

## South Africa's Agricultural and Food Systems: A Scenarios Analysis

### SUMMARY

South Africa is a middle-income emerging market country endowed with abundant natural resources.<sup>1</sup> Its agricultural sector is highly productive but also highly dualistic: a small number of large commercial operations run by predominantly white farmers exist alongside a large number of subsistence farms run by predominantly black farmers. The sector is characterized by a far greater degree of mechanization and technological application than other countries in Africa. The country's food system is at an important stage of transition and current national policy strategies aim to achieve agriculture-driven sustainable and inclusive economic growth and feed a growing population while reducing existing disparities in land ownership and distribution.

A number of evolving trends will shape the future of the food system in South Africa, including but not limited to social and economic development; demographic shifts and urbanization; environmental governance and growing emphasis on sustainable food systems; the adoption and dissemination of agricultural technologies; and shifting dietary patterns. Policymakers in South Africa should account for the uncertainty surrounding the future trajectory of these trends and their likely impact on agricultural production and food security in policy-development and decision-making approaches.

To support this, a scenario exercise for South Africa's food system was conducted with a selected group of stakeholders from government, academia, civil society and the agriculture sector. Through discussion, against a list of trends which were regarded as predictable, two impactful trends (or critical uncertainties) were selected that had high

uncertainty in the way they would develop and shape the food system: the extent to which land reform would occur, and whether climate risks, affecting agriculture and trade, would evolve that were similar to today's ("low risks") or throw up unprecedented and unexpected challenges ("high risks").

These critical uncertainties create a 2x2 matrix that frames four potential futures – one in each quadrant. Each one of these futures was then explored, allowing participants to consider the inherent uncertainty the future holds, and understand how choices, decisions and extraneous factors might contribute to very different outcomes

### POLICY IMPLICATIONS

- The outcomes of the land reform process will certainly affect (positively or negatively) the ability of South Africa as a country to feed its populations in 2050 and to use agriculture and food systems as a powerful tool for rural economic development, poverty alleviation and access to international markets
- To adapt to an increasingly variable climate over the next decades and to build the resilience of the agriculture sector to the effects of climate change in the context of current and future climate uncertainties, South Africa needs to implement current policies
- A climate-smart food system requires integration of planning to adapt, mitigate and build resilience across multiple policy domains

## KEY SOCIO-ECONOMIC AND ENVIRONMENTAL DRIVERS OF SOUTH AFRICA'S AGRI-FOOD SECTOR

South Africa's agriculture sector is highly productive. The sector produces a surplus of food despite the limitations set by the environment (climate, water, soils) which render only 12% of the country's land suitable for food production and 3% truly fertile. This efficiency in agricultural production can be attributed largely to highly industrialized, intensive and export-oriented farming – primarily owned by large-scale commercial farmers. In recent times, however, a range of problems have exposed the vulnerabilities in the South African agriculture sector. Crop losses persist owing to unpredictable rainfall and associated droughts and are likely to continue over the next two to three decades<sup>2</sup>. The drivers shaping the food system in South Africa over the coming decades span social, technological, economic, environmental and political domains.

In the country's 2030 National Development Plan's vision climate change is recognized as a major factor that is already affecting—and will continue to affect—various areas of development and the

broader growth ambitions of South Africa. The South African National Biodiversity Institute – (SANBI) and the Department of Environmental Affairs provide an overview of the most critical climate trends affecting South Africa over the past six decades.<sup>7</sup> In particular, increased warming and droughts and highly variable rainfall patterns affect the agriculture sector, the energy sector with the spillover socio-economic consequences and impacts on industries and the livelihood of South African populations.

Economic and wealth inequality is very high in South Africa, representing a priority development issue which has earned policy attention from various administrations since the end of apartheid in the 1990s. In the context of the agriculture sector, economic inequality manifests in the inability of poor small farmers to adopt new agricultural and food system technologies and afford capital-intensive inputs. This lack of access to new agricultural technologies among small-scale farmers has been acknowledged at the policy level.

