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INSTITUTE



CLIMATE GOVERNANCE  
IN FOUR SOUTHERN  
AFRICAN COUNTRIES:  
**A FOOD  
SYSTEMS  
PERSPECTIVE**

# EXECUTIVE SUMMARY

The Intergovernmental Panel on Climate Change (IPCC) has identified sub-Saharan Africa as a climate change ‘hotspot’ that is particularly vulnerable to climate change effects, such as extreme weather events, shifting rainfall patterns and rising temperatures. This has obvious implications for food production as farmers will battle to maintain yields in uncertain and changing conditions. The links between climate change and food systems are evident, but the degree to which they are being linked by governments in policies to address climate change is not.

The Southern African Faith Communities’ Environment Institute (SAFCEI) undertook research in four African countries (South Africa, Tanzania, Zambia and Zimbabwe) to understand the extent and nature of linkages in governance of climate change and food systems. The research aimed to determine whether current structures would support efforts to create a just food system. A just food system is defined here as a sustainable agroecological approach able to produce a range of nutritious foods that are accessible and affordable to even the most vulnerable, one that empowers women, one that farms animals ethically, and one that restores the health and diversity of life on Earth.

## Key Findings

- Across all four countries, the effects of climate change on farming systems are already being felt. Yields are already dropping in Africa, and are expected to significantly drop as water becomes scarcer and temperatures rise. Any further downward loss in calorific availability of food in Africa (either through lack of availability or affordability) is estimated to result in an additional 11 million children becoming malnourished in coming decades.<sup>xvi</sup>
- There is a predominant approach to agriculture focused on the agrochemical industrial model rather than a just food system and a more sustainable agroecological approach.
- Governance is siloed in all four countries, with low levels of integration in terms of planning and implementation. Zimbabwe is the only country that has adopted a more holistic approach, but struggles with implementation.
- All countries have policies related to food systems and climate change, but implementation is lacking in Zambia and Zimbabwe, there are no integrated policies in Tanzania, and South Africa lacks accountability mechanisms and often makes trade-offs for other priorities.
- There are capacity gaps at the government level and a lack of access to relevant and easy to understand information on linkages between climate change and food systems.
- There is a lack of financial resources in all the countries to enable cross-sectoral planning, communication and collaboration. Often there are clashing mandates and budget priorities between departments.
- All four countries do not tailor programmes and projects according to community needs, and do not use the critical experience gained by civil society in designing and implementing programmes.

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## ABOUT THIS REPORT

The Southern African Faith Communities' Environment Institute (SAFCEI) commissioned four country-level research into food system and climate change governance. Research was undertaken in South Africa, Tanzania, Zambia and Zimbabwe to better understand how governments are approaching the interlinked challenges of climate change and food and nutrition security. This research was complemented with a review of South Africa's (draft) Climate Change Bill and food system. This report provides a synthesis of the findings of the country-level research, including gaps in governance, common challenges, and opportunities within these systems that could be leveraged to bring about a just and sustainable food system, based on agroecological principles.

## LIST OF ACRONYMS

<b>FAO</b>	Food and Agriculture Organization
<b>GHG</b>	Greenhouse gases
<b>IPCC</b>	Intergovernmental Panel on Climate Change
<b>SAFCEI</b>	Southern African Faith Communities' Environment Institute



# INTRODUCTION

Food systems do not operate in isolation from economic, social and natural systems. Economic systems often dictate access to food (cost and supply), social systems shape how we use and value food, and natural systems determine the quantity and quality of food. The United Nation's Food and Agriculture Organization (FAO) defines a food system as encompassing:<sup>i</sup>

*... ecosystems and all activities required for the production, processing, transportation and consumption of food, including inputs needed and outputs generated by each of these activities. Within this system, value chains are composed of the full range of farms, enterprises and their value-adding activities, which produce agricultural raw materials and transform them into food products sold to final consumers and disposed of after use.*

Food systems no longer operate at purely local or even regional levels, but are affected by global politics and economics, the proliferation of Westernised food culture, and by climate change. Climate change will make it difficult for farmers, particularly smallholder farmers in Africa, to grow food.



Scientists predict that the average global temperature is likely to rise by 3–4°C over the next century<sup>ii</sup> – and faster in Africa than in many other places in the world. This increase is being driven by our excessive use of fossil fuels, which emit greenhouse gases; destructive land-use activities; and the industrial agricultural model. Rainfall patterns are already shifting, there are more frequent and intense droughts and floods, and new pests and diseases are emerging or shifting habitats. This means that farmers will be producing in increasingly uncertain conditions.

It is estimated that maize yields on the continent will fall by as much as 30% in coming decades due to climate change.<sup>iii</sup> And this drop in calorific availability will take place in a context of hunger, inequality and poverty, particularly on the African continent. There is therefore an urgent need for a just food system.

**SAFCEI views a just food system as one able to produce a range of nutritious foods that are accessible and affordable to even the most vulnerable, one that farms animals ethically, one that empowers women, and one that restores the health and diversity of life on Earth.**

Understanding how governance of food and climate change issues intersect – to either support or act against each other – is key to developing resilient communities. The Stockholm Resilience Center describes resilience as:<sup>iv</sup>

*... the capacity of a system, be it an individual, a forest, a city or an economy, to deal with change and continue to develop. It is about the capacity to use shocks and disturbances like a financial crisis or climate change to spur renewal and innovative thinking. Its thinking embraces learning, diversity and above all the belief that humans and nature are strongly coupled to the point that they should be conceived as one social-ecological system.”*

# FOOD AND NUTRITION SECURITY

Diet-related diseases, hunger and malnutrition are growing, due to the inability of the current food system to deliver nutritious food that is affordable and accessible to even the most vulnerable. The high levels of food insecurity in Southern Africa countries are highly concerning.

