

The effective use of water and water measurement in irrigation

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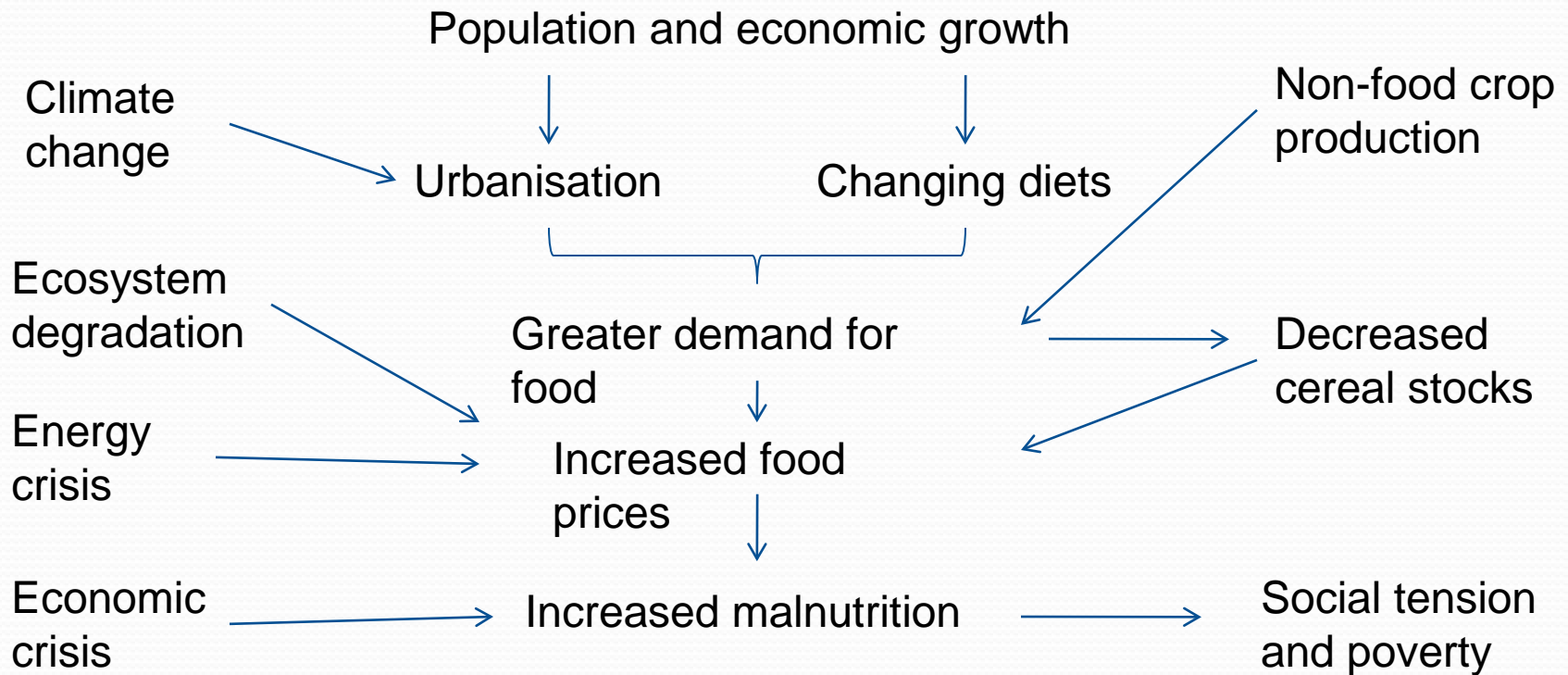


Introduction

- Agricultural water – the international situation
- Importance of irrigation
- Irrigation in South Africa
- Current thinking and new initiatives



The international situation ±2008



Implications for agricultural water sector?

