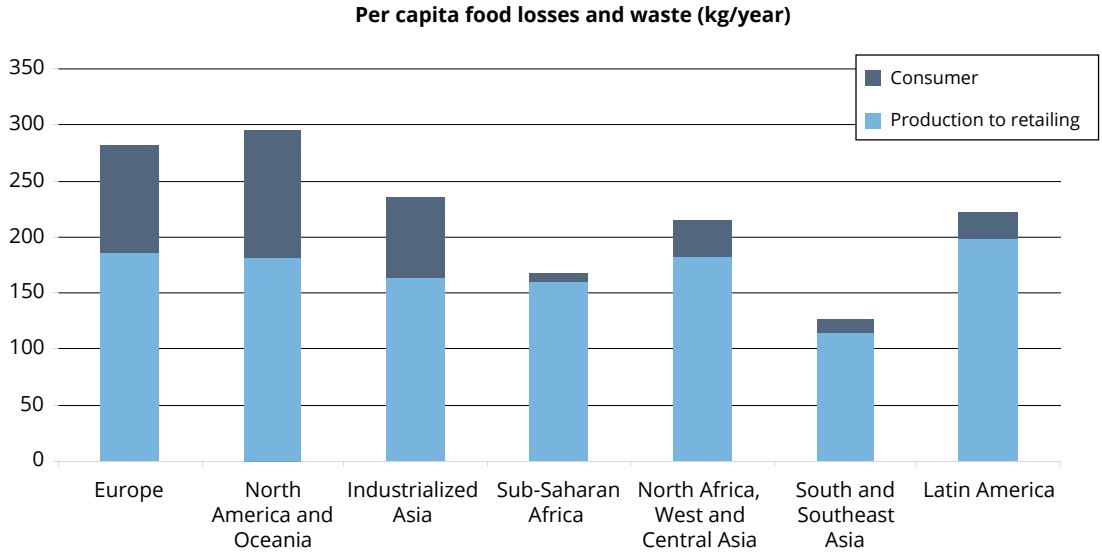


Figure 13: *Per capita food losses and waste, at consumption and pre-consumptions stages, in different regions (Source: FAO. 2011. Global food losses and food waste – Extent, causes and prevention. Rome)*

FAO. 2011. Global food losses and food waste – Extent, causes and prevention. Rome

Climate change is the fundamental driver of change in the world's water resources. This places water at the epicentre of the climate change impact, which has been characterised by extremely devastating events in the form of floods and droughts leading to food insecurity, poor health conditions, loss of dependable shelter and even loss of life.

Some of the countries in the region, with an intensity of freshwater use above 20%, are already recognised as highly water-stressed [22]. Apart from South Africa, the region also relies on hydropower as the main energy source, increasing competition for the scarce water resources with domestic, agricultural and industrial uses. Climate change induced water scarcity only exacerbates the situation. Indeed, research shows that water, energy and food are among the main sectors most affected by climate variability and change in the region[23]. This is because the sectors are inextricably linked as demonstrated through the Food-Energy-Water Nexus studies and scarcity in one sector directly impacts the others. For this reason, water scarcity during drought can lead to a reduction in hydroelectric generation, and irrigation capacity[24].

Energy can play a key role as an enabler to sustainability in the food systems as it is required virtually across the entire value chain[25]. However, the energy access statistics in the Southern Africa region present a gloomy situation on the ground insinuating the tremendous amount of effort required to address the energy gap. For example, access to electricity in the region stands at 48%, but this is highly skewed towards the urban areas with 75% access compared to only 32% in the rural areas[26]. Bearing in mind the high potential of productive uses of electricity in the rural areas for irrigation water pumping, food processing activities like milling or grinding, and preservation activities like pasteurisation, cooling and drying, access to electricity in the rural areas must be prioritised to improve the food systems.

Access to clean cooking services in the region is even worse with only 23% of the entire population in the region having access to clean cooking services as of 2018[27]. This means the majority of the population is dependent on traditional solid biomass fuels used in inefficient cookstoves. This dependence negatively impacts the health of women and children, who are mostly tasked with cooking, through indoor air pollution, leading to forest and land degradation and contributing to carbon emission and consequently climate change.

Country	Population with access to electricity in 2018			Population with access to clean cooking in 2018 (%)
	Total (%)	Urban (%)	Rural (%)	Total (%)
Angola	41	69	16	39
Botswana	61	78	37	57
DRC	17	78	71	5
Eswatini	66	83	61	50
Lesotho	34	66	16	37
Madagascar	23	67	17	2
Malawi	11	42	4	3
Mauritius	100	100	100	98
Mozambique	24	65	5	5
Namibia	56	77	29	45
Seychelles	100	100	100	98
South Africa	86	93	68	82
Tanzania	33	65	17	4
Zambia	31	67	4	13
Zimbabwe	38	86	16	71
SADC	48	75	32	23

Table 1: *Energy access rates in Southern Africa region. Source: REN21, 2018; SADC 2012*

[22] *Conway et al., 2015 "Climate and southern Africa's water–energy–food nexus. Nat. Clim. Chang."*
[23] *Mabhaudhi et al., 2018 "Developing a Framework for the Water-Energy-Food Nexus in South Africa, in: Climate Change and Water Resources in Africa."*
[24] *Scanlon et. al., 2017." The food-energy-water nexus: Transforming science for society, Water Resour."*
[25] *WFP, 2018*
[26] *REN21. 2018. Renewables 2018 Global Status Report (Paris: REN21 Secretariat).*
[27] *Ibid*

Due to their low carbon footprint, renewable energies are expected to play a key role in increasing access to electricity in the SADC countries. The region has committed to achieving 53% renewable energy capacity by 2040[28]. Moreover, the region targets that at least 70% of the rural population have access to modern energy sources, dominated mainly by renewable sources.

