DRIVING FORCES IN THE AGRICULTURAL ENVIRONMENT

Johannesburg

JS Isaacs

11 April 2013
Where to and who is driving?

Johannesburg

JS Isaacs
Content of presentation

1. Introduction
2. Natural Resources (water and energy) and climate change
3. Labour
4. Mechanisation
5. Marketing and market access (Africa as market)
6. Competitiveness / Sustainability
7. Empowerment (land reform) and partnerships
8. Human Capital Development and Training
9. Governance and government
10. Unemployment and poverty
Driving forces...

Self-Driving Car Test- Steve Mahan.3gp
Introduction

Farming: a lifestyle or a business in SA

**Complex**
- People
- Planet
- Profit

All possible risks applies to this sector
- Environmental
- Economic
- Social

**Almost 42 professions in one**
- Technologist
- Mechanic
- Preacher
- Educator
- Medic
- Business person
- Researcher

- **Limited control in the value chain (price taker)**
- Producer
- Market dictates (production and price)

Yet, the basis for our food, fuel and fibre!
Global risk factors

Source: WEF Risk Report (2011)
Natural Resources and Climate Change

Water
- Water is a scarce resource in SA
- Water quality and availability
- Water and the constitution (human, nature and then development)
- Water efficiency?

Soil
- Quality of soil
- Management of erosion and degradation
- Land for agricultural development versus for broader developmental needs
- Access to prime land

Climate
- Different climatic zones – Mediterranean, Arid and Semi-Arid, Tropical and Sub-tropical
- Production patterns
- Suitable technologies
- Irrigation agriculture
- Climate changes

Climate change
- Crop and animal production changes (vine production in the WC)
- Climate changes – increased temperatures, rainfall patterns, wind velocity, etc.
- Disease changes i.e. red spider mite example (changes, epidemiology, veracity, toxicity)
- Natural disasters (insurance frameworks) – hail, flood, drought and…
All the fresh water on earth will fill a droplet with a diameter of 1 400 km
ANNUAL RAINFALL

- WORLD: 857 mm
- HAWAII: 10 000 mm
- SOUTH AFRICA: 470 mm

80% in 5 months
World water scarcity map

- Little or no water scarcity
- Physical water scarcity
- Approaching physical water scarcity
- Economic water scarcity
- Not estimated
Water as a scarce resource

Degradation of natural resources

Scarce and critical skills (succession planning)

Climatic fluctuations (disasters, etc.)

External dependence to achieve own mandate (DRDLR and Land Reform)
The agricultural sector is by far the biggest user of water:

- Agriculture accounted for 70% of the world's total water withdrawal,

- In Africa and Asia, 85-90% of all the freshwater used is for agriculture

- To satisfy global demand for food, by 2025, agriculture expected to increase water requirements by 1.2 times, (industry, 1.5 and domestic consumption 1.8)

- 15% of the world's cultivated lands are irrigated, accounting for almost half of the value of global crop production
After the vet has tested the ostriches for H5N2, he'll test us for mad cow disease...

Curses! Foiled again.
Labour

Can do with or without?

Farm worker strikes
- Social and economic issues
- Highlighted problems on farms, but not achievements ...
- Affected supply change to traditional markets
- Implications...

Minimum wage determination
- Affected (and will affect) employment on farms
- Seasonal workers
- Foreign workers
- Evictions?
- Viability of farming businesses

Mechanisation
- Precision farming (reduced labour requirements but more trained (specialised) workers)
- Importation of more mechanised equipment?
- Future of unschooled labour?
Agricultural employees (Millions)

Source: OECD Database (2012)
‘Take our jobs campaign’

• Farm workers in the USA
  – 85% are immigrants
  – 70% of these are illegal
  – Represented by United Farm Workers (UFW)
  – Argument that immigrants “steal” jobs

• UFW invited Americans to “Take our Jobs”
  – Received 4,000 reactions
  – Only 30 people took up their offer

• Reasons for lack of interest
  – Working conditions
  – Working hours
  – Wages
  – Lack of benefits
Implications of farm worker strikes

Economic impact of farm worker strikes: Exports

- Engage traditional markets i.e. Scandinavia and Germany
- Invest in Ethical Trade initiatives (WIETA and SIZA) and encourage other sectors to start ethical trade initiatives