Implications for agriculture

- Increased production required
- Large-scale and small-scale sectors to be included
- Agricultural water should be secured and the agricultural sector nurtured



Increased production

- 45⁰% of cultivated land has no formal water management solution
- Production under irrigation up to 3x higher
- Potential mechanisms for increased production (FAO):
 - Yield increase (69⁰%)
 - Cropping intensity (10⁰%)
 - Arable land expansion (21⁰%)

Increased production (cont'd)

- Increase productivity of existing producers before developing new areas - Indicators: kg/m³ vs \$/m³ vs gram protein/m³?
 - Environmental concern: effect on water quality?
- Promote simple technologies amongst a wide group – get the message out, not complicated technologies
- Increase accountability – water management split between government departments?
- Develop local markets – better price at the farm gate, increased investment in farm infrastructure?
 - Farmers' concern: increased production = lower price!?

Increased production (cont'd)

- Trends in developing countries (B Schultz):
 - Increased farm size
 - Produce high value (niche) crops
 - Part-time farming
- Unlock dryland potential, for biofuel production and poverty reduction – also improved understanding of supplemental irrigation
- Agricultural land have to increase to 1.7b ha in 2050 (from 1.39b ha in 2007), with the greatest potential in Sub-Saharan Africa and Latin-America

Large vs small-scale

- Increased farm sizes make food more affordable
- Small areas can be as productive as large areas but water supply is more expensive and management problematic – opt for groundwater rather than schemes (India) or implement land consolidation when units are uneconomical
- Migration of especially men to urban centers – interventions should target women
- Human resource development is key – realistic programme and strategies need to be **IMPLEMENTED**