Building Sustainable Food Systems - Poverty and hunger continue to exist even when there is peace, stability and the ability to invest and even in countries with good overall macro-economic indicators. This "structural" nature of poverty is often related to inadequate social protection policies and systems to reach all the people in need and ensure access to food. In southern Africa, the effects of climate change, ecosystem degradation and population growth will amplify the challenges faced for populations in this context. WFP will actively participate in and contribute to country-level and regional dialogues related to food systems and SDG2, including key areas of policy and programmatic linkage between SDG2 and other goals, such as education, poverty alleviation, climate change, peace and justice, health or gender. W FP will continue to raise resources to support communities through investments and long-term partnerships and strengthen the capacity of governments and local stakeholders to prevent and reduce the impact of climate shocks and stressors.

WFP has two reasons to engage in strengthening food systems. Smallholder farmers and their families account for a significant proportion of the most food-insecure and a large segment of WFP's beneficiaries. Additionally, WFP can use its considerable purchasing power and experience to increase smallholder farmers' access to markets, both directly and by mainstreaming learning and best practices across the organisation. Together with the RBAs (Rome-based agencies - FAO, IFAD), WFP will continue these efforts to raise awareness and catalyse policy reform and institutional innovation and capacity development to address hunger from the demand-side of food systems. WFP's demand for food and food system services can be a direct and indirect force for enhanced performance of food systems, contributing to inclusive agricultural growth, sustainable social and economic transformation and broad-based food security. Given that in many countries the bulk of food available in local markets originates from smallholder farms, WFP's procurement footprint in these markets can provide a basis for partnerships with governments and the private sector. These partnerships can catalyse demand-driven platforms that enable smallholders to have sustainable and profitable engagement with local markets beyond WFP.

WFP will continue to collaborate with RBAs on joint strategies, implementation and advocacy, including in areas related to supporting countries' efforts in sustainable food production, where WFP relies on the core strengths of FAO, IFAD and others. WFP will also work in partnership with UN agencies, regional and continental bodies like SADC and the AU, amongst others, to support national programmes and services. Other major partners include international and national civil society entities. Food systems are changing rapidly and profoundly due to such forces as urbanization, changing consumer diets, and supply chain integration due to capital-intensive technology change and expanded use of digital devices and internet access. Food system transformation is embedded in broader transformations of rural areas and wider economies, including urban areas. In both humanitarian and development contexts, WFP will work in synergy with partners to design and implement food assistance activities that address systemic problems rooted in these transforming food systems, aiming to expand the scope for hunger reduction in broader structural and rural transformation processes.

WFP will continue to scale up its support to de-risk food systems in the region. This will be done by focusing on enhancing capacity for effective risk management and preparedness at multiple levels of aggregation. Examples of such efforts include WFP's support to the African Union's Africa Risk Capacity (ARC) mutual insurance initiative that aims to improve current responses to climate-related food security emergencies by providing member countries with rapid funds in the event of natural disasters, and the R4 Rural Resilience Initiative (R4) comprehensive risk management approach that helps communities be more resilient to climate variability and shocks through a combination of four risk management strategies: improved resource management through asset creation, insurance, livelihoods diversification and microcredit, and savings.

[28] *Ibid*

Food Systems, Nutrition and Climate Change

Climate Change is predicted to increase the number of undernourished children under 5 years by an additional 2.4 million in Sub-Saharan Africa by 2050.[29] Modelling conducted by Lloyd, et al., calculated that by 2050, moderate stunting will increase by up to 29% globally, while severe stunting could increase by 23% in Sub-Saharan Africa due to climate change.[30] Climate change exacerbates malnutrition through food availability, quality, access, stability and utilisation, environmental health and access to health services and child feeding and care practice (Figure 14).

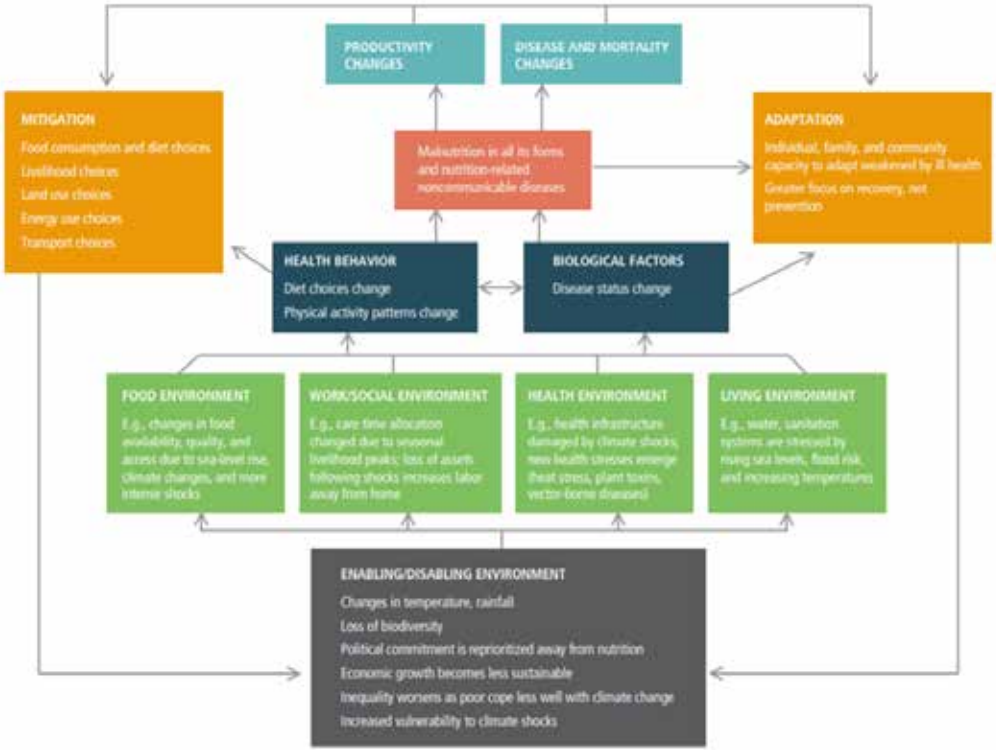


Figure 14: *Conceptual links between climate change and nutrition (Source: Thomson, Madeleine; Fanzo, Jessica. 2015. Climate change and nutrition.)*

Food price increases due to climate change induced low production (price predicted to increase by 5 – 25% [31]) results in households being less able to afford diverse nutritious diets. The cost of beef is set to increase by an additional 26% due to climate change by 2050. According to the WFP Fill the Nutrient Gap (FNG) Analysis, over 50% of households in DRC, Lesotho, Mozambique, Tanzania and Zambia cannot afford a nutritious diet, with this increasing to over 80% in certain districts[32]. 7 to 20% of the households could not even afford an energy only diet. Further price increases will burden these already vulnerable households and might compel them to adopt extreme coping strategies like reduced meals or lower quality.

