Drought Management in SA: Potential for Economic Policy

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Presentation

- The Climate
- Droughts in SA
- Impacts of drought
- Drought Management Strategies
  - Agricultural drought management
  - Hydrological drought management
- The Role of Economic Policy Instruments
- Conclusions
The Climate

- Semi-arid: 500 mm avg.
- High spatial diversity
  - West 2.5 mm
  - East > 1000 mm
  - 65% receive < avg.
  - 20% receive < 200 mm
- Variance follow similar pattern: east high
- Two RF regimes
  - Summer RF: central plateau & east coast
  - Winter RF; S. west
Percentage deviation from mean annual rainfall
Droughts in SA

- Reported since 1800
- Worsening recently: Frequency & duration
  - Below avg. RF in 7 out of 11 yrs. (82-93)
  - Persistence over 2 yrs 81/83 & 92/93 in 70 yrs
- High spatial variation and timing
  - Droughts & floods experienced same time in different regions
  - Recurrent
Drought Types

- Metrological (MD)
  - Deviation from avg. RF: Trigger indicator of RF deficiency episodes (3-6 months)
  - Can translates into:
    - Agric drought (AD): Insufficient soil moisture to support agric activities
- MD can progress into hydrological (HD): longer term RF deficiency (6-12 months)
  - Streamflow deficit
Impacts of AD (91/92)

- In affected areas
  - 70 % crop failure
  - Death of large numbers of lvsk
  - Half population exposed to malnutrition

- Macroeconomic implications
  - Overall econ. growth slowed by 1%
  - Maize imports > $ 600 million
  - Agric exports dropped by $ 250 million
  - GDP fell by 2.4%
  - Agric GDP fell by 27%
Drought management in SA: AG (1)

- AD managed by NDA & regional arms
- Prior to 1980: managed as abnormal disaster event requiring emergency government assistance:
  - Reactive
  - Provided relief to lvstk sector in distater drought (DD) declared areas
  - Little if any assistance to crop farmers
    - 85% of drylands under pasture
    - Crops belong to “insurable assets”, i.e. do not qualify for relief assistance
Drought management in SA: AG (2)

Phased approach:

- **Phase 1**: Onset declaring DDA: trigger
  - Rebate on transport costs subsidizing importation of feed from & moving stock to areas outside DDA
- **Phase 2**: If conditions continue to worsen DDA
  - Loans provided through Agric Credit Board
- **Phase 3**: Direct Gov. subsidy for buying feed kicks in when conditions persist

Several problems necessitated changes in the 80s
Problems of pre 1980 approach

- Criteria for defining trigger (DDA)
  - Subjective indicators – MD
  - DDA 50% of time compared to 35% research-based predictions

- Subjectivity of delineating relief phases

- Discourage adaptation responses
  - Failure to promote self-reliance
  - Highly dependent on public assistance

- Ineffective in reducing vulnerability of affected communities & resilience in natural resource base: degradation continued
Improvements post 1980

- More objective DD assessment procedures & eligibility criteria
  - More stringent MD assessments
  - Other factors considered: conditions of the stock & availability of water & grazing forage
  - Only those complying with maintenance of a nucleus herd (two thirds of the official CC) qualify for assistance
  - Establishing drought committees at national & district levels to assess eligibility for assistance

- Incentives to discourage overstocking to reduce pressure on NR (grazing & water)
  - Incentives for stock reduction (nucleus herd)
  - Subsidies for leasing grazing outside DDA, for buying feed and transport costs, for conversion of crop land into pastures
  - Low interest credit
Remaining Problems

- Ineffective promotion of self-reliance
  - Need for more proactive long-term planning approach (coping with & integrating drought risk mgmt in regular farm mgmt decisions making)
  - Requires changing economic incentives to promote sustainable land & water use practices
  - Sign changes in policy & institutional environm, financing, etc.
- Inadequate DD assessment procedures
  - Monitoring (weather stations networks)
- Poor coordination of relief efforts
- Dissemination of info & creation of awareness/preparedness for coping
- Crop farmers continue left out to weather insurance & derivatives
- Bias towards large commercial farmers
Managing HD

- Water supply system in SA is highly managed
  - Extensive inter-basin transfer infrastructure
  - Large water storage capacity (37 billion m³)
  - High regulation of flow