**Food security is when all people at all times have physical and economic access to sufficient, safe, and nutritious food to meet their dietary needs and food preferences for an active and healthy life.<sup>v</sup>**

The definition extends beyond availability of food (which is reliant on agricultural productivity) to also encompass access (determined by ability to buy food), supply (shaped by market conditions), and use and retention, which are associated with the safety and nutritional quality of food and water.<sup>vi</sup>

Food insecurity is more severe in most African sub-regions than in other regions and countries,<sup>vii</sup> and COVID-19 related economic lockdowns have pushed even more people into hunger. People are food insecure for a range of reasons – there might not be enough food available where they live, they cannot afford to buy food even when it is available or the food that they can afford and that is available is not nutritious or appropriate. Regardless of the reasons for food insecurity, what is increasingly evident is that the impacts of climate change will deepen and expand levels of food insecurity in Africa.<sup>viii</sup>

Climate change is already impacting and will even more severely impact the food system in coming decades. The effects of climate change – changes in rainfall patterns, more frequent and intense extreme weather events, changing pest and disease vectors – will negatively affect farmers' ability to maintain yields and produce food. Consequently, it will affect livelihoods and deepen existing poverty and inequality divides, particularly in Africa.

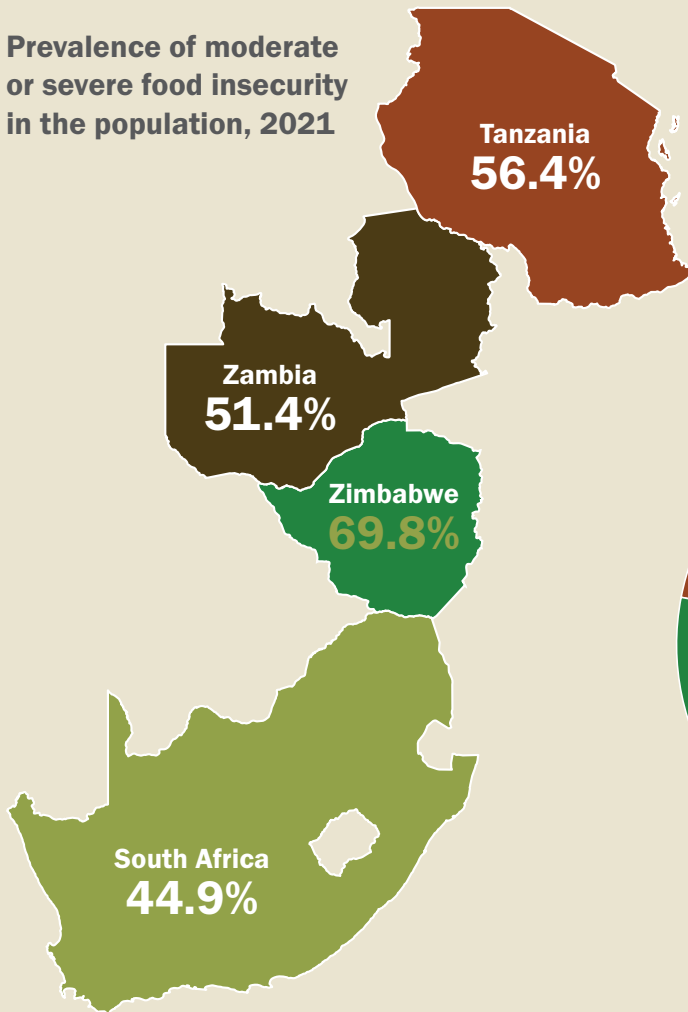


The industrial food model (based on the use of hybrid and sometimes genetically modified seed and synthetic fertilisers and pesticides) is not the solution. This model does not deliver the diversity of foods needed for a healthy life, it strips the soil of nutrients and poisons ground water and rivers. In addition, it places farmers – who operate on very tight margins already – into a dependency on agricultural inputs that are manufactured by corporate companies able to set the prices for their products. In addition, the global food system, based on an extractive agrochemical model, is driving climate change. It contributes a significant amount to global GHG through the use of agrochemicals, large-scale mechanisation, extractive land use, global distribution and packaging chains and methane emissions from industrial cattle feedlots.

The alarming levels of malnutrition in Southern Africa are testament to the lack of diversity of foods in modern diets.

## FOOD INSECURITY<sup>ix</sup>

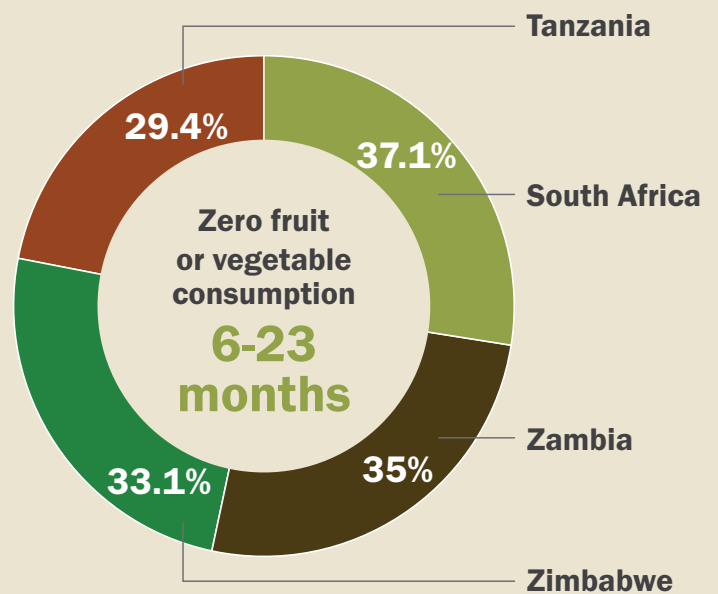
Prevalence of moderate or severe food insecurity in the population, 2021



