



**Climate Change and Regional Trade: Promoting  
Resilience among Regional Transport and  
Agricultural Supply Chains.**

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# Framing the Problem

- Increasingly climate change is having an adverse effect on regional and global value chains.
- The effects of climate change are ever more prominent among vulnerable industries which are highly reliant on climate stability. (IPCC 2021)
- Manufacturing and fixed industries are much more resilient to climate shocks and are key drivers of industrialisation.
- The impact of climate change is multifaceted affecting both production, transport and access throughout regional value chains.
- Agriculture and transport is credited for more than 70% of total employment throughout the SADC
- More than 90% of total produced food crops are cultivated and developed by subsistence and small-holder farmers.

- The aim of this paper is to outline the need for trade and industrial policy to promote the funding and development of resilience throughout agriculture by bolstering market access and improving transport networks
- Currently regional trade in agricultural products is dominated by commercial agriculture in South Africa leading to small-scale farmers unable to compete and unable to leverage climate resilience practices
- The current literature and policy framework broadly promotes competition and bolstering production yields throughout agriculture and transport industries
- The paper further argues that there needs to be a shift to resilience-based policy formulation shifting away from traditional industrial and trade policy development.

# Rethinking Industrial Policy

- Within industrial policy and industry resilience there is a notable debate on shifting focus from competition and production to reviewing how industries can be modified and how to best promote structural and social development.
- The shift in debates has led to an increase in research and conceptualization of industrial policy, industrialization and sector resilience through the promotion of structural and resilience-based approaches to industry challenges (Colin et al. 2016, Di Tomasso et al 2023).
- Industries are widely interconnected and interdependent which has led to a consensus that not every externality can be accounted for and thus there needs to be a holistic approach in industrial policy to rather develop sustainability among the most vulnerable links rather than promoting competition and productive growth (Pant et al. 2014).
- Agriculture as an example is a industry where competition within the SADC does not promote resilience hence the need to shift from production based policies to providing access and entitlement to agricultural products (Sen 1984)
- Policy development often does not account for modification of industries to meet social and development needs. Within literature surrounding agriculture the issues are not production scale or quantity but access to agriculture products in relation to production which is referred to as entitlement (Sen 1984)

# Methodology

- The research was conducted through a desktop review of relevant literature and policy documents
  - Cross-referencing of various institutional reports is widely employed throughout the research with notable sources originating from regional and global institutions. (World Bank, FAO, SADC Secretariat, WFP, UNCTAD etc.
  - The goal of the desktop review is to identify key policy discrepancies and the broader impact on agricultural producers and transport industries.
  
- Analysis and Cross-referencing were utilized through searching for relevant keywords within periodicals and institutional reports.
- Quantitative data was gathered through open-source databases namely trademap, UNCTAD Stats, FAO Stats and the World Bank

# Why A Resilience Based Approach?

- The concept of resilience has largely been explored as pre-emptive responses to climate shocks that decrease the functioning and sustainability of vulnerable industries (Di Tomasso et al 2023).
- The role of resilience in response to post-shock implications on value chains has been less explored (Di Tomasso et al. 2023).
- Pre-resilience planning while necessary is often regarded as highly reliant on the nature and severity of climate shocks and not in relation to the response of existing shocks.
- Resilience based approaches to industrial policy reviews the following
  - The ability of industries and sectors to adapt and recover from disastrous economic, social or environmental shocks
  - Capital and resource investment aimed at promoting rapid recovery from shocks prior to industry shocks.
  - Analysing the need for structural change and promoting institutional and structural sustainability before, during and after external disasters
- Resilience based policy approach is broadly adjusting industries and sectors to holistically satisfy market needs and demands by promoting resilience within vulnerable industries. Resilience is often applied by offsetting shortages during eco-shocks and promoting integration and market access for vulnerable sectors into regional value chains.

