

IS SOUTH AFRICA OPERATING IN A SAFE AND JUST SPACE?

Using the doughnut model to explore environmental sustainability and social justice

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The world has entered an era of unprecedented environmental change and social inequality. South Africa is no exception having suffered unique challenges following decades of injustice under apartheid. The future of South Africa depends on the country's ability to end social deprivation and manage environmental stress, enabling its people to live in a space where it is both safe and just for humanity to exist.

This paper uses Oxfam's 'doughnut model' to describe the multi-dimensional nature of poverty and environmental change, providing a snapshot of South Africa's current position against the suggested set of domains and indicators. It reveals that a significant proportion of South Africans are living below the social floor, while the country has already crossed its safe environmental boundaries for climate change, freshwater use, biodiversity loss and marine harvesting.

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EXECUTIVE SUMMARY

The world faces twin challenges: delivering a decent standard of living for everyone, while living within our environmental limits. These two interwoven concerns are depicted by Oxfam's 'doughnut model', which provides a visual representation of a space between an environmental ceiling (the outer edge of the doughnut) and a social foundation (the inner edge), where it is environmentally safe and socially just for humanity to exist.

Oxfam's new paper – 'Is South Africa Operating in a Safe and Just Space?' – applies this concept to South Africa in order to assess the country's performance across a range of environmental and social domains. It identifies where policy interventions are most needed to help develop a 'safe and just' society and economy.

Background

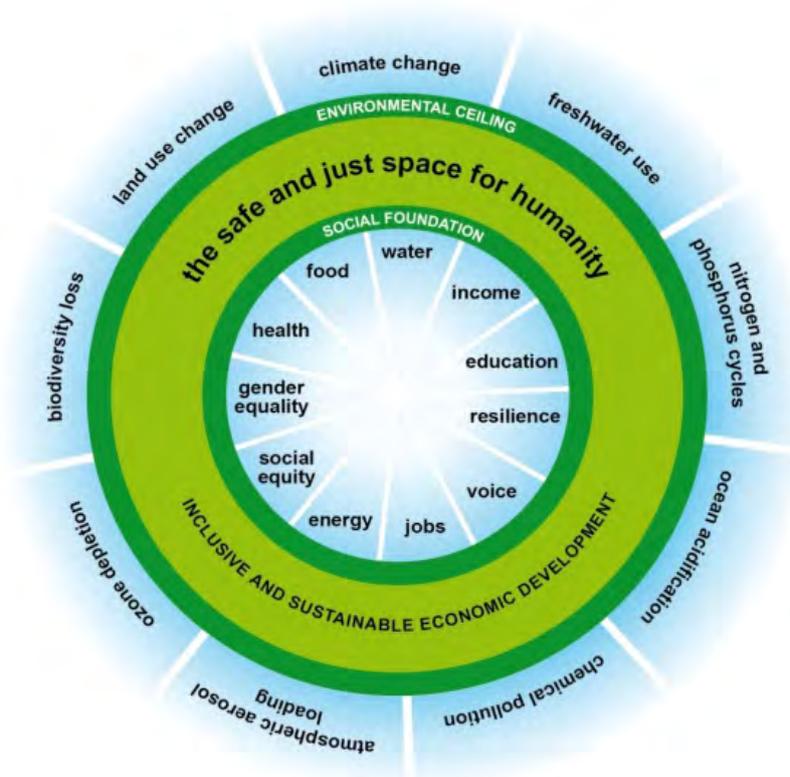
The original doughnut model, developed by Kate Raworth, former Oxfam senior researcher, focused on a global perspective (Raworth, 2012). This incorporated earlier work from a team of leading earth system scientists including Johan Rockström, Will Steffen, the Stockholm Resilience Centre (SRC) and the Stockholm Environmental Institute (SEI), who identified a range of environmental domains that are critical for the continued safe operation of the planet (Rockström et al, 2009). In their paper 'Planetary Boundaries: Exploring the Safe Operating Space for Humanity', they highlighted the risk of crossing critical thresholds in the Earth's biophysical processes and sought to identify planetary boundaries, or tipping points, beyond which vital Earth systems would become unpredictable and/or unsafe.

Though not without its critics, the planetary boundary approach has been used by the UN and the European Commission, and by many civil society organisations. In 2013, the SRC and SEI sought to develop a methodology to apply this approach at a national level, using Sweden as an example (SRC and SEI, 2013). In 2015, the planetary boundaries were updated by Steffen et al (2015).

Changes within these processes, driven by human activity, are already causing severe adverse impacts on weather systems, as well as our ability to produce food and the availability of fresh water. The boundaries for planetary loss of biodiversity and the nitrogen cycle have already been breached, while the climate change boundary is dangerously close to being breached. The updated report from Steffen et al. shows that the safe limit has also now been breached in regards to the phosphorus cycle.¹

Raworth's work combined this 'environmental ceiling' with a proposed 'social foundation' below which it was 'unjust' for people to fall. The combination of environmental ceiling and social foundation is presented diagrammatically in what has become known as the 'Oxfam doughnut model' (Figure 1).

Figure 1: Oxfam's Global Doughnut



The discussion paper downscales the global doughnut model by assessing the extent to which conditions in South Africa exist below the environmental ceiling and above the social foundation (see Cole et al, 2014). It uses 22 indicators to describe environmental and socio-economic systems, while highlighting the interdependent nature of those systems and identifying where people and the environment face unacceptable and dangerous stresses.

This national doughnut report has been produced in order to help shape South Africa's development pathway by informing policy making through the delivery of strategic information on environmental and social problems, identifying key causal factors, monitoring the effects of policy responses and raising public awareness.

The South African report firstly identifies the social and environmental domains used for the national doughnut and goes on to examine performance within the respective domains. It then explores some policy implications that flow from this analysis.

Developing a social foundation

South Africa faces the 'triple challenge' of poverty, inequality and unemployment. It has one of the highest official unemployment rates in the world (25 percent) and is one of the most unequal countries, with a Gini coefficient of 0.69 (Department of Performance Management and Evaluation, 2013). The wealthiest 4 percent of households receive 32 percent of total income while 66 percent of households receive only 21 percent of all income (Visagie, 2013). Over half of South Africans live below the national poverty line and more than 10 percent live in extreme poverty, on less than \$1.25 per day. The hopes of 54 million people depend on South Africa's ability to address such injustices and end social deprivation.

The 'social foundation' developed for South Africa consists of energy, water, sanitation, housing, education, health care, voice, jobs, income, household goods, food security and safety.

A significant proportion of people are living below a decent social foundation as defined by the selected domains and thresholds. This is particularly true in the areas of jobs, safety and income, the latter two of which have seen deteriorations since 1994.

The South African government has an ambitious target of 5.4 percent growth in gross domestic product (GDP) and 11 million new jobs by 2030. However, the achievement of that GDP growth will ring hollow if significant numbers of people are left below the social foundation. Growth for its own sake is insufficient – it must be good-quality growth that works for the poorest people first and foremost and significantly reduces inequalities.

Table 1 shows how the situation across these domains has changed between 1994 and 2012.

An environmental ceiling

Just as the social deprivations listed above constrain the lives of so many citizens, severe environmental stresses are widespread as fresh water and food supplies are under pressure, air quality is in many places damaging health and carbon emissions breach safe levels and add to the pressure of climate change. The poorest citizens are often those least likely to contribute to such environmental stresses as, for example, 24 percent of the population have no access to electricity. However, they are most likely to feel the negative impacts, as food prices mean that 23 percent cannot afford an adequate diet.

The environmental domains developed for the South African doughnut are climate change, ozone depletion, freshwater use, arable land use, biodiversity loss, marine harvesting, phosphorous and nitrogen cycles, air pollution and chemical pollution. The domains developed by Rockström et al. were used as a starting point, but were adapted to reflect various selection criteria, including an assessment as to whether they reflected the key social concerns in South Africa.

The country has crossed its safe environmental boundaries for climate change, freshwater use, biodiversity loss and marine harvesting and is within 10 percent of crossing the boundaries for arable land use, phosphorous loading and air pollution.

Key findings: The South African doughnut model

Figure 2: The South African doughnut

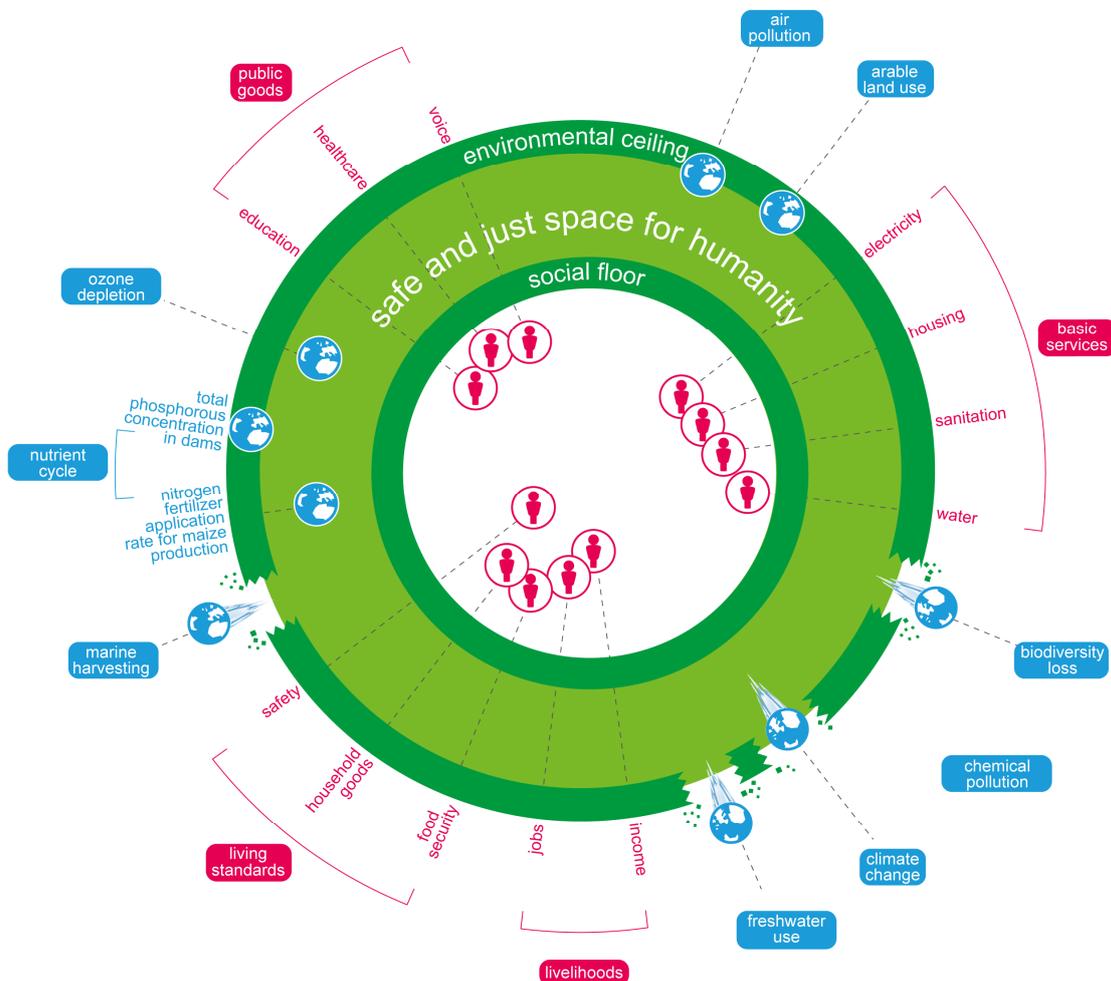


Figure 2 combines South Africa’s social and environmental performance, highlighting key environmental and social factors that need to be addressed if a more just and sustainable socio-economic model is to be developed.

Development must give due regard to the environmental limits highlighted here, as the services provided by the country’s natural resources are under increasing threat. Urbanisation, population growth and industrial developments create stresses on freshwater supplies, land productivity, the seas and air quality. All of this is happening within the context of global climate change, which adds to local and global stresses on food and freshwater supplies.

It is also clear that, while GDP growth in South Africa may be able to help lift the living standards of some its people, the benefits of development must be directed to the poorest and most excluded in society if the deprivations shown above are to be tackled. Thus, for growth to be safe and just, it is fundamental that it simultaneously tackles environmental stress and inequality.

Key policy focus areas have been identified for each of the domains of the social foundation and environmental ceiling (Tables 1 and 2), while specific recommendations are listed below. In addition, three cross-cutting areas are highlighted: good governance, spatial development planning and green jobs.

Good governance: South Africa has a highly respected progressive Constitution and all the institutional elements to ensure good governance, but governance failings at local through to national levels have been highlighted by recent audits (Auditor-General, South Africa, 2014). These must be addressed if the other factors of sustainable development are to be effectively implemented.

Spatial development: Both environmental and social dimensions have important spatial elements. For example, arable land and water resources are concentrated in certain parts of the country and need to be protected against unchecked industrialisation and urbanisation. One of the legacies of apartheid is a high degree of spatial inequality, with the former homelands still experiencing the greatest levels of deprivation. This causes migration between provinces and from rural to urban areas, increasing the pressure on public goods and services in the major cities while leaving behind the most vulnerable people in the most deprived areas. All levels of government are required to create Spatial Development Plans and these provide ideal opportunities to integrate social, economic and environmental aspects of development.

Green jobs: An estimated 816,000 'green' jobs could be created in South Africa by 2025 across the areas of natural resource management (biodiversity, water and land), energy generation, energy efficiency and pollution management. The One Million Climate Jobs campaign² is already pushing for this to be made a reality, and it must be supported.

Key recommendations

A wide range of actions and interventions are required, including new ways of undertaking business, developing measures of progress which go beyond GDP, support for community-led change, encouragement of supportive industries, participatory mechanisms of democracy, policies that reduce inequality and governments and companies being accountable to citizens.

The report's key recommendations include the following:

Governance

- Failings of governance at all levels must be addressed if sustainable development is to be effectively delivered.
- The economic development model in South Africa needs to be re-examined in order to build an economy which fits within the 'safe and just space'.
- National Development Plan (NDP) processes, which pursue GDP growth, must explicitly deliver measures that address the quality and distribution of growth.
- The fight against inequality and hunger must be positioned at the heart of the low-carbon agenda, with economic development assessed against delivery on these goals.
- More coordinated policy development is required at higher planning levels – for example, mining policy should be coordinated with water and food security policies. A National Food Act could hold all parts of government accountable, so that mining concessions are not automatically granted without considering the impacts on local water and food security.
- A greater understanding is needed amongst policy makers of the link between environment and social factors across all departments, not just the Department of Environmental Affairs.
- The National Strategy for Sustainable Development needs to be updated and scaled up to be more effective, and aligned with the NDP.

Spatial development

- Spatial development planning is required to address the apartheid legacy of spatial inequality; this should integrate data at multiple scales and in multiple areas. This is particularly important for managing South Africa's strategic water sources, arable land and mineral resources.
- The Spatial Development Plans required at all levels of government provide a significant opportunity to integrate social and environmental priorities into development planning. The doughnut model could be used to test that all aspects have been covered.

Jobs and education

- Campaigners are calling for one million climate jobs to be created; the potential has been recognised and now needs to be acted upon.
- The government is investing over 20 percent of its annual budget on education, but with poor outcomes. This investment needs to be targeted to ensure that skills are developed that ultimately result in reduced inequality, job creation and poverty alleviation.
- As global and local environmental changes accelerate, it will be critical to have the best possible science, technology, data and monitoring capabilities in order to adapt and make the right decisions. For this reason, investing in technological and scientific education should be a priority.

Voice

- South Africa's social foundation needs to be determined by its citizens, and the voices of the poorest and most vulnerable people need to be heard in national debates. Social attitudes surveys and participation in local planning processes can contribute to making this a reality.
- Further research on inequality in access to, and use of, services, public goods and natural resources is required in South Africa. The extreme inequality evident in incomes is not limited to wages and wealth, but also encompasses the means of obtaining them and a broader quality of life.
- Breaking down the silos between development and environment to create a more holistic picture will enable civil society to call for effective solutions.

Leadership

- South Africa's leadership as a middle-income developing country in international climate change policy and its commitment to a set of goals for action on climate change, which are ambitious by international comparison, need to be matched by delivery on both climate change and poverty reduction.
- South Africa should take a positive and influential leadership role in Africa and globally, through the African Union, the BRICS group, the G20 and UN processes.

South Africa needs to invest in its people and in its natural capital, while respecting global limits. The environment is central to the future prosperity of all South Africans and the country cannot move forward together without bringing along the majority who still live in poverty.

'If you want to go fast, go alone. If you want to go far, go together.' African proverb

1 INTRODUCTION: LIVING IN THE ANTHROPOCENE

Our planet is under pressure. We are living in the Anthropocene – an era where humans are influencing the Earth’s biophysical processes at a global scale (Steffen et al. 2011). While this process was initiated by the industrial revolution in the 1700s, it has accelerated in the past 50 years, during which time global consumption of food, fresh water and fossil fuels has more than tripled (Foley 2010). In 2012, the global population exceeded 7 billion and it is expected to reach 9.55 billion by 2050 (UN Department of Economics and Social Affairs 2012). By 2030, we will probably need 45 percent more energy, 50 percent more food and 30 per cent more water to support this growing population (UN Secretary General’s High-Level Panel on Global Sustainability 2012).

While many people have experienced a higher standard of living as a result of resource consumption, millions still live in poverty and nearly 870 million people face hunger today (FAO et al. 2012). The richest people have used and continue to use the vast majority of the world’s resources: for example, 50 percent of carbon emissions are generated by just 11 percent of people (Raworth 2012).

This skewed pattern of resource use mirrors the skewed distribution of wealth and income: almost half of the world’s wealth is now owned by just 1 percent of the population; this small group owns 65 times the total wealth of the bottom half of the global population (Oxfam 2014). The capture of post-economic crisis growth by the 1 percent is leaving the poorest people even poorer. The World Economic Forum’s Global Risk Report for 2014 rated inequality as the fourth biggest global risk for the decade, (World Economic Forum 2014) and the International Monetary Fund has said that inequality is dangerous and hinders growth (Berg & Ostry 2011).

Our generation faces the dual challenges of global resource constraints and extreme poverty and inequality, and addressing them requires an integrated approach to governance and policy making.

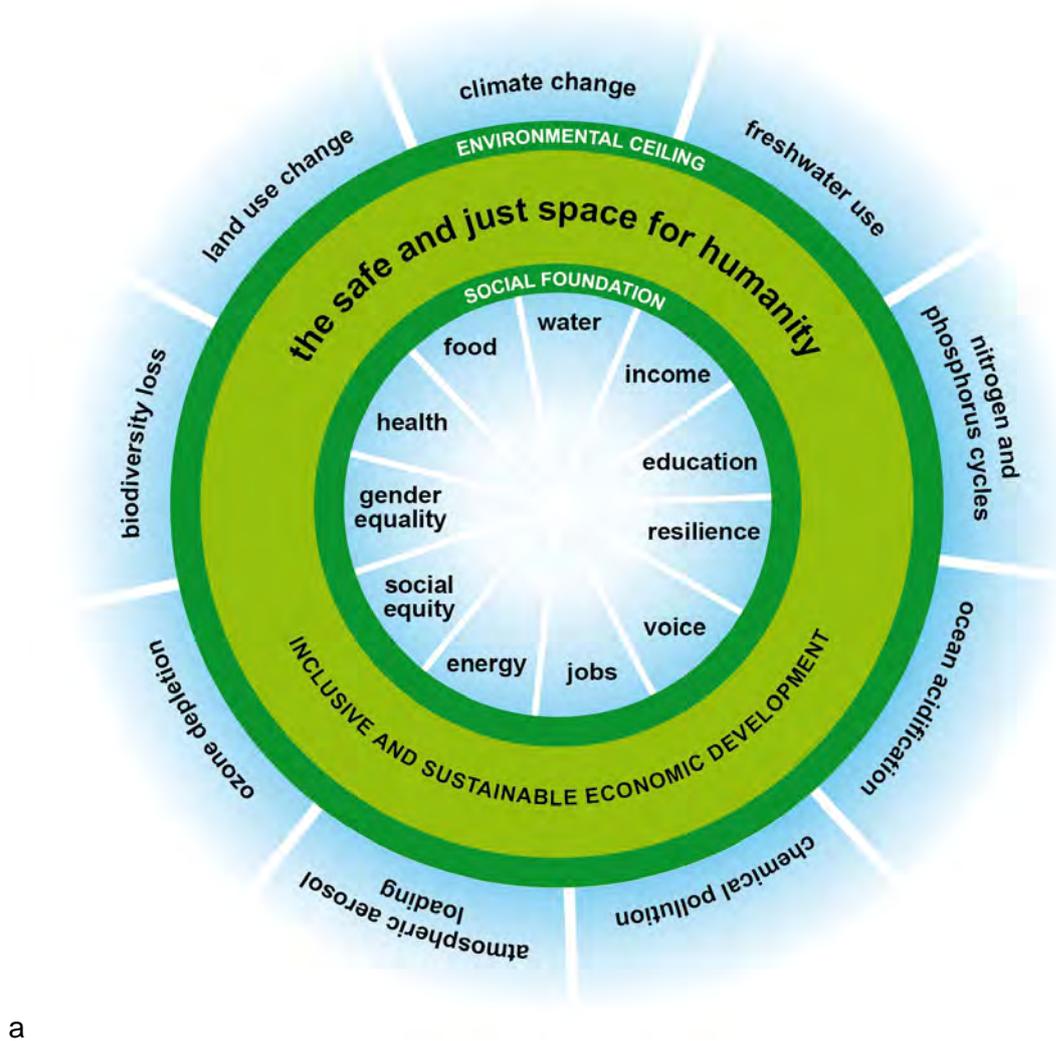
A SAFE AND JUST SPACE FOR HUMANITY

In February 2012, Oxfam published a discussion paper (Raworth 2012) by Kate Raworth on the ‘safe and just space for humanity’. This presented a visual framework for sustainable development, referred to as the ‘doughnut’ (see Figure 1), which highlights the multi-dimensional nature of deprivation and environmental change. The framework has a social foundation, below which there exists unacceptable human deprivation, and an environmental ceiling, above which exists unacceptable environmental degradation. This framework built on the ‘planetary boundaries’ concept proposed by a group of 29 leading Earth scientists (Rockström et al. 2009) which argued that there are global ‘safe boundaries’ which, if crossed, will take us into unknown territory of environmental conditions that we have not experienced before. While some of these boundaries are based on global thresholds or tipping points, most of them are aggregations of local environmental stress.