## FUTURE SCENARIOS: A PARTICIPATORY APPROACH

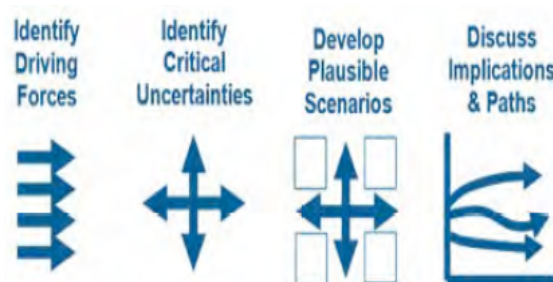
There is considerable uncertainty surrounding the domestic factors that will determine how South Africa's food system will evolve between now and 2050. Such domestic factors are also increasingly shaped by significant uncertainty in the way the rest of the world will develop, from a technological, social and geo-political perspective. Any 'best estimate' forecast of such a complex system over a long timeframe will certainly be wrong.

Accordingly, plans to develop South Africa's agricultural and food systems should be sensitive to this uncertainty. They should allow decision-makers to explore how choices and events might

shape different futures and identify strategies that are resilient to uncertainty, i.e. 'no regret' options that should pay off in a range of possible futures, rather than the one we hope for or expect.

A scenario exercise can help identify resilient policy by exploring the range of possibilities that the future may hold. What kinds of policies can be robust to different plausible futures? Which

*Figure 1: The Steps in a Scenario Exercise*



policies developed for today might lock the system into undesirable trajectories for the future? As a tool for strategic decision-making under uncertainty, a scenarios exercise identifies the two most impactful drivers with high uncertainty as to how they will develop and creates a 2x2 matrix that frames four potential futures—one in each quadrant (see figure 1 below). Each one of these futures is then explored, creating a rich, narrative-driven scenario into which other drivers, with more certainty as to how they will develop, can be integrated.

These four steps define the participatory process. First, driving forces were identified that will shape the future of the food system, in a South African context, and these were classified into those that are predictable (the “known knowns”) and those that are known to be important, but are less predictable (the “known unknowns”). Of the “known unknowns”, two were selected as the

critical uncertainties, used to shape the four plausible futures.

A participatory scenario planning workshop was conducted in November 2018 with a select group of stakeholders from civil society, government, private sector and academic partners from the AFRICAP team.

## IDENTIFYING THE MOST CRITICAL UNCERTAINTIES

Workshop participants identified, discussed and ranked in terms of perceived importance, the following shortlist of uncertainties for South Africa:

**Table 1: Driving forces, critical uncertainties and ranking importance in shaping South Africa’s agri-food system**

Uncertain trends	Key Questions	Ranking
<b>Climate change/risks</b>	<ul style="list-style-type: none"> <li>How will changes in rainfall and water availability affect food production and demand, pests and diseases, and land use?</li> <li>What can be grown where, in view of rainfall patterns and water availability?</li> <li>What options for adaptation are there in the agricultural sector?</li> <li>How will climate change elsewhere affect the potential for trade (export markets and import trade flows underpinning food and nutrition security)?</li> <li>How will government mitigate the impacts of climate change?</li> <li>Will international efforts to address climate change be successful?</li> </ul>	1
<b>Land Reform</b>	<ul style="list-style-type: none"> <li>How will land reform be achieved?</li> <li>How does the uncertainty around land reform affect and limit near-term financial investment?</li> <li>How will it affect investors, jobs and economies in agriculture, the resilience of the agricultural sector, and trade?</li> <li>How will reduced farm size and scale affect competitiveness in the local and national economy?</li> <li>Will land reform restrict or enhance exports?</li> <li>Will governance be efficient and adequate to avoid land grabs?</li> <li>How will politics influence land reform implementation?</li> <li>How will land reform affect food security?</li> </ul>	2
<b>Agricultural trade and markets</b>	<ul style="list-style-type: none"> <li>How will land reform affect global trade?</li> <li>Will trade and markets be out of reach for smallholders?</li> <li>How will subsistence farmers integrate with local markets?</li> <li>How will climate change and geo-political drivers affect global prices and their volatility, as well as the requirement for, and availability of, imports?</li> </ul>	3
<b>Technology/market innovation and adoption</b>	<ul style="list-style-type: none"> <li>Will regional alliances be strengthened, allowing wider technology adoption?</li> <li>Will food regulation and trade continue to be harmonized?</li> <li>What degree of political voice will be afforded to stakeholders from across food value chains, both nationally and internationally?</li> <li>How will new and emerging technologies shape agriculture and food?</li> </ul>	4
<b>Political and economic stability/inequality</b>	<ul style="list-style-type: none"> <li>How will political dynamics affect the food system?</li> <li>How will changes in politics affect job markets?</li> <li>How will changing politics affect stakeholders?</li> <li>Will those with political influence drive land reforms and agricultural production?</li> </ul>	5

