



NEW TT REPORTS

Guidance for sustainable on-farm and on-scheme irrigation water measurement

Isobel van der Stoep, Andrew Pott, Johannes Hendrikus Viljoen, Anna Maria Jansen van Vuuren

The results of this technology transfer project can be summarized in four key messages for potential users of measuring devices for irrigation water.

TT 550/12
ISBN: 9781431203734
Overseas Price: \$35.00

Sustainable techniques and practices for water harvesting and conservation: farmer and extension manual

*JJ Botha,
JJ Anderson, LF Joseph, RM Snetler, N Monde, F Lategan*

The aim of this project was to select and implement water harvesting and conservation techniques that would assist two rural communities (Guquka and Khayaletu) in the Eastern Cape to improve their livelihoods by increasing their food production and developing their rangeland/livestock production systems. On-station and on-farm field experiments were conducted in order to test rainwater harvesting and conservation (RWH&C) techniques.

TT 542/12
ISBN: 9781431203512
Overseas Price: \$35.00

Training material for extension advisors in irrigation water management. Volume 3: Extension learner guide; Part 9: Agricultural extension

Joseph Benjamin Stevens

It is generally recognised that extensionists provide the link between research output and solving the perceived problems which farmer's experience. All types of farmers, but specifically smallholder farmers, are dependent on extension services as a source of information and knowledge. Discussion forums organised by the Water Research Commission in all provinces between 2000 and 2003, in which a wide range of farmers participated, have highlighted that the extension link has deteriorated in recent years and become less effective.

TT 541/12
ISBN: 9781431203444
Overseas Price: \$40.00

Training material for extension advisors in irrigation water management. Volume 2: Technical learner guide; Part 8: Irrigation crop and fodder production

Joseph Benjamin Stevens, Pieter Schalk van Heerden, Peter Reid, Andries Liebenberg, Eckardt Hagedoorn, Gerhard de Kock

TT 540/8/12
ISBN: 9781431203437
Overseas Price: \$40.00

Training material for extension advisors in irrigation water management Volume 2: Technical Learner Guide; Part 7: Irrigation economics

Stefan van Zyl, Petrus Gerhardus Strauss, Joseph Benjamin Stevens

TT 540/7/12
ISBN: 9781431203420
Overseas Price: \$35.00

Training material for extension advisors in irrigation water management. Volume 2: Technical learner guide; Part 6: Irrigation legislative context

Joseph Benjamin Stevens, Frans van der Merwe, Michiel C Laker

TT 540/6/12

ISBN: 9781431203413

Overseas Price: \$35.00

Training material for extension advisors in irrigation water management Volume 2: Technical Learner Guide; Part 5: Irrigation engineering

Frans Buys, Joseph Benjamin Stevens, Stephanus Smal

TT 540/5/12

ISBN: 9781431203406

Overseas Price: \$35.00

Training material for extension advisors in irrigation water management. Volume 2: Technical learner guide; Part 4: Irrigation water management

Joseph Benjamin Stevens, Frans Buys

TT 540/4/12

ISBN: 9781431203390

Overseas Price: \$35.00

Training material for extension advisors in irrigation water management. Volume 2: Technical learner guide; Part 3: Agro climatology

Michiel C Laker, Pieter Schalk van Heerden, Joseph Benjamin Stevens

TT 540/3/12

ISBN: 9781431203383

Overseas Price: \$35.00

Training material for extension advisors in irrigation water management. Volume 2: Technical learner guide; Part 2: Assessing of soil resources

Michiel C Laker, Joseph Benjamin Stevens

TT 540/2/12

ISBN: 9781431203376

Overseas Price: \$45.00

Training material for extension advisors in irrigation water management Volume 2: Technical learner guide; Part 1: Soil-plant-atmosphere continuum

Joseph Benjamin Stevens, Pieter Schalk van Heerden, Michiel C Laker

TT 540/1/12

ISBN: 9781431203369

Overseas Price: \$35.00

Training material for extension advisors in irrigation water management Volume 1: Main report

Joseph Benjamin Stevens, Pieter Schalk van Heerden, Frans Buys, Michiel C Laker

TT 539/12

ISBN: 9781431203352

Overseas Price: \$45.00

Application of rainfall forecasts for agriculturally related decision making

Trevor Graeme Lumsden, Roland Edgar Schulze

The overall objective of this project was to develop and test techniques and models for translating weather and climate forecasts in South Africa into applications for decision support at a range of spatial scales in both rainfed and irrigated agricultural production and water management, in order to reduce risks associated with vagaries of day-to-day to seasonal climate variability.