## DIETARY DIVERSITY<sup>xi</sup>

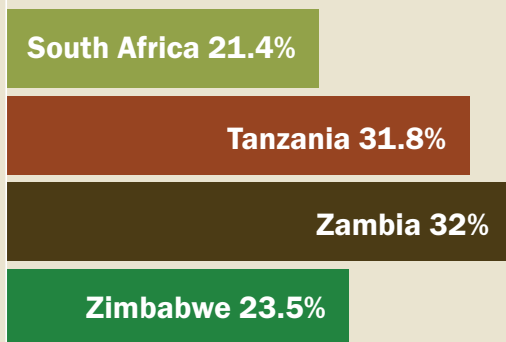


1 in 5 children in SADC region do not eat enough fruit and vegetables, 2021



## STUNTING<sup>x</sup>

About 19 million children stunted in SADC region/1 in three children, 2021



## KEY FINDINGS:

All four countries have high levels of food insecurity, despite Tanzania and South Africa being deemed food secure at the national level. It is not the availability of food in these countries that is the problem, but rather that people cannot afford to buy food.

# FARMING IN A CONTEXT OF CLIMATE CHANGE

Most farmers in Africa practice rain-fed agriculture, making them particularly vulnerable to climate change.<sup>xii</sup> The Intergovernmental Panel on Climate Change (IPCC) estimated in 2007 that agricultural productivity would likely decline from 21% to 9% by 2080 in sub-Saharan Africa.

The IPCC has identified the region as a climate change 'hotspot'<sup>xiii</sup> that is particularly responsive to global warming and at higher risk than other places in the world. Most people and communities in the region do not have the necessary safety nets to adapt to climate change.<sup>xiv</sup>

Yields are already dropping in Africa, and are expected to significantly drop as water becomes scarcer and temperatures rise. This will result in less food in the market, which will drive prices up and further impact the ability of the poor and most vulnerable to buy food. These groups will have even less access to nutritious food, thus perpetuating the cycle of poverty and malnutrition.<sup>xv</sup>

Any further downward loss in calorific availability of food in Africa (either through lack of availability or affordability) is estimated to result in an additional 11 million children becoming malnourished in coming decades.<sup>xvi</sup> It will also have negative consequences for women and children as it will influence how food is allocated within households<sup>xvii</sup> – with preference given to men.

The figure alongside indicates the expected climate change impacts in Africa. The situations in the four countries are described in more detail below.

- **South Africa** is viewed as particularly vulnerable to climate change,<sup>xviii</sup> including water scarcity, making production in already arid regions challenging.
- **Tanzania** – average annual temperatures have already grown by 1 °C and annual rainfall has decreased by an average 2.8 millimetre/month per decade since 1960.<sup>xix</sup> Identified risks include water scarcity,<sup>xx</sup> production challenges and human health risks.<sup>xxi</sup>

- **Zambia** – the frequency and intensity of floods and droughts is growing with shorter rainy seasons and lower average rainfall while average temperatures are rising at 0.6 °C a decade.<sup>xxii</sup>
- **Zimbabwe** – is likely to experience an increase in average temperature of 1-3 °C while average rainfall is decreasing.<sup>xxiii</sup> Drought cycles in the country are growing in frequency and intensity, and are affecting hydroelectric generation at the Kariba Dam between Zimbabwe and Zambia.<sup>xxiv</sup>

## KEY FINDINGS:

Across all four countries, the effects of climate change on farming systems are already being felt. More frequent and longer droughts coupled with temperature increases will devastate rainfed farming systems that are unable to afford water storage and irrigation infrastructure. The interlinkages between food production, water and climate change become evident.



# ANTICIPATED CLIMATIC IMPACTS AT +2°C:

## NORTHERN AFRICA

Temperature increase of about 2°C have been observed over the 20th century. In recent decades, temperature has increased by about 0.16°C per decade. Temperature increase by the end of the century is likely to be between 3.3°C and 6.5°C, relative to the 1961 – 1990 baseline, and higher than the global average. While there are no clear trends in precipitation, it is likely to decline by around 16 per cent by the end of the century.

## EASTERN AFRICA

Temperatures across East Africa have increased by 1.5 - 3°C in the 20th century, and models suggest that between 2050 – 2100 the number of days warmer than 2°C above the 1981 – 2000 average will rise sharply in equatorial eastern Africa. Temperature is likely to rise between 2.7°C and 5.4°C above the 1961 – 1990 baseline by 2100.

## WESTERN AFRICA

Temperatures across West Africa have risen rapidly over the last 50 years. Average annual temperature has increased by about 2°C. By 2100, temperatures could rise by between 3°C and 6.4°C relative to the 1961 – 1990 baseline, much higher than the global average.



## CENTRAL AFRICA

While observations are scarce, climate models suggest an increase of 0.6°C in the 20th century. Climate projections suggest temperature increases of up to 5°C, compared to the 1960 – 2000 baseline values.