Economic impact of farm worker strikes: Employment

- Mechanisation in farming driven by:
  - Biological nature of agriculture (no two plants / animals same).
  - Need to preserve long-term investments (cannot damage plant).
  - Geographical distribution of farming area.
  - Rough and uneven terrain of farming.
  - Indivisibility of machines lead to step-wise mechanisation.
  - Machine specificity (wine-grape harvester vs. table grapes)
  - Investment specificity (apples from apple trees)
  - Investment fixity (trees has been planted, must be harvested)
  - Economics of investment
Implications of farm worker strikes

Economic impact of farm worker strikes: Employment

- However, short labour shedding adjustments will take place:
  - Removal of marginal investments (e.g. old orchards).
  - Structural adjustment on-farm (from tomatoes to potatoes)
  - Increase in labour productivity
  - Higher labour cost make labour replacement investment more feasible (e.g. robot milking)

- Long term significant structural changes expected, driven by:
  - Sensory and touch techniques
  - Diagnostic algorithms
  - Computing time and data storage capacity
  - New materials
  - Miniaturisation
  - Propulsion mechanisms

- Over the longer term there will be very little place for unschooled and unskilled people in the economy.
  - How to we structure our economy?
    - Plan now for later
    - Change the educational opportunities
Mechanisation: Technology in the agricultural sector

Farming is unique, but observe changes in technology

Nature of farming
• Biological products
• Natural environment
• Large areas (command and control problems)
• Plants (sometimes) needs to be protected
• Machines are “lumpy”.
• Investments are sticky and machines are task orientated.
• Mechanisation must make financial sense

Current trends
• Automation
• ITC (Computation speed, database size & diagnostic algorithms).
• Sensory technologies
• Mobility
• Miniaturisation
Automated milking machine

More than just milking

- Fully automated
- 80 cow capacity
- Health
  - Identify cow
  - temperature
  - Somatic cell count
- Human intervention once in 6 weeks
- 50% of milk parlours in Germany
**Grape pruning arm**

**Plan your harvest**

- Fully automated
- Laser image of vine
- Model
  - cuts
  - growth patterns
- Cut based on model
- Purdue University to develop commercial prototype
Weeder robot

- Fully autonomous
- Distinguish between plants & weeds
- Selective weeding
- Organic?
- Experimental - Netherlands
Sensory technology

- Observation
- Touch
- Allow for immediate intervention
- Experimental stage.
Mobility: DARPA grand challenge

Autonomous vehicles

- 2004 – 240 km veldt route
  - Winner completed 11 km
- 2005 – 5 vehicles completed course
- 2007 – urban segment included
- Current – Robot challenge
  - Drive vehicle, climb staircase, navigate rubble, change valve.
Marketing and market access (Africa as market)

Understanding the consumer and the requirements

**Traditional markets**
- Europe (including UK)
  - Can we add value still? And what?
  - Standards galore ...
  - And ageing population

**Emerging markets**
- BRICS?
- Others – who and what?
- Understanding the market requirements
  - Population
  - Lifestyle
  - Money available
  - Rules of the game

**Africa as a market**
- 11 emerging countries’ economies (some in Africa)
  - SADC
  - What and how?
  - CAADP?
  - Leverage?
Export market destinations: Wine

Over exposure to Europe?

- UK: 24%
- Germany: 13%
- Sweden: 11%
- Netherlands: 8%
- Canada: 6%
- Denmark: 5%
- USA: 5%
- Belgium: 3%
- Angola: 2%
- Finland: 2%
- Other: 21%
Proliferation of standards

• One of the biggest challenges to increase and maintain market access is proliferation of standards

• Identified standards with implication to SA:
  ✓ 16 Multilateral level standards (e.g. WTO, OECD, UNECE, etc.)
  ✓ 1 SupraNational at EU level (e.g. Food and Tertiary Office)
  ✓ 19 Collective standards (e.g. Global Gap, BRC, etc.)
  ✓ 9 National (e.g. SA GAP, SWISS GAP, etc.)
  ✓ 2 sector standards (e.g. Organic and UTZ)
  ✓ 6 Individual firm standards (e.g. Nature’s Choice)
Market Requirements
### Exports: Why it is important
(Results of 5% export growth in selected industries)

