



SOUTHERN AFRICA
FOOD LAB

TOWARDS A SCENARIO-BASED DIALOGUE

The Future of Food 2015-2030

Four scenarios examining possible futures of the food system in South Africa



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FOOD LAB**

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Introduction

What is the future of food in South Africa? What might the food system look like in 2030, in terms of production, processing, distribution and consumption? Many people are asking similar questions and producing vision statements, policies and forecasts to enable anticipation and planning in a volatile system. They are all telling stories about the future – some optimistic, some dire. But these stories tend to be disconnected, narrated past each other to different audiences.

The four scenarios contained in this document tell a more connected set of stories. They were developed by a scenarios team of nearly 50 unlikely allies from across the food industry, government, civil society and academia.

The four scenarios contained in this document tell a more connected set of stories. They were developed by a scenarios team of nearly 50 unlikely allies from across the food industry, government, civil society and academia. They have been created to prompt a more coherent conversation between people who are united in their concern about the future of food, but often divided by their different perspectives about, and their different roles and interests in, the food system. These conversations can, in turn, enable actors in the food system to consider the strategic choices they could make now, to either adapt to anticipated developments or to shape, alone and with others, the kind of future they desire.

Transformative Scenario Planning (TSP), the approach used here, starts with key uncertainties. The scenarios team wanted to think about the relationship between

water, energy and food and how this might play out in the future. They had questions about food production – would we produce enough and how might developments in land reform impact on future production? They wanted to probe the role of global economics and its interplay with domestic political, social and economic dynamics. Lastly, they were curious about the link between health and nutrition levels in South Africa and the degree to which consumer agency and choice in relation to food might change over the next 15 years. While the team members were fairly certain that food would be affected by variables such as climate change, land reform, urbanisation, currency exchange rates and technological innovation, they were uncertain about the specific character and direction each of these variables might take over the next 15 years.



Through structured conversation, the scenarios team tested their hypotheses about these uncertainties with one another and, in the process, created four stories about what might happen – not what they thought would happen or should happen – between 2015 and 2030.

Scenario 1

The first scenario is about the **natural resource base** and tells the story of the impact of a severe dry-weather cycle on vulnerable water systems in South Africa, complicated by energy insecurity. If healthy ecosystems are at the root of food production, what could this scenario mean for the South African food system by 2030?

Scenario 2

The second scenario turns our attention to the dimension of **food production**, tracing an imagined sequence of events in land reform and considering what might happen to levels of farmer productivity and morale over the next 15 years in the context of a polarised agricultural sector.

Scenario 3

The next scenario, on food in the **political economy** pans out from the focus on production to tell a story spanning the full food chain. It focuses on the dynamics of pricing and the affordability of food as the rand depreciates and takes us down the road of severe hunger in South Africa.

Scenario 4

The final story is about **nutrition**, exploring possible impacts of malnourishment on a well-resourced strategy towards national economic growth.

Each scenario stands on its own, and gives rise to the next. All four stories, read together, offer different ways of thinking about food: as a natural resource, as an agricultural output, as part of the political economy, and as a primary source of well-being.

What do we mean by the 'food system'?

The food system includes all the components involved in the production, processing, distribution, consumption and waste of food. A sustainable food system is one that takes into consideration environmental, social and economic impacts and provides nutritious food for all.

The food system is not a simple, linear process as understood by a conventional supply chain, but rather a network, consisting of feedbacks and nonlinear relationships that are defined by concentrations of power and resources of various scales and across different levels. Taking this into account, the components of the food system are defined as:

- value-chain inputs, mechanisms and structures for the production (land, water, crops, marine stocks), processing, distribution, access, preparation, consumption, metabolism and waste of food
- participants in the food system, including producers, fishers, industries, labour, governments, purchasers (retailers and buyers, brands, manufacturers, traders), communities, and consumers
- social issues inherent in food equity, food justice and food sovereignty, and political and spatial considerations on local, regional, national and global levels.

About Transformative Scenario Planning (TSP)

Scenarios are stories about the future. The stories contained in the following pages are based on current trends but are essentially an imaginative exercise. Transformative Scenarios by definition involve a multi-stakeholder group of actors who work together to create something that none of them could have created on their own. Their task is to produce stories that are relevant, challenging, plausible and clear. Their audience is prompted to think not only about how they could adapt to these possible futures, but what transformative actions they could take.

This Transformative Scenarios exercise on the future of food was convened by the Southern Africa Food Lab (SAFL) at Stellenbosch University in partnership with the Worldwide Fund for Nature South Africa (WWF-SA) and the Ford Foundation.

The convenors intend these scenarios to be used as conversation starters. Developed as they were by such a heterogeneous group, the scenarios contain unresolved dilemmas that invite deeper understanding, debate and dialogue.

There are four steps to this kind of scenario-based dialogue.

1. First, the scenarios are presented through text, slides, storytelling or video.
2. Secondly, for each scenario the group addresses the question, 'If this scenario occurred, what would it mean for us?' and considers the challenges the scenario poses.

3. Thirdly, the group deals with the question, 'If this scenario occurred, what would we do? What options do we have?'

4. Finally, the group steps back to the present and considers the question, 'Given these possible futures, what shall we do next together to influence the future?'

The four scenarios are summarised in the table below.

Prior to constructing these scenarios, we conducted 30 long interviews with leaders across the food system. Our intention was to help ensure that the scenarios would illuminate the aspects of the future that that they are most concerned and curious about.

Unattributed quotes appearing in this scenario report as *perceptions of current reality* come from these interviews.



Table 1: Four scenarios examining possible futures of the food system in South Africa

	Food as a natural resource Root of the matter?	Food Production Seeds of possibility?	Food in the political economy Kernels of truth?	Food as nutrition Empty husks?
Dimension of the food system in focus	Natural resources and ecosystems dimension	Agricultural dimension	Political and economic dimensions	Nutritional dimension
Food is examined as	A product of nature	A product of farming	A product of the political economy	A source of health, well-being and productivity
Key issue	Capacity of the natural resource base to sustain food production	Productivity and morale of South African farmers	Pricing and affordability of food	Human well-being and productivity
Key vulnerability	Water quality and quantity	Land ownership patterns	Poverty and inequality	Malnourishment and obesity
Linked threats	Declining soil fertility, energy insecurity and a warmer climate	Widening gap between commercial and small-scale farmers, political indecision, volatile exchange rate, climate variability and global instability	Depreciating rand, rising global oil prices, higher domestic electricity tariffs, variable weather patterns	Poor health outcomes, educational performance and workplace productivity
Catalytic events and actions	Severe dry-weather cycle Decision to open nuclear tendering process	Second round of land restitution claims	Broken election promises to the poor	Significant state investment in infrastructure, education and primary healthcare with expectations of positive economic impacts
What happens? What are the consequences for the food system and society?	The capacity of the natural resource base to sustain sufficient food production is threatened.	The productivity and morale of farmers are initially diminished, but start to recover.	Food prices are unaffordable, resulting in widespread hunger and use of the ballot box to bring about change.	Malnourishment refocuses attention on nutrition as a basis for a healthy economy.