## SOUTHERN AFRICA

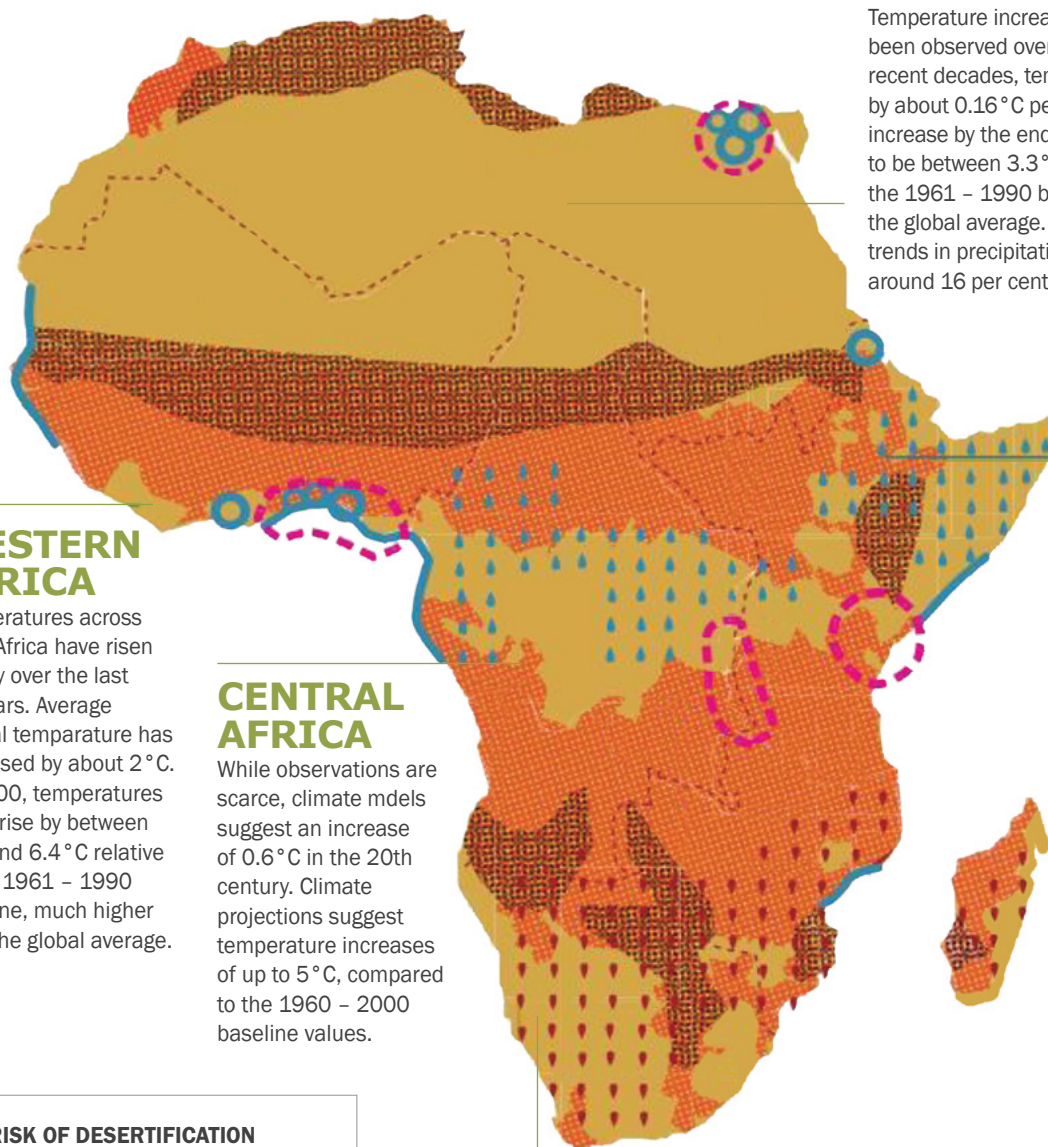
Southern Africa has experienced increases in temperatures of up to 2°C over the last century. The most rapid heating has been observed post-1980. Temperature is expected to continue to increase through the century, and is likely to be anywhere between 2.8°C to 6.3°C above the 1961-1990 baseline.

### RISK OF DESERTIFICATION

-  Currently at risk
-  By 2100

### CLIMATE CHANGE IMPACTS (OBSERVED)

-  Climate change hotspots
-  Increased precipitation
-  Reduced precipitation
-  Sea level rise concerns and affected major cities



Map based on the following sources: Ionesco D., Mokhnacheva D. and Gemenne F., Routledge, Abingdon (2017), The Atlas of Environmental Migration. IOM and Gemenne, Zoi Environment Network. p.63. Based on data from IPCC (2013, 2014) Singh, K., Venkatesh for [www.downtoearth.org.in/infographics](http://www.downtoearth.org.in/infographics). Based on data from Assessment Report 4, IPCC, and Climate Change Scenarios for the Congo Basin by Van Garderen, Ludwig F.



# INTEGRATION OF FOOD AND CLIMATE CHANGE GOVERNANCE

SAFCEI reviewed the governance of both food and climate change in the four countries to determine the level of integrated consideration of ecological and social justice issues. Key findings from this research are related to the framing of the approach to food systems, policy and strategy gaps, coordination and implementation, and budget constraints.

## **Governance structures**

While all countries have policies focused on agriculture, food security and climate change, governance is siloed with different departments bearing responsibility for implementation. There are very low levels of integration in terms of planning or implementation. Zimbabwe is the only country that has shifted to a more holistic food system approach, although implementation is lacking.