Increased carbon dioxide levels lead to the reduced nutritional quality of food, with the iron, zinc and protein content in maize, wheat, rice, peas and soy decreasing by up to 3-17%[33]. This results from a change in the soil's moisture and pH level, which in turn affects the plant's ability to absorb the nutrients from the soil. Ongoing deforestation in some countries, like Mozambique, is likely to leave the land bare. Runoff and excess leaching is likely to occur during the rainy season, making the soil poor on essential micronutrients leading to low nutrient content of the plants that might grow in the future. This might reduce the nutritional value of foods consumed in the future. This is a concern as diets in the region are mainly cereal-based and there is already a high burden of micronutrient deficiencies. The prevalence of anaemia in women of reproductive age in four of the countries in the region (Angola, DRC, ROC and Mozambique) is

[29] *IFPRI. 2017. Global food policy report. Extended results of the IMPACT model.*
[30] *Lloyd, S.J., Kovats, R.S. & Chalabi, Z. 2011. Climate Change, Crop Yields, and Undernutrition: Development of a Model to Quantify the Impact of Climate Scenarios on Child Undernutrition. Child Health.*
[31] *Nelson, et.al. 2009. Climate Change. Impact on Agriculture and Costs of Adaptation. f*
[32] *WFP. Fill the Nutrient Gap Analysis.*
[33] *Myers, S.S., et al., 2014. Increasing CO2 threatens human nutrition. Nature. https://www.nature.com/articles/nature13179*

classified as severe (>40%). In comparison, anaemia in children 6-59 months is classified as severe in all (except Zimbabwe -38%) countries in the region (42% in Eswatini – 68% in Mozambique). Food safety is also of increasing concern as warmer temperatures provide more favourable environments for pathogens such as salmonella and campylobacter, which result in those affected having reduced ability to absorb nutrients.

Outcomes from the first 1000 days of a child may be further impacted by climate change as pregnant women, exposed to high temperatures in regions with low rainfall, are at increased risk of giving birth to low-birth-weight babies. This would hamper countries achieving the World Health Assembly (WHA) nutrition target to reduce low birthweight by 30% by 2025. Babies born with a lower birth weight (less than 2 500g) are at a greater risk of dying during their first month of life, and those who survive have a higher risk of stunting[34] , lower IQ[35] , and chronic conditions such as obesity and diabetes in adulthood[36].

As natural disasters such as flooding and cyclones increase in frequency and severity in the region, access and delivery of health care services are decreased as roads and transport systems are affected. Poor water quality and availability due to climate change result in substandard sanitation practices, increasing the risk of diarrhoea and contributes to malnutrition. Affects may be compounded by poor access to health care services. Unless adaptive capacities of households (especially women) are enhanced, climate change will undo numerous gains made in reducing malnutrition in Southern Africa and exacerbate the intergenerational cycle of malnutrition. Life cycle approaches are required to mitigate the short-term shocks and long-term burdens resulting from climate change[37].

Regarding human health, climate change is predicted to alter the prevalence and distribution of numerous diseases, both vector-borne (e.g. malaria, as colder places get warmer) and water-borne illnesses. This will further exacerbate existing issues of poverty, food security and nutrition.

Southern Africa Development Community (SADC) is still the epicentre of the HIV epidemic, accounting for 38% of new infections globally in 2017.[38] According to SADC RVAA 2018, Southern Africa is the most heavily afflicted region for HIV and AIDS globally. Nine countries - Botswana, Lesotho, Malawi, Mozambique, Namibia, South Africa, Swaziland, Zambia, and Zimbabwe - have adult HIV prevalence rates of over 10%. At an estimated 27.4%, Swaziland has the highest HIV prevalence rate globally, followed by Lesotho (25%) and Botswana (24.8%). Food availability and proper nutrition are essential for keeping people living with HIV healthy for longer. Lack of food security, poor diet and malnutrition can aggravate the effects of HIV and accelerate AIDS-related illnesses in people living with HIV. Inadequate nutrition in women may increase the risk of HIV transmission to their children. Studies in Lesotho have shown that drought conditions are significantly linked with risker sex behaviours and higher prevalence of HIV rates among rural girls and women aged 15-19.[39] In addition to this, inequality in society means that gender-based violence and transactional sex also increase with increased food insecurity[40 41].

Nutrition sensitive programming in the face of climate change impact - Climate change will have far-reaching consequences for nutrition in the region and is, therefore, a cross-cutting theme in the region's nutrition strategy. Programming is shifting to focus on more of an anticipatory action and preventive strategy instead of only focusing on crisis response. Nutrition-sensitive programming forms a key component of this and is an integral part of all efforts to reduce malnutrition in the region. It takes place in sectors complementary to nutrition, such as agriculture, education and social protection, and are designed to address some of the underlying and basic determinants of malnutrition. Activities such as the promotion of biofortified crops; climate-proofing storage facilities; identifying alternative or more effective fuel/energy sources; water harvesting; and shifting from monotonously cultivating staples to inclusion of high nutrient value drought-resistant crops are promoted.