Scenario 1: Root of the matter?

Food as a natural resource



Question: What effects will climate variability and water supply have on food in South Africa?

What if... a severe dry-weather cycle makes the natural system upon which food production depends even more vulnerable?

Food is examined as... a product of nature

This scenario is driven by... climate change, a crisis in water quality and quantity, and energy insecurity

Storyline

2015

It is 2015 and the debates about water availability and electricity supply are fierce. In the lead-up to COP21 in Paris the implications of climate change are also widely debated. Marikana remains fresh in people's minds as disputes in the mining sector continue to make headlines. These seemingly disparate issues tend to converge in discussions about the food system. Some see the depletion of soils, water scarcity, acid mine drainage and competition between mining and agriculture for limited arable land as signs of impending disaster. Others dismiss

this as fear-mongering, citing the resilience and competitive edge of South Africa's commercial farmers, the many policies and strategies already in place to address the problems and the direction set by the National Development Plan (NDP) as reasons for optimism. They also point to the 2014 Memorandum of Understanding between the Chamber of Mines and AgriSA as a milestone towards stronger co-operation to share the available natural resources. A third group foregrounds issues of poverty, inequality and unemployment, arguing that poor people's entitlement to food, water, electricity and jobs cannot be

Setting the scene

What the data is telling us

"Climate change is projected to have a significant effect on agriculture through the three interconnected systems of food, energy and water. The resource nexus argument is that due to the interconnect-edness of each system, demand for one resource can drive demand for another, while at the same time the cost of one resource has an impact on the production efficiency of the others ... The biggest impacts are likely to come from variability in water availability. Since the agricultural sector currently consumes 60% of the total water resources in the country, any increase in irrigation for growing food would have an impact on the water and energy systems."¹

displaced by the 'green' agenda. What is increasingly clear to all is that the current challenges in widespread water pollution and water supply, exacerbated by electricity supply constraints, may well translate into a food security crisis in the not too distant future.

Perception of the current reality



What people are saying

In terms of the value chain, very few of us in the food industry look at the environmental footprint of our end product ... I don't think there's been enough in-depth understanding of the water-food-energy nexus as yet. There's still a long way to go, we've definitely lagged as an industry, but all of us are trying to the best of our ability to sort of catch up.



2016 In early 2016, the water quality of the Berg River, which is under increasing strain from expanding informal settlements and farm run-off, becomes critical due to inadequate wastewater treatment, a condition of poorly maintained sewerage works in the valley. The following

year, many wine, fruit and vegetable farms in that area fail export requirements to the European Union and the USA.

A similar decline in water quality is evident in the Olifants River, with effluent from mines and industry exacerbating sewerage problems and contaminating irrigation water.

Local elections are held in 2016.

2017 The ruling party holds its national policy conference in 2017.

2018 By 2018, insufficient investment in irrigation and water purification systems causes a crisis in the availability of irrigation water, aggravated by drier weather patterns in the Free State and North West. Commercial farmers ramp up their investment in biotechnology, opting for GMO seeds to support production. Their efforts to protect and manage the

natural asset of water has the unintended consequence of reducing unskilled jobs on farms and in pack houses. Actual job losses and the imminent threat of

What the data is telling us

- 98% of all water stored in RSA has been allocated. Although opportunities for additional storage remain, these require significant infrastructure investments, with long lead times.
- 80% of rivers are compromised in terms of quality.
- 90% of vegetable, fruit and wine production is irrigated.²



more deepen the crisis. There is increased stress on small-scale farmers as overall rainfall declines.

A global assessment of soils is commissioned in 2018, prompted by uncertainty about degrees of degradation in valuable agricultural zones around the world in the absence of contemporary data. There is particular interest in what this assessment will say about soils in Africa as the continent's agricultural land is the target of growing direct foreign investments.



We have an annual outlook, a modelling exercise, a baseline of the next ten years in agriculture. What it does is it looks at the maize industry and looks at the supply and demand in the maize industry and then try and model it, which is fair enough. The problem is you don't take into account is what's happening in soils.



During this time, South Africa's electricity supply continues to lag behind demand. The year 2018 marks the tenth year of energy insecurity amidst a growing crisis of confidence in the government and Eskom to address this issue in a coherent and affordable fashion. More photovoltaic panels appear on the roofs of both middle-class homes and social housing projects. Although the first module of the Medupi coal-fired station comes online, the remaining modules and the Kusile facility are severely delayed and over budget. Load-shedding is pervasive. Despite ongoing debate and controversy,

South Africa officially opens the tendering process to build a fleet of nuclear power stations, citing alignment with the chosen economic growth pathway of the mining, mineral beneficiation, energy-intensive industry and global pressure to deliver on the promise, made in Paris in 2015, to reduce carbon emission levels. The nuclear fleet is due to start supplying electricity to the national grid by 2028. As Russia, China, France, Canada, Brazil, the USA and Japan declare their intentions to bid, it becomes increasingly evident that the cost will be formidable. Some say it will bankrupt South Africa.

Given the nuclear decision, the government can no longer continue its interests in fracking and off-shore prospecting, thereby slowing progress on developing a local gas supply. Sasol shelves its plans to build a second gas-to-liquids plant in the country. The agricultural sector sounds the alarm about implications for its fuel requirements into the future.

2019 Provincial and national elections are held.

2020 In 2020, dry conditions worsen in the summer rainfall areas of the Free State, North West, Limpopo and Mpumalanga. Temperatures are starting to climb, causing increasing water loss in reservoirs. There is also evidence that the steady warming is affecting agriculture through heightened crop and livestock stress. Increased irrigation demand of over 20% under these drier and warmer conditions presents substantial risk for the sector. Furthermore, in the hot conditions the nutrient load in dams, which leads to excessive plant growth, has doubled, resulting in a dramatic reduction of usable stored water.