# Contextualising the importance of resilient agricultural supply chains

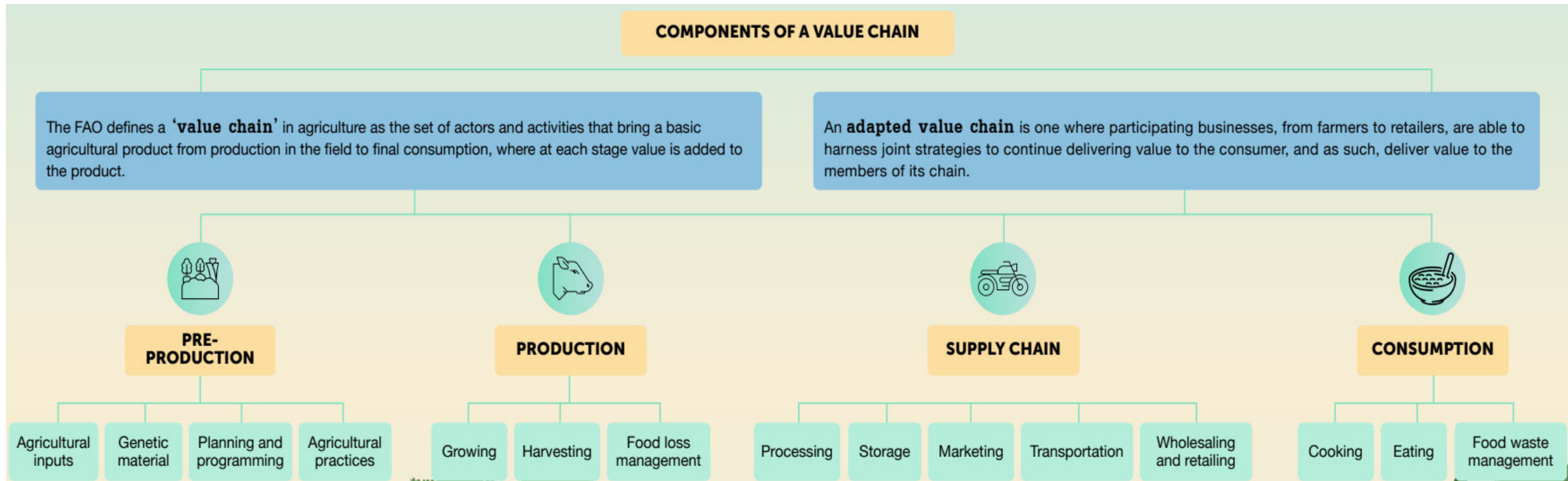
## Resilience in Transport

- Varying means of transport experience different shocks, disruptions and disasters hence require different responses
- Throughout the SADC transport vulnerability is broadly related to regional corridors and physical infrastructure such as railways and roadways.
- Rural roadways are susceptible to disruption from climate shocks due to the lack of fixed paving and limited railway access.
- Notable responses often aimed at promoting resilience relate to increasing transport infrastructure, increasing paved roadways and establishing route redundancies to bypass affected areas.

## Resilience in Agriculture

- Agricultural resilience has been widely researched and discussed.
- Most resilience measures relate to the four pillars of food security namely: Availability, Accessibility, Utilisation and stability.
- Resilience in availability is addressing and recovering from shocks impacting production. Utilisation is maintaining products for consumption and access relates to market access and pricing.
- Notable responses to promote resilience is investments in climate smart agriculture, bolstering irrigation, GMO production and cultivation and lastly crop diversification

# Regional Agricultural Supply and Value Chain



- Agriculture is one of the most vulnerable sectors due to it being largely rain-fed and often undertaken with little to no technological, genetic, financial resources.
- Trade is widely utilised to offset food and agricultural shortages however poor infrastructure, protectionist policies and limited access to information and regional channels of communication leaves little room for adaptation or resilience within agriculture and transport.