Analysis done in the region is also conducted with

[34]Christian P, et al. Black RE. Risk of childhood undernutrition related to small-for-gestational age and preterm birth in low- and middle-income countries. International Journal of Epidemiology 2013;42:1340–55.
[35]Gu H, et al. A gradient relationship between low birth weight and IQ: A meta-analysis. Sci Rep. 2017;7(1):18035. Published 2017 Dec 21. doi:10.1038/s41598-017-18234-9
[36]Jornayvaz FR, et al., Low birth weight leads to obesity, diabetes and increased leptin levels in adults: the CoLaus study. Cardiovasc Diabetol. 2016; 15: 73
[37]Thomson, M. and Fanzo, J., 2015. Climate change and nutrition. IFPRI book chapters, pp.74-84.
[38]Genderlinks
[39]Low AJ, Frederix K, McCracken S, et al. Association between severe drought and HIV prevention and care behaviors in Lesotho: A population-based survey 2016–2017.
[40]McCoy SI, Ralph LJ, Njau PF, Msolla MM, Padian NS. (2014) Food insecurity, socioeconomic status, and HIV-related risk behavior among women in farming households in Tanzania. AIDS and Behavior
[41]Shannon K, Kerr T, Milloy MJ, et al. (2011) Severe food insecurity is associated with elevated unprotected sex among HIV-seropositive injection drug users independent of HAART use. AIDS.

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a climate-sensitive lens contributing to effective programming and knowledge sharing. For example, in Lesotho[42], the FNG found that less than 1% of cropland is irrigated, relying solely on rainfall for watering. Improving access to irrigation through the construction of dams or smaller scale, rainwater harvesting could result in more frequent harvesting, which translates into more availability of fresh nutritious foods. With irrigation for a diversified household food garden, the household cost of a nutritious diet could be cut by 10%. As much as climate change exacerbates malnutrition, dietary choices can, in turn, contribute to greenhouse gas emissions, contributing to climate change. Social and behaviour change communication (SBCC) is a key approach for nutrition-specific and nutrition-sensitive programmes, to promote uptake of positive nutritional practices and behaviours by creating demand and subsequently contributing to improved nutritional outcomes. In addition to being a key tool to address the gender norms that shape behaviours and power disparities that can lead to substantial health and nutrition outcomes of the different individuals, SBCC is also a key component in creating a demand for locally produced, climate-sensitive, affordable nutritious foods and promoting the uptake of climate-sensitive activities, such as using gunny bags/ vertical bags farming using recycled water by smallholder farmers or kitchen gardens using domestic compost to produce nutritious foods. In several countries, including Angola, Lesotho, Madagascar, Mozambique, Tanzania and Zambia, WFP has also positioned itself as a leader on SBCC through supporting national governments in developing national SBCC strategies or being in the frontline of advocating for multi-sectoral integration of SBCC.

As cereal-based diets are prevalent in the region and diverse meals are unaffordable or available, improving the nutritional quality of staple cereals through fortification is an effective way of improving the nutritional status of populations. WFP will continue to advocate for and support governments in national fortification strategies and procure fortified staples and oil for food distributions.

Gender and Climate Change

Women and girls are the most affected during climatic shocks. Throughout the region, the impact of climate change on women and girls is intrinsically linked to intersecting discriminations and violations of their human rights and dignity. They are more likely than men to be already living in poverty; they have higher levels of mortality and morbidity in situations of disaster; they lack access to land despite dominating food production, producing 60 to 80% of the food in most developing countries; they may lack appropriate access to disaster information, financial services, participation in community decision-making and resource allocation, and rights that govern property and mobility; and they carry the weight of caring for their families. The climate crisis is also eroding women and girl's basic right to safety and protection. It exacerbates problematic, toxic, and dangerous gender norms that generate increased threats of violence for women and girls, including risks of sexual exploitation, transactional sex to access food and other basic necessities, forced and early marriages, and forced pregnancies.

Figure 15: *Gender, food security and climate change (Source: Adapted from IPCC AR5)*

[42]*WFP. 2019. Lesotho Fill the Nutrient Gap Analysis. https://docs.wfp.org/api/documents/WFP-0000107436/download/*

In addition, droughts and desertification can mean that women (and girls) must travel further each day searching for water and firewood (or other fuel), increasing their workload and exposing them to risks of violence. Limited, or no, access to fuel for cooking, in turn, creates challenges for preparing meals and thus the ability of women, men, girls and boys to consume adequate food.

Such impacts and responses reinforce oppressive and restrictive gender roles, limiting opportunities, choices and experiences for women, men, girls and boys. Women continue to be assigned primary responsibility for unpaid care and domestic work and have even less time to, for example, develop livelihood skills or participate in a farmer organisation than before the effects of climate change were felt. For girls forced to marry, their mobility is controlled; their education can end prematurely; their physical health can be endangered, and their ability to access information about the climate-induced changes affecting their households and communities in which they live is limited. The discriminatory norms and practices that contribute to these inequalities between women and men generally may also limit women's, relative to men's, 'adaptive capacity': the ability to identify and implement effective actions in response to changing circumstances. It is also possible that, because women and men are not equally present in public spaces and formal decision-making bodies, women's 'adaptive capacities' are not seen and scaled-up.

that women and men participate equally in and benefit equally from agricultural tools, resources, assets, markets and rural economies to better sustain and improve their livelihoods, while preserving the natural resource base and adapting to climate change through participatory, gender-transformative and location-specific adaptation and livelihoods activities. Women's and men's knowledge about climate, natural environments and adaptation should be valued and used equally. Gender lens should always be present in decisions about who – individuals and organisations – receives funding and support to generate climate change adaptation knowledge, technology and techniques; and who the knowledge, technology and techniques benefit (or do not benefit). Women-led organisations, gender-committed organisations, grassroots, and feminist groups should be consulted and actively involved in the climate-related programmes design, implementation, monitoring, reporting, and evaluation, and should be supported to shape policies, legislation and programmes, including those on climate change and food security.