I have concerns about whether primary and secondary producers are sufficiently alive to the water issues in this country and the changing climate in this country, which will affect their ability both to grow sufficient quantities of primary crops and then to transform those into foodstuffs that are accessible and affordable.



In the winter months of 2020, water quality of the Vaal River system tips towards crisis levels due to a confluence of pollution, including acid mine drainage and inadequately treated sewerage, and dry weather conditions in the river catchments. A delay in the second phase of the Lesotho Highlands gravity project means that the expected additional water is not yet available. The government is blamed for not having invested timeously in the necessary technology to address this crisis, and the role of the mining industry in the catchment area is placed under renewed public scrutiny. There is considerable alarm about contamination effects on ecosystems and human health. The Department of Water Affairs makes a decision to allow water downstream of the Vaal Barrage to exceed current salinity levels to enable more water to be provided in Gauteng. In the north of the country, water restrictions are scheduled to support energy production and ensure enough water for basic needs at municipal level.

These water restrictions affect nearly 12 million residents in three provinces. With increasing frequency, residents of middle-class suburbs find themselves queuing with buckets when domestic water supply temporarily fails.

“

Whichever way you look at it, we're going to get water price increases and water is a basic input to food cost. That starts to have some affordability issues.

”

The cost of water rises. The poor pay the highest prices as 'black markets' in water become commonplace in township areas far removed from natural unpolluted sources. There is a marked increase in the number of boreholes sunk in suburban gardens. As more groundwater is abstracted, aquifer water levels drop and boreholes are drilled deeper to track falling water levels.

2021 Pickergill's Reedfrog, already critically endangered, becomes extinct in 2021. Other critically endangered species also appear to be moving closer to extinction and, disturbingly for those concerned about food, certain species of honeybee are found to be endangered.

The mining industry, despite climbing labour costs and nearly annual violent disputes over pay increases, has continued to expand in line with national economic strategy. The industry becomes more compliant with water-use laws as a result of an earnest effort by the government to monitor and enforce water-use licences. However, the growth of coal mining to feed the

Kusile coal-fired station, newly opened in 2021, has a negative impact on water source areas and arable land in the Mpumalanga highlands, causing the need for energy-intensive interbasin transfer schemes in certain areas.

The dry conditions aggravate air quality problems around the large coal-fired power stations. Increased levels of sulphur dioxide in the atmosphere result in damage to sensitive crops including some vegetables and grains.

2022 The Russian nuclear tender is successful and building starts in 2022. Industry insiders produce graphs showing the extent to which a partial shift to nuclear energy will reduce coal mining in the longer term. However, the cost of the tender to South Africa has nearly doubled from 2018 projections. Those concerned about food security worry that this will erode state expenditure on water infrastructure, support to small-scale farmers and social grants.

Data from the global assessment of soils starts to trickle in, demonstrating unexpected declines in Africa's arable agricultural soils. It is now expected that final figures will show a worsening from the 65% in the last assessment in the 1990s. Damage from extensive farming on infertile lands, erosion of topsoils and increasing dependence on NPK fertilisers over the recent course of Africa's Green Revolution are cited as the most important of several compounding factors. In South Africa, where arable land was already in short supply, the data holds no great surprises, showing limited declines in overall soil fertility across the country. However, this is somewhat offset by improvements in fertility in some farming areas,

most notably the KwaZulu-Natal midlands, as a result of years of conservation farming practices.

2023 The dry spell enters its third year in 2023 and a drought is declared.

“

The ability of farmers to adapt to what will be increasingly unpredictable physical circumstances in which they farm, is a point of concern.

”

The restrictions on water extraction from rivers and dams are lifted under the emergency conditions, with less dilution capacity for polluted rivers. This requires more pumping and purification, which in turn require more energy. Poor water quality in the Olifants River, compounded by increased abstraction, has a negative impact on farmers who depend on the Loskop irrigation scheme. Their wheat, soya bean, maize, citrus and table grape crops suffer. Past outbreaks of toxic algae blooms under these conditions raise fears that reservoir water may be unsafe for human consumption. Aquatic species, including crocodiles, in the Olifants River are adversely affected by the rising pollution levels. Tourists start to avoid the Olifants camp in the Kruger National Park because of the reduced likelihood of seeing game in the area.

Drought conditions take hold in several major agricultural zones across the world. Global food prices spike, with significant implications for the staple food in South Africa. As the price of maize continues to rise, the amount of irrigation of maize through centre-pivots also increases, further constraining the




water resource. As almost half the maize grown goes into animal feed, predominantly for poultry, there is a significant impact on the price of meat.

2024-2029 In 2024 and 2025 rainfall improves, albeit through a number of powerful spring and summer storms that cause localised floods. In 2026 rainfall trends finally normalise. By the late 2020s, there are fewer commercial farms. Those commercial farmers who have taken advantage of grants and invested in climate mitigation infrastructure and technology – including shaded orchards and water- and energy-efficient tunnels

– are beginning to benefit from increased productivity. Water supplies have partly recovered, but water quantity remains a pressing issue with knock-on effects on irrigation. Soil conservation techniques are becoming more popular. Overall, however, national production levels have declined in the aftermath of the drought and there is increasing reliance on South Africa's neighbours for the supply of staples to support national food security. This supports the state's strategy of greater regional integration, based on sourcing from where production is most favourable and plentiful.

2030 In 2030, average temperatures are one degree Celsius higher across the region, relative to 1986–2005. There is an associated increase in internal evaporation rates in South Africa's network of dams. More extreme weather events are evident.

The inequality gap widens between those who have the resources to make a plan and those who have fewer viable options. The income streams of small-scale farmers, subsistence farmers and farm workers are drying up. Despite the fact that the urban poor are more vulnerable in 2030, the rate of urbanisation continues to rise.



The inequality gap widens between those who have the resources to make a plan and those who have fewer viable options.

Scenario 2: Seeds of possibility?

Food production



Question: What happens to food production in an unequal and polarised society?

What if... land reform does not move fast enough, resulting in land invasions?

