SOUTH AFRICAN NATIONAL COMMITTEE PRESENTATION

Montpellier, France
12 October 2015

South African National Committee on Irrigation and Drainage

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Extension and Rural Development
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www.sancid.org.za
1. Membership structure of South African National Committee on Irrigation and Drainage (SANCID)

SANCID represents the interests of ICID in South Africa and continues to activate members to participate in international conferences, network through working groups and share knowledge and experience through regional conferences and national symposia. SANCID is represented in ICID at international level (Three Vice Presidents Honoraire), continental level (Chairperson of the African Regional Working Group), regional level (Chairperson of the Southern African Regional Irrigation Association) and National level (Chairperson of the National Committee).

SANCID also celebrated 22 years of excellence within the South African and International landscape, since a very small start in 1993.

(A) Broad basing of National Committee (NC)

i. Who are SANCID members?

SANCID is widely representative of governmental (Department of Agriculture, Forestry and Fisheries; Department Water and Sanitation); parastatals (Agricultural Research Council; Water Research Commission); South African Association of Water User Associations (SAWWUA’s); farmer organisations (AgriSA and National African Farmers Union); professional societies/associations (SA Institute of Agricultural Engineers, Soil Science Society of SA, SA Society for Agricultural Extension, SA Society of Horticultural Science, SA Society of Crop Production, Agricultural Economics Association of SA, SA Sugar Cane Association/SA Sugarcane Research Institute; SA Grassland Society); the irrigation industry (South African Irrigation Institute), Universities, Private sector (WineTech, Murray Biesenbach and Badenhorst Eng Incorporated), Landbank and International Water Management Institute (IWMI).

ii. Disciplines represented include Agricultural economics; Agricultural engineering; Agricultural extension; Crop and pasture production; Horticultural science; Soil science; Sugar-cane production; Viticulture and oenology, farmer organisations and private companies.

iii. Number of members associated: Directly representing 19 member organisations and indirectly representing more than 20 000 individual members involved in irrigation, drainage and flood control or agricultural water management in general.

iv. Services provided to members: Providing opportunities to exchange knowledge and experience through biannual symposia and workshops; distributing relevant international and national information received from ICID and SANCID members. Providing the members with ICID Journals. Offering of training courses. Introducing members to relevant centers and organisations in the field of irrigation and drainage. Distributing of SANCID newsletters to the members. Keep all members informed via e-mail of important news and congresses all over the world. Maintain a website (www.sancid.org.za) for information sharing.

v. Representation: 28 Young Professionals; 3 Women in National Committee; Two young professional members in Work bodies of ICID. Young professionals and women are continuously encouraged to get involved in SANCID and ICID activities. Ms Mary Jean Gabriel is secretary of an ICID working group. Regular communication with members is achieved through Annual General Meetings and Ordinary Meetings. SANCID is represented on 14 different working groups of ICID.

vi. The Constitution of SANCID was accepted on 29 November 1993.

Please view the Constitution of SANCID at the website http://www.sancid.org.za under the link “About SANCID”, and particulars regarding member organisations under the link “Membership” and representatives of organisations under the link “Contact details”. The Constitution was formally submitted to ICID.

vii. SANCID Executive committee

The Executive committee consists of the following:

Chairman: Dr Joe Stevens
Vice Chairman: Dr Sylvester Mpandeli
Secretary: Ms Puleng Mofokeng
Treasurer: Dr Michael vd Laan
Past Chairman: Mr Felix Reinders
Administrative desk: Ms Riana Lombard
viii. Finances

SANCID arranges for its own sources of funds. Funds are raised through membership fees, sponsorship for biennial SANCID symposia from private sector, parastatals, universities and government.

(B) Activities

i. Training courses:

On an annual basis the honorary founder member of SANCID, SABI present courses on irrigation design and management, irrigation scheduling, basic control automation as well as the evaluation of irrigation systems to improve irrigation performance. All courses are accredited by Engineering Council of South Africa for Continuous Professional Development purposes.

ii. Multilateral cooperation with countries in the Southern African Development Community (SADC):

SANCID plays a vital role in the region and is hosting the Southern African Regional Irrigation Association (SARIA) workshops and steering committee meetings since 2000. SANCID played an important role in reactivating SARIA and currently a memorandum of agreement exists between the following SADC countries: South Africa; Botswana, Swaziland, Lesotho, Namibia, Malawi, Zambia, Zimbabwe, Tanzania; Madagascar; Mauritius, Mozambique, Angola and the Democratic Republic of Congo.