TT 538/12

ISBN: 9781431202737

Overseas Price: \$35.00

Technical aspects and cost estimating procedures of drip irrigation systems: main report irrigation guidelines for annual ryegrass pasture

Felix Britz Reinders, Bennie Grové, Nico Benadé, Isobel van der Stoep, Adriaan Smuts van Niekerk

Research funded by the Water Research Commission and projects completed by the Agricultural Research Council's Institute for Agricultural Engineering on the performance of surface and sub-surface drip irrigation found that the emission uniformity as measured in the field declined over time for all dripper types. This indicates a decline in efficiency due to clogging or lack of maintenance. Correct planning, design, installation and maintenance is essential and it is recommended that regular water quality analysis be carried out to identify potential clogging problems.

TT 524/12

ISBN: 9781431202737

Overseas Price: \$35.00

Technical aspects and cost estimating procedures of drip irrigation systems: manual for designers

Felix Britz Reinders, B Grové, Nico Benadé, Isobel van der Stoep, Adriaan Smuts van Niekerk

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TT 525/12

ISBN: 9781431202744

Overseas Price: \$30.00

Irrigation guidelines for annual ryegrass pasture

Melake Kessete Fessehazion, John George Annandale, Colin Stuart Everson, Amanuel Bokhre Abraha, Wayne Frederick Truter

The overall objective of this study was to promote efficient irrigation management of grass pastures (emphasis on ryegrass and kikuyu) by synthesizing available knowledge and generating new knowledge for improving water use efficiency by pastures. Italian ryegrass (*Lolium multiflorum*) was planted in an experiment conducted at the KwaZulu-Natal Department of Agriculture at Cedara located in the midlands of the KwaZulu-Natal mistbelt, one of the main milk producing areas of South Africa.

TT 521/12

ISBN: 9781431202713

Overseas Price: \$40.00

Nutritional value and water use of African leafy vegetables

André Oelofse, Wim van Averbeké

African leafy vegetables are commonly perceived to be heat and drought tolerant, use less water than conventional crops and provide a host of health benefits especially nutritional benefits. If these attributes are true, these crops could contribute greatly to the diet of especially poor, food insecure households, many of whom are living in drought stricken areas of the country. The research consisted of four main thrusts divided into specific research objectives. The review of nutritional status and strategies showed that under- and over-nutrition co-exist in the same communities and often same household. With respect to water requirements, there were distinct differences in water requirements between the different plants which varied from 340 mm to 463 mm.

TT 535/12

ISBN: 9781431203239

Overseas Price: \$25.00

Production guidelines for African leafy vegetables

Willem Sternberg Jansen van Rensburg, Wim van Averbeké, Yacob Ghebretinsae Beletse, Martha Magaretha Slabbert

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TT 536/12

ISBN: 9781431203246

Overseas Price: \$25.00

Water use and nitrogen application for irrigation management of pasture production

Melake Kessete Fessehazion, Amanuel Bokhre Abraha, Colin Stuart Everson, Wayne Frederick Truter, John George Annandale, Magandaran Moodley

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TT 520/12

ISBN: 9781431202713

Overseas Price: \$25.00

Modelling agricultural non-point source pollution and economic-environmental trade-offs of pollution control measures

André Hermann Matheus Görgens, Simon Antony Lorentz, Michael van der Laan, Nebojsa Zarko Jovanovic, Nicolette Matthews, John George Annandale, Bennie Grové, Jacobus Johannes le Roux

This project developed an integrated modeling approach to the prediction of agricultural NPS pollution from field- to catchment-scale for phosphorus, nitrogen,

pesticides and sediments. A project team consisting of four individual Task Teams, comprising of one or more specialists within each of the domains of agricultural nutrients, sediments, pesticides, field-scale bio-physical modelling, catchment-scale bio-physical modelling, and agricultural economics, report on their activities in a series of five reports

TT 516/12
ISBN: 9781431202713
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Investigation of unsteady flow conditions at dam bottom outlet works due to air entrainment during gate closure. Volume II: Computational modelling

Gerrit Basson

The Berg River Dam is equipped with the first multi level draw off environmental flood release outlet in South Africa and can release flows of up to 200 m³/s. The outlet is controlled by a radial gate and is protected by a vertical emergency gate. Commissioning tests of the emergency gate in 2008 found that large volumes of air were expelled from the air supply shaft designed to reduce expected negative pressures in the conduit during emergency gate closure.