Food is examined as... a product of farming

This scenario is driven by... land ownership pressures, climate variability and currency volatility

Storyline

2015 It is 2015 and approximately 3 million farmers and farming families are tending their fields or livestock. This number includes people who are farming to feed their own households, those who sell some surplus food locally, those who are increasingly integrated into formal supply chains, and a smaller number who produce for a globalised food market. Some are working the land themselves; some are paying others to do so. Most are women. Some of these farmers have inherited the land from generations of farmers before them, some are farming on

communal land, others work small plots of land close to their homes in villages, towns and cities across the country. Some are engaged in other livelihoods apart from producing food and do not necessarily think of themselves as 'farmers', while this is a core identity for others. Many, regardless of the scale at which they are farming, are preoccupied by the question of ownership of the land in which they have invested so much.

The first few years of this story see a steady stream of land claims, including claims on communal land by traditional leaders despite confusion about the legal eligibility of their claims. By 2019, a total of

Perception of the current reality

“ *What people are saying*

The dualism I'm talking about is the emergence of two quite different kinds of agricultural systems. We don't have much in the middle, you know.

”

400 000 restitution claims are lodged in addition to the 80 000 received during the first phase. This places a substantial burden on the national fiscus and there is speculation that the government is at risk of raising expectations it cannot meet.



Setting the scene

What the data is telling us

"In South Africa, only 13% of the land is arable, with only 3% of the arable land considered as high-potential land. As of 2012, figures show that 87% of arable land in the country was still owned by white commercial farmers. This is indicative of South Africa's dualistic agrarian structure that comprises about 35 000 large-scale, mostly white commercial farmers who produce almost all the country's marketed output, and a much larger number (approximately 4 million) of small-scale black farmers who are largely confined to the former Bantustans."³

The 50:50 redistribution of farmland proposed by the Minister of Rural Development and Land Reform in 2014 receives a series of counter-proposals from agribusiness in early 2015, followed by an inconclusive series of wider consultations. There is talk of gazetting an alternative split of 70:30 (where farm owners would retain 70% of land and farm workers would qualify for 30%), but little happens beyond the odd political speech over the two years leading up to the ruling party's national policy conference in 2017.

This is a time in which several policies, regulations and proposals relating to food security, small-scale farming, land use and water allocations are issued by the relevant government departments. The lack of coherence between them increases levels of uncertainty about the overall vision and direction for primary production in South Africa.

Several factors combine with this political aimlessness to contribute to a more volatile exchange rate. These factors include near-stagnant national economic growth, a deepening economic crisis in the European Union and violent instability in the Middle East. The rand continues to depreciate from 2015 levels, impacting negatively on input costs for farmers. Fuel, fertiliser, pesticide and implement prices all rise, but the most severe increases relate to domestic pricing issues of electricity, water and wages. Small-scale farmers take the biggest knock, although those in formal value chains benefit somewhat from the current import-parity pricing regime which links local commodity prices to international prices. Meanwhile, exporting commercial farmers cash in on the competitive trading edge created by a weaker rand.

The weather is more variable and unpredictable. In some places it is warmer and drier, in others it is warmer and wetter. Most commercial farmers continue to invest in moveable assets and technology, especially to cope with a changing climate.



The number of commercial farmers has shrunk in the recent past ... those who have remained are the core of farmers who have been able to adapt to a very, very harsh climate and also to a very harsh and pathetic market situation.



However, owing to the uncertainty while various land restitution and redistribution ideas are floated, the investment these farmers make in infrastructure and fixed assets declines. In the short term this does not impede yield and overall production levels. Small-scale farmers tend to be less prepared to adapt to a changing climate and extreme weather events. The gap between commercial and small-scale farming grows.

What the data is telling us

"Commercial food production was in decline because farmers faced uncertainties about land tenure, wage demands and an absence of supportive legislation and agricultural policies. The number of commercial farmers had dropped by at least 20 000 in the past decade, [University of Pretoria, Professor Sheryl] Hendriks said."⁴

What the data is telling us

Altogether 80 000 land claims were received during the first claim period, which closed in 1998. “[Minister] Nkwinti told Parliament journalists that 77 622 land claims from the first period had been settled by the end of March this year, resulting in the transfer of 1.6 million hectares of land to beneficiaries, benefiting 371 191 households. He said R29.2 billion had been approved for restitution processes since 1995 and R24.4 billion spent by the end of March, including slightly more than R7 billion on financial compensation for beneficiaries.”⁵

2016 The year 2016 sees the next round of local elections. Fewer voters participate than five years previously. A woman farm worker involved in the 2012 farm strikes in De Doorns appears on a TV broadcast saying, ‘Why should I vote? No one pays us any attention unless we set farms on fire. I work in the fields but my children go hungry and politicians don’t care’.

2017 At its national policy conference in 2017, the ruling party reiterates its commitment to a ‘radical and rapid break’ from historically skewed structures of farm ownership. An internal discussion paper is leaked, mooted the idea of redistributing all but the most productive 20% of commercial farmland among individual black small-scale farmers who have already proved they can sell surplus food to the market. It is proposed to offer these farmers 15 years of dedicated input, technological and marketing support. The ruling party declines to comment on this publicly, stating that this is just one of several scenarios under consideration.

2018 Sporadic land invasions take place, mostly in urban areas. In 2018, as the cut-off date for restitution claims looms, workers on a large dairy farm in Tshwane stage a dramatic and bloody farm occupation, sparking headlines worldwide. This places the spotlight on a few other smaller-scale invasions that had taken place in an ad hoc fashion across the country in recent years, largely under the public radar, most having been rapidly dealt with and the legal owners reinstated.

2019 In 2019, two months before the second phase of the land claims process closes, the results of the general elections demonstrate weakening support for the ruling party across the country, while more extreme political parties on both the left and the right increase their share of parliamentary seats.

The land claims process closes quietly in mid-2019. In the ensuing six months, the most notable development is the resignation of the Chief Land Claims Commissioner.

2020 On New Year’s Day 2020, at the height of the festive and tourism season, several hundred people from Mbekweni township near Paarl invade a wine farm in Paarl formerly owned by an apartheid-era president. A month later, one of the oldest wine estates in South Africa experiences a larger invasion by residents of Imizama Yethu township near Hout Bay. That evening, an image is beamed around the world of one of the invaders, an older man in a felt hat, kneeling down and letting a handful of earth trickle through his fingers. He says, ‘Farming is in my blood. You should see what I produce in my own backyard, without fancy

fertilisers. Just imagine how many people I could feed from all this land.’ Moving northwards, a farm of high symbolic value is targeted each month. The message is clear: racial patterns of farm ownership, rooted in apartheid but persisting 26 years into a non-racial democracy, have to change fundamentally and there is little confidence, in some quarters, that land reform will deliver this change. It is understood that the invaders enjoy the support of a political party that has made known its views on the necessity of urgent and large-scale land reform. In each case, the invaders stay for a single night and most return home, having made their point. For the most part it is a disciplined exercise, while a minority loot, cause damage to property and refuse to leave. The government appears indecisive and inconsistent in its response, mobilising violent police crackdowns in some areas and treating the invasions as a non-event in others.