SARIA held its annual workshop and steering committee meeting from 17-19 March 2015 at the Roodewallei Hotel in Pretoria, South Africa. SARIA in collaboration with SANCID has a strategy to use these workshops for capacity building. It started off with water use in homestead food gardens (2013), followed by extension for irrigation water management (2014) and this year the theme was on request of SARIA members “Rainwater harvesting and conservation on croplands”. This facilitated exchange of knowledge and practice between researchers, extension advisors and government officials from the SARIA member countries. The steering committee with chairman, Dr Conrad Sawe of Zimbabwe, mainly focuses on regional challenges in the agricultural sector, progress in formation of irrigation and drainage national committees in SARIA member countries that are not yet members of ICID, and the activities of national committees in irrigation and drainage that are ICID members. SANCID through its executive is playing a pivotal role in the supporting of forming national committees and with their affiliation to ICID. A one day filed visit was paid to Loskop Irrigation Scheme in Limpopo which was thoroughly enjoyed by all participants.

iii. Symposia, conferences and seminars/discussion forums

Biennial SANCID Symposia

SANCID actively organizes and presents biennial SANCID Symposia and the 2014 symposium took place from 18-20 November 2014 at Glenburn Lodge, Gauteng South Africa with the theme: "Water, food and energy in the 21st Century". A total of 32 scientific papers were delivered, and a technical tour to two farms in the Tarlton area were used to illustrate how vegetable and flower agribusinesses responded to challenges through designing resilient strategies to take account of the connection between water, food and energy. The symposium was attended by 76 delegates from mainly South Africa, Swaziland and Zimbabwe who also participated in the 21st celebration of SANCID.

The Executive Committee of SANCID has established an organizing committee to prepare and organize the SANCID 2016 Symposium which will be hosted in the Hexriver Valley Irrigation Scheme, Western Cape during September 2016, with the theme: “Sustainable irrigation water management and drainage for food production: Vision 2030”.

Conferences and congresses

Member organizations of SANCID also regularly host annual conferences of which many addressed challenges faced in the irrigation fraternity:

- Agricultural Economics Association of South Africa
  Conference: 29 September – 2 October 2015: “Structure, conduct and performance of South African economy in a fast changing social, political and economic environment”
- **Soil Society of South Africa; South African Society of Crop Production; South African Weed Science Society and South African Society for Horticultural Sciences** held combined Congresses with several sub-themes on irrigation annually.

- **South African Society for Agricultural Extension**
  - Conference: 2-4 June 2015, “The changing dynamics of extension in line with the objectives of the National Development Plan”

- **South African Institute of Agricultural Engineers**
  - CIGR Post harvest Continuous Professional Development Event: November 2012
  - Continuous Professional Event: 27 Feb 2014 “Golden Jubilee celebration”
  - Continuous Professional Event: November 2012 “50 years of Agricultural Engineering Excellence in South Africa”

- **South African Irrigation Institute**
  - Congress: 2 - 5 August 2011, Protea Hotel Kruger Gate, Mpumalanga, “Sustainable Irrigation 2011 –for People, the Planet & Prosperity”
  - Congress: 20 – 22 August 2013, Khaya iBhubesi, Parys, Free State, “Farming into the future with effective irrigation water use.”
  - Congress: 3-6 August 2015, Polokwane: “40 years of irrigation development –quality through innovation”

- **AgriSA**

Apart from the annual conferences hosted by the SANCID member organisations, SANCID also hosted the following international conferences in South Africa:


(ii). November 2007: 2nd African Regional Conference, Gauteng. Theme: “Contribution of rainfed and irrigated agriculture to poverty alleviation through increased productivity in Africa”

**Seminars and discussion forums**

After finishing of the Ordinary SANCID Meeting, which are usually scheduled for October of every year, invited seminars are delivered on various aspects important for irrigation and drainage in South Africa like for instance - in 2009 Impact of climate change on irrigation by Prof Roland Schulze, University of KwaZulu Natal, 2012 an overview on the drafting of the National Water Resource Strategy, 2nd Edition by Mr Fred van Zyl, Department of Water Affairs.