WFP ensures that its programmes address the specific vulnerabilities, needs, capabilities and priorities of the diverse women, men, girls and boys in each community, and be sensitive to the needs of specific groups, including, among others, people with disabilities, youth and indigenous people. To mitigate risks and address the structural vulnerabilities that resulted in women and girls in a more subordinate and

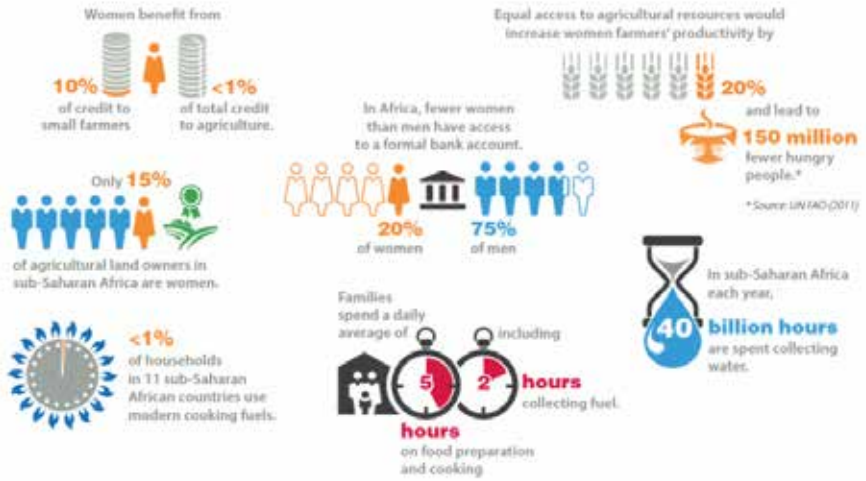

Figure 16: *Summary of climate change and gender inequalities in Africa (Source: AFDB)*

Integrating Gender in climate programming - For WFP, addressing gender inequalities in food systems means strengthening women and men's resilience and investing in their different adaptive capacities to respond to shock. To respond to the gendered impacts of the climate crisis and shocks, WFP ensures

vulnerable position than men and boys, WFP ensures active involvement of men and boys as agents of change and as leaders of the transformative actions. This is done through understanding of boys' and men's multiple roles in climate change by conducting gender and age analysis that looks at the diverse and nuanced ways in which men and boys also impact and

are impacted by climate change, including as heads of households, leaders of institutions and organisations that are the drivers of climate change, as energy consumers, as victims of environmental degradation, as migrants in search of water, energy, and livelihoods opportunities, and as agents of change alongside women and girls.

Through asset creation, digital inclusion, enhancing climate risk management, microinsurance schemes, early warning and climate services, access to savings and credit to improve livelihoods of women and men smallholder farmers, and facilitating access to financial information, education and training, WFP will keep its efforts to eliminate and address gender inequalities and gender-based discrimination for climate change interventions to be effective, equitable and sustainable.

Social Protection and Climate Change

The 2030 Agenda for Sustainable Development sets out to promote efforts by national governments to build the resilience and adaptive capacity of the poor and those in vulnerable situations and the integration of climate change measures into national policies, strategies and planning. It also points toward creating social protection systems that allow all people to enjoy basic standards of living. Climate shocks will increase needs and push more people into poverty and hunger, and thus social protection systems will have to cope with increased demand for services.

Climate change exacerbates temporary and permanent migration drivers, such as food insecurity, income shocks or deteriorating livelihood opportunities. Social protection can be an effective instrument to address these threats. However, benefits are not generated automatically. Programmes must be designed and implemented in a way that explicitly address climate risks.

According to the Southern African Development Community (SADC), poverty remains one of the greatest challenges in the SADC region, with approximately half of the population living on less than $1 a day. The agriculture sector is of major social and economic importance in the SADC region, contributing in the different Member States between 4% and 27% of GDP and approximately 13% of overall export earnings. Climate change threatens to reverse the progress made so far in the fight against hunger and malnutrition by exacerbating poverty.

Social protection can be part of a proactive approach to managing climate-induced migration and, on the other hand, it can reduce distress migration and erosive coping strategies. In particular, public employment opportunities can create assets that enhance livelihood opportunities and explicitly address the impacts of climate change in both rural and urban areas and in places of origin and destination.

Not all aspects of livelihood insecurity can and have to be addressed by a single approach. It does not

Angola (2018)	**51.8 %**
DRC (2012)	**77.2 %**
ROC (2011)	**38.2 %**
eSwaitini (2016)	**29.2 %**
Lesotho (2017)	**27.8 %**
Malawi (2016)	**70.8%**
Mozambique (2014)	**63.7 %**
Madagascar (2012)	**77.4 %**
Namibia (2015)	**13.8 %**
Tanzania (2017)	**49.4 %**
Zambia (2015)	**58.7 %**
Zimbabwe (2017)	**33.9 %**

Table 2: *Population below USD 1.90 a day (Source: World Bank, Development Research Group*

https://www.sadc.int/themes/poverty-eradication-policy-dialogue/

offer a solution for maintaining indigenous culture often strongly affected or even disrupted by climate change. Social protection programmes serve as critical temporary safety nets and provide fast start-up support depending on the design and effective implementation for different climate-induced migration outcomes. Social protection provides an effective generic approach to deal with varying forms of migration.

Social protection, climate change adaptation and disaster risk reduction (DRR) all share the same motivating principle of mitigating risks, reducing vulnerability, and building resilience to livelihood shocks.[44] This overlap lends itself to integrated policies and programmes that address both social and environmental factors with a long-term, preventative approach. This is known as 'adaptive social protection'. While some use the terms 'adaptive social protection' and 'shock-responsive social protection' interchangeably, adaptive was first used[45] to transforming productive livelihoods to adapt 'to changing climate conditions rather than simply reinforcing coping mechanisms.

Social protection offsets losses from climate change effects and adverse impacts of pro-climate policies on people. Social Protection safeguards populations against the impacts of economic and environmental vulnerabilities and shocks. The ILO recommends integrating social protection into responses to environmental impacts and challenges of the transition for those likely to be negatively affected, particularly employees, including using employment guarantee schemes and public works.[46] The need to promote social protection mechanisms that contribute to offsetting the impacts of climate change.