Anxiety levels soar among certain sectors of the commercial farming community. Over the ensuing few years, several thousand large-scale farmers, including a small number of black commercial farmers, either leave the country to produce elsewhere, or abandon farming altogether. Livestock farmers are drawn to Botswana by incentives in



that country's strategy to diversify its economic base beyond diamond mining. Fruit, vegetable and grain farmers mostly head to Mozambique to take advantage of its ports and ongoing infrastructure development. Zambia, Zimbabwe, Namibia and the DRC also prove attractive. These farmers start exporting their products to South Africa and benefit from the free trade agreement signed between the Southern African Development Community (SADC) members to enhance regional procurement.

2022 Meanwhile, by 2022, there are some positive signs that the Agricultural Extension and Advisory Services policy, implemented since 2016, is gradually improving the scope and co-ordination of services, especially to small-scale farmers ambitious to enter more formal supply chains.

“

What I'm trying to say is you must involve smallholders in supply chains. All I'm saying is to do that effectively is going to cost the country a pretty penny.

”

A new strategy on farming co-operatives gives impetus to commodity-based marketing and retail co-operatives. This coincides with a marked change among South African retailers intent on securing local supply in view of the continuing decline of the rand. It appears that public, private and non-governmental providers of support to small-scale farmers are all starting to pull in the same direction.

While the process of adjudicating restitution claims continues to limp along, a series of large and well-publicised community-private land deals had demonstrated in recent years the potential for effective transfer of productive land. A growing number of commercial farmers perceive this option as a strategy for managing the pervasive political, economic and climatic uncertainties. They sell their land, thus shedding the business risk, receive the agreed amount by way of compensation, and then lease the land back from the new owners in a facilitated partnership arrangement.

2023

Climate instability in South Africa coincides with a clear picture of warmer temperatures across the globe and dwindling surface and groundwater supplies in multiple important agricultural zones. The production of staples declines at home and abroad. Unemployment levels rise as both the primary production and food manufacturing sectors shed jobs and food insecurity spreads. In 2023, research shows that 22 million South Africans regularly go to bed hungry.

In light of an overwhelmed fiscus, the government conducts an urgent review of spending patterns and proposes a revised social security system to supplement a smaller cash grant with food stamps.

“

As you know, the government is already subsidising food through income rather than through subsidising producers.

”



What the data is telling us

“South Africa’s social grant network has grown to be among the largest in the developing world and, for this [2014] financial year, the scheme’s expenditure is projected to reach \$12 billion. The number of people receiving grants increased from 2.4 million in 1998 to 16 million in 2011.”⁶

This becomes a key election issue for the ruling party as it heads into the 2024 elections. Public intellectuals and activists launch a vigorous critique but a sizeable number of leaders from poorer communities publicly put their weight behind food stamps. They cite household food insecurity, especially infant malnutrition, and the concern that the current child support cash-grant system encourages teenage pregnancy. According to the proposal, the elderly and parents of young children already receiving grants in both rural and urban areas would also be issued with monthly cash vouchers valid at food retailers for spending on a range of approved, nutritious foodstuffs. These retailers would qualify by procuring a set proportion of their fresh produce from local small- and medium-scale farmers.

2024 In the 2024 national and provincial elections, the ruling party wins back some of the ground it had lost in 2019, despite widespread speculation that its support would continue to decline. The party interprets this as approval for the food-stamp plan and moves into a three-year implementation phase that includes seeking international support to upscale the programme, incorporating lessons

learned from BRICS and other countries that have successfully delivered food-stamp programmes.

2025 The land restitution process continues to move slowly. From 2025, there are several precedent-setting decisions to return communal land to traditional leaders who had submitted claims for dispossession predating 1913. In some high-profile cases, platinum exploration deals are signed by traditional leaders in Limpopo, triggering waves of controversy and conflict among their subjects.

2027 In 2027, a series of extreme weather events creates unprecedented damage, heightening farmers’ fears of the impacts of climate change. Retailers ramp up investment in crop insurance and advanced irrigation systems for their smaller-scale local suppliers.

2028 As a growing number of successful large- and medium-scale black farmers become established, the dualism that has characterised primary production starts to blur. By 2028, although the total number of commercial farmers has declined from 35 000 in 2015 to 30 000, nearly 30% are black. Altogether 250 000 small-scale farmers are operating in both formal and informal value chains. Many of them aspire to grow their business and are optimistic that they can do so. These numbers are hailed as a major success. The average age of commercial farmers exceeds 60 years. Some are concerned about this while others shrug off the issue of age, noting that this figure is no

higher than the average age of business people in the rest of the South African economy.

2030 By 2030, local production is not yet at the targets set by the government, which is concerned about food security, or by retailers, which are concerned about security of supply.



“

One of the things that keeps me up at night is our very thin pipeline for succession planning for farmers. I think the pool of farmers is a very big risk.

”

Scenario 3: Kernels of truth?

Food in the political economy



Question: Will the government and the private sector work together to address inequality and unaffordable food prices?

What if... rising living costs and broken government promises catalyse a powerful and organised national response from those most affected by hunger?

Food is examined as... a product of the political economy

This scenario is driven by... food prices and the affordability of food in the South African context, hunger, organised social movements and the relationship between the market and the state

Storyline

2015 It is 2015 and the rand continues to depreciate, driving up exports. As more South African produce is sold on the world market, prices are exposed to international market volatility. Imports cost more. Global oil prices climb once again, after a short-lived period of cheaper oil. Variable weather patterns create greater risks for agribusiness. All these factors push up food prices, which continue to outstrip wage increases

Perception of the current reality

“ *What people are saying*
The pricing of commodities being internationally driven doesn't really help our cause of responsible production.