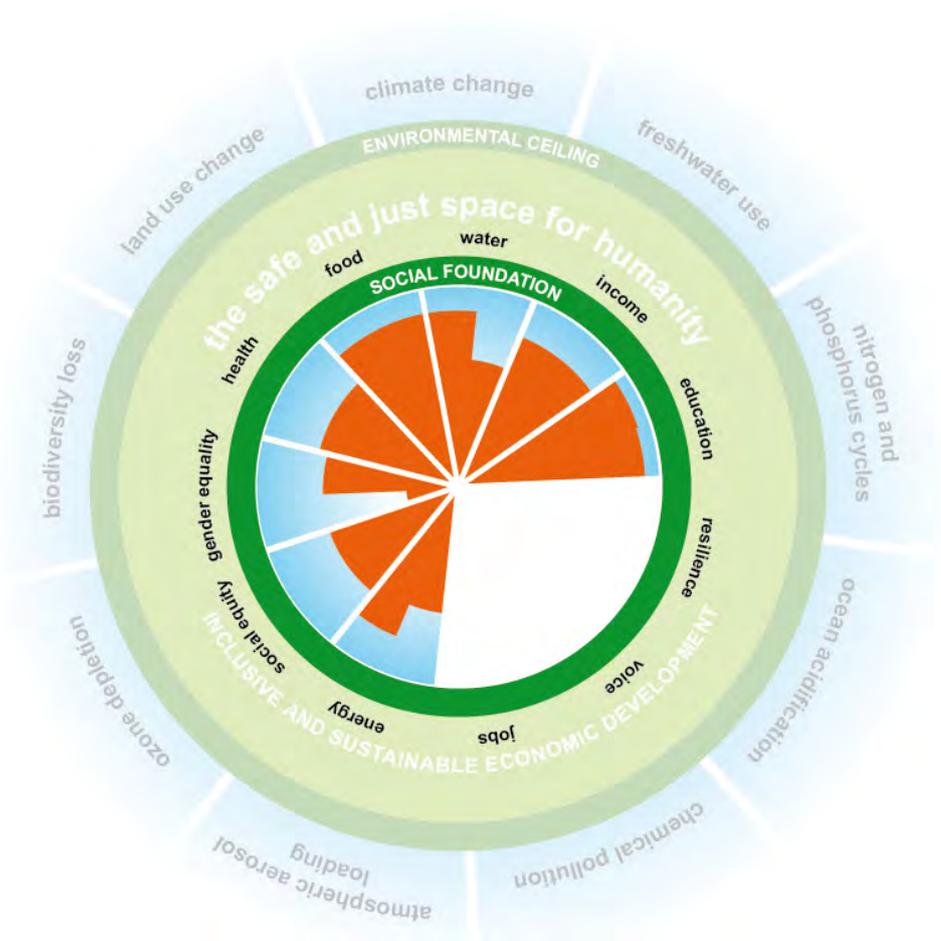
In the first iteration of the doughnut concept, it was suggested that the social foundation might consist of 11 dimensions, offered as health care, education, water and sanitation, food security,

energy, jobs, income, voice, resilience, social inequality and gender equality (see Appendix 1). This list was derived from the priorities of 80 government submissions to Rio+20, the UN Conference on Sustainable Development held in Rio de Janeiro in June 2012. Potential social indicators for eight of the dimensions, largely based on the Millennium Development Goals (MDGs), were proposed. The environmental dimensions (and their indicators) were taken from the planetary boundaries paper by Rockström et al. (2009): climate change, ocean acidification, freshwater use, land use change, biodiversity loss, disruption of the nitrogen and phosphorous cycles, ozone depletion, atmospheric aerosol loading and chemical pollution (see Appendix 2). The accompanying analysis showed that ending global deprivation would *not* push the world past these planetary boundaries: planetary boundaries should not be used to hinder development, nor would respecting planetary boundaries automatically hinder efforts to end deprivation.

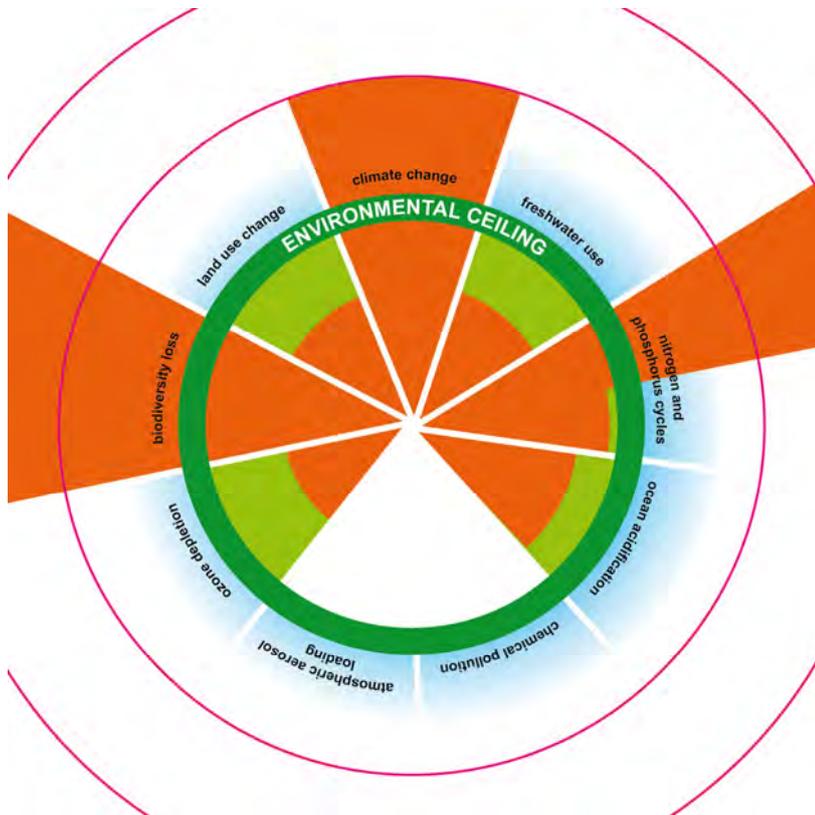
Figure 3: a) Raworth’s ‘safe and just space for humanity’, b) values for a global social foundation and c) values for a global safe space



a



b



c

Source: Raworth (2012)

The 'doughnut' has received much attention from think tanks, development agencies, NGOs and the United Nations. Its appeal is that it brings together diverse information about environmental and social development in a clear and integrated way.

To be used in policy making at both the global and national scales, the 'doughnut' needs to be downscaled to the national level. National analysis could also help to shed light on a number of facets of national sustainability simultaneously, such as a nation's progress, its 'natural resource budget' and its levels of equity.

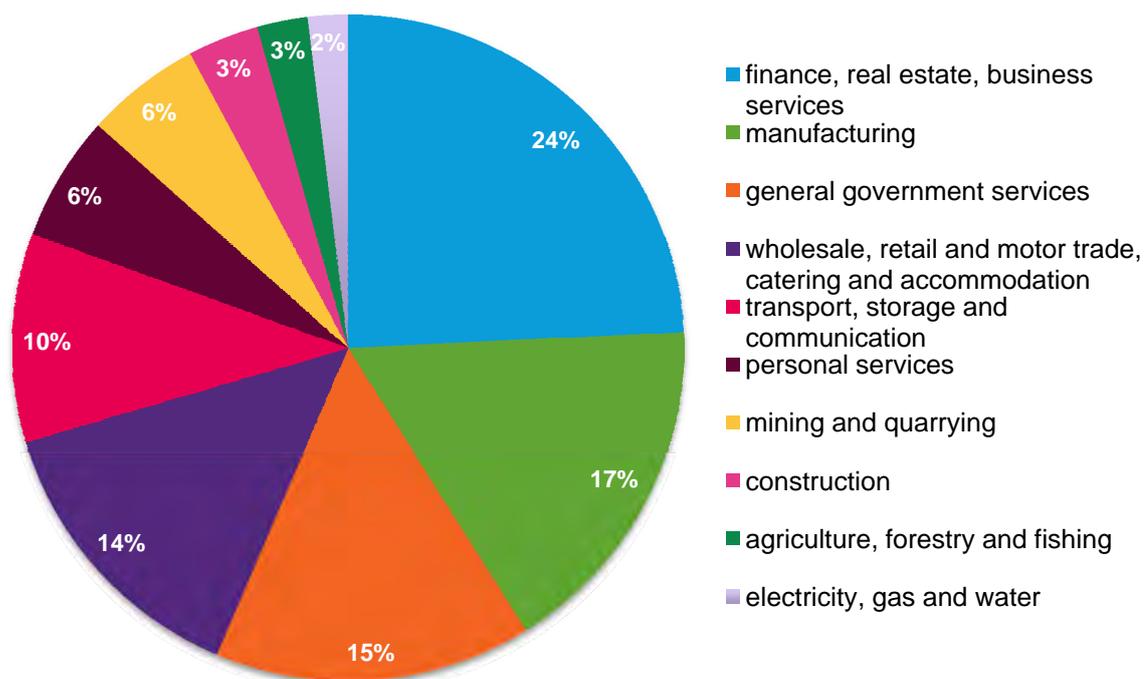
National analyses have been published for Scotland, the UK and Wales. A report for Brazil mapping the extent to which it operates within a safe and just space is being developed. The first study attempting a national 'doughnut' for South Africa was undertaken by Cole et al. (2014) They developed a decision-based methodology and interviewed 43 experts in South Africa to create a 'national barometer for inclusive sustainable development'. The method and results of their work are summarised in this paper and are then used to identify policy focus areas and to develop recommendations for South Africa.

2 IS SOUTH AFRICA LIVING IN A SAFE AND JUST SPACE?

South Africa is one of the youngest democracies in the world, with elections in 1994 marking the end of white minority rule. The majority of the 54 million population are black African (80 per cent) with 9 percent Coloured, 9 percent white and 2.5 percent Indian/Asian (StatsSA 2014b). Nearly 30 percent of the population are younger than 15 years and roughly half are under the age of 25. The population growth rate (including immigration) is 1.3 percent, significantly lower than that for sub-Saharan Africa as a whole (2.7 percent), (World Bank 2014) and South Africa's population is projected to peak, plateau and then decline to between 60 and 70 million people in the second half of this century (UN Department of Economics and Social Affairs 2012).

The country has the second largest economy in Africa, and the 18th largest stock exchange in the world. The mining sector has played a key role in its economy for 140 years, making it the most industrialised country in Africa (Chamber of Mines of South Africa 2013). In 2013, over two-thirds (70 percent) of gross domestic product (GDP) was derived from services (see Figure 4), while industry contributed 28 percent (17 percent manufacturing, 6 percent mining and quarrying, 3 percent construction, 2 percent utilities) and agriculture, forestry and fisheries contributed 2 percent (StatsSA 2014d). Economic growth has slowed down in recent years from 3.1 percent in 2011 (World Bank 2013b) to 2.5 percent in 2012 and to 1.8 percent in 2013, lagging behind other emerging economies, (IMF 2013) and the government is starting to look at the manufacturing sector to generate growth. Job creation has been led by the public sector rather than the private sector, which remains cautious of expansion due to economic challenges including the global financial crisis and domestic labour unrest (Muthethwa 2013).

Figure 4: Sector contribution to GDP in 2013



Data source: StatsSA 2014d

South Africa is one of the most unequal countries in the world: the wealthiest 4 percent of households receive 32 percent of total income, while 66 percent of households receive only 21 percent of all income (Visagie 2013). Based on the Global 2014 Forbes Rich List (BusinessTech 2014) and the Credit Suisse Global Wealth Databook 2013, (Credit Suisse Research Institute 2013) the two richest people have the same wealth (\$14.3bn) as the poorest 50 percent of the population and the top 1 percent have 41 percent of total wealth. The 'middle class' (based on occupation, not median income) who make up 30 percent of the population had an income (after-tax, including all types of income) between R1,400 (\$133) and R10,000 (\$950) per capita per month in 2008 money terms (Visagie 2013) (Kharas (2010) defines the 'global middle class' as those earning between \$300 and \$3,000 per month). More than 10 percent of South Africans live in extreme poverty, on less than \$1.25 per day (DPME 2013).

In his State of the Nation address in February 2014, President Jacob Zuma highlighted South Africa's 'triple challenge' as being poverty, inequality and unemployment (The Presidency South Africa 2014) – which is also a key message of the country's National Development Plan 2030 (NDP). While these are South Africa's most pressing challenges, there are a number of other social and environmental issues that need to be addressed simultaneously if it is to achieve inclusive sustainable development. Cole et al (2014) have captured 12 dimensions of social deprivation and 10 dimensions of environmental stress in a South African 'safe and just space' framework, with 21 nationally appropriate indicators and boundaries. These are described below and provide a comprehensive overview of the context and challenges that the country faces.

SOCIAL DEPRIVATION

Cole et al. selected 12 social dimensions for the South African 'just space': electricity, water, sanitation, housing, education, health care, voice, income, jobs, household goods, food security and safety. They were grouped into four domains – basic services, public goods, economic activity and living standards. The dimensions and indicators were based largely on the South African Index of Multiple Deprivation (SAIMD) developed in 2000 by the University of Oxford, the Human Sciences Research Council (HSRC) and the South African Department of Social Development (DSD). The SAIMD was updated in 2007 and is being used by the DSD to identify the most deprived areas in order to target its social grants and initiatives.

The original dimensions and indicators chosen by Raworth were tested against four criteria. The criteria for selecting the dimensions were: 'Is this relevant at the national scale?' and 'Does the set of dimensions include the main social concerns in South Africa?' The criteria for selecting indicators were: 'Is the indicator the best available direct measure of that dimension?' and 'Are there sufficient reliable data that are measured on a regular basis?' If the existing dimension or indicator did not meet the criteria, then it was removed or replaced with a more appropriate national choice. The dimensions and indicators were tested through interviews with experts in South Africa. The status in 1994 and the current status for each indicator were sourced from the Presidency's 'Development Indicators 2012' report, (DPME 2013) which uses aggregate data from a range of sources covering the post-apartheid period (1994–2013), and the General Household Survey (GHS) 2012 (StatsSA 2013a) and 2013 (StatsSA 2014a). The results are shown in Table 1 and Figure 5, while Table A1 in Appendix 1 compares Raworth's original social indicators with the SAIMD indicators and the indicators used here.

Eight of Raworth's original 11 dimensions were kept, although water and sanitation were separated into individual dimensions. Housing, household goods and safety were added as new dimensions, as millions of people still do not live in formal housing; household goods are a useful proxy for material deprivation; and tackling high crime rates is a national priority. Resilience, social inequality and gender equality were removed. The experts saw resilience as a cumulative effect that is dependent on the other dimensions, and therefore an indirect measure.

For example, having good health and an education makes an individual more resilient to unemployment. Experts felt that both social equity and gender inequality should be incorporated into the other dimensions as they are cross-cutting and related not solely to income and political representation. As is shown by the UN's Gender Inequality Index (GII), which combines five indicators (maternal mortality, adolescent fertility, education, representation and labour force participation), (UNDP 2013) gender could be addressed under the dimensions of health, education, voice and employment. Ideally, gender equality should be measured for all the dimensions of the barometer. This was not done due to lack of available data, but analysis of household survey results could provide the necessary information for future iterations. One other indicator that was considered was connectivity, measured by Internet access and/or transport. However, this was rejected as experts felt that it was not a national priority in South Africa.

The social foundation for each dimension is essentially determined by the indicator selected, as the aim is that nobody (0 percent of the population) should live in deprivation. There are three types of indicator sets that can be used. The first type is a range of levels of deprivation, which are commonly found in household surveys. For example, choosing 'access to piped water within 200m of the dwelling' rather than 'access to piped water in the dwelling' sets a lower foundation. The second type of indicator set is a range of definitions of the same indicator. For example, unemployment can be defined narrowly or more broadly (to include discouraged job seekers). The third type is a diverse set of indicators that represent different aspects of a dimension. For example, material deprivation can be measured by ownership of a range of household goods such as a refrigerator or television. Each indicator is described below.

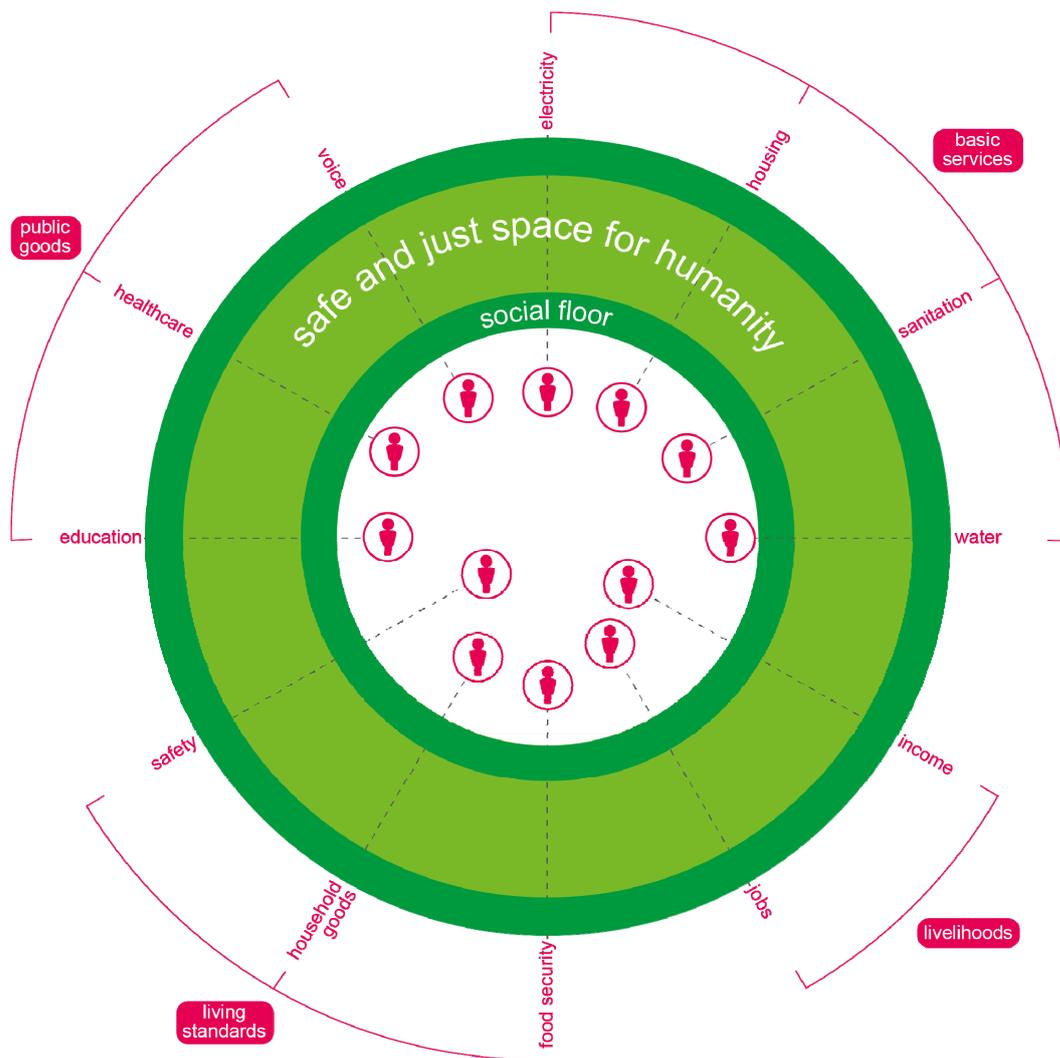
The results are shown in Table 1 and Figure 5 below. Multiple deprivations exist in South Africa, but in 2012 it was most serious regarding safety (64 percent below the social floor), income (52 percent below the social floor) and jobs (36 percent below the social floor). Social deprivation has decreased in all dimensions since 1994 (ranging from 34 percent in water access to 1 percent in employment), except for safety and income, where it has increased by 19 percent and 2 percent respectively. While basic services and public goods are nearing the social foundation, there is a long way to go with livelihoods and some aspects of living standards.