Given the uncertainty around climate change, social protection represents a key form of low regrets investment, which balances supporting poverty alleviation and simultaneously addressing vulnerability to climate change. The rationale of this vision is that social protection should improve or support households' adaptation to climate change. This entails:

1. Recognising climate change uncertainty.
2. Prioritising food security and nutrition considerations.
3. Supporting households' long-term adaptation strategies.
4. Avoiding maladaptation.
5. Understanding trade-offs.
6. Defining resilience objectives.
7. Improving the environment.
8. Adjusting programmes to context.
9. Acknowledging even small contributions.
10. Working across disciplines.[47]

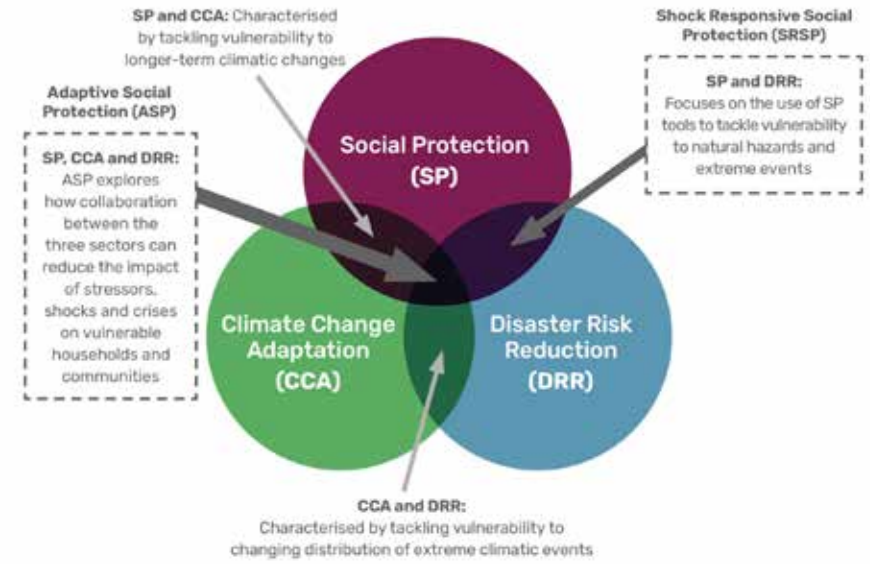

Figure 17: *Thematic positioning of social protection (Source: Cornelius et al. 2018)*

[44]Vincent & Cull, 2012. "Adaptive Social Protection."
[45]Davies et al. (2009: 9). "Climate change adaptation, disaster risk reduction and social protection. Promoting pro-poor growth: Social protection, 201, p.217."
[46]Schwarzer, H., Van Panhuys, C. and Diekmann, K., 2016. Protecting people and the environment: lessons learnt from Brazil's Bolsa Verde, China, Costa Rica, Ecuador, Mexico, South Africa and 56 other experiences. International Labour Organization.
[47]Solórzano, A. and Cárdenes, I. 2019. "Social protection and climate change: WFP Regional Bureau for Latin America and the Caribbean's vision to advance climate change adaptation through social protection".

As well as helping to protect against current shocks, 'social protection can support more effective resilience building at scale by integrating early action and preparedness'[48]. For example, public works programmes may contribute to adaptation and DRR by constructing community assets that enhance resilience through better natural resource management and adaptation. Adaptive social protection could be used to target those whose livelihoods and status are vulnerable to climate change, reducing their dependence on climate-sensitive livelihoods strategies and helping build household resilience to climate risks[49].

and employment guarantee schemes) that can be used to support households that are particularly vulnerable to both the ongoing and acute impacts of climate changes. While some of the programmatic aspects of this are not new, they have to be brought to the forefront of the discussions, including insurance systems (promoting) adaptive behaviour, Public works, Education and training that supports livelihood diversification.[52]

WFP in southern Africa will strive to link projects like Forecast-based Financing (currently in Lesotho, Zimbabwe, Mozambique, and Madagascar) with

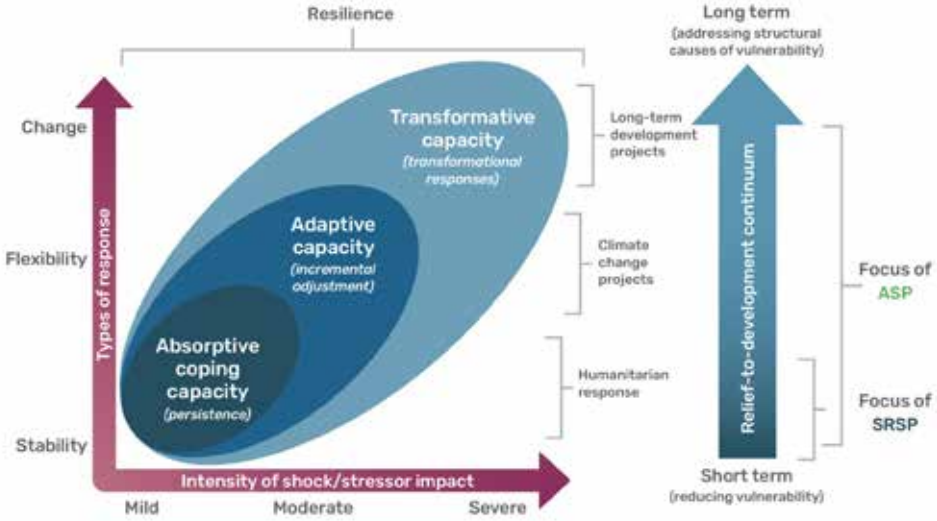

Figure 18: *Adaptive Social Protection and Shock Responsive Social Protection in the context of resilience and the development continuum (Source: Cornelius et al 2018[50])*

Making social protection climate-sensitive - A wide range of WFP **social protection-related** programmatic activities can include a climate-lens and stimulate climate sensitive food systems, spanning all four spheres of Social Protection (Provision/Preventive/ Promotive and Transformative). These include **social transfers** that increase the resilience of households to shocks; **school feeding programmes** and **public works/asset creation programmes** that focus on environmental conservation and rehabilitation, improving soil and water management, and disaster-proofing physical infrastructure[51].