Whilst all of the drivers and their trends—some of which are considered are clearly important in determining whether or not South Africa’s food system in 2050 will be sustainable, productive and climate smart, they vary in terms of their uncertainty. For example, while there may be some uncertainty about the extent of population growth and urbanization that will occur, there is

little doubt that both will increase significantly. In a similar vein and as indicated, while most climate projections point to warmer and drier conditions and changing patterns in rainfall, there is uncertainty about how these changes will concretely materialize in different regions and around the risks associated with such changes.

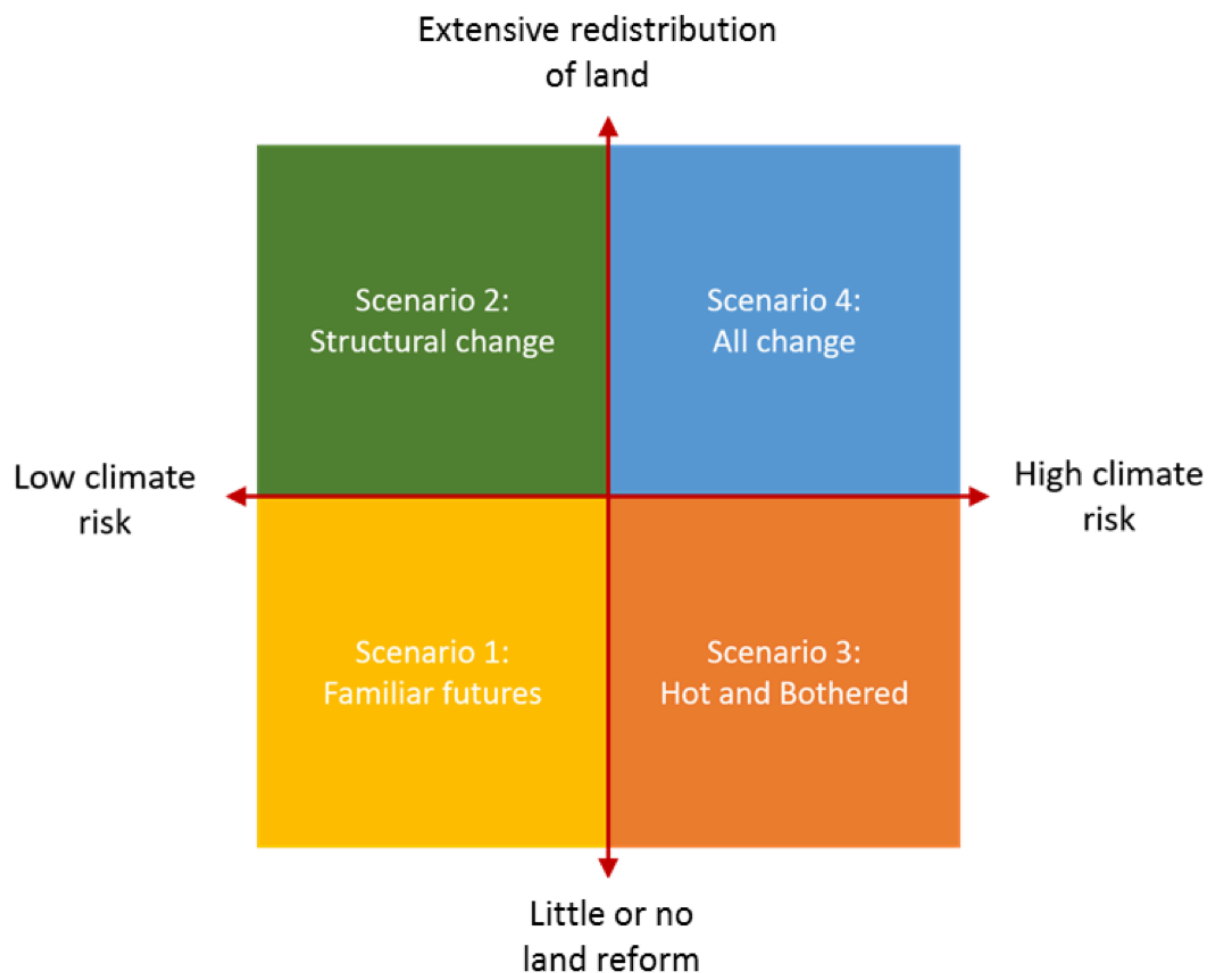
## CONSTRUCTION OF THE SCENARIOS AND KEY CONSIDERATIONS FOR THE NARRATIVES

The two most important and hard-to-predict drivers identified were:

- (1) climate risks, and
- (2) land reform

These key uncertainties can be used to describe four plausible but very different futures, defined by a combination of extremes of the two:

**Figure 2: Four Scenarios for the future of South Africa's agricultural and food system**

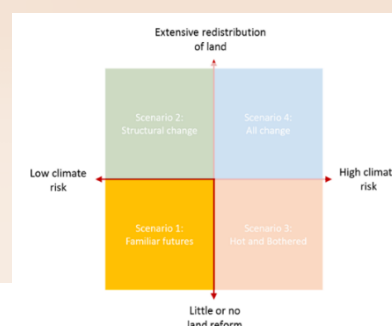


## SCENARIO 1: FAMILIAR FUTURES

This scenario depicts the future of the agricultural and food system in South Africa is minimally affected by climate impacts—in other words, that the risks from climate change are not significantly different from those observed today.