TT 529/12
ISBN: 9781431202874
Overseas Price: \$40.00

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Eddie Bosman, Gerrit Basson

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TT 528/12
ISBN: 9781431202867
Overseas Price: \$35.00

Drivers for wastewater technology selection: Assessment of the selection of wastewater treatment technology by municipalities in relation to the management capability and legislative requirements

M vd Merwe-Botha, G Quilling

This project identified the minimum requirements for effective and sustainable drinking-water service delivery within non-metropolitan water distribution networks to ensure acceptable drinking-water quality. Interviews with municipalities followed by site visits provided insight into current treatment plant and distribution network operation and maintenance procedures and the key factors that result in water quality failures in non-metropolitan networks. A web-enabled risk assessment tool was developed, as were practical guidelines aimed at different levels and/or users of the water service team, supported by two web-enabled tools available via the electronic Water Quality Management System (eWQMS).

TT 543/12
ISBN: 9781431203529
Overseas Price: \$35.00

An assessment of the key factors that influence the environmental sustainability of a large inland industrial complex: Volume I: Inception report

Dave Edward Cleary Rogers, Godfrey Ganizani Mvuma, Alan Colin Brent, Suzanna Hester Helena Oelofse, Linda Keren Godfrey

This project looked at the key factors that influence the environmental sustainability of a large inland industrial complex: The Secunda Industrial Complex. The main finding for this study is that the long term increasing trend for unaccounted salt flows to the surface water systems indicates control of salt storage and disposal is the key factor for environmental sustainability. The economics of desalination and waste storage are driven by the cost of water and the management of post closure liabilities.

TT 544/12

ISBN: 9781431203659

Overseas Price: \$30.00

An assessment of the key factors that influence the environmental sustainability of a large inland industrial complex: Inventory of inland salt production

Dave Edward Cleary Rogers, Christopher John Brouckaert, Phillip Hobbs

This project looked at the key factors that influence the environmental sustainability of a large inland industrial complex: The Secunda Industrial Complex. The main finding for this study is that the long term increasing trend for unaccounted salt flows to the surface water systems indicates control of salt storage and disposal is the key factor for environmental sustainability.

TT 545/12

ISBN: 9781431203666

Overseas Price: \$30.00

An assessment of the key factors that influence the environmental sustainability of a large inland industrial complex: Volume III: Development and assessment of technological interventions for cleaner production at the scale of the complex

Godfrey Ganizani Mvuma, Floor Hooijman, Alan Colin Brent, Suzanna Hester Helena Oelofse, Dave Edward Cleary Rogers

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TT 546/12

ISBN: 9781431203673

Overseas Price: \$35.00

An assessment of the key factors that influence the environmental sustainability of a large inland industrial complex: Volume IV: Governance assessment

Godfrey Ganizani Mvuma, Floor Hooijman, Alan Colin Brent, Suzanna Hester Helena Oelofse & Dave Edward Cleary Rogers

TT 547/12

ISBN: 9781431203420

Overseas Price: \$30.00

An assessment of the key factors that influence the environmental sustainability of a large inland industrial complex. Volume V: Linking technologies to governance

Dave Edward Cleary Rogers, Godfrey Ganizani Mvuma, Alan Colin Brent

TT 548/12

ISBN: 9781431203697

Overseas Price: \$30.00

Framework document for a WRC research programme on engineered nanomaterials

Victor Wepener, Bhekie Mamba, Ndeke Musee

Nanotechnology has taken the world of science by storm since it allows for the development of new materials with extraordinary properties. Examples of novel nanotechnology applications include the development of highly accurate and sensitive medical diagnostic devices, new ways of disease therapy, and the monitoring and remediation of basic water supplies.

TT 549/12

ISBN: 9781431203710

Overseas Price: \$30.00

Tools to measure impacts and operations of rural small-community water supply in rural South Africa

Paul Jagals

The original question that spurred this work was whether small community water supply interventions in South Africa were beneficial to their recipients and to what extent.

The purpose of the research was two-fold - this report presents the method and the research to develop and apply it.

