

## Institutional Reform and Modernisation of Irrigation Systems in South Africa

By

Gerhard Backeberg and Felix Reinders  
Pretoria

### Outline of discussion

- Introductory remarks
- Policy instruments to change water use behaviour
- Water measurement for distribution and application
- Irrigation technologies for efficient water use
- Concluding observations



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# 1. Introduction



## ➤ Framework on Water for Growth and Development

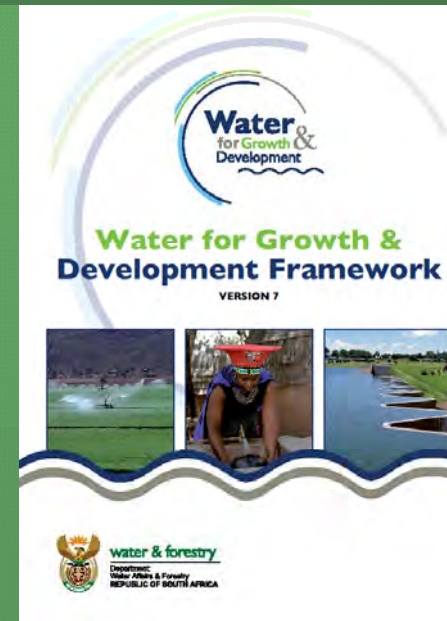
- Measurement of water use
- Water use efficiency plans
- Upgrading of irrigation systems

## ➤ Expansion of area under irrigation

- Savings through water loss control
- Improved irrigation efficiency  
e.g. application of drip irrigation

## ➤ Purpose of paper:

- Explain available knowledge
- Actions to accomplish water savings



## 2. Policy instruments to change water use behaviour



- Water institutional reform
  - National Water Act of 1998
  - National Water Resource Strategy of 2004
- Interventions for effective demand management
  - Implement water user charges
  - Enforce water use licenses
  - Promote self-regulation
  - Education and public awareness
- Incentives for efficient water use and water savings
  - Cost recovery for operating and upgrading of irrigation infrastructure
  - Regulated trade of water use licenses



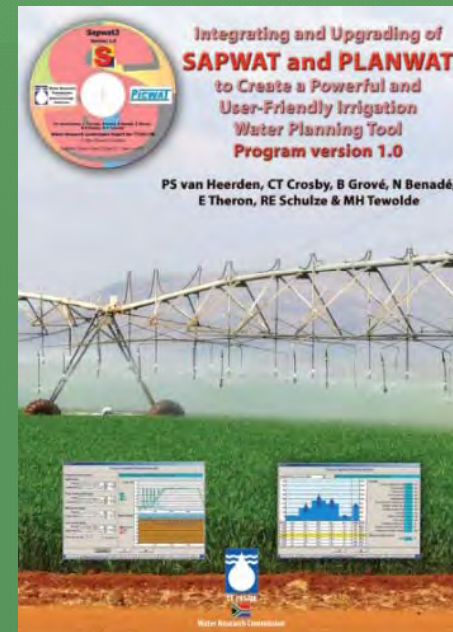
# Water conservation and demand management



- Framework for regulatory support in order to increase productivity of water use
  - Appropriate measures that reduce wastage of water
  - Progressive modernisation of water conveyance, distribution and application infrastructure, equipment and methods
  - Preventative maintenance programmes
  - Generation of sufficient irrigation information which is accessible to all stakeholders
  - Implementation of water audits from the water source to the end user

## ➤ Water user charges

- Water resource management
- Water resource development
  - Recover cost of planning, designing, constructing, operating and maintaining water supply infrastructure



### 3. Water measurement for distribution and application



➤ Trends in modernisation of irrigation technology

Year	Area	Method of irrigation		
		Flood	Sprinkler	Micro/drip
	ha	%	%	%
1990	1 290 132	32,8	54,4	11,8
2007	1 675 882	14,4 (23,3)	54,9	21,8

➤ Technical efficiency standards

	Current	Proposed
Flood :	55 – 65%	86 – 98%
Sprinkler:	70 – 85%	78 – 90%
Drip :	85 – 95%	85 – 95%