# Vulnerability in Transport

## Vulnerability in Transport

- South Africa accounts for 40% of regional transport value which accounts for more than 7% of national GDP.
- Preserved goods and perishable agricultural products are largely transported through refrigerated trucks.
- Firms in South Africa dominate regional refrigerated transport hosting more than 9000 vehicles.
- Road transport is highly vulnerable to climate change which often lead to blocked rural routes, increased maintenance costs and road degradation.
- 6 SADC member states are landlocked and rely on regional transport corridors to export commodities and import goods and services

## Challenges

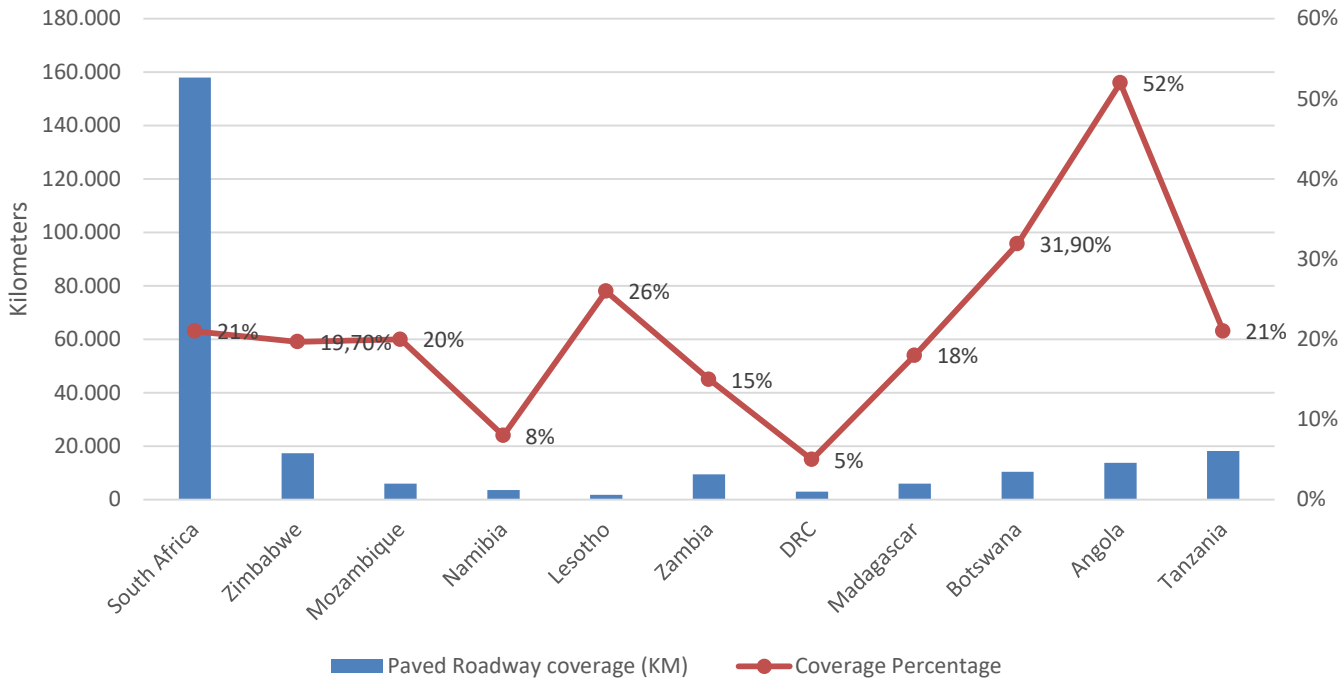
1. Regulation and Policy disharmony between RECs and regional member states
2. Poor transport infrastructure funding, development and maintenance
3. Long waiting times and inefficient processing at border posts
4. Social insecurity throughout high trafficked regions
5. High transport fees
6. Delays following climate related disasters

## Opportunities

1. Leveraging increased regional transport performance (World Bank 2023)
2. Promoting trade facilitation through addressing key non-tariff trade barriers.
3. Promoting investment and maintenance in key roadways.
4. Promoting harmonisation and implementation of key infrastructure masterplans and policies

# Regional Transport Infrastructure

## SADC Roadway coverage



- As of 2023, 90% of cross-border transport throughout the SADC and haulage for commercial, industrial and commodity-based freight is transported through road haulage
- Climate shocks increase maintenance and development costs of infrastructure. Flooding and severe climate shocks can block entire markets from access to regional value chains
- A notable example of limited interconnectivity and poor infrastructure maintenance is noted with Mozambique with no major north-south corridor route between the port of Beira and Maputo.
- 68% of Mozambican small-holder farmers have insufficient access to refrigerated transport or maintained paved roadways.