In the face of increasing shocks in the region, social protection offers a wide range of instruments (e.g. cash transfers, insurance products, pension schemes

national social protection systems. These projects have the potential to not only help smooth climate-related shocks, preserve development gains, but also can help the vulnerable rural communities manage climate shocks in a timely manner.

In anticipation of shocks (e.g. natural hazards, conflict, economic shocks), WFP will coordinate with partners to trigger internal, national and system-wide preparedness actions to preempt and mitigate impacts while enabling a timely and effective humanitarian response. This will include connecting the social protection system with predictable finance to become more self-sustaining over time. As a complement to these activities, Social Behavioural Change and Communication interventions (SBCC) will be linked to

[48]Costella et al., 2017: 31. Scalable and sustainable: How to build anticipatory capacity into social protection systems.
[49]Davies et al., 2009. "Climate change adaptation, disaster risk reduction and social protection. Promoting pro-poor growth: Social protection, 201, p.217."
[50]Béné, C., Cornelius, A. and Howland, F., 2018. "Bridging humanitarian responses and long-term development through transformative changes—some initial reflections from the World Bank's adaptive social protection program in the Sahel." Sustainability, 10(6), p.1697.
[51]Solórzano, A. and Cárdenes, I. 2019. "Social protection and climate change: WFP Regional Bureau for Latin America and the Caribbean's vision to advance climate change adaptation through social protection".
[52]Béné, C., et al. (2014), "Social Protection and Climate Change", OECD Development Co-operation Working Papers, No. 16.

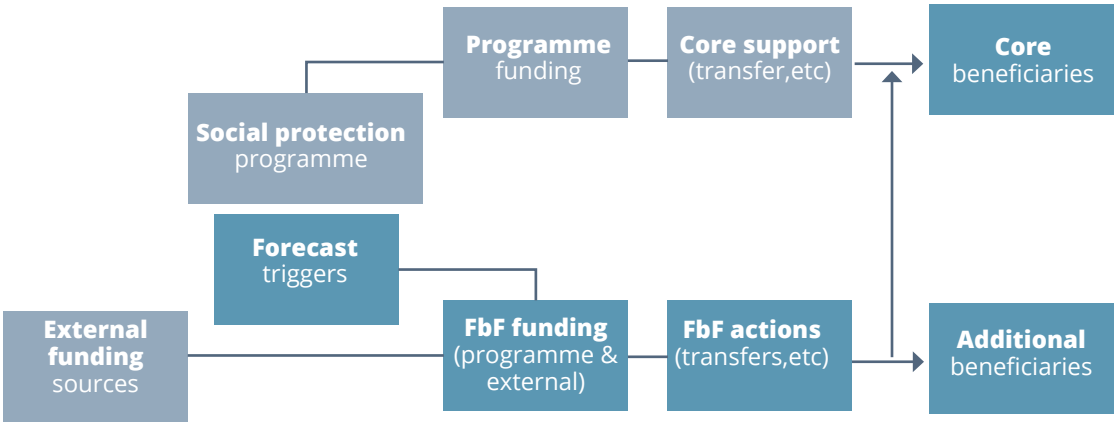

Figure 19: *FbF mechanism integrated into a social protection structure or programme (Source: Costella et al. 2017)*[53]

social protection programmes to support behavioural change towards adaptation and consider the different enabling factors and barriers to climate change adaptation. These actions aim at addressing some of the values, preferences and social norms that influence behaviour, including maladaptation.

WFP will engage in providing technical assistance and policy support and facilitate dialogue among different institutions and partners to support more climate-adaptive social protection programmes. For example, public-works programmes can enhance the adaptive capacity of households by creating assets that could increase resilience to future shocks, either by enabling livelihood diversification and adaptation or by better protection from the shock itself. WFP in the region will ensure that social protection systems are inclusive, shock-responsive and nutrition-sensitive; they meet the differentiated nutritional needs of targeted populations; are equipped to expand their targeting and benefits; and enable governments to transfer cash to their citizens.

Human migration and Climate Change

As described in previous sections, climate change negatively impacts the food security of populations through shocks and stressors. However, when these shocks are recurrent, they can exacerbate existing political and socio-economic pressures. Outmigration of populations is a last resort after the failure of multiple coping mechanisms, including stopping education, reducing food intake, distress sale of productive assets etc. According to a recent report, despite COVID-19 lockdowns in 2020, southern Africa saw climate-induced displacement for almost half a million people.[54]

Global warming and climate change in the SADC region already contributes to inside-country migration. With more crop failure associated with the recurrence of droughts, more and more people, especially the subsistence farmers, abandon their land and migrate into towns and cities to seek alternative income-generating opportunities. Climate change is expected to exacerbate the environmentally induced migration patterns.[55]

A model suggests that climate migrants, or refugees, have to leave their areas of origin immediately or in the near future because of sudden or gradual impacts of climate change. This migration may be temporary or permanent, depending on several factors, including the affected community's adaptive capacity and persistence of the environmental insult.[56] Climate change is projected to increase human migration in the coming decades due to a combination of factors, including rising sea levels, extreme weather events, conflicts over depleting natural resources, and food insecurity.[57] The strongest impacts of climate change on human migration will be seen in sub-Saharan Africa, which is projected to see 86 million climate change migrants by 2050 due to decreased crop productivity and water shortages.[58]

[53]Costella, C., et al. (2017), "Scalable and sustainable: How to build anticipatory capacity into social protection systems."
[54]IDMC and NRC: Internal Displacement in a changing climate. IDMC Global report on Internal Displacement 2021
[55]SADC Policy Paper on Climate change: Assessing policy options for SADC Member States
[56]Biermann F, Boas I. Preparing for a warmer world: Towards a global governance system to protect climate refugees. Global Environ Politics. 2010;10(1):60–88.
[57]Warner K, Hamza M, Oliver-Smith A, Renaud F, Julca A. Climate change, environmental degradation and migration. Nat Hazards. 2010;55(3):689–715.
[58]Rigaud KK, Jones B, Bergmann J, et al. Groundswell: Preparing for Internal Climate Migration. Washington, DC: World Bank; 2018.