## **Framing of the approach to food systems**

A glaring issue is the predominant approach to agriculture in policy documents that promotes the agrochemical-intensive industrial model despite its limited success in raising farmer incomes, boosting productivity and maintaining ecosystem health. There are many critiques of this model. It devastates biodiversity (which will be needed for adaptation to climate change), it poisons soils and water bodies, it does not produce nutritious food, it strips farmers of control over production by making them reliant on external inputs, and it marginalises traditional farming and plant knowledge.

## **Policy and strategy gaps**

All countries have policies related to food systems and to climate change, but in Tanzania there are no cross-cutting policies that look at both issues in an integrated way and in Zambia implementation of policy is lacking. Zimbabwe has made significant strides in mainstreaming climate change into national policies and action plans, but implementation remains problematic.

## **Implementation, capacity, communication and coordination**

All of the countries reviewed struggle with implementation albeit for different reasons. South Africa lacks accountability mechanisms and trade-offs are often made for other priorities. All four countries do not tailor programmes and projects to actual community needs. There is significant under-use of civil society organisations in policy and planning decision-making circles despite these groups acting as ‘frontline’ workers on the ground. There are capacity gaps at the government level, including a lack of access to relevant and easy to understand information on linkages between climate change and food systems.

## **Budget constraints**

All four countries do not have enough financial resources allocated to capacitating departments to enable officials to plan holistically, communicate across sectors and implement collaboratively. There are also issues around clashing mandates and budgets between departments.

## **Insufficient focus on climate change mitigation**

There appears to be a lack of political will to eliminate GHG emissions from food system as a contribution to mitigation. All four countries are focused on climate-smart agriculture as a response to the interlinkages between food systems and climate change. Climate-smart agriculture describes a range of production practices and approaches that aim to grow productivity while building resilience to the impacts of climate change and reducing emissions (normally through soil sequestration). Some approaches aligned with this approach are conservation agriculture and regenerative agriculture.

Conservation agriculture works to build the carbon sequestration capacity of soil while also increasing yields. The obvious benefits are that soils can retain more water because of expanded soil cover and the soil is more fertile because of the use of nitrogen-fixing legume crops. There is also evidence that maize yields increase after three to five

seasons.<sup>xxv</sup> But conservation agriculture is linked to rapidly increasing usage of herbicides because weeds proliferate in no-tillage systems.<sup>xxvi</sup> And herbicides infiltrate water bodies harming ecological systems as well as damaging human health.

Climate-smart agriculture has become a contentious term as it does not preclude the use of agrochemicals that in many countries are causing significant ecological and human health problems and it tends to focus on yields as a measure of success, rather than also encompassing nutrition and diversity.

- **South Africa** – the government is actively promoting climate-smart agriculture indicating its belief that climate resilience can be achieved through technical solutions to produce more food, as opposed to tackling the social, political and economic drivers of food insecurity.
- **Tanzania** – the government supports the uptake of climate-smart agriculture and has a dedicated Climate Smart Agriculture Program (2015-2025) and the

Tanzania Climate Smart Agriculture Guidelines (2017), which informs implementation and upscaling of climate-smart agricultural practices and technologies.

- **Zimbabwe** – conservation agriculture is the most widely practiced climate-smart agriculture approach in the country. It is supported by the government through training and provision of free and subsidised inputs.<sup>xxvii</sup>
- **Zambia** – the government is actively promoting uptake of conservation agriculture as a climate change mitigation and adaptation approach.<sup>xxviii</sup> In Zambia, the Farm Input Support Programme has been linked to the uptake of conservation farming, which has escalated herbicide use in the country. Climate-smart agriculture has been criticised as it focuses on technical fixes for production rather than the holistic political and social changes needed to bring about a sustainable and just food system. By not acknowledging the politicised nature of the globalised food system, it allows the existing policy agendas to continue and minimises questions of power, inequality and access that dictate food justice.