Table 1: Dimensions of social deprivation in South Africa in 2012/13 and change since 1994

Domain	Dimension	Indicator of deprivation	Current status of deprivation	Change since 1994*
Basic services	Electricity	Households without access to electricity	24%	-26%
	Housing	Households without formal dwellings	22%	-14%
	Sanitation	Households without a toilet or ventilated pit latrine	17%	-33%
	Water	Households without access to piped water within 200m (\geq Reconstruction and Development Programme standard)	5%	-34%
Livelihoods	Income	Population living below the national poverty line (R577/month in 2011 Rand)	52%	+2%
	Jobs	Broad unofficial unemployment rate (adults aged 15–64 available to work)	36%	-1%
Living standards	Food security	Households without adequate food	23%	-1%
	Household goods	Households without a refrigerator	28%	-21%
	Safety	Households who feel unsafe walking alone in their area at night	64%	+20%
Public goods	Education	Adults without more than seven years of schooling (adult illiteracy)	19%	-11%
	Health care	Infant (<1 year) immunisation coverage	9%	-28%
	Voice	Population who do not feel free to say what they think	16%	No data

* Or since start of measurements if later than 1994. Negative value represents reduction in deprivation; positive value represents increase in deprivation. Data sources: 'Development Indicators 2012', 'General Household Survey' 2012 and 2013.

Figure 5: The South African doughnut – Social floor



Basic services

Electricity

Access to electricity is a national priority and has been since the unbanning of the African National Congress (ANC) in 1990, when two-thirds of the population lived without electricity. The Integrated National Electrification Programme (INEP), which started in 1992, placed responsibility for the provision of electricity to all households on the state-owned electricity company Eskom and municipal distributors tasked with delivering 'electricity for all'. In the NDP, the government aims to provide access to electricity to 90 percent of the population by 2030. It has not targeted 100 percent due to the high costs of certain hard-to-access areas.

Poor households do not always use electricity for cooking, lighting and heating, though the proportion of households that are replacing paraffin and firewood with electricity has increased by 20 percent in the past 10 years (StatsSA 2014a). Although more than two-thirds of households rated the electricity supply services as 'good', electricity interruptions affected 14 percent of households of paying customers in 2013 (StatsSA 2014a).

Indicator

Percentage of households without access to electricity.

Social foundation

All households have access to electricity.

Result

In 2012, 23.5 percent of households lacked access to electricity (DPME 2013).

Water access

Although access to water has improved significantly since 1994, the National Water Resource Strategy (NWRS) acknowledges the persistent inequities in access to water services, access to water resources and access to the benefits of water resource use through economic, social and environmental development and management. The official national indicator for water access is '25 litres of potable water per person per day without interruption for more than 7 days within 200m of the household', known as the RDP (Reconstruction and Development Programme) standard, (StatsSA 2010) although multiple levels of access are measured, as shown in Table 2.

The main source of water for 6 percent households is still rivers or springs, rainwater tanks or water carriers/tankers, (StatsSA 2014a) although more than half (55 percent) of households do not pay for water. Over 10 percent rate their municipal water services as 'poor', with 26 percent experiencing interruptions in water supply that lasted more than two days during the past year, while 7 percent of households believe that their water is not safe to drink (StatsSA 2014a).

Indicator

Percentage of households without access to piped water within 200m of their dwelling (RDP standard).

Social foundation

All households have access to piped water within 200m of their dwelling (RDP standard).

Result

In 2012, 4.5 percent of the population did not reach this social foundation (DPME 2013).

As Table 2 shows, if the social floor (definition of level of access) is set at a higher level of attainment, fewer households meet the standard – 54 percent of households are deprived of piped water in their homes.

Table 2: Level of water access in South Africa, 2011/12

Level of household water access	Indicator	% with access*	% without access
1. Tap water in dwelling		46%	54%
2. Tap water in dwelling or yard	SAIMD	73%	27%
3. Tap water within 200m of dwelling	RDP standard	85%	5%
4. Tap water within 500m of dwelling		89%	
5. Tap water within 1km of dwelling	MDG 7.8	90%	
6. Tap water >1km from dwelling		91%	
7. No tap water access			9%

* Combined levels i.e. the percentage for level 3 includes levels 1 and 2.

Data source: General Household Survey 2012 (StatsSA 2013c)

Sanitation

Sanitation is important in the prevention of disease and in protecting human dignity, and has a direct impact on the quality of water resources through effluent discharges. Access to adequate sanitation in South Africa grew from 66 percent in 2003/04 to 83 percent in 2011/12. There are different types of sanitation, ranging from flush toilets, chemical toilets (which require no water), pit latrines (with or without ventilation) and bucket toilets (see Table 3). The official national indicator (the RDP standard) is access to a ventilated pit latrine or toilet. In the South African Social Attitudes Survey (SASAS) 2005, 84 percent of respondents said that having a flush toilet in the house was essential; (Wright et al. 2007) however, this is not always feasible in informal settlements.

Although access is important, quality has a significant effect on whether people use the facilities available. The GHS 2013 assessed the quality of sanitation facilities for the first time. It revealed that one-quarter of households were concerned by poor lighting and inadequate hygiene, one-fifth complained that there was no water to wash their hands after they had used the toilet, and one-fifth complained of long waiting times. More than 20 percent of households felt that their physical safety was threatened when using toilets, 13 percent complained that toilets were not properly enclosed and more than 25 percent complained about the cleanliness of toilets.

Indicator

Percentage of households without ventilated pit latrines or toilets (RDP standard).

Social foundation

All households have a ventilated pit latrine or a toilet.

Result

In 2012, 17 percent of the population lacked this level of sanitation (DPME 2013). This is based on the latest Development Indicators report. There are data discrepancies between the GHS and the Development Indicators report, as the latter uses multiple data sources.

As Table 3 shows, the level of deprivation depends on the level of access defined as the social foundation. If the foundation were increased to flush or chemical toilets (levels 1–3), 37 percent of households would be living in deprivation, 9 percent more than the official national indicator, according to GHS 2012.

Table 3: Level of sanitation access in South Africa, 2012

Level of household sanitation access	% with access*	% without access
1. Flush toilet connected to sewerage system	57%	37%
2. Flush toilet with septic tank	60%	
3. Chemical toilet	63%	
4. Pit toilet with ventilation (VIP)	72%	28%
5. Pit toilet without ventilation	91%	9%
6. Bucket toilet	93%	7%
7. Other	98%	2%
0. None	2%	2%

* Combined levels i.e. the percentage for level 3 includes levels 1 and 2.

Data source: GHS 2012

Housing

There are three main types of housing in South Africa: formal dwellings made of brick or concrete, informal dwellings such as shacks, and traditional dwellings, mostly found in the Eastern Cape and KwaZulu-Natal. It is more difficult to provide basic services to informal settlements than to formal settlements, and over 3.38 million houses have been built since 1994 by the government to correct historical imbalances and to support poverty alleviation (DPME 2013). In 2013, 15 percent of households lived in an RDP or state-subsidised dwelling and a further 14 percent had at least one household member on a waiting list for state-subsidised housing. These dwellings are not well built and 16 percent of households reported weak or very weak walls and roofs (StatsSA 2014a).

The reduction in average household size from 4.5 members in 1996 to 3.3 in 2013 means that demand for housing has remained high, while immigration and rural-to-urban migration continue to contribute to the growth of informal settlements and the demand for basic services.

Indicator

Percentage of households without a formal dwelling.

Social foundation

All households have a formal dwelling.

Result

In 2011, 22 percent of the population still did not live in a formal dwelling (DPME 2013). This includes people living in traditional dwellings, who made up 10 percent of the population in 2011.

Public goods

Education

South Africa's education system is large, complex and diverse. There are pockets of good practice, but the public school system is failing too many young South Africans, (CDE 2011) with school results among the worst in southern Africa (Wilkinson 2014). Despite spending 22 percent of its national budget on education and achieving the MDG goal of universal access to primary school, South Africa still struggles with poor school results and a semi-skilled workforce. Access to education obviously does not translate into attainment, and the quality of education is of concern. A major problem is the knowledge and ability of teachers; a recent study in KwaZulu-Natal showed that more than a quarter of teachers failed the maths final matric (Grade 12) exam that their pupils had to sit (Jansen 2014).

At tertiary level, in South Africa's 23 public universities, the graduation rate for undergraduates is 15 percent, for master's students 20 percent and for doctoral students 12 percent. Reasons proposed for these low success rates include financial constraints, which cause students to leave education after enrolling for a course, a lack of academic preparedness and poor support from universities. The highest failure rates were found in maths and science programmes, which encompassed medicine, science, technology and business studies (Muthethwa 2013).

South Africa performs well on the Gender Parity Index (GPI), which is the ratio of the gross enrolment rate (GER) for female learners to that of male learners, regardless of age, in public and independent ordinary schools for a given year. In 2011, the GPI was 0.98 for primary schools, 1.07 for secondary schools and 1.39 for higher education (DPME 2013). This shows that at lower levels of education roughly the same number of girls attend school as boys; however, girls are outnumbered in higher education. Two of these GPI figures are higher than in the UK, which has a GPI of 1.00 for primary and secondary education and 1.36 for tertiary education.

Indicator

Percentage of adults (age 20 and over) without a basic education (seven years).

Social foundation

All adults have a basic education.

Result

In 2011, 19.3 percent of adults were illiterate, and did not have a basic education (DPME 2013).

Health care

While health is about the well-being of the population, health care is about government services. There are a number of MDG indicators on health relating to infant and child mortality, maternal mortality, HIV and AIDS, TB and malaria. Overall health in South Africa is measured by life expectancy and this is shown in Figure 6, which illustrates the negative impact of AIDS in 2002–07 and the improvements in more recent years as a result of government action, after years of campaigning, most notably by the Treatment Action Campaign. Life expectancy in 2012 was 60 years, which is low compared with a world average of 70 years. Over 10 percent of the population lives with HIV or AIDS (DPME 2013) (the fourth highest percentage globally in 2011 after neighbouring Swaziland, Botswana and Lesotho), and South Africa is currently implementing the largest antiretroviral treatment programme in the world.

The country spent 13 percent of its national budget on health care in 2013/14 and is planning to implement a progressive new National Health Insurance scheme to improve the quality of the public service and ultimately to provide universal access. Pilots are currently under way. Measures of health care include infant immunisation coverage and access to clinics and doctors.

Indicator

Percentage of infants not immunised.

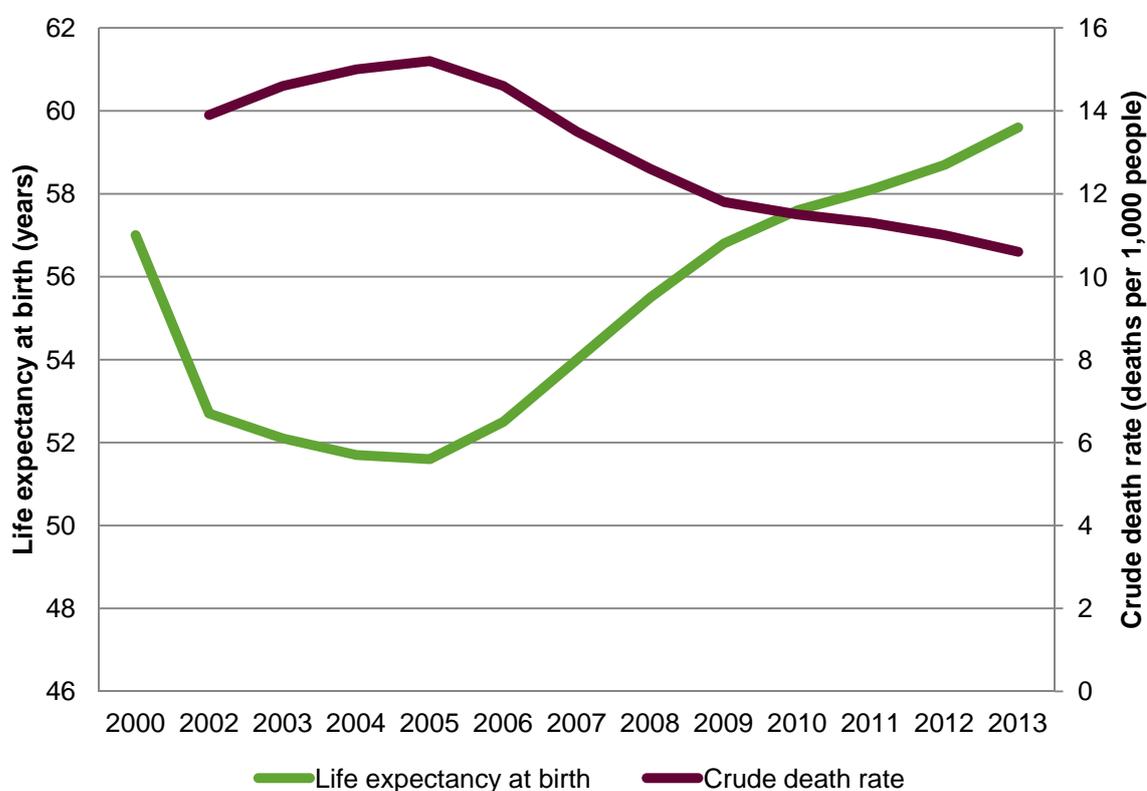
Social foundation

All infants are immunised.

Result

In 2011, infant immunisation coverage was 91 percent, which meant that 9 percent of the infant population were living below the social foundation (DPME 2013).

Figure 6: Life expectancy and crude death rate, 2000–13



Data source: Mid-year population estimate (StatsSA 2014b)

Voice

There is no definitive definition of ‘voice’ and Raworth did not define an indicator for it, although her gender empowerment indicator ‘gender gap in parliament’ could be used to provide a gender component to this dimension. The Development Indicators 2012 report included membership of voluntary organisations, voter turnout, female representation in parliament and

the Corruption Perceptions Index (CPI). However, experts did not feel that any of these were suitable indicators to represent voice. They recommended that voice should measure public participation in decision making.

South Africa has progressive legislation on local government, and communities are consulted on their Integrated Development Plans (IDPs). However, in SASAS 2005 only 8 percent of respondents said that they participated in the IDP process, and even this is thought to be over-reported (HSRC 2010). The majority (91 percent) of those who participated in the IDP process felt that they had 'some' to 'much' influence on local government decision making, while only 28 percent of those who did not participate felt the same. Due to the lack of wide support for any specific indicator, Cole et al. did not define an indicator for voice.

For this Oxfam report, an indicator has been chosen from the latest Afrobarometer survey on democracy and governance in South Africa (Citizen Surveys 2013) which reflects freedom of speech, as a starting point.

Indicator

Population who feel free to say what they think.

Social foundation

All people feel free to say what they think.

Result

According to the Afrobarometer, (Citizen Surveys 2013) in 2011 16 percent of the population felt that they were 'not free' or 'not very free' to say what they thought.

Livelihoods

Jobs

Unemployment is one of South Africa's main challenges and is a strategic priority. According to the World Bank, the country's labour force participation rate (57 percent) is one of the lowest in Africa (World Bank 2013a). The official (narrow) unemployment rate³ is 24 percent, while broad unemployment (which includes discouraged job seekers) is 35 percent, with 4.8 million of the labour force out of work (StatsSA 2014c). Two-thirds of those out of work are long-term unemployed;⁴ youth unemployment (age 15–24) is 49 percent, while female unemployment is 4 percent higher than male unemployment (StatsSA 2014c). The labour force of 20 million adults is split between 64 percent in services, 23 percent in industry (12 percent manufacturing, 8 percent construction, 3 percent mining) and 5 percent in agriculture (StatsSA 2014c). In 2001, Natrass and Seekings (2001) argued that the 'labour market and economic policies steer the economy down a growth path that shuts out many of the unskilled and unemployed'.

The NDP aims to create 6 million jobs by 2020 and 11 million by 2030, resulting in 'near full employment' (6 percent unemployment). Poor-quality education for the majority and slow economic growth that has produced few jobs have both contributed to very high rates of unemployment and youth unemployment. Conversely, there is a skills shortage in many key sectors of the economy and new 'scarce skills' visas have been introduced to tackle this problem via immigration. Although the majority of workers (71 percent) are in the formal sector, there are concerns about the quality of jobs being created and the income they provide (Muthethwa 2013). There has been a rise in contract work and many of the jobs created by the government in works programmes are very short-term.

Indicator

Broad (unofficial) unemployment rate – adults aged 15–64 without work and available to work.

Social foundation

Unemployment rate of 6 percent. Some level of unemployment is seen as ‘natural’ or inevitable i.e. frictional as people move between jobs, thus 100 percent is impossible.

Result

In 2012, 36 percent of adults aged 15–64 were unemployed (DPME 2013).

Box 1. Minimum wages in 2014/15

There is no national (statutory) minimum wage in South Africa; however, the Basic Conditions of Employment Act permits the Minister of Labour to set minimum terms and conditions of employment, including minimum wages. These are in place in areas of economic activity where labour has been deemed vulnerable. There are nine such sectors: farm and forestry workers (R12.41 per hour), the hospitality sector (R12.39/hr for small firms), taxi employees (R8.89/hr), contract cleaners (R15.66/hr in metropolitan areas and R14.99/hr elsewhere in South Africa), domestic workers (R8.30/hr) and the private security, wholesale and retail and civil engineering sectors.

In sectors that fall under the Department of Labour, the government adjusts minimum wages unilaterally. In sectors covered by a collective agreement concluded via a bargaining council or through centralised or decentralised bargaining at company or plant level, they are adjusted after consultation with employer and trade union representatives.

The lowest minimum wage is for domestic workers in KwaZulu-Natal (excluding areas covered by a bargaining council agreement) at R1,147 per month, which is roughly double the national upper-bound poverty line of R577 per month.

According to the Global Wage Report, South Africa’s actual minimum wage (PPP \$390 in 2009) is the highest in Africa, almost 3.5 times that of the African median, and nearly double that of its BRICS counterparts. However, it is lower than in advanced economies (Gwatidzo & Benhura 2013).

Source: mywage.co.za

Income

The expansion of the social grants system from 2.7 million people in 1994 to 16 million (30 percent of the population) in 2013 has significantly contributed to reducing extreme poverty. Nevertheless, more than half of South African’s population continue to live in income poverty (SASSA 2013). Only 65 percent of households receive income from a salary/wage/commission while 13 percent receive income from a business. Grants are the main source of income for more than a fifth of households, and remittances are an important source of income in rural areas (StatsSA 2013a).

Different poverty lines can be used to measure deprivation, as shown in Table 4. The official food poverty line (the amount of money an individual needs in order to consume the required energy intake) is R305 (\$28) per person per month (in 2011 Rand). The lower-bound poverty line is R416 (\$39) and the upper-bound poverty line is R577 (\$54) – these poverty lines are calculated using the food poverty line plus the average amount derived from non-food items of households whose total food expenditure is equal to the food poverty line.

Indicator

Population living below the upper-bound poverty line of R577 per person per month in 2011 Rand.

Social foundation

No one lives below the upper-bound poverty line of R577 per person per month in 2011 Rand.

Result

In 2011, 52.3 percent of the population were living below this social foundation (DPME 2013).

Table 4: Poverty headcount in South Africa using international and national poverty lines, based on the Living Conditions Survey 2008/09 (StatsSA 2011)

Indicator of income poverty (in 2011 Rand)	% deprived
\$1.25 per person per day (R191 per person per month)	11%
\$2.50 per person per day (R382 per person per month)	36%
National food poverty line (R305 per person per month)	26%
National lower-bound poverty line (R416 per person per month)	39%
National upper-bound poverty line (R577 per person per month)	52%

Living standards

Food security

Food security has three components – access, availability and utilisation (WHO 2014) – and can be measured in a number of ways. South Africa has been technically food-secure at a national scale for a number of decades and has produced enough maize (the staple crop) for 47 of the past 50 years, with drought causing insufficiencies in the remaining three years (StatsSA 2013a). However, food insecurity at the local level is widespread, a reflection of inequality in the country. The results of the SASAS survey over three years (2003–05) indicate that households in informal and tribal areas are least likely to have enough food to meet their needs, (HSRC 2010) and the GHS 2013 reported that 23 percent of households had limited or inadequate access to food (StatsSA 2014a).

In 2013, 19 percent of households were involved in agricultural production, 89 percent of whom cultivated backyard gardens. More than three-quarters of these households did this in order to secure an additional food source, while 10 percent used it as their main source of food. Access to agricultural land is a contentious issue in South Africa and land reform policies have done little to benefit the poorest and most vulnerable in society (see Box 2).

Indicator

Percentage of households without adequate food.

Social foundation

No households lack adequate food.

Result

In 2012, 23 percent of households experienced hunger, down slightly from 24 percent in 2010 (StatsSA 2014a).

Box 2: Land reform (Pepeteka 2013)

In the 20th century, black South Africans were systematically dispossessed of their land by the state. The Natives Land Act of 1913 restricted Africans to buying, leasing and selling land in only 7 percent of the country, which was later increased to 13 percent of land in 1936; these areas were known as Bantustans or homelands.

Dispossession culminated in apartheid, when an estimated 3.5 million non-whites were forcibly removed from their ancestral lands, often without compensation.

In 1994, South Africa began the process of redressing past injustices through land reform and black economic empowerment in agriculture. There are three pillars of land reform:

1. Restitution: settling land claims through restoration or financial compensation. Some 97 percent of the 78,000 claims lodged before 1998 (1,443 million hectares) had been settled by 2013, most with monetary compensation. The cut-off date was extended in 2013.
2. Redistribution: transferring white-owned agricultural land to black people, based on the 'willing buyer/willing seller' principle. In 1994 this was aimed at poor people, but shifted to black commercial farmers in 2001 and to the state in 2009. The target is 30 percent (24.6 Mha) by 2014, but the actual figure was 7.5 percent by 2013.
3. Tenure reform: providing more secure access to land in communal areas and commercial farms. Very little progress has been made, and over two million farm dwellers, mostly women and children, were evicted between 1994 and 2004.