# Transport Costs

- Regional transport costs are relatively high.
- Refrigerated transport markets are largely centralised with cost markups estimated between 30-50% of transport costs (Vilakazi 2018)
- Outside of South Africa major refrigerated transport companies do not service rural developing areas leading to increased overall costs for agricultural products.
- Variable costs throughout the North-South corridor through road freight costs an estimate of \$1,28 per kilometer. A single trip between Lusaka and Johannesburg costs on average \$2050.
- Vilakazi and Paela (2017) note that the costs for refrigerated transport of key processed foods are unsustainably high due to limited roadway access.

# Vulnerability in Agriculture

- Small Scale Farming dominates the sector.
- 80% of all cultivated land contributing to 90% of total produce is undertaken by these small-scale farmers
- Commercial agriculture is centrally adopted and well developed in South Africa leading to higher exports in food and cereals
- Small-holder farming is dependent on rain-fed cultivation.
- Throughout the SADC only South Africa has a net balance of food which is largely attributed to commercial agriculture.
- South African industries have access to resilience-based technologies such as refrigeration, GMO's, Crop and Seed Diversification.

## Challenges

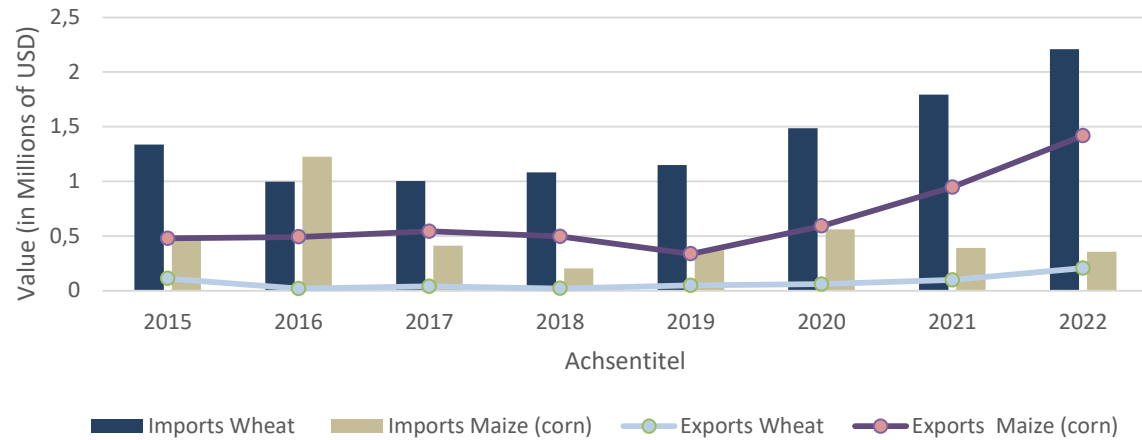
1. Insufficient funding to adopt modern agricultural technologies
2. Limited market access due to high levels of commercial competition and poor transport infrastructure
3. A lack of political will in promoting resilience-based policies
4. High food and cereal prices.
5. Regional industrial policy is largely geared towards industrialization and manufacturing