”

Setting the scene

What the data is telling us

‘The 2014 PACSA Food Price Barometer has shown that as economic pressures increase on households and certain foods become unaffordable, households substitute those foods with cheaper products. These cheaper products have now become unaffordable, leaving households with no further choices but hunger (maize meal increased by 6.98%, brown bread by 8.51%, cake flour by 13.88%, potatoes by 29.42%, chicken by 17.45%, cabbage by 19.25%, fresh milk by 21.64%). The protests that are mushrooming across the country and the increasingly protracted and violent wage strikes are indicative of the situation in which workers can no longer afford to feed their families on their low wages. Unless wages can increase and food prices and the costs of electricity, transport and household debt come down, the working class will soon approach its tipping point and we will enter a new age of hunger riots and food protests.’⁷

of the working poor and annual social grant increases. The price of electricity rises by nearly 13% in this year. The majority of consumers keep tightening their belts.

In late 2015, research into the food baskets of lower-income households indicates that a threshold has been breached and that those who had managed to absorb food price increases by eating cheaper food in smaller quantities now have little room left in their budgets with which to manoeuvre. The problem of hunger is in the spotlight, receiving renewed attention from researchers and the media, and sparking lively debates about the validity of research data and its interpretations.

“

Affordability of food is generally our biggest problem in South Africa. And this is not because food is too expensive. Our food is some of the cheapest in the world. It is because people don't have the means. There are not enough jobs. That is where the problem comes in.

”

Progressive political groups and social movements gather at the end of the year to launch a Right to Food Coalition. Although it is not as big as had been touted, the launch does represent a wide spectrum of organisations. They seem to have found a rallying call which unites the left around an inspiring vision of food sovereignty – claiming people's right to choose what food they eat and how it is produced – rather than around a negative campaign issue.

2016

In the lead-up to the 2016 local elections, more people are declared indigent, reducing income for many municipalities. This further accelerates the trend of reduced service provision and heightened protest. A relatively new political party with a strong worker constituency makes its first foray into the polls during the local

elections in 2016, gaining seats in the Nelson Mandela Municipality, on the East Rand and in Tshwane.

2017

Major supermarket chains continue to expand into the rural areas of South Africa, and across the continent. In 2017, South Africa's largest food retail chain announces the opening of its 1 500th store on the African continent, electing to situate it in Steynsburg in the Eastern Cape. The age of 'rural malls', as some say, has arrived.

“

More food goes through supermarkets in South Africa than anywhere else in the world, which then drives, transforms the value chain.

”



Meanwhile, farmers' markets and local markets also continue to spring up across the country, often pioneered by young social entrepreneurs who see the opportunity to bridge the gap between smaller – and usually organic – producers, and consumers. There is much talk of localising food chains and reducing food miles. Increasingly, these are not just weekend affairs, but become a more established fixture in middle-class suburbs across South Africa.

The ruling party's national policy conference is held.

2018 In 2018, the National Electricity Regulator of South Africa (NERSA) approves Eskom's proposal to hike electricity prices by 15%.

These trends, and amplified discontent about the impact of increasing food costs on citizens, reinvigorates discussion about the government's role in material redistribution, in regulating trade and markets, and in the affordability of food.

“ I'm a free-market capitalist, but there are 12 million currently in South Africa who are food-insecure. Our system is not optimal because it is very much controlled by monopolies. So I think the system is distorted and there's certainly a lack of transparency. ”

2019 Food looms large in the 2019 election campaigns and several parties hand out hampers of food while on the campaign trail. The ruling party tells poorer voters: 'Your time has come!' and promises to increase the range of basic food items eligible for zero-rating of value-added tax (VAT), among other pro-poor strategies in their election manifesto. The labour party's slogan is 'Hungry for change: Jobs and food for all'. The ruling party's support shrinks at the polls but it retains a majority.

Within weeks of the elections, it becomes clear that the government's fear of antagonising investors and compromising economic growth outweighs other loyalties and priorities. Hunger is the match that sparks anger all over the country in what is seen as a series of broken promises. Food riots rage for several days.

“ I think a very important current driver is the involvement of multi-national companies in our market ... So you've got the A, B, C, Ds here now. A is ADM, B is Bunge, C is Cargill, and D is Dreyfuss, Louis Dreyfus. All of them are here now. ”

Worries about a full-scale descent into social chaos are held in check for the time being by the Right to Food Coalition. Having managed to frame the issues of hunger in a convincing way over the last four years, and having forged strong relationships across religious and civil society structures, they seize the opportunity that presents itself. Over a matter of days, taking

advantage of social media, the coalition organises a million-person march through the streets of Johannesburg in mid-2019. Coalition leaders' voices converge around the issue of food, putting pressure on the state and the food industry to bring food prices down. Research into the food price weighting in the Consumer Price Index gives impetus to demands for a revision of the CPI as it relates to food, as well as a call for increased wages. Amid accusations of collusion between actors in the food industry, the Coalition demands an inquiry into food pricing.

The Minister of Trade and Industry and an agribusiness CEO appear in a live television debate with a spokesperson from the Right to Food Coalition. Facing the charge that the state is sitting by while citizens starve, the Minister, her palms in the air, says: 'South Africa is part of a global food economy. We are signed up to the World Trade Organization. There is nothing we can do to regulate food prices. Any talk of food sovereignty is a fantasy.' The agribusiness CEO adds, 'If government regulates food prices that will only worsen the food situation. Let market forces sort out the prices'.

2020 Due to higher inflation in South Africa compared to other major economies, the rand continues to weaken. In early 2020, the rand/dollar exchange rate is R15 to one US dollar. The prices of imported food rise accordingly. A heavy carbon tax imposed by trade partners in developed countries pushes the price of food still higher.

The mood in poorer households across the country is grim. Short-term measures are put in place to increase the distribution of food

parcels and the setting up of soup kitchens in every available community and church hall. International humanitarian organisations and municipal disaster-management teams monitor the situation and plug gaps when particular townships or informal settlements tip into emergency.

This sense of teetering on the brink of crisis prompts urgent discussions between the state and the private sector and a discernible shift in rhetoric develops as the discussions continue. Together, they announce a 'New Deal Food Pact', which involves unprecedented levels of infrastructural and logistical investment in local food production, particularly among small-scale farmers. Transnational food companies operating in South Africa are persuaded to put their weight behind the Food Pact.

“

I think the current food system is one in which, and I'm going to be shot for this, there are too many players. The cost of it becomes astronomical because everybody along the way is trying to make a living out of this food product.