<table>
<thead>
<tr>
<th>INDUSTRY</th>
<th>MULTIPLIER (Rm)</th>
<th>EMPLOYMENT (Yr)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deciduous fruit</td>
<td>R36,8</td>
<td>4 261</td>
</tr>
<tr>
<td>Table grapes</td>
<td>R18,2</td>
<td>2 073</td>
</tr>
<tr>
<td>Viticulture</td>
<td>R14,3</td>
<td>986</td>
</tr>
<tr>
<td>Animal fibers</td>
<td>R5,3</td>
<td>409</td>
</tr>
<tr>
<td>Other vegetables</td>
<td>R4,9</td>
<td>402</td>
</tr>
<tr>
<td>Flowers &amp; bulbs</td>
<td>R2,6</td>
<td>301</td>
</tr>
<tr>
<td>Citrus</td>
<td>R2,3</td>
<td>276</td>
</tr>
<tr>
<td>Layers</td>
<td>R1,8</td>
<td>127</td>
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</tr>
<tr>
<td>Total Agriculture</td>
<td></td>
<td><strong>9 505</strong></td>
</tr>
<tr>
<td>Non-Agriculture</td>
<td></td>
<td><strong>13 446</strong></td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td></td>
<td><strong>22 951</strong></td>
</tr>
</tbody>
</table>

Source: Provide (2001)
Competitiveness / Sustainability

Investment in research and technology development

Administered resource prices
- Electricity
  - Renewable energy on-farm (and the value change)
- Labour
  - Mechanisation
  - Reduction in employment but increased productivity
- Fuel
  - Green filters
  - Green tractors
  - Conservation agriculture (no-till/minimum till)

Environmental compliance

Market demands

Water management

Low-input, high output (SMARTER production) [cost pressure pinch]

Diversification (agri-tourism)

Land ownership versus farming businesses
Origins of agricultural technology

Tractors in 2011 ($335 million)

- USA, $69.47, 21%
- Italy, $57.24, 17%
- Germany, $50.84, 15%
- Mexico, $36.18, 11%
- India, $29.73, 9%
- UK, $24.11, 7%
- Brazil, $21.28, 6%
- France, $11.32, 3%
- Turkey, $15.14, 5%
- China, $6.31, 2%
- Other, $13.80, 4%

Source: ITC (2012)
Global patent registrations (Thousands)

2001
- Japan, 383, 46%
- United States, 178, 21%
- China, 30, 4%
- Germany, 50, 6%
- Korea, Rep., 74, 9%
- Other, 119, 14%

2010
- Japan, 290, 26%
- China, 293, 26%
- USA, 242, 22%
- Korea, 132, 12%
- Germany, 47, 4%
- Other, 118, 10%

Source: WIPO (2012)
Human Capital Development and Training

People, profit and planet – let’s focus on people

Current skills level in the sector

What skills are required in the next 10 – 15 years?
- Law and agriculture
- Environment and agriculture
- Risk managers
- Advance technologists
- Communication specialists (IT)

Who will assess these needs and how will training institutions respond?
- Basic education (maths and science)
- Technical skills development
- Career information
- Tertiary education
- Work readiness?
Human Capital Development and Training

Among those aged 5 – 24 years, percentage attending an educational institution

More than 95% of children aged 7 to 14 years were attending school
Human Capital Development and Training

So what are we doing about the current unschooled and unemployment?

How do we juxtapose transformation on the agenda?

How do we instil work ethics on unemployment and unemployable persons?

What are the risks to agriculture and agri-businesses?

Below took 13 years to achieve, how much time do we have?
Changing face of the Department: Agricultural economists in 1997 and 2010
Governance and government

The opaque, the difficult and the indecisive or better, faster and open?

Government as a partner
- How and what can/should be the basis
- Can this happen? NDP?

Government as an opposer of good
- Current perception?
- Or given the social cohesion challenges, remain the obstacle to development

Government as a regulator
- Known globally as a role governments are comfortable with..
- But how to benefit development and economic growth?