## Opportunities

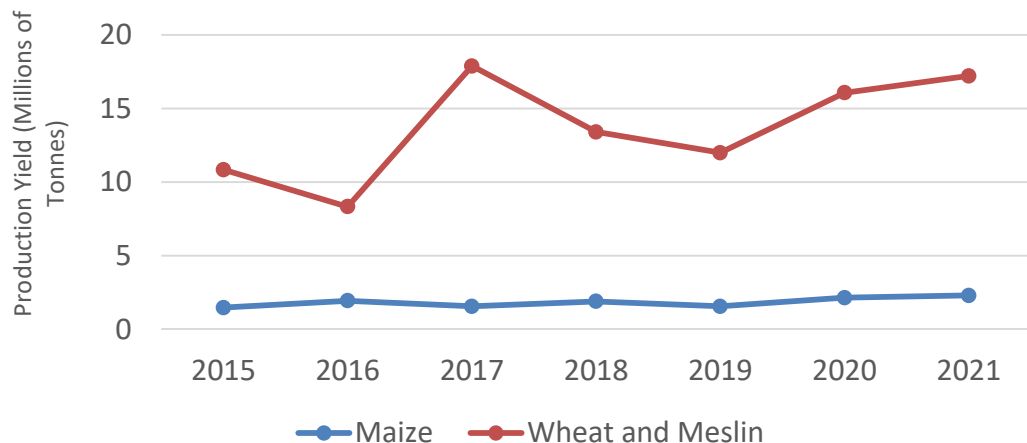
1. Bolstering of inter-regional trade through free trade agreements such as the AfCFTA.
2. Promoting intra-regional integration to limit food price volatility
3. Establishing funding frameworks for resilience-based technologies (irrigation, desalinization and crop diversification).

## Regional Trends in the trade of Maize and Wheat

Import and Export Values of Maize and Wheat within the SADC 2015-2022



Agricultural Production Trends throughout the SADC.



- Up to the measuring year of 2022 intra-SADC trade on maize and wheat averaged at 6% in relation to total world imports.
- The low trade is in conjunction with overall high cultivation of maize and wheat.
- Imports of cereal crops for consumption is unsustainably high with wheat imports increasing significantly between 2015 and 2022 despite overall high production levels in 2020 and 2021.
- The import/export curve of maize is relatively stable with the only significant spike in imports occurring during 2016 at the height of a severe regional drought.
- More than 70% of local agricultural production throughout the SADC is undertaken by subsistence farmers and SME's (SADC 2021)

# Promoting Resilience through Trade: Regional Policy Responses.

- Agricultural availability and access remain in deficits among low-income countries
- There are substantial risks to income for small-holder farmers competing with commercial farmers
- The stakes are higher for food security and regional transport following climate disasters
- Only South Africa has the manufacturing and capital means to promote resilience among vulnerable industries
- Regional institutions have little capacity and oversight mechanisms to enforce vital resilience practices and policies.
- Non-tariff trade barriers such as long waiting times, poor infrastructure, policy disharmony, social unrest and limited electricity supply decreases trade facilitation.
- Promising initiatives such as the AfCFTA, SAFTA, and The Tripartite Agreement have the opportunity to diversify trade and markets
- Holistic policies are needed that both foster trade from commercial producers while securing income and food security for small-holder farmers
- Bolstering funding for infrastructure projects both in transport and agriculture as outlined in the RIDM and RISDP is necessary to limit regional trade inequalities.
- Policy and regulatory disharmony often leads to delays in regional trade and access to vulnerable markets.

## Closing Thoughts

- There is a notable shift in industrial and trade policy through the implementation of vertical policy initiatives aimed at competitiveness and production to a more holistic approach aimed at promoting resilience and modifying vulnerable industries.
- Governments and regional institutions through the development of initiatives such as the AfCFTA and SAFTA have largely concentrated on resilience within manufacturing leading to increased vulnerability on rain-fed and transport reliant industries.
- Resilience needs to be accompanied by just market integration as the imposition of trade barriers limit access to regional value chains and discourages the participation of small-scale farmers in providing necessary agricultural goods regionally
- Resilience includes developing policies that integrates small-holder farmers into regional market value chains to offset the prolonged impact of climate change on agriculture
- Despite trade initiatives aimed at easing the flow of agricultural goods poor transport infrastructure, policy disharmony and non-tariff trade barriers continue to plague wheat, maize and transport value chains
- Resilience based policies need to shift away from market centralisation and promote agricultural diversification among landlocked and low income countries.

**Thank you!**

**Additional Comments**

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