TT 534/12

ISBN:

Overseas Price: \$00.00

Guide to SANIVEY – assessing user acceptance and functioning of mobile communal sanitation facilities in informal settlements

A Lagardien, C Muanda, A Benjamin

Technical innovations often lack sustainability due to a lack of attention or provision of operational requirements and community involvement. The application of these sanitation technologies in informal settlements however is lacking a framework for introducing, assessing the performance and functioning as well as an understanding of the perspectives of end-users of the new technology despite the existence of the national Strategic Framework for Water Services. This general framework does not clearly define "basic sanitation" in terms of technology.

This research was initiated to deal with this problem by investigating the current approaches to the implementation of a new sanitation technology, their acceptance and functioning in the natural setting of informal settlements.

TT 533/12

ISBN: 9781431203147

Overseas Price: \$35.00

The WDM municipal balanced scorecard model user guide

Ronnie Mckenzie

Before implementing any new WDM intervention, it is normal practice to undertake an investigation of the area in question in order to assess the key problems and to propose a strategy to address them.

The resulting WDM strategy is usually a range of actions or interventions designed to address the main problems in order to reduce losses and or consumptive use.

TT 523/12

ISBN: 9781431202713

Overseas Price: \$25.00

The state of non-revenue water in South Africa (2012)

R Mckenzie, ZN Siqalaba, WA Wegelin

This study builds on and follows on from the two previous assessments undertaken through the WRC. This study is the most comprehensive and detailed study of its type to date and expands on the knowledge acquired previously and through collaborative efforts with the DWA Regional Offices in the data gathering process. Data were gathered from 132 of the possible 237 municipalities throughout South Africa representing over 75% of the total Municipal water supply. From the analysis of the results, it was estimated that the current level of non-revenue water for the country as a whole is 36.8%. This figure is similar to the estimated world average of 36.6% but is on the high side when compared to other developed countries and low when compared to other developing countries. The use of percentages is not recommended by the International Water Association when referring to water losses or leakage levels as they can often be misleading.

TT 522/12

ISBN: 9781431202638

Overseas Price: \$40.00

Compendium of water conservation and water demand management interventions and measures at the municipal level in South Africa

Mike Rabe, Dawid Maree, Rendani Ramano, Guy Price

The need for demand-side interventions that effectively reduce physical losses in water networks, artificial demand at the end-user level created through leakage, as well as apparent losses due to metering and billing deficiencies is abundantly clear.

TT 519/12

ISBN: 9781431202522

Overseas Price: \$45.00

Ethnographic research methods to better understand household water practices -(DVD)

Iske van den Berg, Sarah Slabbert

This study aimed to test the viability of an ethnographic participative technique, i.e. the use of digital media in the form of a video camera, to do research about water related issues in rural communities. In addition its intention was to inform communication and education campaigns aimed at effective water management. Due to the nature of exploratory research, it was predicted that other unexpected outcomes could present themselves. The study responded to the call in developmental discourse that indigenous household water practices and innovations should be taken into consideration in development interventions and solutions for rural water problems.

TT 517/12

ISBN:

Overseas Price: \$15.00

Modelling agricultural non-point source pollution and economic-environmental trade-offs of pollution control measures

André Hermann Matheus Görgens, Simon Antony Lorentz, Michael van der Laan, Nebojsa Zarko Jovanovic, Nicolette Matthews, John George Annandale, Bennie Grové, Jacobus Johannes le Roux

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- WRC Report No TT 516/12: Modelling agricultural non-point source pollution and economic-environmental trade-offs of control measures
- WRC Report No 1516/1/12: Modelling nitrogen and phosphorus dynamics in cropping systems at the field scale
- WRC Report No 1516/2/12: Modelling the fate of pesticides: primary processes, non-point source data collection and guidelines
- WRC Report No 1516/3/12:
 - Modelling nutrient and sediment dynamics at the catchment scale
- WRC Report No 1516/4/12: Modelling economic-environmental trade-offs of agricultural non-point source pollution control measures

TT 516/12

ISBN: 9781431202400

Overseas Price: \$25.00

Guidelines for using the web-enabled Water Safety Plan Tool

Unathi Jack, Philip de Souza

Water Safety Planning is a systematic process that aims to consistently ensure acceptable drinking water quality that does not exceed the numerical limits in SANS 241 by implementing an integrated water quality management plan, which includes a risk assessment and risk management approach from catchment to point of delivery. In so doing the process allows for better understanding of water supply systems. Once the risk has been identified, control measures can be put into place to mitigate these risks.