## Key findings related to food and climate change governance

	South Africa	Tanzania	Zambia	Zimbabwe
Framing of agricultural policy	<ul style="list-style-type: none"> <li>Industrial farming model, with primary focus on increasing yields to improve food security</li> </ul>	<ul style="list-style-type: none"> <li>Industrial farming model, with primary focus on increasing yields to improve food security</li> </ul>	<ul style="list-style-type: none"> <li>Industrial farming model, with primary focus on increasing yields to improve food security</li> </ul>	<ul style="list-style-type: none"> <li>Shifting to a more holistic food systems model with a focus on nutrition and food security at the household/ individual level</li> </ul>
Policy & strategy gaps	<ul style="list-style-type: none"> <li>Comprehensive and collaborative set of climate change governance policies and frameworks</li> </ul>	<ul style="list-style-type: none"> <li>No stand-alone food security or climate change policies focused on cross-cutting issues</li> </ul>	<ul style="list-style-type: none"> <li>Comprehensive policies but not integrated</li> </ul>	<ul style="list-style-type: none"> <li>Coordinated structures between the Ministry of Agriculture and Ministry of Environment but misaligned mandates</li> </ul>
Implementation	<ul style="list-style-type: none"> <li>Comprehensive policies, but implementation is poor because of trade-offs for other policies and lack of accountability mechanisms</li> </ul>	<ul style="list-style-type: none"> <li>Top down with limited joint planning</li> </ul>	<ul style="list-style-type: none"> <li>Centralised governance planning and implementation does not respond to community-level needs</li> </ul>	<ul style="list-style-type: none"> <li>Comprehensive policies but poor implementation due to lack of enforcement, weak political will and poor coordination</li> </ul>
Ineffective coordination	<ul style="list-style-type: none"> <li>Disconnect between provincial and municipal levels and between more and less highly resourced municipalities – there is a lack of consideration of the broader landscape impacts of climate change governance</li> </ul>	<ul style="list-style-type: none"> <li>Disconnect between national and local government implementing structures</li> <li>Limited regular sectoral communication</li> <li>Competing sectoral objectives</li> <li>Lack of technical capacity</li> </ul>	<ul style="list-style-type: none"> <li>Centralised planning does not support collaborative action at all levels of government</li> </ul>	<ul style="list-style-type: none"> <li>Weak coordination and cross-sectoral cooperation between national government, local authorities, United Nations agencies and development partners, civil society organisations and communities</li> </ul>
Information gaps		<ul style="list-style-type: none"> <li>Lack of easily available, accessible, credible and timely information related to both sectors</li> <li>Low base of knowledge and skills related to climate change adaptation and mitigation in government</li> </ul>	<ul style="list-style-type: none"> <li>Communities do not have access to adequate information or tools to respond to hazards</li> </ul>	
Financial challenges	<ul style="list-style-type: none"> <li>Department of Environment, Forestry and Fisheries has limited resources, including financial</li> </ul>	<ul style="list-style-type: none"> <li>Limited financial resources</li> <li>Sector-based budgeting restricts collaboration</li> </ul>	<ul style="list-style-type: none"> <li>Inadequate resources are allocated in the national budget to community strategies to respond to climate change</li> </ul>	<ul style="list-style-type: none"> <li>Inadequate funding to fully implement programmes or support effective coordination between key government stakeholders</li> </ul>
Inclusion of civil society and smaller actor voices in policy development	<ul style="list-style-type: none"> <li>Unlike climate change governance, food system governance has not engaged with key stakeholders across the sector, and smaller players have not had a voice in policy development</li> </ul>	<ul style="list-style-type: none"> <li>Despite significant contributions on the ground, civil society is inadequately included in policy decision making circles</li> </ul>	<ul style="list-style-type: none"> <li>The climate change Technical Committee includes representative stakeholder organisations, including civil society and farmer organisations</li> </ul>	<ul style="list-style-type: none"> <li>Limited participation by non-state actors in government decision-making structures.</li> <li>Representation of non-state actors working on climate change issues is not well defined at national or provincial levels</li> </ul>

# A JUST, RESILIENT, SUSTAINABLE FOOD SYSTEM

None of the countries have the governance frameworks needed to build resilience to climate change, let alone to support the emergence of a just and sustainable food system. Agricultural systems that work with and not against nature, that build resilience to climate change, and that are socially just are needed at this time. Agroecology provides for such a system.

Olivier de Schutte, the United Nations Special Rapporteur on the Right to Food in 2012, noted that it was not sufficient to increase food production to meet needs, but that agricultural frameworks must also focus on growing the incomes of smallholders and of poor consumers – and that it must do this without “undermining biodiversity and the natural resource base”.<sup>xxix</sup> His report highlights agroecology as a suitable response in this regard.

An agroecological system would have “high levels of diversity, productivity and efficiency”.<sup>xxx</sup> Agroecological principles extend beyond production to encompass issues of ecological justice (for example, maintaining and enhancing on-farm and wild biodiversity) and social justice (fair prices for farmers and consumers, boosting rural livelihoods and ensuring social wellbeing). The FAO used a multi-stakeholder process to identify 10 core elements of agroecology that can be implemented at different scales and in different contexts.<sup>xxxi</sup>

## ELEMENTS OF AGROECOLOGY

- |   |   |
|---|---|
|  <p><b>Efficiency - using innovative practices to produce more, using less external resources</b></p>                                  |  <p><b>Human and social value - improving rural livelihoods and social wellbeing</b></p>   |
|  <p><b>Diversity - supporting diversification for food and nutrition security while protecting and enhancing natural resources</b></p> |  <p><b>Builds resilience of communities and ecosystems</b></p>   |
|  <p><b>Co-creation of knowledge to create relevant and context-specific appropriate responses to local challenges</b></p>              |  <p><b>Recycling of inputs and resources that lowers costs and generates ecological benefits</b></p>   |
|  <p><b>Synergies that enhance key functions across food systems</b></p>  |  <p><b>Circular economies that connect producers and consumers to provide innovative solutions to living within planetary boundaries</b></p> |
|  <p><b>Culture and food traditions - supports health, diverse and culturally appropriate diets</b></p>                                 |  <p><b>Land and natural resource governance that is responsible and effective at all levels</b></p>  |



# OPPORTUNITIES

There are several opportunities available to address the challenges mentioned above that would better support the transition to a just and sustainable food system.

## Opportunities to strengthen food and climate change governance frameworks



**Review and align existing policies**



**Provide appropriate funding**



**Plug information gaps**



**Promote regional exchanges**



**Use civil society voices**



**Host multi-stakeholder engagements**

# WHAT CAN YOU DO?

It is critical that the world focuses on building resilience at the urban and rural levels; the national and community levels; at all scales and in different contexts. This requires a different way of thinking about how we produce, distribute, market and consume food. As an initial step we must act urgently to reduce the significant GHG emissions produced through the global food system.