The 2011 Green Paper on Land Reform is still under review. It seeks to change the 'willing buyer/willing seller' model to a 'just and equitable' process, establish the Office of the Valuer General, implement a land tax and a ceiling on land ownership and adopt a policy on foreign land ownership.

Currently, 67 percent of land is largely white-owned commercial agricultural land, 15 percent is largely state-owned black communal land (84 percent of this is agricultural), 10 percent is other state land and 8 percent is urban areas (PLAAS 2013).

Governments across Africa are welcoming South African farmers to help them reduce food imports and food prices by farming state-owned land. Both commercial interests and government in South Africa are driving this expansion north, though it is not about food security for South Africa but about business development specifically for white farmers who face land reform. The South African government has signed bilateral investment treaties with 13 African countries, and by late 2010 industry association AgriSA South Africa was negotiating for land with 22 African governments. The land in question consists largely of state-owned farms, but also encompasses communal land where development is likely to meet resistance from subsistence farmers (Hall 2011). There is also the risk that farmers will grow export crops with higher potential profits rather than staple grains for local consumption (Pearce 2011).

Household goods

The ownership of household goods is a measure of material deprivation, which is an economic and social condition that is more persistent and prevalent than income poverty. Household assets also influence the extent to which a household can diversify its livelihoods (StatsSA 2014a). There has been a general improvement in access to household goods, such as televisions, washing machines and refrigerators, in South Africa since 1994. Households in

metropolitan areas are most likely to own assets, followed by those in urban areas, which are much more likely to own assets than households in rural areas.

In SASAS 2005, the household items that more than half of all respondents felt were essential were a refrigerator (89 percent said that this was essential), a radio (77 percent), an electric cooker (74 percent), a television (72 percent), a landline phone (64 percent), a cell phone (63 percent) and a sofa/lounge suite (52 percent) (Noble et al. 2013).

Indicator

Percentage of households who own a refrigerator.

Social foundation

All households own a refrigerator.

Result

In 2012, 31 percent of households did not own a refrigerator, down from 50 percent in 2001 (StatsSA 2013a).

Safety

Safety was added as a new dimension as it is an important issue in South Africa and was intended to be included in the SAIMD, but was left out due to lack of small area data. Safety is a national concern as the country has one of the highest murder rates in the world (31 per 100,000 people compared with a global average of 6.9 per 100,000) (UNODC 2011). Safety is a complex dimension to measure, as crime statistics are not comparable across jurisdictions (except for murder). Although perceptions of safety do not necessarily reflect the actual risk of being a victim of crime, they are comparable. Statistics South Africa (StatsSA) has conducted four Victims of Crime Surveys which measure perceptions of safety and crime rates for burglary, livestock theft, car theft, vandalism, crop theft and murder. The South African Police Service (SAPS) reports on serious crime – drug-related crime and sexual offences – and on detection rates and prison inmates. The poorest people are often the most vulnerable to crime as they have to walk and take public transport, and cannot afford home security.

Indicator

Percentage of households whose members feel unsafe walking alone at night in their area.

Social foundation

All households feel safe walking alone at night in their area.

Result

In 2011, 64 percent of households felt unsafe walking alone at night in their area, an increase of nearly 20 percent from 1998 (DPME 2013). As this is one of the few social indicators that is getting worse over time, it highlights a serious concern.

Social equity

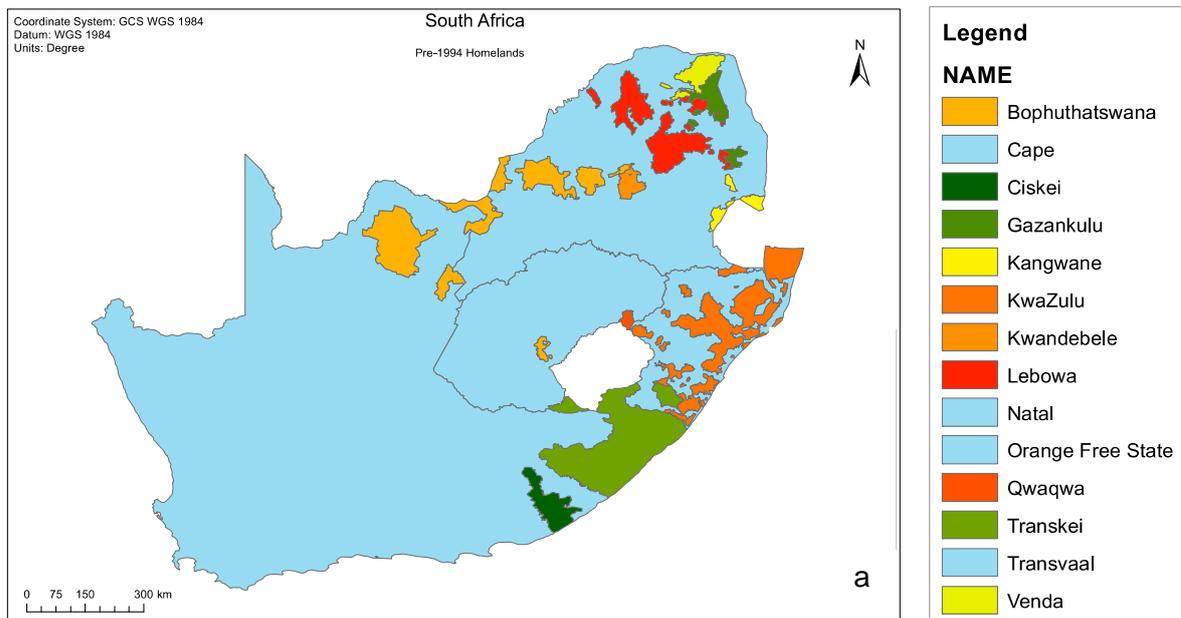
Although social equity is not included in the doughnut as a separate dimension due to its cross-cutting nature, it is worth highlighting here as South Africa is one of the most unequal countries in the world in terms of incomes (Palma 2011). The poorest 20 percent of the population earn just 2.3 percent of total income, while the richest 20 percent earn 70 percent of income (National Planning Commission 2012). Inequality in South Africa has historically been based on race; however, Seekings (2007) argues that this has shifted to class, and concludes, 'The rich

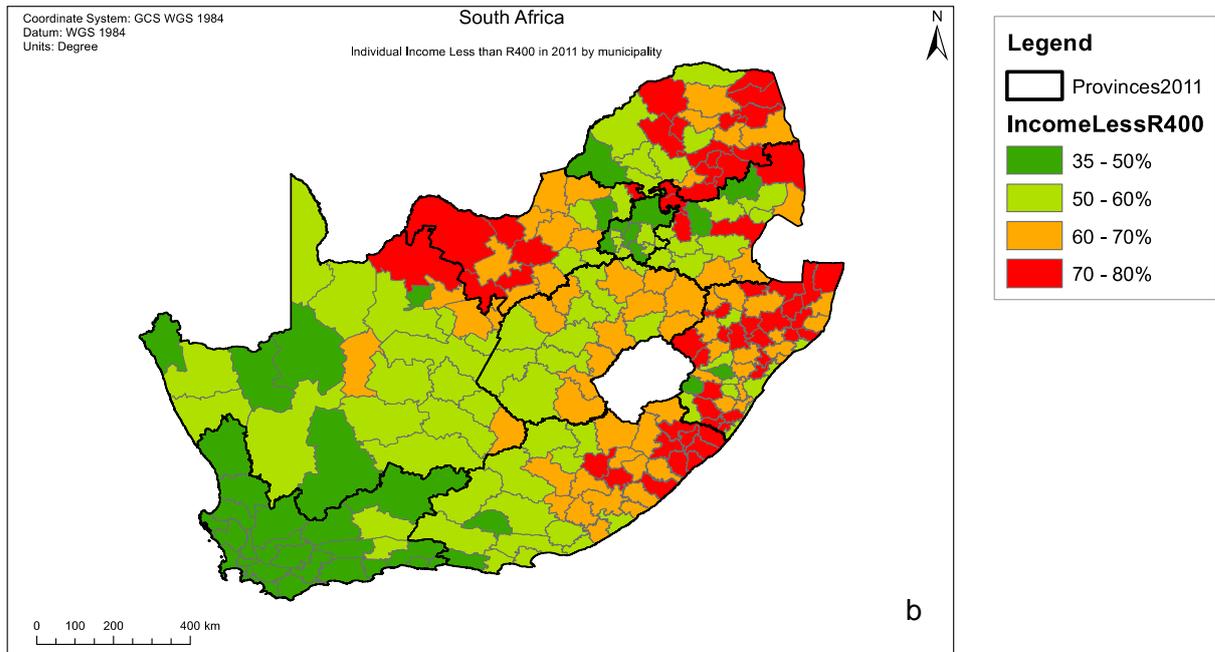
are no longer all white, even if almost all white people are still rich.’ This is largely due to the end of apartheid and the policy of black economic empowerment.

South Africa also has a unique spatial inequality, which is a legacy of apartheid. There are two clear settlement patterns: urban areas of high economic growth, high population densities and high levels of poverty in informal settlements; and rural areas with low economic growth, high population densities and high levels of poverty (particularly in the former homelands/Bantustans – see Figure 7). These low economic growth areas are reliant on welfare transfers, grants and remittances and are experiencing net out-migration to urban areas.

Earnings for those workers in the bottom deciles have not risen in real terms since apartheid, and have in fact fallen significantly relative to those of workers in the higher deciles, whose incomes have risen in real terms. Research by Finn and Leibbrandt (2013) shows that from 2008 to 2011 income mobility became more concentrated in the middle quintiles rather than in the lower deciles, meaning that a high proportion of the population remained trapped in poverty. Sustained high growth rates with a more equal distribution seem unachievable, in large part due to the structure of South Africa’s growth model, in which profits from economic growth ‘favour the organised, the educated, the highly skilled and the well connected’ (Bhorat 2013). Individuals with links to those previously privileged under the apartheid system, or those who have become privileged in post-apartheid South Africa, are more likely to find jobs and receive higher pay.

Figure 7: Maps of a) the pre-1994 homelands/Bantustans (data source: Municipal Demarcation Board) and b) of income poverty in South Africa by municipality in 2011 (data source: StatsSA - Census 2011)





Gender equality

Although gender equality is not used as a separate dimension due to its cross-cutting nature, it is worth highlighting here.

Since the mid-1990s South Africa has made great strides in balancing its gender gap. Gender parity laws have seen women rise to powerful positions in parliament and civil society. South Africa ranks 17th out of 136 countries in the World Economic Forum's Global Gender Gap Report 2013 (WEF 2013) and ranks 10th in the world for female participation in parliament at 41 percent, up from 28 percent in 1994. It has also reached gender parity in primary school enrolment and near parity in literacy, and females are now more likely to enrol in secondary school than males.

However, being a woman increases the likelihood of being unemployed or under-employed. At the end of 2013 the female adult unemployment rate was 38 percent, compared with 31 percent for men (StatsSA 2014c). The unemployment rates were higher for women than they were for men in all age categories but were particularly acute for those aged 15–24 years, with 54 percent of young women being out of work compared with 45 percent of young men. Women were also less likely to be in full-time work: part-time work accounted for 11 percent of total female employment compared with 5 percent for men.

Women also fare worse when it comes to opportunities to run companies. Securing finance to start a business can be problematic, as only 51 percent of females have a bank account with a formal financial institution, compared with 56 percent of males. The proportion of women on the boards of listed companies is only 13 percent, while firms with female participation in ownership account for 23 percent of the total.

Women too often have to rely on employment in occupations that are perceived as being traditional for women, such as the domestic or farming sectors, and have thus become concentrated in low-paying positions with high rates of under-employment and turnover. This can partially be explained by the caring responsibilities that are often left to women. On average, women have to devote more than twice as much of their time to household work as men and they constitute 97 percent of care-givers who qualify for the Child Support Grant.

In addition, HIV infection rates are on average five times higher among young women than among young men. Studies have shown that being HIV-positive increases the likelihood of being unemployed, and this creates another disadvantage and reinforces existing inequalities

that prevent women from having an equal opportunity to participate in the labour market when compared with men.

According to UNICEF, women’s vulnerability to HIV infection is particularly heightened by their economic dependence on men, lack of access to education, poverty, sexual exploitation, coercion and rape, as well as by their engagement in informal and commercial sex work. Rape victims in South Africa are most likely to be young women aged between 16 and 25 years. The country has one of the highest rates of rape and other sexual offences in the world. In 2011/12, there were over 64,500 reported cases of sexual crime and the sexual crime rate was 127 per 100,000 (DPME 2013). According to the Victims of Crime Survey 2012, 44 percent of victims of sexual offences were attacked by a community member known to them and 17 percent were attacked by a relative, while 30 percent of incidents took place at home.

ENVIRONMENTAL STRESS

Nine environmental dimensions were selected for the South African ‘safe space’: climate change, ozone depletion, freshwater use, arable land use, nutrient cycle (phosphorous and nitrogen), biodiversity loss, marine harvesting, air pollution and chemical pollution. The dimensions and indicators were determined using a decision-based methodology and were guided by existing literature and interviews with experts in each field. The original dimensions and indicators chosen by Rockström et al. were tested against five criteria. The criteria for selecting the dimensions were: ‘Is this relevant at the national scale?’ and ‘Does the set of dimensions include the main social concerns in South Africa?’ The criteria for selecting indicators were: ‘Is the indicator the best available direct measure of that dimension?’, ‘Are there sufficient reliable data that are measured on a regular basis?’ and ‘Can a national boundary be determined?’ If the existing dimension or indicator did not meet the criteria, then it was removed or replaced with a more appropriate national choice. The status in 1990 and the current status for each indicator were taken from a variety of sources, including UN databases, national databases and academic literature.

The results are summarised in Table 5 and Figure 8 and are discussed below. Table A2 in Appendix 2 compares the original planetary boundary indicators with the indicators used here. The results show that South Africa is in a state of environmental stress on multiple fronts, and that this has become worse since 1994. Four dimensions – climate change, freshwater use, marine harvesting and biodiversity loss – have exceeded their safe environmental boundaries (defined below). Arable land use, phosphorous loading and air pollution could exceed their safe boundaries with an increase of less than 10 percent.

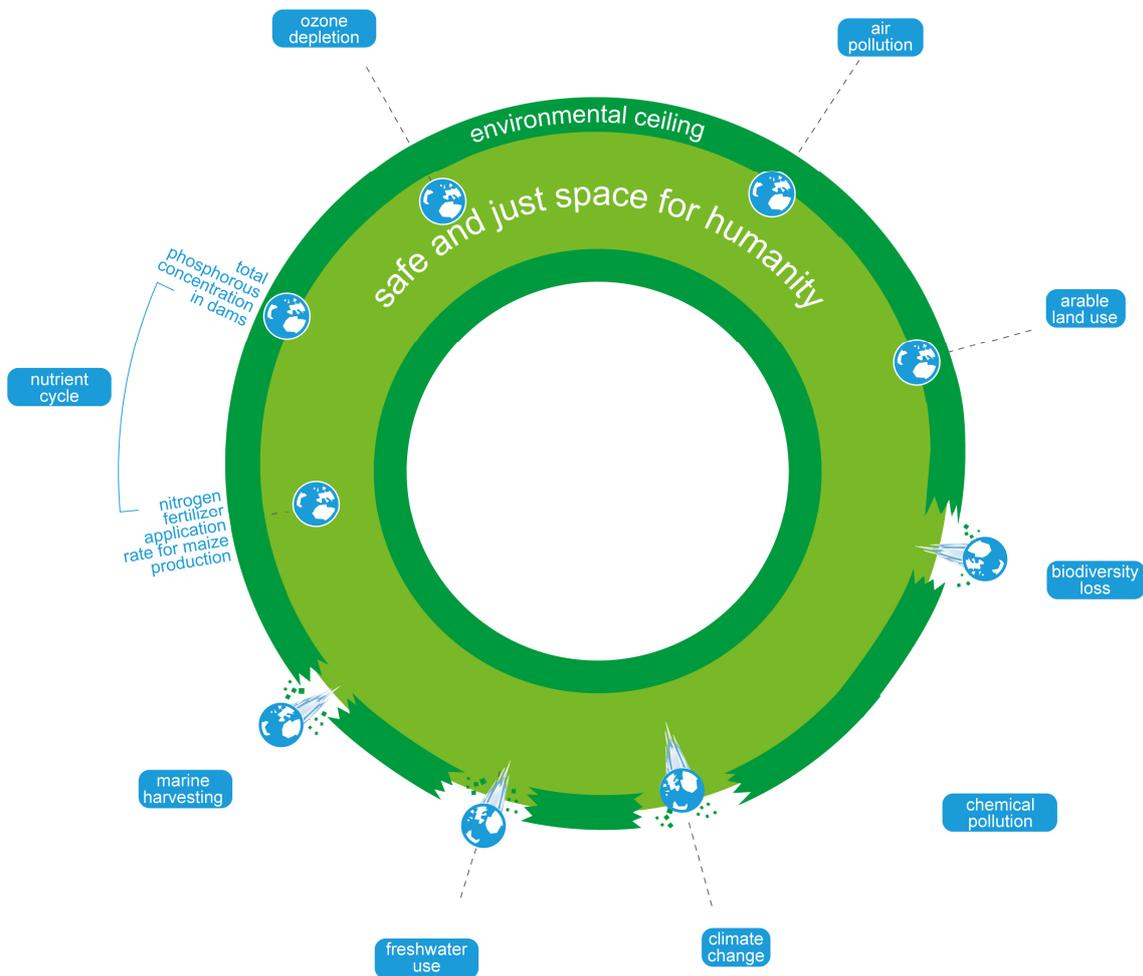
Table 5: Dimensions of environmental stress for South Africa, 2012/13

Dimension	Indicator	Current state	Safe national boundary	Proximity to boundary*
Air pollution	Annual average PM10 concentration	47 ug/m ³	50 ug/m ³	94%
Arable land use	Rain-fed arable land converted to crop land	11.9%	12.1%	98%
Biodiversity loss	Endangered and critically endangered ecosystems	37%	0%	137%
Chemical pollution	To be determined			
Climate change	Annual direct CO ₂ emissions	460 MtCO ₂	451 MtCO ₂	102%

Freshwater use	Annual consumption of available freshwater resources	18,895 Mm ³	14,196 Mm ³	134%
Marine harvesting	Depleted marine fisheries stocks	45%	0%	145%
Nutrient cycle	Total phosphorous concentration in dams	0.098 mg/l	0.100 mg/l	98%
	Nitrogen fertiliser application rate for maize production	85 kg N/ha	144 kg N/ha	59%
Ozone depletion	Annual HCFC consumption in ozone-depleting tonnes	262 t	370 t	71%

*100 percent is on the boundary.

Figure 8: The South African doughnut – Environmental ceiling



Climate change

Climate change poses a significant threat to development gains in developing countries and is hitting the poorest people first and worst. Rising temperatures, flooding and drought, changing rainfall seasons, stronger winds and more hot days have the potential to negatively affect South Africa's biodiversity, marine stocks, food security, water security, human health and possibly job security (see Box 3) (DST 2012). This situation requires the development of new skills, new jobs and the ability to manage change and to adapt to unexpected conditions. South Africa can contribute to mitigating this global problem by reducing its dependence on coal as an energy source.⁵ The country has one of the highest per capita levels of greenhouse gas (GHG) emissions in the world at 8.6 tCO₂ per person and is responsible for 45 percent of Africa's carbon dioxide (CO₂) emissions. GHG emissions are dominated by CO₂ (85 percent), which comes largely from coal-fired power generation (World Resources Institute 2013).

Although nations have agreed to limit global warming to 2°C under the UN Framework Convention on Climate Change (UNFCCC), there are no internationally agreed targets for GHG emissions for developing countries. In the Copenhagen Accord in 2009, South Africa pledged to voluntarily reduce CO₂ emissions to 34 percent below 'business as usual' (BAU – which assumes that no measures are taken to reduce emissions) by 2020 and to 42 percent below BAU by 2030. This commitment is based on the emissions trajectory of the 'Required by Science' scenario in South Africa's Long Term Mitigation Scenarios (LTMS) (Scenario Building Team 2007) (see Figure 9), which incorporates the UNFCCC principle of common but differentiated responsibilities and respective capabilities (CBDRRC) and the 'right to development'.

Indicator

Annual direct CO₂ emissions in million tonnes (MtCO₂).