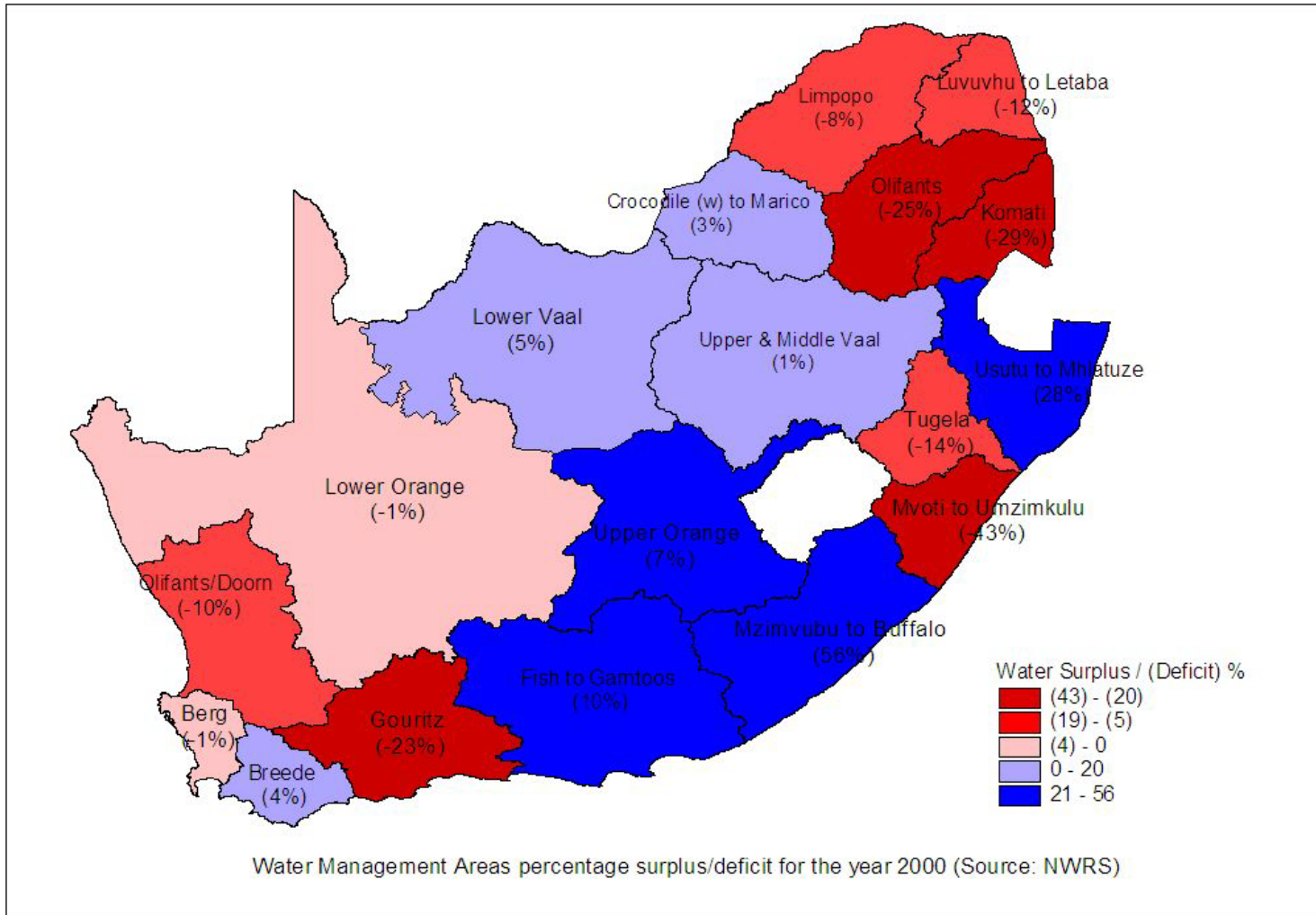
Agricultural water security

- Increasing demand = increasing competition (47% of world population will live under water stress by 2030)
- Protection of agricultural water rights is crucial – water is being “siphoned” away through:
 - Administration (transferred by government)
 - Stealth (aquifers depleted without anybody noticing)
 - Economic mechanisms (sell rights to other sectors)
- Farmers compensate by being more efficient on farm
- Water, energy and agriculture should be governed together (DWA vs DoA, etc)
- Investment is required in agricultural sector – only 4% of development finance goes to agriculture

Water pricing and efficiency

- Potential of pricing as tool to improve WUE is overstated –
 - Purpose of pricing is to recover costs not make profit
 - Prices and supply are too marginal to have any real benefit
 - Only effective as long term strategy and subject to conditions
- Pricing can be used as management tool by either:
 - Efficiency pricing -under achievers are priced out (DWAF), or
 - Quotas – water allocated for development (DoA)
- No country in the world uses pricing to balance water supply and demand – Chris Perry
- Increased pricing can lead to increased demand – farmers change technologies, improve productivity and then expand their irrigated areas
- Create order first through knowledge, information, water accounting and incentives (other than economic) then you can manage – politicians need to accept this

The South African situation



Water situation in SA

- Total amount of water available as mean annual run-off in rivers is approximately 49 km³/year.
- With a population of 49,3 million in July 2009, SA has just crossed the boundary from a "water stressed" to "water scarce" country (less than 1 000 m³/year per person).
- Surface runoff is further highly variable and erratic within seasons and between seasons.
- The quality of the available water is progressively deteriorating.

(Van der Merwe, 2010)

Water situation in SA

- Total storage created amounts to 65% of total mean annual runoff (for dams of more than 1 million m³ capacity each).
- Most urban and industrial development have been established in locations remote from large watercourses.
- Large-scale transfers of water across catchments have been implemented.
- The need to manage water resources properly is evident, and applicable laws were needed – National Water Act 1998.