**Buy your food locally**



**Buy food produced agroecologically or organically**



**Ask government to eliminate pesticides from farming systems**



**Demand that large GHG emitters are held accountable**



**Support the call for policies that support smallholder farmers**



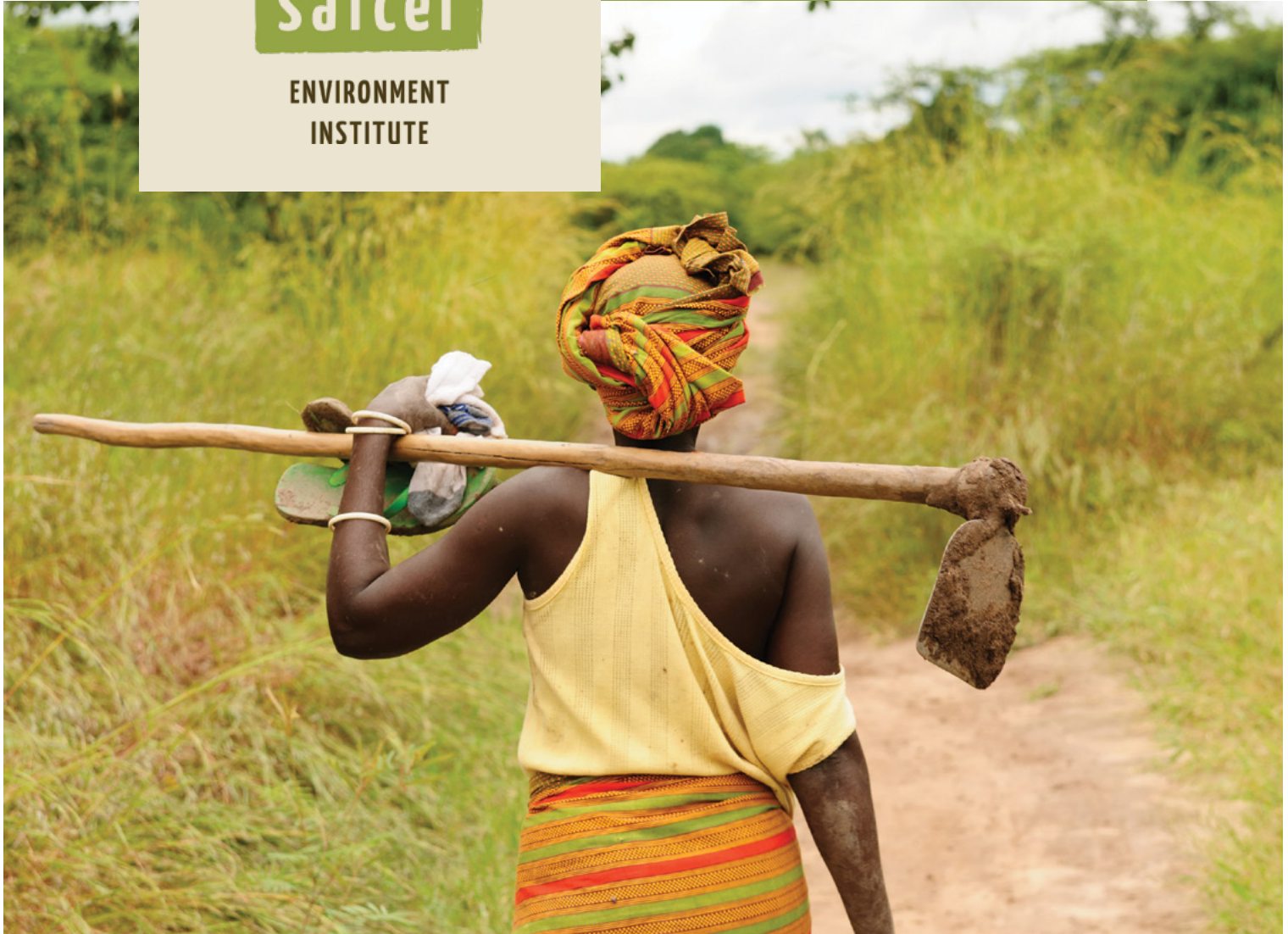
**Call for support for indigenous seeds and products**