In this scenario the following is taking place:

- Low climate risks mean SA's climate has warmed, but there are no deep changes in rainfall patterns, no extended dry spells or frequent floods - less risks to farming
- Little to no land reform: lack of appetite from government to achieve significant land reform/land redistribution, no secured tenure rights for smallholder farmers, failed opportunity to increase employment in farming
- Large-scale farming of commercially viable crops such as maize remains the predominant farming system, therefore BAU in farming practices and agro industry
- Persistent inequality between commercial and small-scale subsistence farmers and farm workers
- Shifts in dietary patterns and increased demand for processed food with associated increase in non-communicable diseases
- Global, regional, national actions on climate change at least deliver responses to shocks associated with weather events similar to today's



**Winners:** Commercial farmers, suppliers of inputs, academic researchers

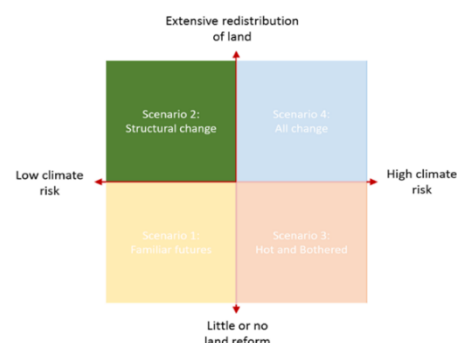
**Losers:** Consumers/economy as people not farming due to uncertainty around expropriation; smallholder farmers frustrated

## SCENARIO 2: STRUCTURAL CHANGE

In this scenario, the government has implemented a programme of land reform, which delivers deep changes in land ownership and tenure, and the impact of climate change on South Africa's agriculture sector are largely similar in magnitude to those experienced today.