Government the enabler
- Is this possible?
- NDP – how to take it forward
### Institutionalised Silos

**Local Government**

<table>
<thead>
<tr>
<th>District Municipality 1</th>
<th>District Municipality 2</th>
<th>District Municipality 3</th>
<th>Cape Town Metropole</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Municipality A</strong></td>
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<tr>
<td>Waste Management</td>
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<td>Environment</td>
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<td>Library</td>
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<td>Corporate</td>
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<td>Potable Water</td>
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<td>Traffic</td>
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<td>Housing</td>
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<td>Roads</td>
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<td>Local Economic Development</td>
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<td>Etc.</td>
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<td>Infrastructure</td>
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<td>Regional Development</td>
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<td>and planning</td>
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<td>Rural and Social</td>
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<td>Development</td>
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<td>District Roads</td>
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<td><strong>Municipality B</strong></td>
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<td><strong>Municipality C</strong></td>
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</table>

**National Departments**

<table>
<thead>
<tr>
<th>National Departments with Provincial Branches</th>
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</thead>
<tbody>
<tr>
<td>Rural Development and Land Reform</td>
</tr>
<tr>
<td>Water Affairs</td>
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<tr>
<td>Police</td>
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<td>Etc.</td>
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</tbody>
</table>

**Tertiary Training**

| University of Stellenbosch                  |
| University of Western Cape                 |
| Boland College                             |
| Saasveld Campus                            |
| NMMU                                        |
| Cape Peninsula University of Technology    |

**National Departments with Provincial Offices**

<table>
<thead>
<tr>
<th>National Statutory Bodies with Provincial Presence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agricultural Research Council</td>
</tr>
<tr>
<td>Medical Research Council</td>
</tr>
<tr>
<td>PPECB</td>
</tr>
<tr>
<td>TELKOM</td>
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<td>TRANSNET</td>
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<tr>
<td>Etc.</td>
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</tbody>
</table>

**National Government**

<table>
<thead>
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<tbody>
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<td>Rural Development and Land Reform</td>
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<tr>
<td>Police</td>
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<tr>
<td>Water Affairs</td>
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<tr>
<td>Justice</td>
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<tr>
<td>Prisons</td>
</tr>
<tr>
<td>Agriculture, Forestry and Fishing</td>
</tr>
<tr>
<td>International Cooperation</td>
</tr>
<tr>
<td>Health</td>
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<tr>
<td>Education</td>
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<tr>
<td>Defence</td>
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<td>Etc.</td>
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<table>
<thead>
<tr>
<th>National Statutory Bodies</th>
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</thead>
<tbody>
<tr>
<td>Research Councils</td>
</tr>
<tr>
<td>Economic Agents / Agencies</td>
</tr>
<tr>
<td>Universities</td>
</tr>
<tr>
<td>Etc.</td>
</tr>
</tbody>
</table>
Sphere of influence: provincial agricultural department

PEOPLE
- Schools
- Relationships
- HIV/Aids
- Relaxation
- Art

PLANET
- Land, water, climate
- Human nexus
- $\Pi_{\text{max}} = \sum (U,Y) - \sum (P,X)$
- Itsy
- Feely
- Tree-hugging
- Forests
- Climate change
- Fauna
- Sea
- Fynbos
- Flora
- Mining