## Irrigation water measurement

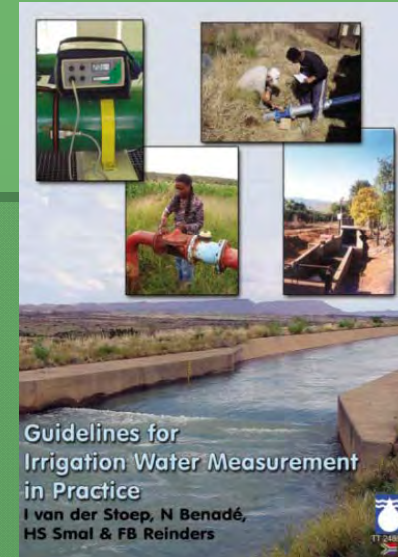


➤ Technology for measuring is available

- Correct installation
- Regular maintenance
- Accurate recording

➤ Managed implementation

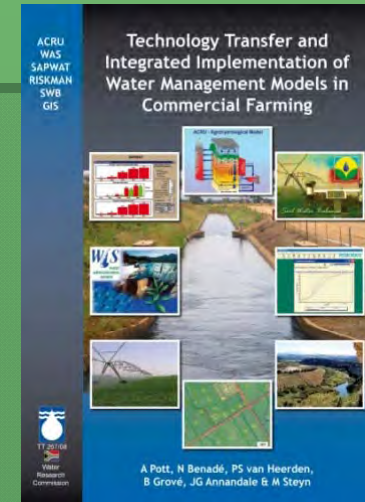
- A reason for measuring (the “trigger” of the management process)
- Acceptance and support by the water users
- Assessment of the current situation and planning the system
- Choosing appropriate technologies
- Correct installation by skilled technicians
- Sound operation and maintenance practices
- A system for data retrieval and management
- Comprehensive financial planning
- Procedures for handling disputes and tampering



## Canal water loss control

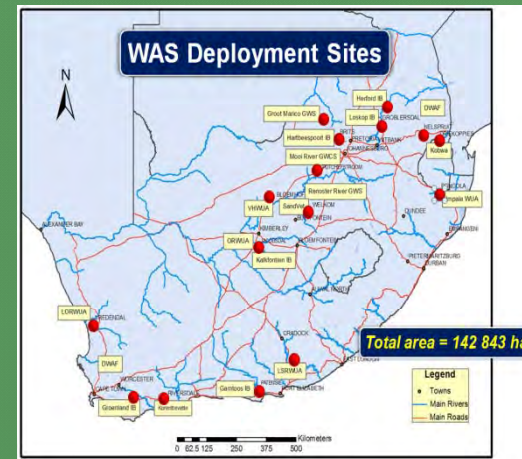
➤ Water Administration System (WAS) designed as water management tool for irrigation schemes with main benefits:

- Minimising of water distribution losses
- Improved management of water distribution and usage per farmer
- Management of date and time related flow data collected from electronic loggers or mechanical chart recorders
- Availability of an extensive list of water reports on farm and scheme level
- Increased productivity of scheme management personnel
- Integrated accounting system that improves debit management



➤ Water use efficiency accounting report

- Newly developed report module
- Includes water orders, meter readings and water use
- Records volume and % losses



## 4. Irrigation technologies for efficient water use

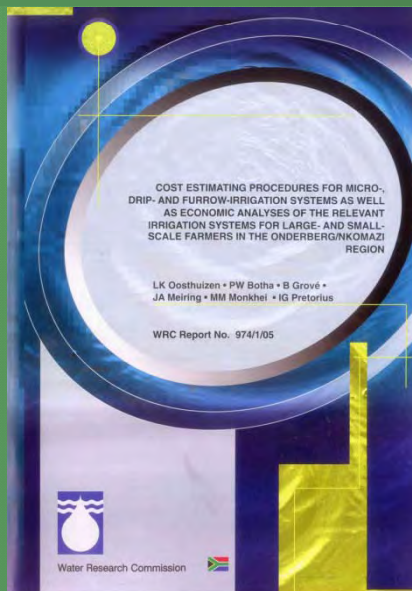


- Changing to more efficient drip irrigation requires
  - Stable water supply
  - Higher capital and management inputs
  - Higher crop yields
  - Lower energy use
  - Regular maintenance
  
- Task of management
  - Capital and operating budgets for irrigation technology
  - Crop enterprise budgets
  - Partial or whole-farm analyses



## Investment and cost estimating procedures

- Comparison of drip with flood or sprinkler irrigation
- Consider range of technical, financial and economic variables
- Cost budgeting before decision and action
  - Long-term investment of preferred irrigation technology
  - Short-term operating costs for crop irrigation
- Guidelines applied by farmers or professional advisors



## Performance of surface and sub-surface irrigation



- Field and laboratory tests of drip irrigation
- Emission uniformity declined over time for all dripper types
  - Decline in efficiency due to clogging
  - Correct emitter and filter selection
  - Correct installation and maintenance essential
  - Preventative measures e.g. root growth inhibitors
  - Regular water quality analysis
- Compile maintenance schedule for weekly, monthly and yearly implementation
- Technology transfer and training courses for designers and farmers



## 5. Conclusion



- Technologies, tools and procedures available for efficient irrigation water use
  - Water metering
  - Canal water distribution
  - Investment and cost analysis
  - High performance drip irrigation
- Improvements already under way with shift to drip irrigation
- Future priorities
  - Broad based water measurement
  - Refinement of policy instruments
  - Technology transfer and training
  - Improved management of water
- Successfully achieve water savings for expansion o



# Notes