TT 515/12

ISBN: 9781431202386

Overseas Price: \$30.00

Technical Assistance Centre – small water and wastewater treatment plants

Chris Daniel Swartz

The Technical Assistance Centre (TAC) for small water and wastewater treatment plants was established to provide technical (but also non-technical) support to water services providers (WSPs) experiencing challenges with their water and wastewater treatment plants.

TT 510/12

ISBN: 9781431201976

Overseas Price: \$35.00

The identification of a suitable culture organism to establish a bio-assay for evaluating sediment toxicity

Y Cloete, B Shaddock

Sediments act as a source and sink for a variety of organic and inorganic contaminants. These contaminants accumulate, resulting in extremely high concentrations even once the overlying water concentrations are at or below acceptable water quality guidelines. Any changes in the physical parameters of the overlying water can cause these pollutants to be released back into solution.

TT 532/12

ISBN: 9781431203109

Overseas Price: \$40.00

Uthukela case study: Refurbishment vs replacement

Annalien Toerien, Priyal Dama-Fakir, Henlo du Preez

South Africa has approximately 850 municipal treatment plants. In a recent Green Drop evaluation carried out, 55% of the treatment plants investigated scored below 50%, indicating that drastic improvements are required. This trend in many cases is due to minimal maintenance and replacement, causing infrastructure and equipment to deteriorate to the extent that replacement is considered. However, refurbishment is an option that should be considered.

TT 480/12

ISBN: 9781431202225

Overseas Price: \$40.00

The freshwater science landscape in South Africa, 1900–2010: Overview of research topics, key individuals, institutional change and operating culture

Peter Ashton, Dirk Roux, Charles Breen, Jenny Day, Steve Mitchell, Maitland Seaman, Michael Silberbauer

This study set out to record the evolution of aquatic sciences in South Africa since 1900, identify the external driving forces that helped to direct research, pinpoint the individuals and institutions responsible for shaping the ways in which aquatic sciences developed, and determine the extent to which aquatic sciences have contributed to effective management of South Africa's water resources.

TT 530/12

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Overseas Price: \$30.00

Investigation of unsteady flow conditions at dam bottom outlet works due to air entrainment during gate closure. Volume I: Physical modelling
Eddie Bosman, Gerrit Basson (Editors)

The Berg River Dam is equipped with the first multi-level draw off environmental flood release outlet in South Africa and can release flows of up to 200 m³/s. The outlet is controlled by a radial gate and is protected by a vertical emergency gate. Commissioning tests of the emergency gate in 2008 found that large volumes of air were expelled from the air supply shaft designed to reduce expected negative pressures in the conduit during emergency gate closure.

TT 528/12

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TT 529/12

ISBN: 9781431202874

Overseas Price: \$40.00

Development of a tool for assessment of the environmental condition of wetlands using macrophytes

F Corry

This is the last report of 11 reports emanating from Phase 2 of the WRC Wetland Health and Importance (WHI) research programme. In addition to biotic indices using macrophytes and aquatic invertebrates, a method for the assessment of temporary wetlands during dry conditions and a method for the assessment of the cumulative impacts of human activities at the landscape and catchment levels on wetlands was developed. The socio-economic aspects of wetlands ecosystem services were investigated and case studies presented.

TT 436/12

ISBN: 9781770059283

Overseas Price: \$45.00

Groundwater resource directed measures (2012 edition)

Ingrid Dennis, Kai Witthüsser, Koos Vivier, Rainer Dennis, Andrew Mavurayi

To be able to implement the NWA, the Minister needs to ensure that the tools and expertise required to implement the Act are available. This manual addresses the methods and procedures needed to implement Resource Directed Measures (RDM).

To distinguish between RDM in general and RDM related to groundwater, the term Groundwater Resource Directed Measures (GRDM) will be used when the focus is only on groundwater.

TT 506/12

ISBN: 9781431203217

Overseas Price: \$45.00

A 2011 perspective on climate change and the South African water sector

RE Schulze

This project was initiated as a result of, among others disparities in water availability and access to water experienced by many of the country's people, and since these could well be amplified by climate change. Other factors that were taken into account were that South Africa is characterised by a highly variable climate added to an already stressed water situation and an imperfect governance system.

TT 518/12

ISBN: 9781431202683

Overseas Price: \$40.00