PROFIT
- Subsidies
- R/$
- Tariffs
- Remittances
- Off-farm
- Tax

© Western Cape Government 2012
Unemployment and poverty

Plans are good, but people must benefit
## Unemployment and poverty

<table>
<thead>
<tr>
<th>Employment by province</th>
<th>Oct - Dec 2011</th>
<th>Oct - Dec 2012</th>
<th>Unemployment Rate (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>South Africa</td>
<td>13 497 000</td>
<td>13 645 000</td>
<td>24.9</td>
</tr>
<tr>
<td>Limpopo</td>
<td>985 000</td>
<td>1 084 000</td>
<td>19.6</td>
</tr>
<tr>
<td>KwaZulu-Natal</td>
<td>2 562 000</td>
<td>2 533 000</td>
<td>22.5</td>
</tr>
<tr>
<td>North West</td>
<td>700 000</td>
<td>754 000</td>
<td>23.3</td>
</tr>
<tr>
<td>Gauteng</td>
<td>4 115 000</td>
<td>4 194 000</td>
<td>23.7</td>
</tr>
<tr>
<td>Western Cape</td>
<td>1 842 000</td>
<td>1 806 000</td>
<td>23.9</td>
</tr>
<tr>
<td>Northen Cape</td>
<td>291 000</td>
<td>290 000</td>
<td>28.4</td>
</tr>
<tr>
<td>Mpumalanga</td>
<td>923 000</td>
<td>928 000</td>
<td>29.4</td>
</tr>
<tr>
<td>Eastern Cape</td>
<td>1 326 000</td>
<td>1 330 000</td>
<td>29.8</td>
</tr>
<tr>
<td>Free State</td>
<td>753 000</td>
<td>736 000</td>
<td>33.2</td>
</tr>
</tbody>
</table>

*Due to rounding figures may not add up to totals

Source: StatsSA Labour Force Survey
Although South Africa compares favourably with other sub-Saharan countries, it is one of only 18 countries in the world to have recorded a decline in its HDI between 1995 and 2005.
17% of South Africa’s population lives below the income poverty line ($1.25 a day), whilst 13% suffers from multidimensional poverty

Table 2.12: South Africa’s multiple deprivations relative to selected countries, 2011
Source: UNDP, 2011b:5.

<table>
<thead>
<tr>
<th>Country</th>
<th>MPI value</th>
<th>Multidimensional poverty headcount (%)</th>
<th>Population in severe poverty (%)</th>
<th>Population vulnerable to poverty (%)</th>
<th>Population below income poverty line (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>South Africa</td>
<td>0.057</td>
<td>13.4</td>
<td>2.4</td>
<td>22.2</td>
<td>17.4</td>
</tr>
<tr>
<td>Namibia</td>
<td>0.187</td>
<td>39.6</td>
<td>14.7</td>
<td>23.6</td>
<td>n/a</td>
</tr>
<tr>
<td>Congo, Rep</td>
<td>0.208</td>
<td>40.6</td>
<td>22.9</td>
<td>17.7</td>
<td>54.1</td>
</tr>
</tbody>
</table>
In general, the incidence of poverty in South Africa has declined slightly in recent years, but remains high among black Africans, children, and households with low levels of education.

Table (next slide): Poverty measures by population group and gender, 1993, 2000 and 2008

Notes:

1) The proportion of the cohort with a per capita income of less than R515 per month (in constant 2008 terms).

2) The proportion of the total number of people living in poverty accounted for by that cohort. Thus, in 1993, for instance, 42% of all South Africans with a per capita income of less than R515 per month were black African males.

Source: Adapted and compiled from OECD, 2010:36.
<table>
<thead>
<tr>
<th>Population group and gender</th>
<th>Share of population (%)</th>
<th>Head count (%)&lt;sup&gt;1)&lt;/sup&gt; (poverty incidence)</th>
<th>Poverty share (%)&lt;sup&gt;2)&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Black African</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>40</td>
<td>41</td>
<td>42</td>
</tr>
<tr>
<td>Male</td>
<td>36</td>
<td>38</td>
<td>38</td>
</tr>
<tr>
<td><strong>Coloured</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>4</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Male</td>
<td>4</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td><strong>Asian/Indian</strong></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Female</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Male</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td><strong>White</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>6</td>
<td>5</td>
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</tr>
<tr>
<td>Male</td>
<td>6</td>
<td>5</td>
<td>4</td>
</tr>
</tbody>
</table>
Western Cape: Land of milk and honey?

- Wheat = 171 kg / person / annum
  - = 1 bread / person / day
- Apples = 118 kg / person / annum
- Pears = 65 kg / person / annum
- Grapes = 259 kg / person / annum
- Wine = 200 l / person / annum
- Milk = 127 l / person / annum
- 0.067 ha of irrigated land / person
  - = 671 m² / person
- 0.35 ha of dryland / person
  - = 3557 m² / person
Household hunger in South Africa

People experiencing hunger over the past year

Source: Household Survey (2012)
Western Cape’s hungry

Source: Jacobs (2009)
Thank you
Contact Us

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