- Able to cope with the high spatial & temporal variability in RF

- Principal strategy is based on restricting withdrawals of water during low flow
<table>
<thead>
<tr>
<th></th>
<th>Total water transferred (mil. m³)</th>
<th>Share of transfer in… (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Sending region</td>
<td>Receiving region</td>
</tr>
<tr>
<td>Total interregional water transfers</td>
<td>5,528</td>
<td>-</td>
</tr>
<tr>
<td>Water transfer schemes</td>
<td>1,415</td>
<td>-</td>
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<tr>
<td><em>Orange River Project</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td>From Upper Orange to Fish-Tsitsikamma</td>
<td>714</td>
<td>17.4</td>
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<tr>
<td><em>Thukela-Vaal transfer schemes</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td>From Thukela to Upper Vaal</td>
<td>431</td>
<td>49.7</td>
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<tr>
<td><em>Lesotho Highlands Water Project</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td>From Lesotho to Upper Vaal</td>
<td>270</td>
<td>n/a</td>
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<tr>
<td><em>Major river-based transfers</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Vaal river</em></td>
<td></td>
<td></td>
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<tr>
<td>From Upper Vaal to Middle Vaal</td>
<td>799</td>
<td>32.1</td>
</tr>
<tr>
<td>From Middle Vaal to Lower Vaal</td>
<td>603</td>
<td>55.6</td>
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<tr>
<td><em>Orange river</em></td>
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<tr>
<td>From Upper Orange to Lower Orange</td>
<td>2,360</td>
<td>57.6</td>
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<tr>
<td><em>Breede river</em></td>
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<tr>
<td>From Breede to Berg</td>
<td>200</td>
<td>26.7</td>
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</table>

Source: Hassan et al. (2008).
Table 3. Curtailment levels on water supply in the Vaal and Western Cape water systems

<table>
<thead>
<tr>
<th>Acceptable frequency</th>
<th>0</th>
<th>1 in 20 years</th>
<th>1 in 100 years</th>
<th>1 in 200 years</th>
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<tbody>
<tr>
<td><strong>Restriction levels</strong></td>
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<td>0</td>
<td></td>
<td></td>
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<tr>
<td>1</td>
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<td>2</td>
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<tr>
<td>3</td>
<td></td>
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<tr>
<td><strong>Restricted demand (% of normal)</strong></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td><strong>Vaal water supply system</strong></td>
<td>100%</td>
<td>80%</td>
<td>70%</td>
<td>50%</td>
</tr>
<tr>
<td>Domestic</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Industrial</td>
<td></td>
<td>90%</td>
<td>70%</td>
<td>40%</td>
</tr>
<tr>
<td>Irrigation</td>
<td></td>
<td>80%</td>
<td>70%</td>
<td>50%</td>
</tr>
<tr>
<td>Strategic</td>
<td></td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
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<tr>
<td><strong>Western Cape water system</strong></td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
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<td>Domestic</td>
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<td>100%</td>
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</tr>
</tbody>
</table>
Efforts in Progress

- Major shifts addressing these issues
  - White paper on disaster management (DM) and DM act
  - Establishment of National DM centre
  - In progress work on development of agric disaster risk management plan & DM plan

- Main focus remains on improving emergency response capacity
  - Info & instit failures & lack of preparedness
  - More accurate assessment, monitoring & early warning
  - Policy and instit reforms for better coordination & efficacy of relief efforts

- Little use if any of economic incentives & policy instrmts
  - Exception of subsidy to encourage stock reductions
  - Leaves out lvstlk farmers outside DDA
The role of Economic Policy 1

- Incentive or subsidy schemes to promote adoption of more efficient irrigation technologies
- Current tariff systems do not encourage voluntary water savings
  - Water quotas based on licensed land areas and fixed tariffs charged irrespective to whether farmers use allocations or not, i.e. no incentive to conserve water
  - Charging on actual water use-needs metering
  - Innovative schemes such as a rebate system giving credit for using less than full quota in form of:
    - Direct cash compensation, or
    - Credit/permits to be carried forward for future own use or trade
The role of Economic Policy 2

- No special higher levy on water use during drought periods to discourage over use
  - Reliance on legal enforcement measures such as penalties & fines – expensive to administer

- Provisions for crop farmers (CF) currently excluded from AD management programs
  - Instruments and institutions to enable CF participate in yield & weather insurance
  - Particularly for small emerging farmers

- Extension of incentive schemes for stock reductions to include lvstk farmers outside DDA

- Improve self-insurance options (diversified livelihoods, off-farm employment and income opportunities, credit & saving schemes, etc.)