”

This coincides with the scaling up of the new National Extension and Advisory Services policy. For several years prior to 2020, major retailers had expressed interest in increasing their procurement from small-scale farmers, but had complained about the many obstacles to recruiting farmers, formalising these agreements and realising an economically viable strategy that also appealed to their shareholders.

The state then moves to address these impediments and play a more interventionist role, following a reframed mantra: 'When the playing fields are not level, careful regulation helps create access to markets, triggering markets to stimulate growth once more'.

This strategy includes support to primary production through hybrid commercial and smallholder co-operatives. Plans are implemented to iron out specific problems in South Africa's agricultural economy, such as bringing down the production costs of chicken feed. Meanwhile, major logistics routes engineered through the National Infrastructure Plan start to come online. Production gradually increases and so does employment in the agricultural industry. The cost of national and regional distribution starts to fall and South Africa's export to neighbouring countries grows.

2023 From 2023, the volume of agricultural imports drops. Food price increases start to level off. This is partly attributed to the increase in competition in the food market through the meaningful entrance of more small producers and agro-processors. However, the impact on prices is more modest than expected; affordability and hunger remain serious problems for many. Trade unions and others renew the call for a price inquiry. This time, they are joined by a large national agricultural and farmers' union representing members who claim they are being squeezed for price as never before, but that this is not reflected in the prices of their products on supermarket shelves. Scrutiny turns to the role of intermediaries in the supply chain and the costs of processing, distribution, marketing and retail.

What the data is telling us

"In terms of exports of agricultural products by South Africa during 2013, the five largest trading partners were the Netherlands, with exports to the value of R7 604m, the United Kingdom (R6 261m), Zimbabwe (R5 639m), Mozambique (R4 325m) and Japan (R3 472m). The five largest trading partners from whom South Africa imported agricultural products during 2013 were Argentina, with imports valued at R5 536 million, Brazil (R4 728m), China (R4 528m), the United Kingdom (R3 839m) and the Netherlands (R3 128m)."⁸

Questions are raised about the influence of buyers and the futures trade in agricultural commodities.

2029 Having narrowly won the 2024 elections on the back of action to address the food crisis, the ruling party loses the 2029 elections. In its place a new party is swept into power, largely through the ballot of poorer voters. The Right to Food Coalition is one of several social movements credited with bringing the key needs and rights of people into public consciousness issues and for convincing disillusioned young and disempowered citizens to vote. In its first 100 days in office, the new government enters talks with other BRICS countries experiencing severe food insecurity. It is rumoured that they are exploring co-ordinated opposition to the World Trade Organization (WTO). On the domestic front, they launch an inquiry into food pricing and profit margins related to specific staples. The inquiry is widened to include the impact of employment patterns and social grants, particularly on the affordability of food.

Scenario 4: Empty husks?

Food as nutrition



Setting the scene

What the data is telling us

"For all children, the prevalence of stunting in 2012 was 15.4%, of severe stunting 3.8%, of wasting and severe wasting 2.9% and 0.8%, respectively, and of underweight and severe underweight 5.8% and 1.1%."⁹

Question: Why do people eat the food they do?

What if... the crisis of malnutrition significantly dents South Africa's economic growth and social prosperity?

Food is examined as... a source of health, well-being and productivity

This scenario is driven by... urbanisation, low education outcomes, a growing burden of lifestyle diseases, increased nutrition awareness and increased food regulation by the state

Storyline

2015 It is 2015 and the problem of malnutrition is increasingly recognised as one of both under-eating and over-eating. As South Africa establishes itself as one of the most obese countries in the world, questions of food quantity and food quality come under the spotlight, with growing attention on the affordability of nutritious food.

During this period, the 2012 National Infrastructure Plan firmly establishes itself as one of the cornerstones of South Africa's New Growth Path. Construction starts on most of the 18 Strategic Integrated Projects (SIPs), creating transport infrastructure and logistical corridors, and building and upgrading ports, hospitals, schools and industrial facilities across the country. With approximately R3.6 trillion allocated over the

Perception of the current reality



What people are saying

There's this whole contradiction of people facing hunger and yet, South Africa being one of the most overweight societies in the world and, partly people not understanding the right foods to eat, but also partly because they don't have access to the right foods to eat ... So, eating loads and loads of starches will eventually make you fat.





What the data is telling us

"Under-nutrition is responsible for 45% of deaths of children younger than 5 years, amounting to more than 3 million deaths each year."¹⁰

period until 2023, this infrastructure development accelerates the rate at which rural dwellers migrate to South Africa's towns and cities in search of jobs.

“

As the population starts to move from being very rural and deeply poor, into higher income, their protein needs change ... a rich man's diet needs so much more energy to produce than a poor man's diet.

”

Some SIPS projects have a distinctly rural focus and so other rural job seekers elect to stay close to home, creating instead more concentrated settlements around specific development nodes.

2016

There is also an optimistic mood in education. In pursuit of the National Development Plan (NDP) objective

to increase enrolment at universities by 70% by 2030, ambitious pre-school to Grade 12 education reforms are announced in 2016, the year in which local elections are held. These reforms are rolled out from the beginning of the 2018 school year, with the expectation that the cohort of current Grade 8s will demonstrate a first round of improved matriculation results at the end of 2022. These reforms include a more comprehensive package of school feeding programmes based on existing models, which are, however, envisaged to operate within current constraints of food supply and food storage capacity.

It seems, to the lay person, that more people are thinking and talking about nutrition. Conversation around the dinner tables of the middle class and wealthy regularly turns to the pros and cons of a low-carbohydrate diet. Suburban supermarkets are devoting more shelf space to wheat-free, gluten-free and dairy-free products. Meanwhile, as informal settlements grow and as low-cost apartment

What the data is telling us

"The 165 million children with stunted growth in 2011 have compromised cognitive development and physical capabilities, making yet another generation less productive than they would have otherwise been."¹¹

blocks close to SIPS projects threaten to burst at the seams, most inhabitants seek to keep their living costs as low as possible. Few invest in luxuries such as fridges, and many lack place or the means to cook. Spaza shops and pavement food vendors abound: from early morning, the smell of deep-fried food fills the air. In rural settlements across the country, mothers and grandmothers murmur with concern over half-empty cooking pots. Sometimes these pots simply contain boiling water and sugar so that their children have something in their stomachs before going to bed. More research is being done on the nutritional content of the average monthly food basket of

What the data is telling us

"Three out of four children in the Western Cape come to school hungry every day."¹²

poorer households. The South African National Health and Nutrition Examination Survey (SANHANES), first published in 2013, becomes a regular fixture, creating a platform for research by the World Health Organization (WHO), Oxfam and others. This information, in turn, forms the basis for a series of nation-wide campaigns on food security and nutrition.