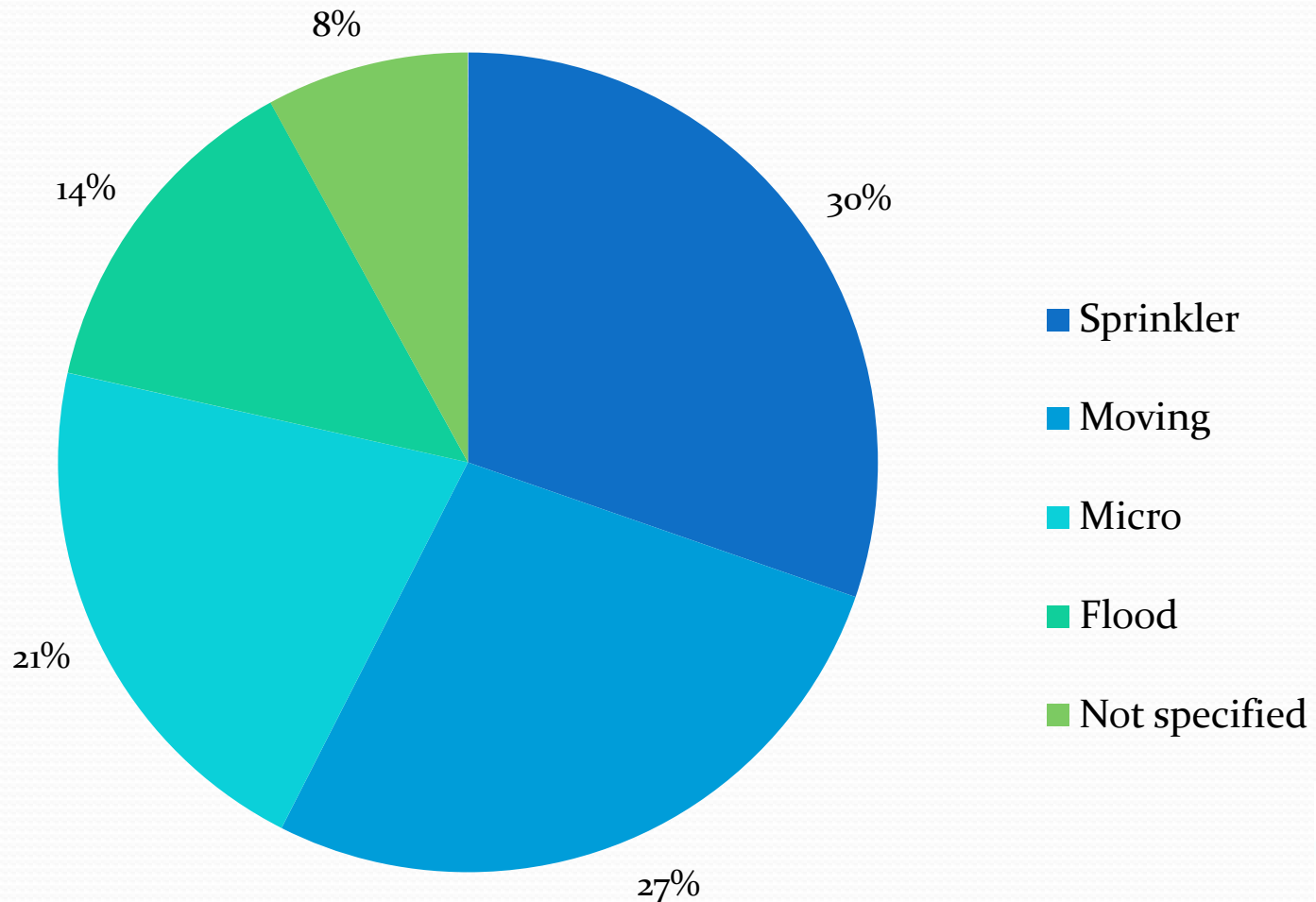
(Van der Merwe, 2010)

Water situation in SA - Irrigation

- Selected data – July 2008:
 - 73 237 registered irrigation systems
 - 38 243 unique registered water users
 - 1 675 822 ha of registered irrigation area
 - 1 399 221 ha of annually irrigated area

(WARMS, DWA)

Irrigation system types



So what do we have to do?

Current initiatives

- Expand water measurement implementation



- Improve water accounting



- Improve irrigation efficiency



- Implement Water Conservation and Water Demand Management regulations

Water measurement

- Water cannot be managed without being measured
- WRC study (2009):
 - Only 30% of irrigation water use is being measured
 - National rollout of metering will require capital expenditure of R529.5 million



Water accounting

- Effective management of water require accurate recordkeeping and useful analyses
- Water Use Efficiency Accounting Reports being implemented by DWA
 - scheme, WMA, region and national levels



Irrigation efficiency

- Better water management can help water users to :
 - optimise water productivity,
 - reduce production costs, especially electricity,
 - make better use of fertiliser,
 - conserve soil, etc.
- WRC study (2010):
 - Water balance approach to irrigation system analysis recommended (ICID approved)



WC/WDM Water Use Regulations

- Under construction
- To apply to moderate and major water users
- Brings together all water conservation measures:
 - Measurement
 - Reporting
 - Improvement
- Contribute to awareness creation and skills development

Conclusion

- Investment in physical and social infrastructure for agricultural water use required to ensure social stability, economic development and poverty reduction
- Can the 21st century be the century of agriculture?