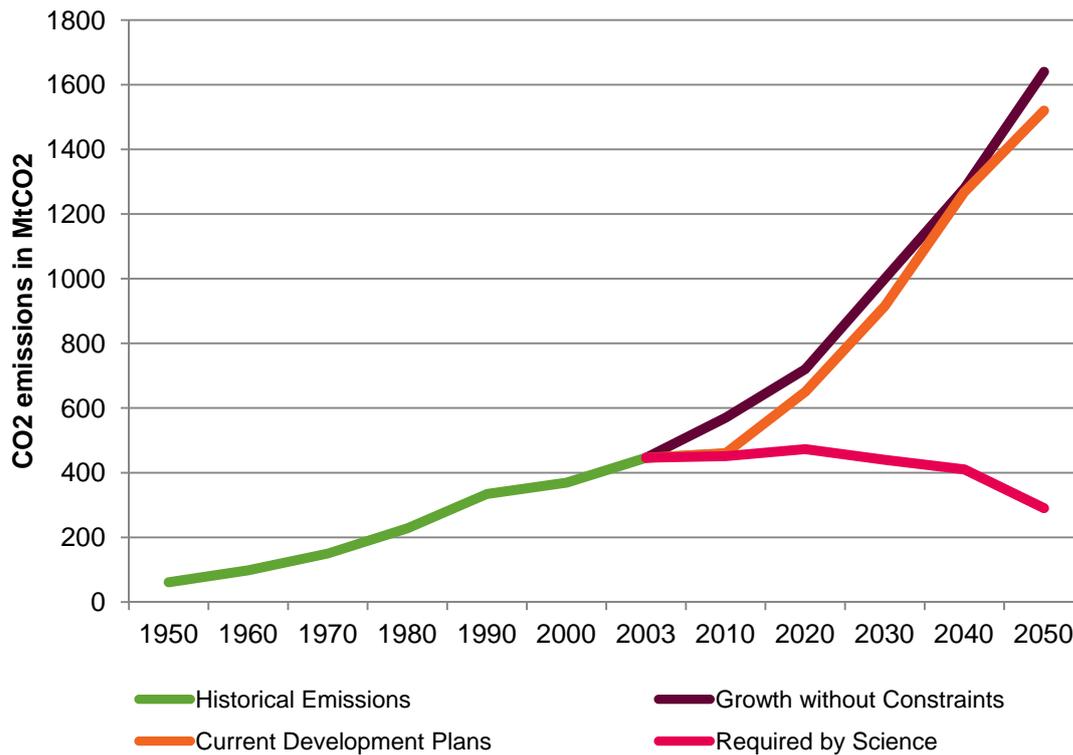
Safe boundary

The safe boundary uses the emissions trajectory of the LTMS 'Required by Science' scenario, which differs from BAU from 2003 until 2050 (purple line in Figure 9). The boundary for 2010 (the most recent data available) is 451 MtCO₂.

Result

The current status was 461 MtCO₂ in 2010 (United Nations Statistical Division 2013) South Africa has exceeded its safe national boundary by 2 percent.

Figure 9: Carbon emissions trajectories for South Africa



Data source: LTMS 2009 (Winkler 2007)

Box 3: Future climate change impacts in South Africa

The mean annual temperature is projected to increase by 2°C by 2050, with the following impacts: (Midgley et al. 2007)

- Increase in evaporation and plant transpiration by ~5–15 percent, reducing water supply;
- Increasing frequency and intensity of extreme rainfall events, resulting in higher risk of flooding in urban areas;
- More frequent droughts and heatwaves, causing more frequent fires;
- Greater rates of soil erosion, especially in wet years;
- More variable stream flows despite higher predicted flows overall, except for parts of the Western Cape;
- Expansion of the borders of vector-borne diseases such as malaria;
- Increasing water shortages, which will reduce crop yields and increase yield variability;
- Heat stress, which will reduce the productivity of perennial and annual crops, especially deciduous fruit dependent on chill units, and livestock;
- Increased water requirements for summer rainfall crops, by 10–30 percent;
- Rising sea levels and high tidal/storm events, which could damage coastal areas.

Box 4: Fracking

A new challenge in this area is fracking, a process whereby water, sand and chemicals are pumped into wells to extract shale gas. South Africa has potentially the eighth largest shale gas reserves in the world, with an estimated 390 trillion cubic feet (tcf) of gas (a 260-year supply) underneath the Karoo semi-desert region, (Crossley 2014) although this has been revised down to 40 tcf by national oil company PetroSA (Forde 2014). Although this fossil fuel resource could boost employment, reduce fuel prices and contribute to economic growth, this may not be the case if skills are lacking and if the gas is exported.

Those living in the Karoo and other concerned members of the public believe that the economic benefits will not outweigh the environmental impact, and a number of academics have sided with the anti-fracking lobby, arguing that the multinational oil companies will benefit most (Forde 2014). The two main environmental concerns related to fracking are water and carbon emissions. The Karoo is a particularly dry part of the country and scarce water resources must be protected from pollution and from being diverted away from communities, small businesses and farmers to water-hungry energy companies. Contamination of local water resources will have serious health effects for communities. Governance is therefore crucial. Draft regulations for fracking were gazetted in 2013, allowing exploration to begin.

The other big concern is that, instead of reducing national carbon emissions (gas has lower emissions than coal), emissions will increase as shale gas is sent to the Mossgas refinery in Mossel Bay, the world's third largest gas-to-liquids refinery. To mitigate climate change, the government should use the gas directly and use it to displace coal-based electricity.

Ozone depletion

The depletion of ozone (O₃) in the stratosphere allows severe and irreversible UV-B radiation from the sun, which negatively affects human health and ecosystems. Ozone depletion is one of the few environmental challenges to have been successfully managed at a global scale. The Montreal Protocol sets out phasing-out schedules (which are different for developed and developing countries to allow for different capabilities) for the production and consumption of 96 ozone-depleting substances. Since the Montreal Protocol was signed in 1990, South Africa has phased out all ozone-depleting substances except hydrochlorofluorocarbons (HCFCs), which are used for refrigeration and air-conditioning and in the manufacturing of polystyrene and polyurethane. Although South Africa accounts for only 4 percent of global HCFC consumption, (UNEP 2014) these substances have been declared national priority air pollutants (GCIS 2011) by the government, meaning that they must be eradicated.

Indicator

Annual HCFC consumption in ozone-depleting tonnes (ODPt).

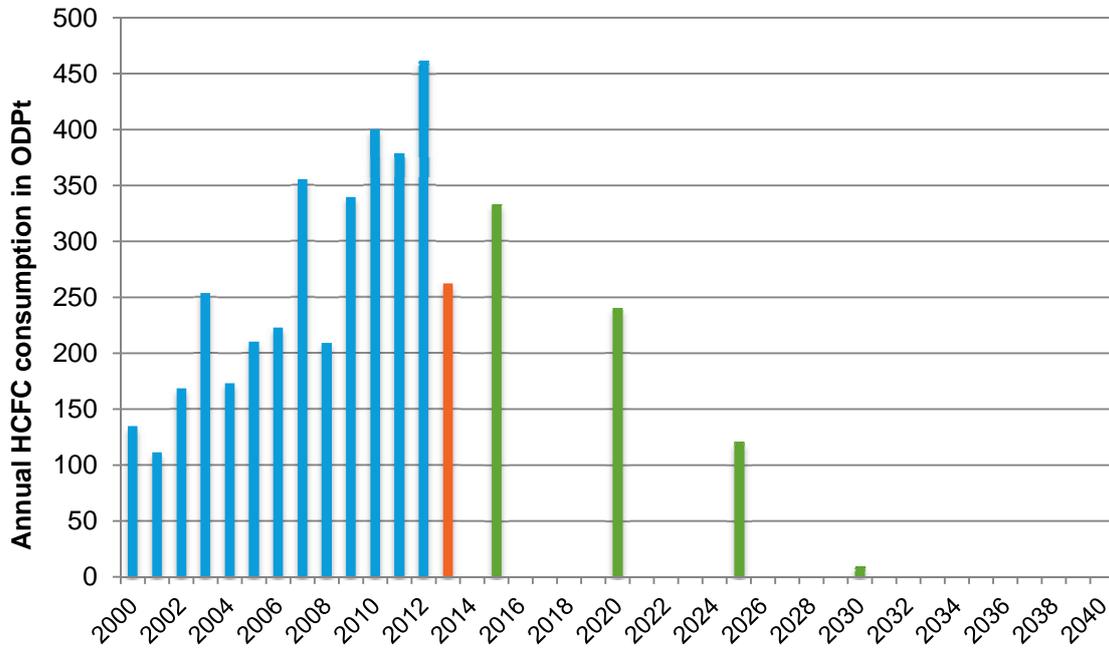
Safe boundary

The safe boundary for South Africa is based on the government commitments under the Montreal Protocol to eliminate HCFCs by 2050. The government aims to freeze HCFC consumption by 2013 and limit it to the baseline of 370 ODPt, to reduce HCFCs by 35 percent by 2020 and by 67.5 percent by 2025, and to phase them out by 2040 (NEDLAC 2012) (see Figure 10).

Result

HCFC consumption was 262 ODPT in 2013 (UNEP 2014) and, as this was the year of the committed freeze at the baseline of 370 ODPT, South Africa is 29 percent below the safe national boundary for ozone depletion.

Figure 10. Actual (blue), targeted (green) and current (orange) HCFC consumption in South Africa, 2000–40



Data sources: United Nations Environment Programme (UNEP 2014) and NEDLAC (NEDLAC 2012)

Freshwater use

South Africa is the 30th driest country in the world, with low and variable rainfall, erratic run-off, high levels of evaporation and shallow dam basins (DWA 2013). The country's economy depends primarily on its surface water resources (including imported water from Lesotho), which contribute 76 percent of supply, while groundwater provides 9 percent and return flows (i.e. re-use) contribute 15 percent (StatsSA 2006). More than 60 percent of rivers are fed by flow from only 20 percent of the land area, requiring large-scale inter-basin transfers (Nkondo et al. 2012).

The second National Water Resource Strategy (NWRS2), (DWA 2013) published in 2013, states that the 'sustainability of the country's fresh water resources has reached a critical point', and it identifies three main challenges: security of supply (30 percent of towns currently are in deficit), environmental degradation and resource pollution (25 percent of riverine ecosystems and 48 percent of wetland ecosystems are critically endangered⁶ (Driver et al. 2012)) and the inefficient use of water (25 percent of municipal water is physically lost (Mckenzie et al. 2012)). Ensuring a sustainable water balance requires a multitude of strategies, including water conservation and water demand management (WCWDM), further utilisation of groundwater, desalination, water re-use, rainwater harvesting and (treated) acid mine drainage.

The 1998 National Water Act established a reserve for basic human needs and ecological functioning, (Republic of South Africa 1998) and maintaining this reserve is the foremost priority

in water resource planning (DWA 2013). The ecological reserve is the minimum in-stream flow needed to support ecological functioning (StatsSA 2006). Approximately two-thirds of freshwater is allocated (or licensed) by the government for agriculture, 16 percent is allocated for domestic use and 2 percent for power generation as a national 'strategic user' (StatsSA 2006). Water demand is expected to increase by 32 percent by 2030 (Colvin et al. 2011).

Indicator

Annual human consumption of freshwater in million cubic metres (Mm³).

Safe boundary

Available freshwater resources for human consumption, which include surface water, groundwater, imported water and return flows, are 14,196 Mm³yr.¹

Result

Cole et al. estimated freshwater consumption as 18,895 Mm³yr¹ in 2013. This means that the ecological reserve is not being met, and South Africa exceeds the safe boundary by 34 percent.

Arable land use

South Africa is a largely semi-arid country with little in the way of land that is capable of supporting sustainable crop production. Roughly 80 percent of land is in its natural state, albeit largely used for grazing. The country is particularly susceptible to land degradation due to both its semi-arid climate and the unique land tenure situation in the former homelands of the apartheid regime (Meadows & Hoffman 2002).

It is important to differentiate between land capability, land suitability and land use. National land capability measures agricultural potential based on soil, climate and terrain and is classified as rain-fed arable land (Classes I–III: see Figure 11), marginal land (Class IV) and non-arable land (Classes V–VIII) (Collett 2013). While land *capability* is based on ecological sustainability, land *suitability* depends on economic and social factors in addition to environmental factors. Hence an area of land can be capable of crop production, but deemed suitable for urban development or mining instead. For instance, Mpumalanga has 21 percent of South Africa's arable land, which supports commercial and subsistence farmers, but 54 percent of the province is under some form of planned mining activity⁷ (Colvin et al. 2011).

Indicator

Cultivated land (or cropland) as a percentage of the total land area.

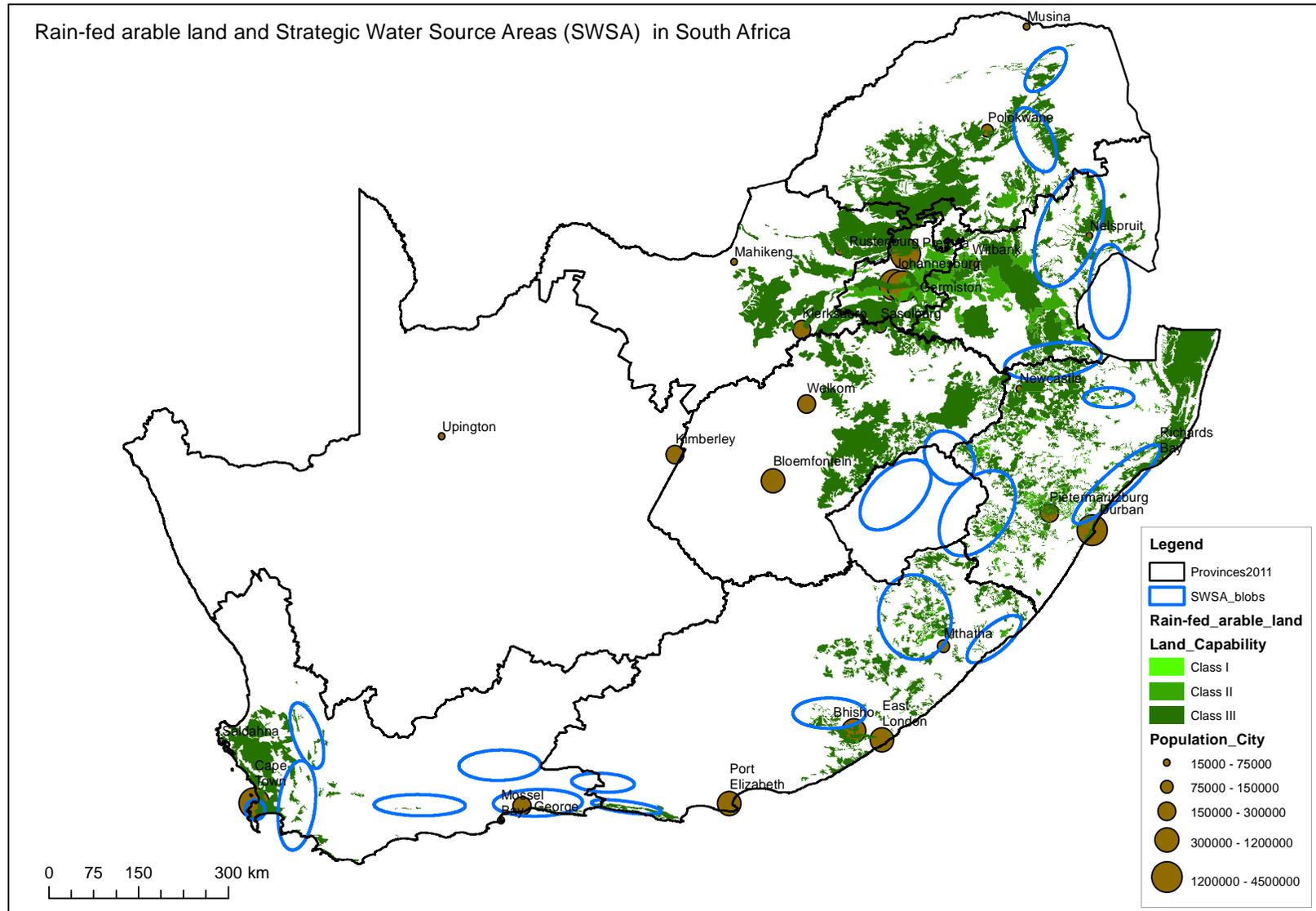
Safe boundary

The safe boundary is 'rain-fed arable land' as a percentage of the total land area, which was 12.1 percent in 2012 – i.e. only 12.1 percent of land in South Africa is capable of rain-fed crop production. Marginal land was not included as it requires irrigation and is susceptible to drought and climate change.

Result

Land used for crop production was 11.9 percent in 2005; (Schoeman et al. 2013) hence South Africa is a mere 2 percent below its safe boundary.

Figure 11: Arable land (land capability classes I, II and III shown in green), high water yield areas (shown in blue ovals) and cities (shown by brown dots) in South Africa



Box 5: Biofuels

A controversial aspect of land use and food production is biofuels. The government is moving ahead with its Biofuels Industrial Strategy, which provides mandatory blending regulations; this is set to come into effect on 1 October 2015 and will guarantee the uptake of all biofuels supplied by licensed manufacturers. Biofuels could constitute 2 percent of existing fuel volumes, and would be farmed on 300,000 ha of underutilised land in the former homelands (1.4 percent of arable land), (Burger 2014) with the aim of promoting farming and creating 25,000 jobs in these areas, where poverty is rife (DME 2007).

Biodiversity loss

Apart from their intrinsic value, biodiversity (the degree of variation of species or ecosystems within an area) and the services that ecosystems provide play an essential role in supporting social development and economic prosperity. Ecosystem services include the production of food and water, the control of climate and disease, nutrient cycles and crop pollination, and spiritual and recreational benefits (Arico et al. 2005). As the Minister of Water and Environmental Affairs, Edna Molewa, has recognised, 'Healthy intact ecosystems give us more options for responding to climate change, alleviating poverty and building a green economy' (Driver et al. 2012).

South Africa is one of 17 mega-diverse countries globally and has three of the world's 25 biodiversity hotspots (see Box 6). It has undertaken biodiversity assessments since 1980 and has made a significant contribution to global conservation efforts (Raimondo 2011). The 2011 National Biodiversity Assessment (Driver et al. 2012) reported the threat status of 1,763 ecosystem types across six categories – terrestrial, rivers, wetlands, estuaries, coastal and inshore, and offshore ecosystems.

Indicator

Number of endangered and critically endangered ecosystems⁸ as a percentage of total ecosystems.

Safe boundary

The safe national boundary is zero endangered and critically endangered ecosystems.

Result

In 2011, 37 percent of all ecosystems were endangered and critically endangered, hence South Africa has exceeded its biodiversity boundary by 37 percent.

Box 6: Mega-diverse countries and global biodiversity hotspots

Conservation International identified 17 mega-diverse countries in 1998. These countries host the majority of the Earth's species and are therefore considered extremely biodiverse. They are: Australia, Brazil, China, Colombia, Democratic Republic of Congo (DRC), Ecuador, India, Indonesia, Madagascar, Malaysia, Mexico, Papua New Guinea, Peru, Philippines, South Africa, the United States and Venezuela.

Conservation International also identified 25 biodiversity hotspots based on plant diversity that are home to at least 1,500 endemic species. South Africa's three hotspots – the Cape Floral Kingdom, Succulent Karoo and Maputaland-Pondoland-Albany – contain more than 20,000 plant species, half of which are found nowhere else on Earth.

Marine harvesting

South Africa's 3,000km coastline meets the Indian and Atlantic oceans and is home to rich marine biodiversity. The country's commercial, subsistence and recreational fisheries catch more than 630 different marine species. Fisheries contribute an estimated R6bn to the economy and provide 27,000 jobs (StatsSA 2013b). The Department of Agriculture, Forestry and Fisheries (DAFF) uses operational management procedures that are based on the precautionary principle and determine the total allowable commercial catch (total amount in kilograms or tonnes permitted to be caught by permit holders), to manage the major marine fisheries.

The status of 17 fishery sectors and 45 species or sub-species is reported in DAFF's 2012 'Status of South African Marine Fishery Resources' report, (DAFF 2012) and these are summarised in Figure 12. Stock status is based on maximum sustainable yield (MSY) – a scientific target for optimal utilisation. Stock status is reported as 'unknown', 'abundant', 'optimal', 'depleted' or 'heavily depleted'. For example, deep-water hake (currently the most economically valuable fish) have been depleted to 21 percent of the pre-fished biomass of 1,358,000 tonnes and have an MSY of 24 percent of pre-fished biomass (325,920 tonnes), and are therefore classified as 'depleted'.

Indicator

Depleted fisheries species as a percentage of total fisheries species with known status.

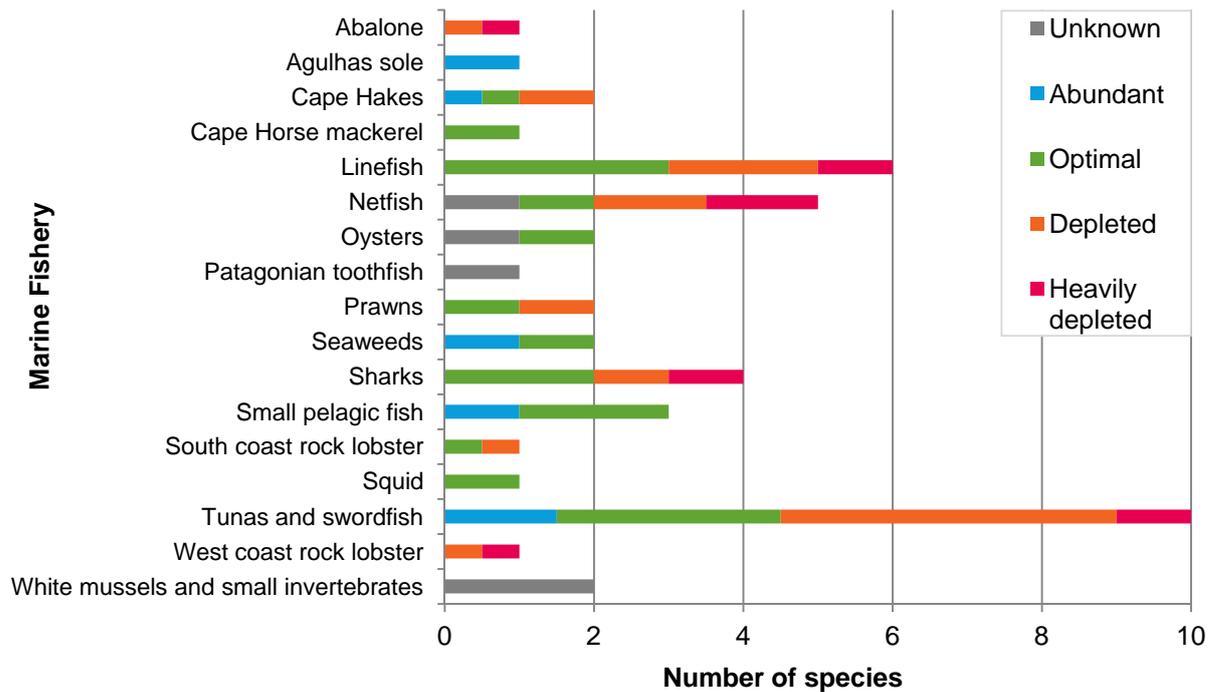
Safe boundary

The safe national boundary is zero depleted species, which includes both the depleted and heavily depleted stock status.