- ii Food and Agriculture Organization. 2018. Transforming food and agriculture to achieve the SDGs. [Online] Available: <http://www.fao.org/3/CA1647EN/ca1647en.pdf>.
- ii Zewdie, A. 2014. Impacts of climate change on food security: a literature review in sub-Saharan Africa. *Journal of Earth Sciences Climate Change* 5(8):225.
- iii Pereira, L. 2017. Climate change impacts on agriculture across Africa. *Oxford Research Encyclopedia of Environmental Science*. New York: Oxford University Press.
- iv Stockholm Resilience Center. 2015. What is resilience? [Online] Available: <https://www.stockholmresilience.org/research/research-news/2015-02-19-what-is-resilience.html>. P1.
- v Food and Agriculture Organization. 2008. Climate Change and Food Security: A Framework Document. Rome: Food and Agriculture Organization.
- vi Food and Agriculture Organization. 2008. Climate Change and Food Security: A Framework Document. Rome: Food and Agriculture Organization.
- vii Food and Agriculture Organization & International Fund for Agricultural Development. 2018. The state of food security and nutrition in the world: Building climate resilience for food security and nutrition. [Online] <http://www.fao.org/3/i9553en/i9553en.pdf>.
- viii Food and Agriculture Organization. 2008. Climate Change and Food Security: A Framework Document. Rome: Food and Agriculture Organization.
- ix <https://www.fao.org/3/cb4474en/cb4474en.pdf>
- x [https://reliefweb.int/sites/reliefweb.int/files/resources/Synthesis-Report-2021\\_English.pdf](https://reliefweb.int/sites/reliefweb.int/files/resources/Synthesis-Report-2021_English.pdf)
- xi [https://reliefweb.int/sites/reliefweb.int/files/resources/Synthesis-Report-2021\\_English.pdf](https://reliefweb.int/sites/reliefweb.int/files/resources/Synthesis-Report-2021_English.pdf)
- xii Food and Agriculture Organization & International Fund for Agricultural Development. 2018. The state of food security and nutrition in the world: Building climate resilience for food security and nutrition. [Online] <http://www.fao.org/3/i9553en/i9553en.pdf>.
- xiii Ngcobo, N. 2018. Intergovernmental panel says southern Africa a climate change hotspot. <https://ewn.co.za/2019/01/21/intergovernmental-panel-says-southern-africa-a-climate-change-hotspot>.
- xiv Wlokas, H. L. 2018. The impacts of climate change on food security and health in southern Africa. *Journal of Energy in Southern Africa* 19(4).
- xv Wlokas, H. L. 2018. The impacts of climate change on food security and health in southern Africa. *Journal of Energy in Southern Africa* 19(4).
- xvi Zewdie, A. 2014. Impacts of climate change on food security: a literature review in sub-Saharan Africa. *Journal of Earth Sciences Climate Change* 5(8):225.
- xvii Zewdie, A. 2014. Impacts of climate change on food security: a literature review in sub-Saharan Africa. *Journal of Earth Sciences Climate Change* 5(8):225.
- xviii Niang, I., Ruppel, O.C., Abdrabo, M.A., Essel, A., Lennard, C., Padgham, J. & Urquhart, P. 2014. Africa. In: *Climate change 2014: impacts, adaptation and vulnerability. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*. Cambridge: Cambridge University Press.
- xix United Republic of Tanzania. 2014. Tanzania Agriculture Climate Resilience Plan, 2014–2019. Dar-es-salaam, Tanzania: Ministry of Agriculture & Food Security.
- xx Malley, Z., Taeb, M., Matsumoto, T. & Takeya, H. 2008. Linking perceived land and water resources degradation, scarcity and livelihood conflicts in southwestern Tanzania: implications for sustainable rural livelihood. *Environment Development and Sustainability* 10(3):349-372.
- xxi Malley, et al., 2009. United Republic of Tanzania. 2012. National climate change strategy. Dar es Salaam: Vice President's Office, Division of Environment; United Republic of Tanzania, 2017).
- xxii Zambia-United Nations Sustainable Development Partnership Framework (2016-2021. Partnership framework. [Online] Available: [http://www.zm.one.un.org/sites/default/files/final\\_zambia-united\\_nations\\_sustainable\\_development\\_partnership\\_framework.pdf](http://www.zm.one.un.org/sites/default/files/final_zambia-united_nations_sustainable_development_partnership_framework.pdf).
- xxiii Brazier, A. 2015. Climate change in Zimbabwe: facts for planners and decision makers. [Online] Available: [https://www.kas.de/c/document\\_library/get\\_file?uuid=6dfce726-fdd1-4f7b-72e7-e6c1ca9c9a95&groupId=252038](https://www.kas.de/c/document_library/get_file?uuid=6dfce726-fdd1-4f7b-72e7-e6c1ca9c9a95&groupId=252038).
- xxiv Intergovernmental Panel on Climate Change. (2021). *Climate Change 2021: the physical science basis. Summary for policymakers*. [Online] Available: [https://www.ipcc.ch/report/ar6/wg1/downloads/report/IPCC\\_AR6\\_WGI\\_SPM.pdf](https://www.ipcc.ch/report/ar6/wg1/downloads/report/IPCC_AR6_WGI_SPM.pdf).
- xxv Thierfelder, C., Mwila, M. & Rusinamhodzi, L. 2013. Conservation agriculture in eastern provinces of Zambia: long-term effects on soil quality and maize productivity. *Soil and Tillage Research*. <https://doi.org/10.1016/j.still.2012.09.002>
- xxvi Food and Agriculture Organisation & United Nations Development Programme. 2020. Conservation agriculture for climate change adaptation in Zambia: A cost-benefit analysis. Rome: FAO.
- xxvii UK Aid et al. 2018. Climate-smart agriculture in Zimbabwe. [Online] Available: [https://cgspace.cgiar.org/bitstream/handle/10568/97083/CSA%20\\_Profile\\_Zimbabwe\\_12012018\\_1330.pdf?sequence=1&isAllowed=y](https://cgspace.cgiar.org/bitstream/handle/10568/97083/CSA%20_Profile_Zimbabwe_12012018_1330.pdf?sequence=1&isAllowed=y).
- xxviii Food and Agriculture Organisation & United Nations Development Programme. 2020. Conservation agriculture for climate change adaptation in Zambia: A cost-benefit analysis. Rome: FAO.
- xxix Koohafkan, P., Altieri, M. & Holt Gimenez, E. 2012. Green agriculture: foundations for biodiverse, resilient and productive agricultural systems. *International Journal of Agricultural Sustainability* 10(1):61-75.
- xxx Koohafkan, P., Altieri, M. & Holt Gimenez, E. 2012. Green agriculture: foundations for biodiverse, resilient and productive agricultural systems. *International Journal of Agricultural Sustainability* 10(1):61-75.
- xxxi Food and Agriculture Organization. n.d. The 10 elements of agroecology. [Online] Available: <http://www.fao.org/agroecology/overview/overview10elements/en/>.

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