Responding to climate-induced disasters and humanitarian crises - WFP as a humanitarian actor has increasingly strengthened its intervention to limit and intervene when natural hazards trigger conflicts, migration and movements of populations. WFP's long experience in humanitarian and development contexts has established strengths for the organisation in supporting building resilience for food security and nutrition. WFP will support national efforts in disaster risk reduction and climate resilience that facilitate the achievement of zero hunger, using innovative tools from climate science and finance to link early warning systems with anticipatory action and early response mechanisms, and implementing programmes that create productive assets, promote the production of nutritionally diverse foods, diversify livelihood strategies and rehabilitate natural resources.
At the regional level (SADC), the main identified gaps in Emergency Preparedness involve logistics capacities, (i.e., moving beyond delivering to enabling) and strengthening the movement of humanitarian commodities during emergencies. A coordinated mechanism to work with the different national stakeholders is being established. The action pursued in fostering Urban Preparedness will also allow for the creation, or the harmonisation, of such mechanisms. The MoU between SADC and WFP identifies - among the Core Areas of Cooperation and Partnership - the "Harmonisation and Standardisation of Policies, Strategies and Programs" and the "Enhancement of Disaster Risk Management". The second area includes the enhancement of EPR Capacities of member countries. WFP will ensure the involvement of all active stakeholders in Countries, ensuring that process will be inclusive and anchored in NDMAs structures. With the involvement of the SADC, the harmonisation outcomes are expected to bring out participatory and inclusive process anchored and validated at a higher institutional level.

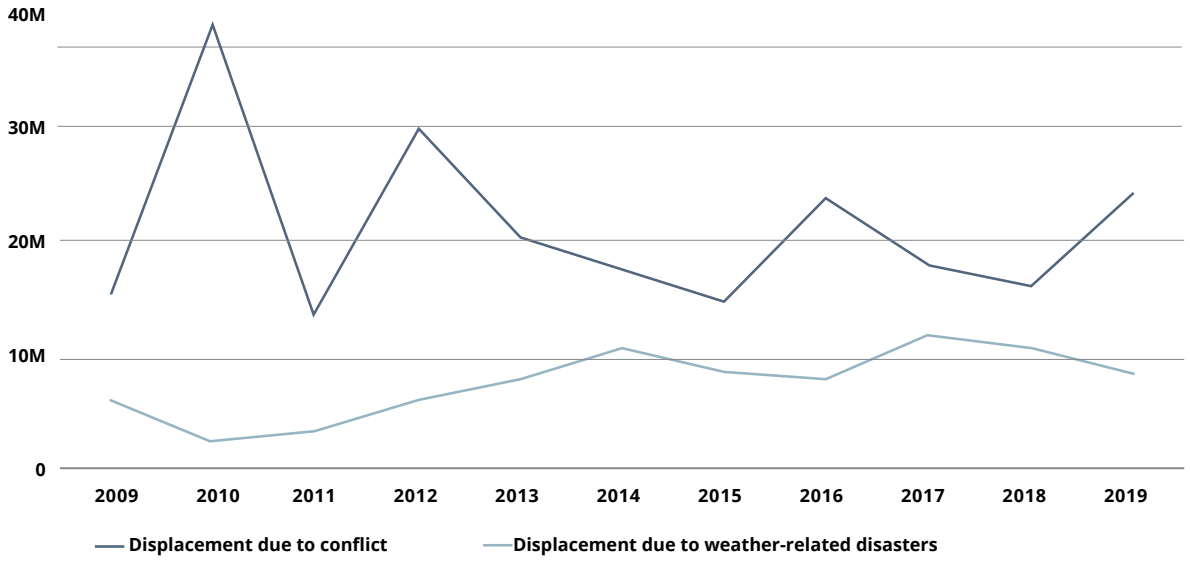

Figure 20: *New displacements (global) due to conflict and weather-related disasters, 2008-2019 (Source: UNHCR, IDMC)*

Sendai Framework for Disaster Risk Reduction 2015–2030

In March 2015, the Third World Conference on Disaster Risk Reduction in Sendai, Japan, adopted the Sendai Framework for Disaster Risk Reduction 2015–2030. The framework recognizes the importance of addressing food insecurity and undernutrition to reduce vulnerability and build resilience. It emphasizes the importance of anticipating long-term risks and taking action to prevent new and reduce existing disaster risk. It highlights the contribution of climate change to increasing the risks to food systems posed by higher temperatures, drought, flooding and irregular rainfall. WFP incorporates disaster risk reduction and management into its broader resilience-building efforts and supports all four of the priorities agreed upon at Sendai:

1. ***understanding, communicating and using disaster risk information;***
2. ***strengthening governance and institutions to manage disaster risk;***
3. ***investing in disaster risk reduction for resilience and sustainable development; and***
4. ***enhancing disaster preparedness for effective response and to "build back better" in recovery, rehabilitation and reconstruction.***

Regional Leaders spoke during the online climate change symposium organized by WFP Regional Bureau in Southern Africa on May 25, 2021:

Successful climate strategies must therefore simultaneously pursue both mitigation of greenhouse gas emissions and adaptation to the impact of climate change that we will undoubtedly the face. Mitigation and adaptation policies must go hand in hand and if best be properly coordinated."- ***H.E. Martin Schäfer, German Ambassador to South Africa (Eswatini, Lesotho, South Africa)***

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