Result

In 2012, species in 45 percent of fisheries were depleted, and South Africa has therefore exceeded its marine harvesting boundary by 45 percent.

Figure 12: Status of South African marine fisheries, 2012



Data source: Department of Agriculture, Forestry and Fisheries (DAFF 2012)

Nutrient cycles: nitrogen and phosphorous

Nitrogen and phosphorous are essential for food production as they are primary ingredients of chemical fertilisers. Globally, nutrient use efficiency is low due to the oversupply of nutrients, an imbalance of nutrients and/or including livestock in the food chain (Sutton et al. 2013). Over 80 percent of nitrogen and 25–75 percent of phosphorous is lost to the environment, polluting soil, air and water and disrupting natural cycles (Sutton et al. 2013).

Phosphorous

Eutrophication (algal and plant production as a result of increased levels of nutrients) of freshwater resources is widespread in South Africa and is a national concern as it has significant health risks (van Ginkel 2011). Water quality is deteriorating primarily through poor control of effluent discharges. Nearly 95 percent of the country’s wastewater treatment plants are operating below acceptable levels, and 30 percent require urgent attention to avoid crises such as outbreaks of waterborne disease.

Indicator

Mean annual total phosphorous (P) concentration in freshwater reservoirs/dams in milligrams per litre (mg/l).

Safe boundary

The safe national boundary for phosphorous in freshwater is 0.10 mg/l, which is used as a maximum level for the outflow from wastewater treatment plants into rivers (Oberholster & Ashton 2008).

Result

The mean annual total P in dams and reservoirs was 0.098 mg/l in 2013; hence South Africa is only 2 percent below its safe boundary.

Nitrogen

Agriculture uses fertilisers to replace nutrients removed from the soil in the process of crop production. The biggest users of fertiliser in South Africa are maize, sugar cane, fruits, vegetables and wheat, as shown in Figure 13. Nitrogen constituted 62 percent of the fertilisers, and maize production uses nearly two-thirds of nitrogen fertiliser in South Africa (FSSA 2013). As the country's staple crop, maize is of most interest.

Indicator

Nitrogen application rate for maize production in kilograms per hectare (kg/ha).

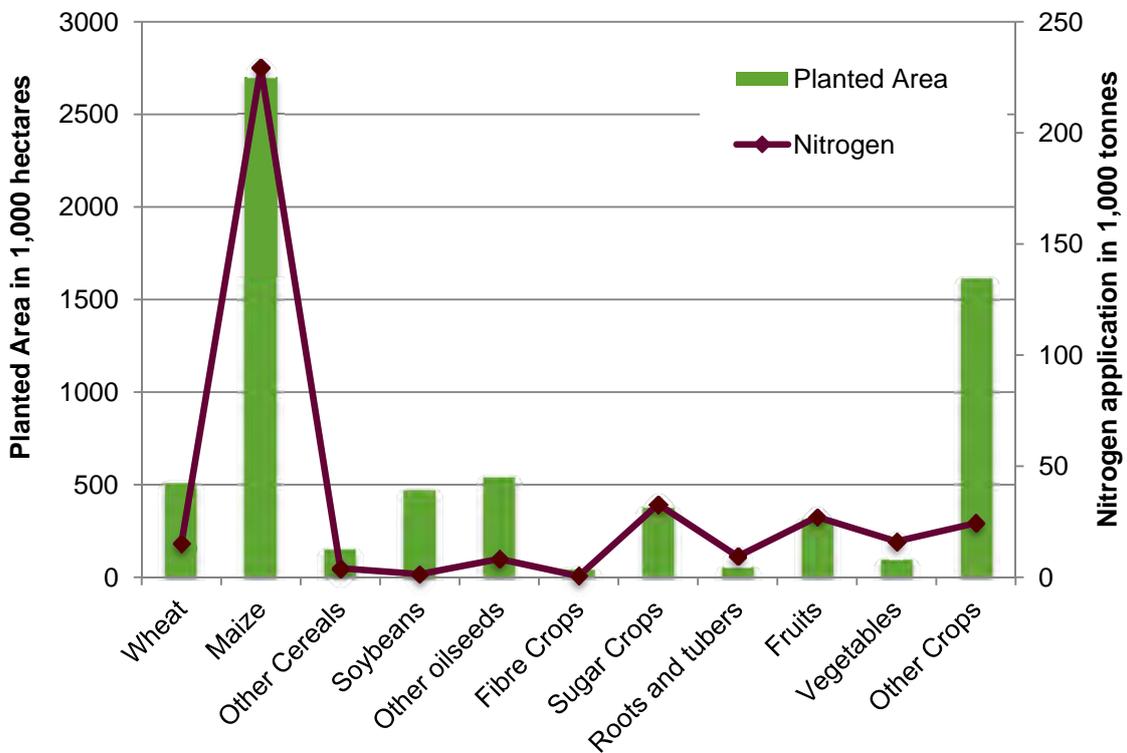
Safe boundary

The safe national boundary for nitrogen is 144kg N/ha for maize, based on Brentrup and Palliere's (2010) nitrogen use efficiency threshold.

Result

With an application rate of 85kg of nitrogen per hectare in 2012, South Africa is 41 percent below this boundary.

Figure 13: Estimated planted area and nitrogen fertiliser use by crop in South Africa, 2012



Data source: Fertiliser Society of South Africa (FSSA 2013)

Air pollution

South Africans have a constitutional right to clean and healthy air. The country has three national priority 'hotspots' of poor-quality air – the coal and gold mining areas of the Vaal Triangle, the Highveld and the Waterberg – and four other hotspots in the metropolitan areas of Johannesburg, Tshwane, eThekweni and Cape Town. The government's 'State of Air' report for 2012, (DEA 2013) based on over 90 air quality monitoring stations, shows that PM10 – particulate matter (fine particles found in the atmosphere, including soil dust, dirt, soot, smoke, pollen, ash, aerosols and liquid droplets) of less than 10 microns – is the greatest national cause for concern in terms of air quality.

Indicator

Annual average PM10 concentration in micrograms per cubic metre ($\mu\text{g}/\text{m}^3$).

Safe boundary

The safe national boundary is the DEA's PM10 threshold of $50 \mu\text{g}/\text{m}^3$.

Result

The mean annual PM10 concentration was $47 \mu\text{g}/\text{m}^3$ in 2012; hence South Africa is 6 percent below its boundary.

Although this national boundary has not been crossed, a large proportion of the population is living with poor air quality. In 2009, 50 municipalities that are home to 36 million people had sub-standard air quality (DWA 2012). The poorest citizens, who have little scope to move away, are often those who suffer the worst.

Chemical pollution

Chemical pollution – such as radioactive compounds, heavy metals and organic compounds – impacts on human and ecological functioning when it exceeds certain levels. While South Africa has enacted progressive legislation via the National Environmental Waste Management Act 2008, there is a large gap between policy and practice (Papu-Zamxaka et al. 2010). The government's latest National Waste Information Baseline Report (DEA 2012) estimates that over 1.3m tonnes of hazardous waste were produced in 2011. Three types dominated – 'inorganic waste' (22 percent), 'tarry and bituminous waste' (19 percent) and 'other organic waste without halogen or sulphur' (15 percent) – while 25 percent was classified as 'miscellaneous'. As all of this waste goes to landfill, it poses a threat to human health. Voluntary reporting and incomplete measurement undermine the setting of a national baseline; thus, due to the lack of detailed and accurate information on chemical pollution and its thresholds, a national indicator and boundary have not been defined for this dimension.

3 KEY FINDINGS FROM THE DOUGHNUT

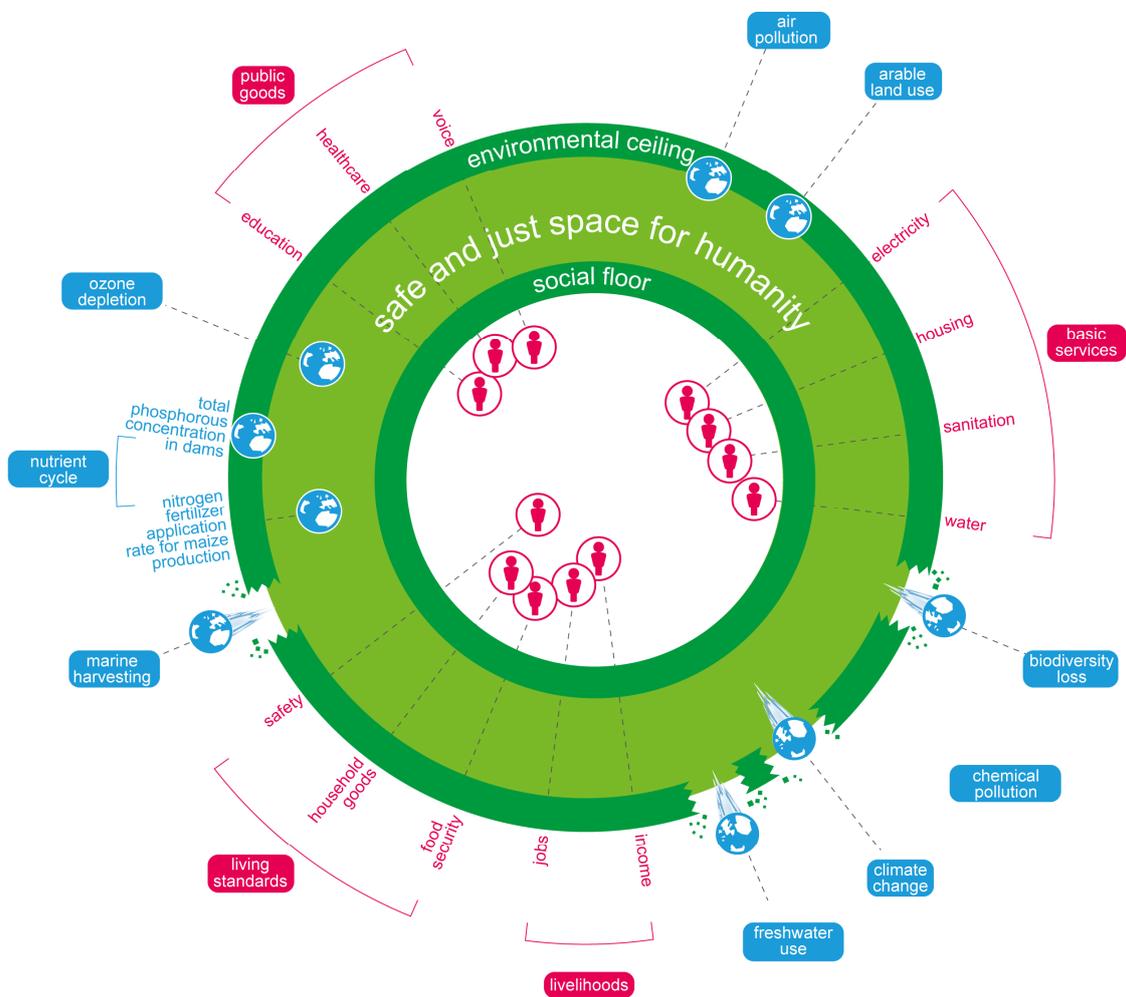
Some of the key findings of the doughnut analysis presented in the previous section are summarised here:

- South Africa has not achieved its social foundation for any of the 12 dimensions.
- South Africa's ability to meet its social foundation is hindered by its stressed environmental and constrained natural resources.
- Inequality exists across a wide range of basic services, public goods, livelihoods and living standards. Inequality is also evident in access to natural resources and in the social economic gradient in contributions to environmental stress.
- South Africa has made the most progress on basic services since 1994: electricity, water access, sanitation and housing.
- It has made limited progress on reducing poverty, inequality and unemployment. Around 52 percent of the population live below the national poverty line of R577 per person per month (in 2011 Rand) and 36 percent of the labour force are unemployed.
- Of the 12 social dimensions, South Africa performs worst on safety, with 65 percent of households feeling unsafe walking in their neighbourhood at night.
- Food security has only recently been introduced into household surveys, but in 2013 almost one in four South African households did not have enough food.
- Apart from ozone depletion and the nitrogen cycle, all environmental dimensions in the doughnut are in a critical state – they are either close to their safe boundary or have already exceeded it.
- The most critical environmental dimensions are marine harvesting, biodiversity loss, freshwater use and climate change (CO₂ emissions), which have all exceeded their safe national boundaries.
- There has been a general increase in environmental stress since 1990, although there has been some progress in recent years, specifically on marine harvesting, air pollution and ozone depletion.
- Compared with most developing countries, South Africa has rich and reliable data; however, in some instances a lack of available data limits the doughnut analysis.
- The choice of indicator in the doughnut matters. For example, health care appears to have reached higher levels of attainment than other social indicators (at 91 percent). However, only one indicator (infant immunisation coverage) was usable for the doughnut, which does not reflect the full spectrum of health issues. Sanitation is another example. Using the government's official indicator, 17 percent of South Africans lack access to adequate sanitation; however, 40 percent lack access to the level of sanitation that most South Africans want.

4 BRINGING THE TWO TOGETHER – WHAT DOES THE DOUGHNUT MEAN?

The doughnut provides a useful and easy-to-read snapshot of the current status of social deprivation and environmental stress in South Africa. But it does not immediately reveal the links between the different dimensions and the implications for the country, its neighbours and the world. While it is impossible to cover all aspects of the doughnut in this report, it highlights some important implications at different levels.

Figure 14. The South African doughnut



NATIONAL IMPLICATIONS

The doughnut can support policy making in South Africa by supplying strategic information on environmental and social problems, identifying key factors that cause pressure, monitoring the effects of policy responses and raising public awareness for action. The doughnut highlights the inter-relationship between the environment and the economy. The National Development Plan's ambitious target of 5.4 percent GDP growth and 11 million new jobs by 2030 requires a healthy, functioning natural environment if it is to be achieved. A collapse in fish stocks would result in thousands of job losses. Further deterioration in water quality will reduce the available water supply and limit productive activities such as agriculture and manufacturing. A changing climate is already impacting on small and large-scale farmers, and flooding can halt mining operations, hinder the transport of goods and leave commuters stranded. Climate change may also contribute to further environmental stress, such as freshwater use, land use change and biodiversity loss, and the country's energy sources need to shift from coal-based to renewables.

The 12 dimensions of the social deprivation barometer highlight the fact that inequality exists not just in terms of income but across a wide range of basic services, public goods, livelihoods and living standards. Inequality is also evident in access to natural resources and in contributions to (and impact of) environmental stress. Nearly a quarter of the population do not have access to electricity, yet providing universal access would increase CO₂ emissions by only 0.04 percent (Tait & Winkler 2012). Over 6 percent of the population still use rivers and other natural sources of water for their basic needs.

Table 6 relates the environmental dimensions of the barometer to basic national policy priorities, indicating where changes in the environmental dimension will impact directly on the broad social dimensions explored above. Exceeding the environmental boundaries has real implications for energy security, food security, water security, job security and human health, which in turn affect the national economy. As both the population and the economy grow, environmental stress is likely to increase, and many of the boundaries could be exceeded.

Table 6: Direct links between environmental stress and national policy applications

Environmental dimension	Energy security	Water security	Food security	Job security	Human health
Climate change	✓	✓	✓	✓	✓
Ozone depletion					✓
Freshwater use		✓	✓		✓
Land use change	✓	✓	✓	✓	
Nutrient loading		✓	✓	✓	✓
Marine harvesting			✓	✓	
Biodiversity loss		✓	✓	✓	✓
Air pollution			✓		✓
Chemical pollution		✓	✓		✓

If 'business as usual' continues, the current nature of economic growth in South Africa is likely to cause further environmental stress. For example, increasing mining production and beneficiation (production of higher-value goods using raw metals) requires additional water and energy and may cause biodiversity loss, land fragmentation and air pollution.

If well managed, however, there is much potential for the 'green economy' to achieve both social and environmental goals. For example, solar energy will create new jobs, provide access to electricity, reduce carbon emissions and enable extractive industries to reduce their environmental impact significantly.

The economy and the National Development Plan

The former Minister of Finance, Pravin Gordhan, in his February 2014 Budget speech, said, 'We have to work together to radically change our economy ... to accelerate growth, create work opportunities and build a more equal society' (Government of South Africa 2014). This economic transformation is intended to be realised through the National Development Plan (NDP) Vision 2030, (Government of South Africa 2014) which will be implemented over three five-year periods, starting with the 2014–19 medium-term strategic framework. The NDP has two overarching goals – to eliminate income poverty and to reduce inequality, as measured by the Gini coefficient, from 0.69 to 0.60 by 2030 (National Planning Commission 2012). To do this, it aims to achieve an average annual growth rate of 5.4 percent and to create 11 million jobs (i.e. reach near full employment) by 2030 by:

- Improving economic policy coordination and implementation;
- Building partnerships between the public sector, business and labour to facilitate, direct and promote investment in labour-intensive areas;
- Raising competitiveness and export earnings through better infrastructure and public services, lowering the costs of doing business, improving skills and innovation and targeting state support to specific sectors;
- Strengthening the functioning of the labour market to improve skills acquisition and to match job seekers with job openings.

Most new jobs are likely to be sourced in domestically oriented businesses and in growing small- and medium-sized firms. The NDP has a strategic vision for rural economic development that includes attention to labour-intensive agricultural activities, despite the de-agrarianisation in rural areas that has seen households moving away from agricultural-based activities and becoming reliant on government grants (Daniels et al. 2013).

Cilliers and Camp (2013) believe that the targets laid out in the NDP are achievable only if large and systemic changes are made to the structure and efficiency of the economy, if there is a reduction in the prevalence of HIV and AIDS and if there is an increase in foreign direct investment (FDI).

Some government initiatives that contribute to the NDP vision are already under way. Those highlighted by Minister Gordhan (Government of South Africa 2014) are:

- Accelerated public infrastructure investment across the economy;⁹
- New spatial plans for cities, improved public transport and upgrading informal settlements;
- Support for special economic zones and manufacturing incentives in the Industrial Policy Action Plan;
- A tax incentive to encourage youth employment (the government shares the cost of employment with private employers for a maximum of two years);
- Expansion of public works programmes to create additional jobs;
- Renewed focus on accountability and quality in education;
- Phasing-in of the universal National Health Insurance scheme;
- Further investment in renewable energy and support for the transition to a low-carbon economy.

The NDP has been criticised by the National Union of Metalworkers of South Africa (NUMSA) (NUMSA 2013) and parts of civil society for promoting labour market deregulation and a neoliberal macro-economic policy framework, rather than nationalisation and state ownership of strategic assets and industries such as mining and banking. The Congress of South African Trade Unions (COSATU) (COSATU 2013) has criticised the NDP for a lack of ambition by:

- Proposing too many low-quality, unsustainable jobs, focusing on services and small, medium and micro enterprises (SMMEs) rather than on 'decent work' (in COSATU's view, this means manufacturing) and growth being export-driven rather than seeking to raise local demand through increased purchasing power;
- Increasing the share of income of the bottom 40 percent of income earners from 6 percent to a mere 10 percent;
- Seeking to end poverty for 39 percent of South Africans, but using an unambitious poverty line of R418 per person per month (2009 prices).

The trade unions argue that the NDP supports 'business as usual' and will not transform the country as promised by the government. While economic growth is necessary for poverty alleviation, the quality of growth is essential for it to address extreme inequality and unemployment (Cilliers & Camp 2013).

One of the positive aspects of the NDP is its call for the development of a 'social floor' and for indicators to measure environmental stress. The South Africa 'safe and just space' could be used in this process. The 2013/14 national budget of R1.15 trillion (\$117.8bn) also supports the dimensions in the doughnut. It allocated 22 percent to education (compared with an OECD average of 6 percent (OECD 2013)), 15 percent to defence, public order and safety, 13 percent to health, 12.5 percent to social protection (including National Health Insurance) and 8 percent to infrastructure (National Treasury 2014). The funding is therefore available to address many of the challenges highlighted by the doughnut.

Influential players

The development pathway that South Africa takes over the coming years will be influenced by the governing party the ANC, big business, labour, the media and civil society.

Political parties and government

The ANC was formed in 1912 as a national liberation movement and came into power in 1994; it has won more than 60 percent of the vote in subsequent national elections. It is in a tripartite alliance with the South African Communist Party (SACP) and COSATU, which has about 2 million members. There is currently a split within COSATU, which has a bearing on current and future decisions and politics. There have been two breakaway parties from the ANC: the Congress of the People (COPE) in 2008 (which gained 9 percent of the vote in 2009 and 1 percent in 2014) and the Economic Freedom Fighters (EFF) in 2012 (which won 6 percent of the vote in 2014). However, neither of these new parties challenges the ANC's majority. The official opposition is the liberal democratic Democratic Alliance (DA), which governs Western Cape Province and won 22 percent of the national vote in 2014.