At a policy level, restrictions on the amount of salt permissible in processed foods kicks in from 2016. The Department of Health watches closely to assess levels of compliance in the food industry, and to start monitoring health impacts on consumers. Around this time, salt shakers start to disappear from restaurant tables.

2017 The 2017 national policy conference of the ruling party reaffirms its commitment to the principle of addressing the social determinants of health. It names nutrition as one such key social determinant, especially in early childhood. National Health Insurance (NHI) remains the strategy for preventing illness and providing primary healthcare in a more equitable fashion. As one party leader says: 'Whatever NHI costs, it will be worth it for our people'.

2019 The ruling party sustains its 2014 majority in the general elections by a similar margin on the back of promises to translate these significant investments in infrastructure, education and health into sustained national economic growth and greater wealth and well-being for all citizens.

2020 Although the introduction of NHI is lagging behind initial time-frames, by 2020 the pilot phase has been completed in all nine provinces, over 100 nursing colleges have been refurbished or built, and six flagship state hospitals are nearing completion. Around this time, research indicates that there is a much steeper increase in non-communicable diseases than had been projected, signifying a need to review primary healthcare planning. 'Lifestyle' diseases, including cardiovascular disease, diabetes and hypertension, compound pressure on the state health system. There is broad consensus that diet is largely responsible and that cheaper foodstuffs high in energy but low in vitamins and minerals are contributing to obesity in South Africa.

“Some of my major concerns have been cheap, widely accessible and low-quality maize meal that people are eating, sealing potentially a massive diabetes epidemic. So, I'm concerned about the lack of choice and, even when the choice is there, the marketing that steers people towards a very poor quality food that's creating a whole lot of secondary health problems.”

“The more and more we industrialise the production of food, the more and more we've got to have all this other rubbish in it.”

What the data is telling us

"9 159 773 learners received daily meals through the National School Nutrition Programme (NSNP) in the 2012/2013 financial year, 13 254 more than the previous year."¹³

Obesity is not just an issue for poor consumers, however: the girth of the middle class is also expanding. An opposition Member of Parliament hits the headlines with a speech about the New Growth Path being a more apt description of the national waistline than of the national economy.

Meanwhile, as concern mounts about the knock-on effects of the affordability of NHI, the government announces a 'sin tax' on sugar-sweetened and carbonated beverages. Manufacturers in the beverages industry, forewarned of this development, are trialling new recipes. The local sugar industry, which has been investing in distilleries attached to existing sugar mills, indicates that it will be ready to contribute ethanol at a meaningful scale to the national energy mix by 2025.

What the data is telling us

"Over 60% of South Africans are overweight, making South Africa 'the most obese country in sub-Saharan Africa' and 'the third-heaviest nation in the world.'"¹⁴

Food processors and retailers catch the trend about nutrition awareness. Supermarkets compete for consumer attention on the basis of in-store food nutrition campaigns, promoting the health benefits of certain fresh produce and fortified foods. Marketing campaigns increasingly promote 'three for the price of two' on healthy produce and sugar-free products. Detractors

What the data is telling us

"At a body mass index (BMI) of 45, life expectancy in males can decrease by up to 20 years and up to eight years in females."¹⁵

state that 'sin taxes' and nutrition education have been shown to have little impact on consumption patterns. Instead, they argue for material incentives at a macro-level, such as subsidies to agro-processors to reinforce grains and maize with vitamin supplements, and investment in local protein-rich products. One specific proposal is to convert 300 000 tonnes of fishmeal from local sardine and anchovy catch into products for human consumption.

What the data is telling us

"In South Africa, moderate obesity (BMI 30–35) is associated with an 11% increase in healthcare costs and severe obesity (BMI 35+) with a 23% increase."¹⁶

2023 The year 2023 proves to be a watershed year.

Several of the SIPS infrastructure projects are seriously behind schedule. Delayed energy generation and manufacturing projects create ripples of disturbance among investors and prospective beneficiaries alike. One of the culprits seems to be a high incidence of absenteeism in the building industry. This is exacerbated by strike action as labourers' wage increases lag further and further behind inflation. Some employers, observing growing levels of lethargy among their workers, institute workplace feeding schemes.

This is also the year in which the 2022 matric results are analysed. They prove to be disappointingly low, indicating that the first cohort to benefit from five consistent years of education reform did not achieve

the academic standard expected. What catches the attention of the state, the private sector and the general public alike is that children from a wide range of backgrounds and income levels show similar patterns of underperformance. The only way to meet the university enrolment goal by 2030 will be to significantly drop entrance criteria. The Minister of Education seems to entertain this possibility, unleashing a storm of debate.

What the data is telling us

"With 6.3 million people living with high blood pressure, South Africa has one of the highest rates of hypertension worldwide."¹⁷

2026 At the same time the health system begins to buckle under the burden of non-communicable diseases. In 2026 – the year NHI is intended to realise its objective of quality universal healthcare following unprecedented investment in infrastructure, capacity and systems – the Presidency commissions a review (with support from National Treasury) to try to get to grips with education and health outcomes, and their effect on productivity levels.

2028 The report, released in 2028, makes explicit the direct links between nutrition and educational, health and productivity outcomes, as well as earning potential. It draws attention to nutritional deficits of both middle-class and poor children in schools. Although the eating patterns and diets are different, both groups show signs of malnourishment and both demonstrate a negative impact on performance, with suspected life-long after-effects.

What the data is telling us

"According to World Action on Salt and Health (WASH), burgers from four of South Africa's most popular fast-food chains have been found to contain up to 2.47g of salt per burger. WHO [World Health Organization] recommends 4–6 g daily."¹⁸

2030 By 2030 the questions remain: What will translate this causal awareness into different food choices and changed behaviour at all levels of the South African food system? Is there more that can be done now, or will it take another generation to correct?

What the data is telling us

"Nutrition and urban lifestyle-related diseases include diabetes, cardiovascular heart disease, hypertension, asthma, cancer and mental illness (especially depression). Dietary quality has therefore become a very important health issue in the context of rapid urbanization and the nutrition transition. The double burden of disease illustrates the very real consequences of dietary changes in urban contexts."¹⁹





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