In this scenario the following is taking place:

- Low climate risks similar to Scenario 1 (familiar futures)
- High/profound land reform: cases of expropriation without compensation, extensive redistribution of land with secured tenure rights for smallholders
- Increased employment in the agri-sector through: (a) creation of cooperatives among smallholders or (b) linking smallholders to established commercial farmers
- Land reform drives economic growth, especially rural areas, rural to urban movement of people decreases
- More households involved in agriculture improves food and nutrition security
- Land reform process exacerbates other issues e.g. limited water availability and limited production capacities especially for smallholders



**Winners and losers:** More winners than losers

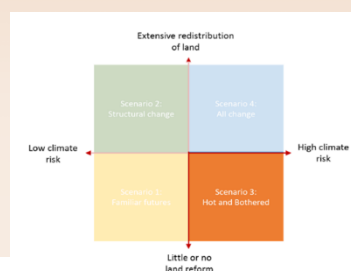
**Potential losers:** Commercial farmers (expropriation without compensation- but this will be transient)

**Definite Winners:** Smallholder farmers, financial investors due to increased borrowing and lending, international investors.

*This scenario dependent on land reform implemented within the next 10 years.*

### SCENARIO 3: HOT AND BOTHERED

In the future described as “hot and bothered”, the impetus for land reform did not follow through into significant action. At the same time, the Paris Agreement’s ambition failed to gain momentum, as one after another, countries withdrew due to narrow self-interest. As a result, the climate is increasingly affecting the food system. This arises both through weather affecting domestic production, and climate impacts elsewhere creating volatility in the markets.



In this scenario the following is taking place:

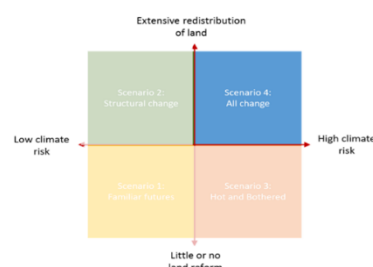
- High climate risks and little to no land reform
- SA witnesses unpredictable and highly variable rainfall, outbreaks of pest and diseases, extended drought with impacts on availability of water for irrigation
- Stagnation or decreased food production with impacts on food and nutrition security
- Increased food prices, hunger, undernourishment, increased unemployment and, potentially, social unrest
- Commercial farmers heavily in control of food production: better access to mechanization and other innovative farming and food processing technologies
- More migration to urban areas by smallholders and landless
- Inequality exacerbated between urban rich and urban poor with possibility of racial and social tensions

**Winners:** Commercial farmers and agribusiness, investors, technology developers

**Losers:** Smallholder farmers, consumers

### SCENARIO 4: ALL CHANGE

In this future, land reform has been deep and extensive, including for instance the allocation of small parcels of land to smallholder farmers who now enjoy stronger legal land ownership and tenure rights. This has led, in part, to the segmentation of larger areas of land previously owned by largescale commercial farmers, into many small farms managed by smallholder subsistence farmers.



In this scenario the following is taking place:

- High/profound land reform with cases of expropriation without compensation and high climate risks
- Smallholders have secured tenure rights, segmentation of large farms into smaller farms managed by smallholders
- Severity of climate risks is high: reduced food production, highly volatile food prices which will affect the more vulnerable rural dwellers and urban poor
- Crop production and animal husbandry become very challenging to near impossible economic/subsistence activities for all farmers, especially smallholder farmers
- Potential for social unrest in urban areas
- But, if land reform is supplemented by government rural development plans, then there is more employment in the agriculture sector in rural settings
- Success in land reform process means reduction in rural to urban movement of people

**Losers:** Largescale farmers and land owners; everyone (land reform target land under production and/or no support to new owners)

**Winners:** Smallholders/new land owners, broader economy; technology developers



## IMPLICATIONS OF THE SCENARIOS

The descriptions of the four scenarios have exposed the magnitude of uncertainty as to how South Africa's agricultural and food systems will evolve over the next decades. Successful development of the food system in South Africa requires coordinated thinking about the domestic and international impacts of climate change, through trade's sensitivity to climate impacts elsewhere. Furthermore, it requires coordinated investment in the agri-food sector and its supporting infrastructure, and a deliberate linkage between domestic production, imported food and nutrition security. In this context of high uncertainty, what are the implications of policy decisions made today and what policy decisions are robust across the four scenarios? Some of the implications, arising from discussions at the scenarios workshop, include:

**(1) The outcomes of the land reform process will certainly affect (positively or negatively) the ability of South Africa as a country to feed its populations in 2050** and to use agricultural and food systems as a powerful tool for rural economic development, poverty alleviation and access to international markets. The impacts of land reform might be positive; that is, enabling a booming food system-based rural economy and by implication contributing to a food-secure South Africa; or they could be negative, affecting agricultural production if—despite the secure tenure rights earned by smallholder farmers as a result of the land reform process they are not capable of valorising their land through profitable farming activities.