Voter turnout is high, at 73 percent in 2014, although it has dropped from 89 percent in 1999. IDEA 2014). According to the Afrobarometer, (Citizen Surveys 2013) 91 percent of South Africans feel free to choose who to vote for and 89 percent thought that the 2009 elections were free and fair. South Africa has a parliamentary proportional representation electoral system at all levels except for local government. As the ANC consistently attains more than 60 percent of the vote in national and provincial elections, it functions more like a majoritarian system of representation. The Constitution provides for some degree of separation of powers through an independent Constitutional Court, Public Protector and central bank. However, although South

Africa has strong institutions, in some cases they are being undermined by the current government (see Box 7).

Box 7: Nkandlagate

The recent 'Nkandlagate' scandal is a prime example of governance issues in South Africa. Thuli Madonsela, the Public Protector – an office similar to that of an ombudsman in other countries, and whose independence from the executive is enshrined in the Constitution – stated that the government had tried to stop her investigation into the use of public money to upgrade President Zuma's rural homestead, Nkandla (Mail and Guardian 2014). Madonsela's 443-page report found that Zuma had improperly benefited from an 'obscene' R265m (£15m). It showed how the security upgrade had the potential to benefit the local community, but instead benefited the President alone and even involved the relocation of his poor neighbours. She also showed that the President and Cabinet ministers sought to undermine trust in her office and in the government as a whole (Mail and Guardian 2014). One quote from the report summarises the affair: 'Virtually all parties either failed to do what they were required to do, or did what they were not supposed to do' (De Wet & Evans 2014).

Big business

Big business has significant influence in South Africa. Table 7 shows the 20 largest companies by market capital on the Johannesburg Stock Exchange (JSE). The list is dominated by mining, banking and fund management, and telecoms, but also includes tobacco, breweries, media and the Internet, luxury goods, petroleum, pharmaceuticals and retail (Sharenet 2014). The companies that depend heavily on energy and water, such as the mining companies, are involved in public-private partnerships (PPPs).¹⁰ A good example is the Strategic Water Partners Network, which aims to 'help close South Africa's projected water gap in 2030 through collaboration and partnership projects with strategic national impact' (SWPN-SA 2013).

Table 7: Top 20 companies by market capital in August 2014 (source: sharenet.co.za)

Name	Sector	Market capital (R million)
1. British American Tobacco PLC	Tobacco	1,251,315
2. SABMiller PLC	Breweries	962,259
3. Glencore Xstrata PLC	Mining	844,108
4. BHP Billiton PLC	Mining	758,346
5. Naspers Limited	Media and Internet	569,116
6. Richemont Compagnie	Luxury goods	525,915
7. MTN Group Limited	Telecoms	437,770
8. Sasol Limited	Petroleum	396,976
9. Anglo American PLC	Mining	390,734
10. Firstrand Limited	Banking	248,915
11. Standard Bank Group Limited	Banking	227,925
12. Vodacom Group Limited	Telecoms	187,467
13. Old Mutual PLC	Fund management	168,018
14. Nbexx2 (Nedbank Limited)	Banking/mining	146,494
15. Barclays Africa Group Ltd	Banking	141,998
16. Aspen Pharmacare Holdings	Pharmaceuticals	139,033
17. Sanlam Limited	Banking	138,264
18. Anglo American Platinum Corporation Ltd	Mining	125,146
19. Steinhoff International Holdings Ltd	Retail	124,470
20. Nedbank Group Ltd	Banking	123,353

Trade unions

Roughly a quarter of all employed workers were members of a trade union in 2011–13 (compared with an OECD average of 17 percent) and negotiations between unions and employers accounted for the settlement of 2.88 million salaries (22 percent) in 2013 (StatsSA 2014c). The largest trade union is NUMSA, which has more than 339,500 members, followed by the National Union of Mineworkers (NUM) and the South African Democratic Teachers Union (SADTU). However, workers are shifting their membership between unions due to dissatisfaction with wages and working conditions, leading to inter-union rivalries, particularly in the mining sector where the Association of Mineworkers and Construction Union (AMCU), formed in 1998, now competes with the NUM.

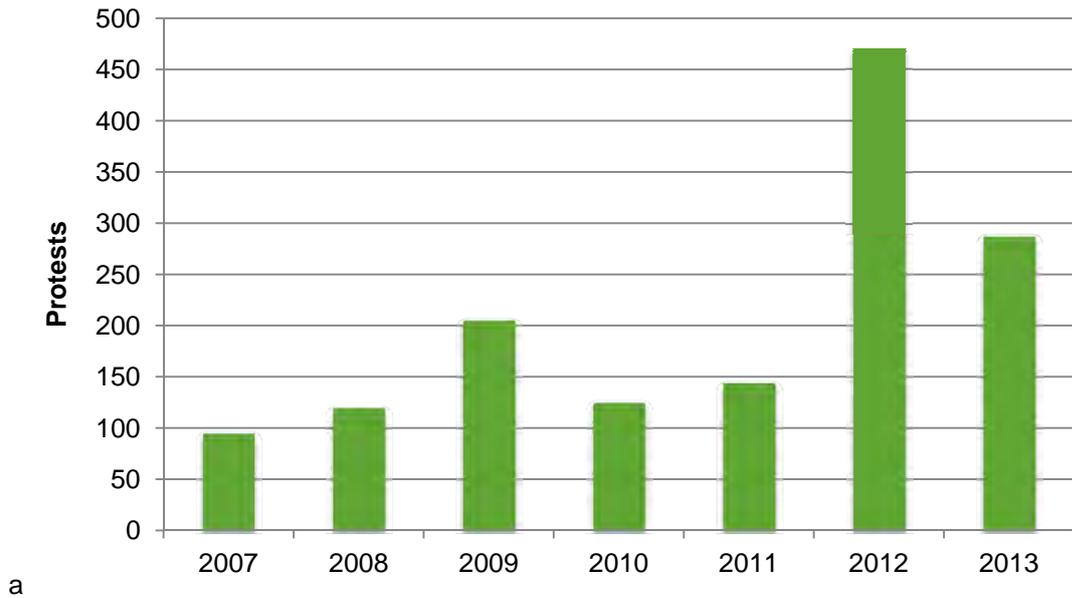
South Africa has one of the highest rates of industrial action in the world, with an average of 65 strikes a year from 2007 to 2011. In 2012, 17m working hours (94 percent of them in the mining industry – see Box 8) were lost due to 99 separate strikes, half of which were unprotected (Odendaal 2014). In 2013, 144 strikes resulted in 1.85m working days being lost, and R6.7bn in lost wages (Department of Labour 2014). A recent five-month-long strike in the ‘platinum belt’, led by the AMCU, shut down 40 percent of global platinum output (Stoddard 2014) (see Box 8). The previous Minister in the Presidency, Trevor Manuel, said on 4 February 2014, ‘South Africa has to find a way to secure a lasting and sustained peace in mining labour relations, given the sector’s importance to the economy’ (Donnelly 2014). Vehicle manufacturing was brought to a standstill in August 2013 after 30,000 workers went on strike to demand pay increases of more than double the inflation rate of 6.3 percent (Brand & Vuuren 2013). There were also violent strikes in 2012/13 by Western Cape farm workers demanding a 52 percent increase in the minimum wage, which resulted in the Department of Labour announcing a new minimum wage of R105/day, effective from 1 March 2013 (Reddy 2013) (see Box 1 on minimum wages, and Box 8 for discussion of minimum wages in the mining sector). Disputes over wages, bonuses and other forms of compensation are the main reason for work stoppages, (Department of Labour 2014) and these strikes highlight the level of anger that exists at income inequality and wage disparities.

While strikes may result in benefits for those who are employed, they can hinder aspiring small businesses. Herman Mashaba, the founder of a successful African hair-care business, ‘Black Like Me’, has said that South Africa has lost momentum in its entrepreneurial development because of the government’s ‘draconian’ labour legislation (Zwane 2014). A new Ministry of Small Business has been set up to address the problem.

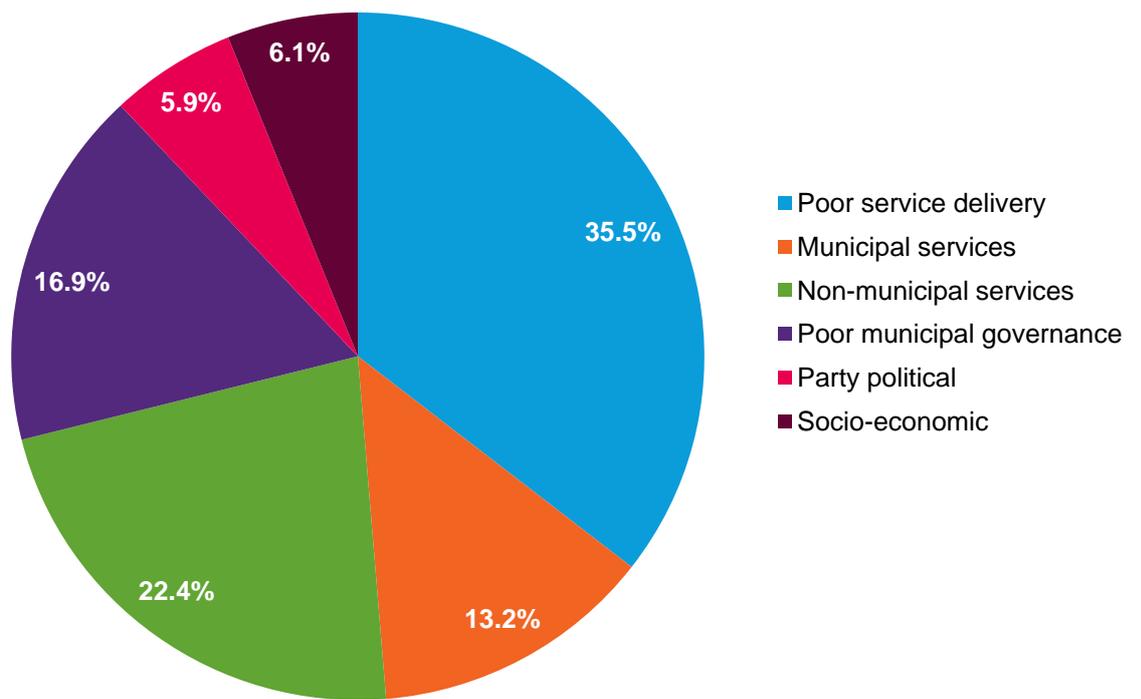
Civil society

Meanwhile, those who are unemployed voice their concerns through protests about poor-quality government service delivery. Protests have become commonplace in South Africa, with 470 held in 2012 (80 percent of which turned violent (de Visser & Steytler 2012)) and 287 protests in 2013 (Grant 2014). Grievances are largely related to municipal services (see Figure 15) – including lack of electricity, water, sanitation or roads – but the issues are complex. For example, water service delivery issues encompass inadequate access to water, poor quality of water, poor operation and maintenance of infrastructure, infrequency of water supply, high tariffs, privatisation, inaccurate water bills, disconnection (due to water demand devices and/or non-payment) and apparent inaction/apathy on the part of local municipalities to address the problem (van Vuuren 2013). The majority of protests tend to occur in working-class urban and peri-urban localities characterised by high levels of poverty, unemployment, marginalisation and miscommunication between planning processes at municipal and national levels and use at local household and community levels.

Figure 15: a) Service delivery protests in 2007–13 and b) Grievances raised in 2007–12



a



b

Source: Service Delivery Protest Barometer (de Visser & Steytler 2012)

Box 8: Mining sector wages (Gwatidzo & Benhura 2013)

The mining sector in South Africa contributes 5 percent of GDP, 39 percent of export earnings and 15 percent of corporate tax and directly employs 500,000 people, 3 percent of the economically active population. The sector has struggled with national policy uncertainty, global price instability, increasing extraction costs and extensive strikes in recent years.

Labour productivity has declined by 30 percent since 2001, while unit labour costs have risen by 140 percent, in line with output price, over the same period. Mine workers have higher median wages than workers in most other sectors, and the third highest minimum wage after transport/communication and manufacturing. The increasing use of outsourcing, however, means that lower than minimum wages are paid. Contract workers also do not receive benefits such as housing and health care, and do not belong to unions. The percentage of foreign contract workers is growing and is a major contributor to mining strikes.

Wages have been determined largely by collective bargaining since the early 1980s, and trade unions are powerful due to high membership rates (60 percent of the workforce are members of the NUM). Centralised bargaining is conducted by the Chamber of Mines (the employers' organisation) for gold and coal, while non-centralised bargaining is conducted at company level in platinum and diamond mining. Dissatisfaction with the NUM in recent years has led to the emergence of a new union, the AMCU, and to workers taking action independently.

The wage bill in the mining sector in 2012 was 23 percent of total costs. In 2011, the average annual salary for mining company CEOs was R20m, 355 times the mining sector median minimum wage.

GLOBAL AND REGIONAL IMPLICATIONS

Although South Africa is a middle-income economy, it faces high levels of social deprivation and inequality. The South Africa doughnut highlights the fact that a large and growing GDP does not necessarily result in an end to poverty, but rather many people are left behind. This is true for many emerging economies around the world: rising in-country inequality has become a global trend (Sumner 2011). The current economic model is not working for millions of poor people, and growth and development need to be reviewed. As a leader in Africa, South Africa has a role to play in global socio-economic agreements.

South Africa is not alone in facing environmental stress, as evidenced by the growing number of international agreements for global environmental governance. The country's proximity to its environmental boundaries is likely to result in international pressure, partly channelled through these agreements. Those relevant to the doughnut include the UNFCCC; the Vienna Convention for the Protection of the Ozone Layer and the Montreal Protocol; the UN Convention on Biological Diversity (CBD); the Basel Convention on chemical pollution; the Law of the Non-Navigational Uses of International Watercourses; and the Law of the Sea. Global environmental governance has an important role to play in national environmental management. The Montreal Protocol is a good example of how the international community can work together to avoid environmental disaster. Other efforts such as the UNFCCC have been less successful, largely due to their complexity and perceived competition with economic growth; however, they have played a big role in raising awareness and in getting environmental stress included on national and regional agendas. They have also enabled funding to flow from rich to poorer nations in recognition of differing capacities and capabilities and historical responsibilities.

South Africa has roughly 0.7 percent of the world's people (UN Department of Economics and Social Affairs 2012) and 0.9 percent of its land area (World Bank 2013c). It was responsible for 1.4 percent of global CO₂ emissions in 2010, (World Resources Institute 2013) 4 percent of HCFC consumption in 2013, (UNEP 2014) 0.5 percent of global freshwater use (based on Rockström et al (2009)) and 0.4 percent of global nitrogen fertiliser consumption in 2010 (FAO 2013). It is therefore not a big contributor to global pressure on the planetary boundaries. It is, however, the main contributor on the African continent and, as a member of the BRICS group,¹¹ is closely associated with countries that do have a significant global impact. This provides impetus to act.

South Africa has further ties with India, China and Brazil through the BASIC group – a negotiating group on the UNFCCC that was formed in the lead-up to the fifteenth Conference of the Parties (COP15) in 2009. This group developed common negotiating positions to counter pressure from other countries to assume binding emission reduction targets. The BASIC group has continued to play a significant role in subsequent COPs and has the ability to promote or prevent a global climate deal.

Africa

South Africa's role as an emerging economy is tied to Africa and its role in the continent, (IGD 2011) and this can lead to tension between itself and other African nations. It is a member of the Southern African Development Community (SADC), the G20 (and co-chair of the Development Working Group) and the G24, which coordinates the position of developing countries on monetary and development issues and promotes their increased representation and participation in negotiations on reform of the international monetary system (G24 2014). Nkosazana Dlamini-Zuma, a former South African Cabinet Minister, currently chairs the African Union Commission (AUC), whose mission is to drive African integration and development (AU 2014). South Africa is seeking permanent membership of the United Nations Security Council (UNSC), after serving a second term as a non-permanent UNSC member from 2011 to 2012. It was also elected to serve as a member of the United Nations Economic and Social Council (ECOSOC) from the beginning of 2013.

While these international roles may have very little impact on the lives of the average South African, they do show that the country's approach to sustainable development could be influential globally. The preamble to the White Paper on South Africa's foreign policy states that 'since 1994, the international community has looked to South Africa to play a leading role in championing values of human rights, democracy, reconciliation and the eradication of poverty and underdevelopment'. The government is in the process of establishing the South Africa Development Partnership Agency (SADPA) to coordinate its international development work.

Southern Africa

South Africa is one of 15 member countries of SADC, which aims to achieve development, peace and economic growth for its 250 million people through regional integration. Although South Africa works most closely with its immediate neighbours, it is committed to SADC and its policies, including on water, agriculture and energy. Environmental stress and social deprivation in South Africa have impacts on the wider region, particularly as South Africa is the economic hub and attracts many migrants from SADC. Over 70 percent of tourists,¹² which includes business visitors, to the country in 2013 were from SADC (Wilkinson et al. 2014). There are also significant trade and migration between South Africa and neighbouring countries. South Africa invests about R36bn (\$3.4bn) a year into other African countries, which in 2013 accounted for 29 percent of its exports and for 12 percent of its imports (SARS 2014). Social deprivation and environmental stress in South Africa therefore impact on the region in a number of ways, as described below.

Energy/emissions: As part of the Southern African Power Pool agreement, which aims to provide reliable and economical electricity to SADC members, South Africa exports 0.7 percent of its electricity to utilities and companies in the SADC region (Department of Public Enterprises 2010). The fuel used to generate this electricity impacts on these countries' GHG emissions. Eskom imports hydropower from Mozambique, and in November 2013 President Zuma signed a power purchase agreement with the DRC for 2.5 GW of hydropower from the Grand Inga Hydroelectric Power Complex, which is due to begin construction in 2015 (Mataboge 2013). This would nearly double South Africa's hydropower capacity and would contribute to its climate change mitigation strategy.

Water: Southern Africa is a partly semi-arid region and neighbouring Namibia, Botswana and Zimbabwe are also amongst the driest countries in the world. South Africa shares 60 percent of its river stream flow with other countries (DWA 2013) and has multilateral agreements with Lesotho, Swaziland, Botswana and Namibia. Over 11 percent of its surface water yield is imported from Lesotho, making it highly dependent on its small neighbour, particularly as the imported water serves the economic hub of Gauteng. While South Africa seeks to protect its ecological reserve, its neighbours have not committed to doing the same. The sustainability of the country's water resources are therefore partly dependent on its neighbours, and its growing water needs are likely to have an impact on the region.

Land and food: In 2012 the Department of Water Affairs commissioned a desk study (Rutherford 2010) on crop production potential in Zimbabwe, Zambia, Malawi and Mozambique, as a way of reducing water demand in South Africa while maintaining food security. The study estimated that there are 27m hectares of high-potential rain-fed cropping land in these four countries, although much of it is home to subsistence farmers. As demand for food rises in South Africa, the country could either positively support agricultural development in SADC and Africa as a whole for mutual benefit, or it could become a drain on regional resources as food (and the virtual water it incorporates) is exported from poorer countries to South Africa.

Biodiversity: As biodiversity does not respect political boundaries, regional cooperation is necessary to prevent further loss of species and ecosystems. Conservation of terrestrial biodiversity in southern Africa is managed through Transfrontier Conservation Areas (TCFAs), which also support ecotourism in the region; South Africa shares five TCFAs¹³ with its neighbours. There is also regional cooperation on marine species and ecosystems¹⁴ (UNOPS 2014). This regional cooperation should reduce biodiversity loss, but it also increases the complexity of managing South Africa's own ecosystems.

5 POLICY FOCUS AREAS

The far-reaching implications of the social deprivation and environmental stress that exist in South Africa require a review of current national policies. The doughnut is a useful tool for highlighting priority focus areas and prompting new questions in the discourse on inclusive and sustainable development. The doughnut shows that, although there has been significant progress on basic service delivery since 1994, there has been limited improvement in raising employment levels and incomes for poor people, and deprivation and inequality are still widespread. Tables 8 and 9 highlight policies related to the 22 dimensions of social deprivation and environmental stress represented in the doughnut, as well as the existing policies that should be driving action. The focus areas are those initiatives that are likely to have the greatest effect in reducing social deprivation and environmental stress.