**(2) Agriparks programme has the potential to facilitate a positive land reform process.** One specific process that may facilitate the land reform process is the Agri-parks programme led by the Department of Rural Development and Land Reform (DRDLR) in collaboration with the Department of Agriculture, Forestry and Fisheries

(DAFF). The Land Reform policy discussion document highlights the need to design a government-supported rural development plan, which would make provisions for financial and technical support to farm dwellers earning secure tenure rights over their land. With the Agri-parks programme, smallholder farmers will be able to participate in a networked food system innovation scheme, using its logistics, training and extension services and therefore benefiting from the economy of scale.

**(3) Policy implementation is key for adaptation and resilience building.** To adapt to an increasingly variable climate over the next decades and to build the resilience of the agriculture sector to the effects of climate change in the context of current and future climate uncertainties, South Africa needs to implement current policies. The effects of climate change to the South African food system are already visible and—based on the projections indicated above—climate shocks are likely to continue to impact on agricultural productivity and overall production over the coming decades to 2050 and beyond. How exactly such impacts will materialize is however highly uncertain. South Africa has committed to making its agriculture sector resilient to climate change.

**(4) Climate risks to the food system are not a consequence of domestic changes in agriculture alone.** Global markets are affected by climate change elsewhere and food price volatility will spill over and affect input prices, domestic market prices and, in extremis, the cost of humanitarian aid. A climate-smart food system requires integration of planning to adapt, mitigate and build resilience across multiple policy domains. In a worst-case scenario, a drought in South Africa could be coupled with a multiple breadbasket failure elsewhere, and a lack of availability of, and high price for, imports.



## REFERENCES

<sup>1</sup> South Africa is among the 17 world megadiverse countries:

<https://www.worldatlas.com/articles/ecologicallymegadiverse-countries-of-the-world.html>

<sup>2</sup> Draft South Africa National Adaptation strategy, 2016, P19

<sup>3</sup> <https://www.jse.co.za/>

<sup>4</sup> WHO (2011) Global status report on non-communicable diseases. Geneva: WHO

<sup>5</sup> Shisana et al, 2013. South Africa National Health and Nutrition Examination Survey

<sup>6</sup> Climate Trends and Scenarios: Climate and Impacts Factsheet Series, Factsheet 2 of 7, Department of Environmental Affairs of South Africa; GIZ and South African National Biodiversity Institute (SANBI), 2018, available at: <https://www.sanbi.org/wp-content/uploads/2018/03/Itas-factsheetclimate-trends-and-scenarios2013.pdf>

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### **About the Agricultural and Food-system Resilience: Increasing Capacity and Advising Policy (AFRICAP) Programme**

The Agricultural and Food-system Resilience: Increasing Capacity and Advising Policy (AFRICAP) programme is a four-year research programme focused on improving evidence-based policy making to develop sustainable, productive, agricultural systems, resilient to climate change. The programme is being implemented in Malawi, South Africa, Tanzania, Zambia, and the UK led by the University of Leeds, a leading Russell Group university in the north of England, in partnership with the Food, Agriculture and Natural Resources Policy Analysis Network (FANRPAN), a pan-African multi-stakeholder policy network. The programme is funded by the UK Government from the Global Challenges Research Fund (GCRF), which aims to support research that addresses critical problems in developing countries across the world. It is administered by the UK's Biotechnology and Biological Sciences Research Council (BBSRC) - UK Research and Innovation (UKRI).

**Implementing Partners:** FANRPAN; University of Leeds; University of Aberdeen; the UK Met Office; Chatham House - Royal Institute of International Affairs; the Civil Society Agriculture Network (CISANET), Malawi; Department of Agriculture Research Services (DARS), Malawi; National Agricultural Marketing Council (NAMC), South Africa; Economic and Social Research Foundation (ESRF), Tanzania; and the Agricultural Consultative Forum (ACF), Zambia.

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