Table 8: Policy focus areas related to social deprivation

Dimension	Potential focus areas	Existing laws/policies/plans
Energy	Off-grid electricity for remote areas	Integrated Resource Plan for Electricity 2010–30 (IRP)
Water	Free basic water for all	Water Services Act
Sanitation	Maintenance of community facilities	Water Services Act
Housing	Formal housing for shack dwellers	Housing Act
Education	Teacher training	National Education Policy Act, Employment of Educators Act
Health care	National Health Insurance	Green Paper on the National Health Insurance Policy
Voice	Community involvement in Integrated Development Plans	The Local Government: Municipal Systems Act
Jobs	Labour regulation Skills development	Employment Tax Incentive Act, National Skills Development Act
Income	Wage disparities	Basic Conditions of Employment Act
Household goods	Social grants	Social Assistance Act
Food security	Food banks	Social Assistance Act
Safety	Violence against women	Protection from Harassment Bill Domestic Violence Act Sexual Offences Act

Table 9: Policy focus areas related to environmental stress

Dimension	Potential focus areas	Existing laws/policies/plans
Climate change	Expand renewable energy Support independent power producers Introduce carbon tax	Integrated Resource Plan for Electricity 2010–30 (IRP) Renewable Energy Independent Power Producer Programme (REIPPP) Carbon Tax Policy Paper
Ozone depletion	Eliminate HCFCs	HCFC Phase Out Plan
Freshwater use	Reduce physical losses Expand groundwater infrastructure Improve measurement of usage	National Water Policy Review National Water Resources Strategy 2
Land use change	Review use of arable land Include land capability in mining licence approval process	Spatial Planning and Land Use Management Act Preservation and Development of Agricultural Land Act (not yet approved)
Phosphorous loading	Skills development for wastewater treatment plant maintenance and operation	Water Services Act Green Drop Programme
Nitrogen application	Monitor fertiliser use by farmers	–
Marine harvesting	Enforce total allowable catches of commercial fisheries	Marine Living Resources Act Policy for the Small Scale Fisheries Sector
Biodiversity loss	Expand protected areas – land, aquatic and marine Rehabilitate critically endangered ecosystems	National Biodiversity Strategy and Action Plan
Air pollution	Reduce PM10 pollution	National Air Quality Act
Chemical pollution	Mandatory reporting of hazardous waste	National Waste Management Strategy

Good governance and spatial development planning need to underpin all of these policy focus areas if South Africa is to protect its natural assets and reduce inequality and poverty. The 2013 Spatial Planning and Land Use Management Act (SPLUMA) promotes social and economic inclusion and sustainable and efficient use of land. It defines five principles, including ‘spatial justice’ aimed at redressing historical imbalances and ‘spatial sustainability’ aimed at integrating economic, social and environmental considerations (Kidd 2014). This is a new opportunity to ensure that development in South Africa moves into the ‘safe and just space’, which will require spatial analysis of multiple factors and the distribution and unequal use of resources.

Box 9: Mining and environmental management

Within government, the Environmental Management Inspectorate (EMI), whose inspectors are known as the Green Scorpions, is in charge of compliance but it cannot enforce legislation – it hands cases over to the National Prosecuting Authority. The Department of Mineral Resources (DMR) often overrules the EMI, and recent amendments to the Minerals and Petroleum Resources Development Act have made the Minister of Mineral Resources responsible for overseeing environmental matters that relate to prospecting, mining, exploration and production (Wild 2014) – a clear conflict of interest. A 2009 Auditor General Report on the country's 5,906 abandoned mines highlights the shortcomings within the DMR, which has failed to adequately address the problem of pollution (Colvin et al. 2011). The DMR has also faced a number of lawsuits because it has granted duplicate prospecting and mining rights to applicants. It is granting licences at a much faster rate than allows for proper environmental and social impact assessments to be performed. Vested interests in mining and energy are holding back progressive policies. This is one of the many contradictions in South African policy making – where economic activity that is both harmful and beneficial is supported by different parts of government.

GREEN JOBS

Probably the policy area that will go furthest to meeting the challenges described by the doughnut is that involving 'green' jobs. Creating employment will contribute to reducing poverty and inequality, raising living standards and improving basic services and public goods through tax revenues. If this employment is focused on reducing environmental stress across the dimensions discussed in this report, then South Africa will be taking significant steps towards achieving its 'safe and just space'.

The New Growth Path, which laid the foundation for the NDP, identifies green jobs as one of 10 job drivers, while the Industrial Policy Action Plan (IPAP) promotes green industries. The Green Economy Accord 2011 (EDD 2011) focuses on technology and job creation (300,000 jobs in 10 years) to meet development goals in a more sustainable way.¹⁵ Although organised labour, business, community constituents at the National Economic Development and Labour Council (NEDLAC)¹⁶ and government have signed the Accord, it has been criticised by civil society for not going far enough and for 'simply gather[ing] a number of existing initiatives which have been in the public domain for some time' (Parker 2011). The Green Economy Accord (EDD 2011) envisages job opportunities based on:

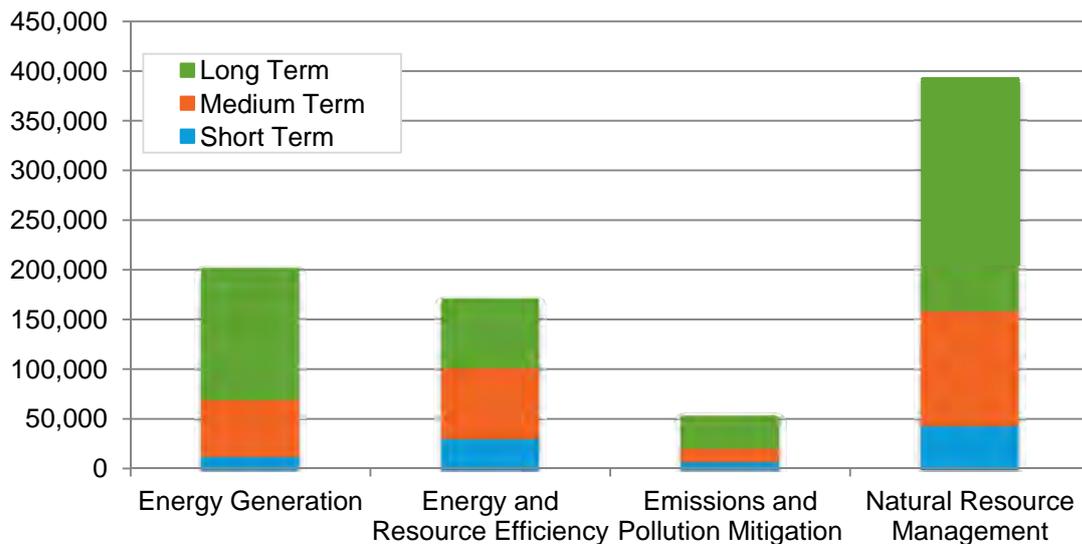
- Manufacturing or assembly, construction and installation of renewable energy equipment;
- Creation of small enterprises aimed at beneficiating waste at landfill sites;
- Retrofitting buildings with energy-efficient equipment;
- Local manufacture of electric-powered vehicles and batteries, and harvesting and supply of bio-gas to retrofitted public transport vehicles;
- Production of agricultural feedstocks for biofuels refineries, refineries and associated industries.

A comprehensive report on Green Jobs published by the Development Bank of South Africa (DBSA) in 2011 (Maia et al. 2011) described the potential for net direct job creation in the formal economy (though without specifying skill requirements and excluding multiplier effects), and looked beyond energy-related opportunities. The DBSA estimated that 816,000 jobs could be created by 2025 (see Figure 16): 98,000 jobs could be created in the short term (2011–12), 255,000 jobs in the medium term (2013–17) and 462,000 jobs in the long term (2018–25). Roughly half of these jobs were associated with natural resource management, which involves biodiversity conservation, ecosystem rehabilitation and soil and land management. Energy

generation would create 14 percent of the jobs in the short term and 28 percent in the long term, energy and resource efficiency would contribute 32 percent in the short term and 15 percent in the long term, and the remainder would relate to emissions and pollution mitigation. Jobs in these diverse sectors would contribute to addressing the challenges highlighted in the doughnut i.e. climate change, ozone depletion, air pollution, biodiversity loss, land use change and freshwater use.

An alliance of civil society organisations (CSOs) is driving the ‘One Million Climate Jobs Campaign’ (see Box 10), which is calling for the government to put the interests of workers and poor people at the forefront of climate change strategies and to create one million climate-related jobs.(climatejobs.org.za 2014)

Figure 16: Green job creation potential in South Africa, according to DBSA (Maia et al. 2011)



Box 10: Proposals of the One Million Climate Jobs campaign

The campaign proposes the following:

1. Produce 50 percent of electricity with renewable energy in 10 years → create 150,000 jobs and reduce emissions by 20 percent.
2. Implement a 20 percent energy efficiency target by 2025 → create at least 27,000 new jobs.
3. Reduce energy use in homes and buildings by constructing new buildings to be energy-efficient and retrofitting existing buildings → create 120,000 jobs just by retrofitting old buildings and houses.
4. Shift 10 percent of private car commuters to public transport → create 70,000 jobs and reduce emissions by 24 MtCO₂. Overall, proposals for expanding public transport would create 460,000 new jobs.
5. Produce food through organic small-scale agro-ecology. In Gauteng alone, it is possible to create nearly 500,000 new jobs in local food production in urban areas.
6. Protect water, soil and biodiversity resources through ecosystem restoration projects → create up to 400,000 jobs.
7. Adopt zero waste principles → create at least 400,000 jobs and reduce emissions by about 35 MtCO₂e.

6 SUMMARY AND RECOMMENDATIONS

The world's population is currently 7 billion and is projected to reach 9.5 billion by 2050. Globally, we will need to produce 50 percent more food and 45 percent more energy in the context of accelerating climate change. The world's cities and mega-cities are rapidly expanding as rural-to-urban migration accelerates. More than at any time in history, there is an urgent need to address both human development needs and environmental stress if we are to have a safe and just future. Fortunately, we also have more tools and technical solutions than ever before – if only we can find the political will to change the status quo.

South Africa is no different. The challenges faced in the country are a microcosm of these wider global challenges, but are exacerbated and made unique by the legacies of colonialism and apartheid.

The findings in this report highlight a very broad range of challenges and opportunities. Many aspects of the South African political economy indicate that it is failing to meet the needs of its people, and this is undermining the environment in which they live. The two objectives of environmental sustainability and social development are closely intertwined, and their challenges need to be understood together. South Africa needs to imagine, develop and pursue an economic model that delivers for people and planet, one that keeps 'within the doughnut'. Keeping within the doughnut does not mean denying South Africa its full potential – exactly the opposite, as it is only by staying within the doughnut that its citizens can thrive collectively and individually. Getting there requires action from and is the responsibility of a range of actors – including, but not limited to government at all levels, businesses, communities and civil society. Actions and interventions will range from new ways of undertaking business, measures of progress that go beyond GDP, support for community-led change, encouragement of supportive industries, participatory mechanisms of democracy, policies that reduce inequality and governments and companies that are accountable to citizens.

Oxfam's key recommendations are as follows:

- The economic development model in South Africa needs to be re-examined in order to build an economy which fits within a safe (environmentally) and just space – i.e. the 'doughnut'. NDP processes, which pursue GDP growth, must explicitly deliver measures that address the quality and distribution of growth. The existence of good policies is not enough: to allocate people free basic water is of little use if the water delivery system does not work, and creating more jobs is not enough if those jobs lead only to insecurity and exploitation.
- Social justice and environmental objectives need to be considered side by side in development debates. Breaking down the silos between development and environment to create a more holistic picture will enable civil society to call for effective solutions. A collective approach through platforms such as Awethu on social justice, the South Africa Forum for International Solidarity and South Africa Network on Inequality would be most influential.
- South Africa's social floor needs to be determined by its citizens and the voices of the poorest and most vulnerable people need to be heard in national debates. Social attitudes surveys and participation in local planning processes can contribute to making this a reality.
- Spatial development planning is required to address the apartheid legacy of spatial inequality, and this should integrate data at multiple scales in multiple areas. This is

particularly important for managing strategic water sources, arable land and mineral resources.

- The fight against inequality and hunger must be positioned at the heart of the low-carbon agenda, with economic development assessed against delivery on these goals.
- South Africa's leadership as a middle-income developing country in international climate change policy and its commitment to a set of goals for action on climate change, which are ambitious by international comparison, need to be matched by delivery on both climate change and poverty reduction.
- More coordinated policy development is required at higher planning levels; for example, mining policy should be coordinated with water and food security policies. A National Food Act could hold all parts of government accountable, so that mining concessions are not automatically granted without considering the impacts on local water and food security.
- A greater understanding is needed amongst policy makers of the link between environmental and social factors across all departments, and this should not just be consigned to the Department of Environmental Affairs. The National Strategy for Sustainable Development needs to be updated and scaled up to be more effective, and aligned with the NDP.
- The Spatial Development Frameworks required at all levels of government are a significant opportunity to integrate social and environmental priorities into development planning. The doughnut could be used to test that all aspects have been covered.
- The main three current priorities for the government are poverty alleviation, tackling inequality and jobs. Green jobs offer a major opportunity to simultaneously address unemployment, poverty and environmental stress. Campaigners are calling for one million climate jobs; the potential has been recognised and it now needs to be acted upon.
- The government is investing over 20 percent of its annual budget in education, but with poor outcomes. This investment needs to be targeted to ensure that skills are developed that ultimately result in reduced inequality, job creation and poverty alleviation. Without building its human capacity, South Africa will continue to struggle to address its environmental and social challenges.
- Many South African scientists are leaders in Africa and in the world. Centres of excellence can be built upon to strengthen the country's ability to adapt to a changing climate, resource scarcity and new economic paradigms. In particular, as global and local environmental change accelerates, it will be critical for South Africa to have the best possible science, technology, data and monitoring capabilities in order to adapt and make the right decisions. For this reason, investing in technological and scientific education should be a priority.
- South Africa has a highly respected constitution and all the institutional elements to ensure good governance, but there are governance failings from local through to national levels. Efforts must be made to protect and strengthen democratic institutions.
- South Africa has the ability to play an influential leadership role in Africa and globally, through the AU, the BRICS, the G20 and UN processes. It has the choice to hinder progress or drive it.
- Further research on inequality in access to and use of services, public goods and natural resources is required in South Africa. The extreme inequality evident in income disparities is not limited to wages and wealth, but to the means of obtaining them and to a broader quality of life.

Ultimately, South Africa needs to invest in its people and in its natural capital. The environment is central to the future prosperity of all South Africans. And the country cannot move forward together without bringing the majority who still live in poverty along.

'A greener but also a more prosperous South Africa is in all our best interests.'

President Jacob Zuma, November 2011

APPENDICES

APPENDIX 1 SOCIAL FOUNDATION AND THE SOUTH AFRICAN DOUGHNUT

Table A1: Comparison of social indicators in Raworth's (2012) social foundation and the South Africa doughnut

Dimension	Raworth's Social Foundation indicators	Indicator used in South Africa doughnut
Energy	Population lacking access to electricity Population lacking access to clean cooking facilities	Population without access to electricity
Water	Population without access to an improved drinking water source	Population without access to water infrastructure \geq RDP standard (25l potable water per person per day within 200m of household)
Sanitation	Population without access to improved sanitation	Population without access to sanitation (ventilated improved pit latrines)
Housing	–	Households not in formal dwellings
Education	Children not enrolled in primary school Children enrolled in tertiary education Illiteracy among 15–24-year-olds	Adults without more than seven years of schooling (adult illiteracy rate)
Health care	Population estimated to be without regular access to essential medicines	Percentage of infants not immunised.
Jobs	E.g. labour force not employed in decent work	Broad unofficial unemployment rate (adults aged 15–64 available to work)
Income	Population living below \$1.25 (PPP) per day	Population living below the upper national poverty line (R577 a month in 2011 constant Rand)
Social equity	Population living on less than the median income in countries with a Gini coefficient exceeding 0.35	–
Gender inequality	Employment gap between women and men in waged work (excluding agriculture) Representation gap between women and men in national parliaments	–
Food	Population undernourished	Households without adequate food

Voice	Not defined	Population who feel they are not free to say what they think
Household goods	–	Households without a refrigerator
Safety	–	Households who feel unsafe walking alone in their area at night

APPENDIX 2: PLANETARY BOUNDARIES AND THE SOUTH AFRICAN DOUGHNUT

Table A2: Comparison of Rockström et al.'s (2009) planetary boundaries and the South Africa doughnut

Planetary boundaries		South Africa doughnut	
<i>Dimension</i>	<i>Indicator</i>	<i>Dimension</i>	<i>Indicator</i>
Climate change	CO ₂ concentration (ppmv) Change in radiative forcing (Wm ²)	Climate change	Annual total CO ₂ direct emissions
Ozone depletion	Ozone concentration (Dobson units)	Ozone depletion	Annual consumption of HCFCs
Biodiversity loss	Extinction rate (number of species per million species per year)	Biodiversity loss	Endangered ecosystems
Nitrogen and phosphorous cycles	Amount N ₂ removed from atmosphere for human use (Mt/yr)	Nitrogen and phosphorous cycles	Nitrogen application rate
	Phosphorous flowing into oceans (P Mt/yr)		Total P concentration in dams (P mg/l)
Ocean acidification	Global mean saturation state of aragonite in surface sea water	Marine harvesting	Depleted marine fisheries stocks
Freshwater use	Consumption of freshwater by humans (km ³ /yr)	Freshwater use	Available freshwater consumed
Land use change	% global land cover converted to cropland	Land use change	Rain-fed arable land converted to cropland
Aerosol loading	Overall particulate concentration in the atmosphere	Air pollution	Annual mean PM10 concentration in ug/m ³
Chemical pollution	Not defined	Chemical pollution	Not defined

ACRONYMS AND ABBREVIATIONS

AMCU	Association of Mineworkers and Construction Union
ANC	African National Congress
AUC	African Union Commission
BAU	Business as usual
CBD	UN Convention on Biological Diversity
CBDRRC	Common but differentiated responsibilities and respective capabilities
COPE	Congress of the People
COSATU	Congress of South African Trade Unions
CSO	Civil society organisation
DA	Democratic Alliance
DAFF	Department of Agriculture, Forestry and Fisheries
DBSA	Development Bank of South Africa
DMR	Department of Mineral Resources
DSD	Department of Social Development
ECOSOC	United Nations Economic and Social Council
EFF	Economic Freedom Fighters
EMI	Environmental Management Inspectorate
ESIs	Environmental Sustainability Indicators
FDI	Foreign direct investment
GER	Gross enrolment rate
GHG	Greenhouse gas
GHS	General Household Survey
GII	Gender Inequality Index
GPI	Gender Parity Index
HCFCs	Hydrochlorofluorocarbons
HSRC	Human Sciences Research Council
IDP	Integrated Development Plan
INEP	Integrated National Electrification Programme
IPAP	Industrial Policy Action Plan

IRP	Integrated Resource Plan for Electricity 2010–30
JSE	Johannesburg Stock Exchange
LYMS	Long Term Mitigation Scenarios
MDG	Millennium Development Goal
MSY	Maximum sustainable yield
NDP	National Development Plan 2030
NEDLAC	National Economic Development and Labour Council
NUM	National Union of Mineworkers
NUMSA	National Union of Metalworkers of South Africa
NWRS	National Water Resource Strategy
PPP	Public-private partnership
RDP	Reconstruction and Development Programme
SACP	South African Communist Party
SADC	Southern African Development Community
SADPA	South Africa Development Partnership Agency
SADTU	South African Democratic Teachers Union
SAPS	South African Police Service
SASAS	South African Social Attitudes Survey
SDG	Sustainable Development Goal
SAIMD	South African Index of Multiple Deprivation
SIP	Strategic Infrastructure Project
SMMEs	Small, medium and micro enterprises
SPLUMA	Spatial Planning and Land Use Management Act
StatsSA	Statistics South Africa
TCFA	Transfrontier Conservation Area
UNFCCC	UN Framework Convention on Climate Change
UNSC	United Nations Security Council
VIP	Ventilated improved pit latrine
WCWDM	Water conservation and water demand management

NOTES

- 1 A variety of changes have been introduced to the planetary boundaries framework in the updated work by Steffen et al. (2015), op. cit. However, Oxfam's Doughnut Report for South Africa continues to focus on the SRC's 2013 downscaling of the framework to a national level as the most relevant for the objectives of analysing and influencing national impacts.
- 2 See: <http://www.climatejobs.org.za/>
- 3 Defined as the percentage of adults aged 15–64 without work and available to work, and who have taken steps to look for work or start a business.
- 4 Unemployed for more than a year.
- 5 Coal is used for 95 percent of domestic power generation, and South Africa is the world's fourth largest exporter of thermal coal, which brings in significant foreign exchange.
- 6 Less than 10 percent of the original extent (area, length or volume) of the ecosystem remains.
- 7 In Mpumalanga, 13.7 percent of land is under mining rights applications and 40.3 percent is under prospecting applications.
- 8 Ecosystems with less than 20 percent of their original extent in good ecological condition are classified as critically endangered (CR) and ecosystems with less than 35 percent of their original extent in good condition are classified as endangered (EN).
- 9 The National Infrastructure Plan aims to 'transform the economic landscape', creating jobs, strengthening service delivery and promoting African integration. Eighteen Strategic Infrastructure Projects (SIPs) have been developed.
- 10 South African law defines a PPP as a contract between a public sector institution/municipality and a private party, in which the private party assumes substantial financial, technical and operational risk in the design, financing, building and operation of a project. For more information, see <http://www.ppp.gov.za>.
- 11 The BRICS group of emerging economies (Brazil, Russia, India, China and South Africa) cover more than a quarter of global land mass, are home to more than 40 percent of the world's population and hold over 40 percent of foreign reserves. South Africa will host the Africa Division of the BRICS Bank.
- 12 Defined as an overnight visitor.
- 13 Kgalagadi, Lubombo, Great Limpopo, Maloti-Drakensberg, Ai-Ais/Richtersveld.
- 14 Such as the Benguela Environment Fisheries Interaction and Training programme and the Benguela Current Large Marine Ecosystem programme, which are regional partnerships between Namibia, Angola and South Africa focused on marine ecosystems off the southwest African coast, and the Agulhas and Somali Current Large Marine Ecosystems Project, which involves eight African countries in southern and East Africa.
- 15 The Green Economy Accord has 12 commitments: solar water heaters, investment, renewables, energy efficiency, waste recycling, re-use and recovery, biofuels, clean coal, retrofitting, road transport, electrification of poor communities, economic development and COP17 follow-up.
- 16 NEDLAC was set up in 1994 by an Act of Parliament to secure the commitment and participation of all social partners in addressing economic and development challenges.

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