iv. **Contribution of NC to national policy and strategy:**

Inputs by SANCID was provided regarding the development and finalizing of the National Irrigation Strategy of the Department of Agriculture (2015), and the drafting of the Second Edition of the National Water Resources Strategy of the Department of Water Affairs, which was published in 2013. Members serve also on a work team to revise improve water management by focusing on implementation and alignment with macro-economic and sector specific to establish SMART water management.
SANCID also assisted the Department of Water Affairs with the adjudication of the Water Conservation and Water Demand Management Sector awards which was presented at a gala event during Water week celebrations in March of every year.

(C) Publications

Proceedings of the SANCID Symposium held biennial are published on Multimedia CDs and distributed to all participants and posted on the SANCID website.

Contribution to the ICID News Update, ICID Newsletter and ICID Annual Reports were also made.

(D) Participation by SANCID as NC of South Africa in IECs, ICID Congresses, Workshops and Regional Conferences

(i). Participation in meetings of the International Executive Council (IEC) of ICID by the past chairpersons of SANCID: Mr Dawid van der Merwe, Mr Felix Reinders and Dr Gerhard Backeberg.

(ii). SANCID members actively participated in ICID Conferences through presenting of papers and posters since 1993: (1) Workshops and special sessions of ICID Workbodies during the 20th ICID Congress, Lahore, Pakistan, October 2008; (2) Workshops of ICID Workbodies and the ICID 5th Asian Regional Conference, New Delhi, India, October 2009; (3) Workshops of ICID Workbodies and the 6th Asian Regional Conference, Yogyakarta, Indonesia, 10 – 16 October 2010. At all these events an average of 10 delegates actively attends and participates in these meetings. Dr Backeberg received ICID Best Paper Award in 2007, for the article published in Irrigation and Drainage, Vol 55 No 1. Also see www.sancid.org.za under the link “Activities” for details of papers presented.

(iii). International events of interest to ICID: VPH Felix Reinders on invitation attended a workshop on “The New Hose Reel machines for the reduction of Economic Water and Energy costs” on the 3 June 2010 in Italy. He delivered a presentation and the workshop was preceded by a study tour to six mayor manufacturing companies. On invitation of the Malawian National Committee, VPH Felix Reinders attended a consultative meeting on the 29th July 2010 to present the vision, mission and activities of ICID and to assist with the drafting of a constitution and by-laws for MALCID. With the World Forum in Istanbul, 2009, South Africa played a prominent role and Ms Isobel van der Stoep, a member of SANCID was part of the panel of ICID to report on one of the themes.

(iv). SANCID nominated 5 presenters of papers from South Africa for Question 56 and 57, the Special Session and Symposium during the ICID 21st Congress on Irrigation and Drainage, to be held in Tehran, Iran from 15 - 23 October 2011 and all has been accepted.

(v). Regular presentations by SANCID executive members at meetings of the SA Irrigation Institute, SARIA, SANCID Symposium and the Annual General Meeting of SANCID to further stimulate awareness of the role that ICID is playing. This also serves as an opportunity to further explain the objectives and activities of ICID and SANCID in South Africa to scientists and practitioners who are interested in agricultural water management for food production.

(E) Contribution to ICID organizational work as member of WG or as Office-Bearers

VPH Felix Reinders is a member of the Management Board of ICID, and is a member of the IEC as well as chair of PCTA. VPH Dr Gerhard Backeberg was a member of the IEC up to 2014 and served on WG on Irrigated Agriculture under Drought and Water Scarcity (WG:ADWS) and lately chaired the Task Force on Financing Water for Agriculture. SANCID members, either personally or by representation, regularly contributed to technical activities of 15 ICID workbodies or task forces, by way of amongst others chairing, compiling minutes, collecting information and responding to questionnaires of workbodies and those sent by Central Office e.g. the ICID Country Database and information regarding South Africa.

SANCID members took part or were represented in the following ICID Working Groups (WG) during 2014/2015:
Minutes of the 66th IEC Meeting

SANCID – Write-Up

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<td>Dr S Mpandeli</td>
<td>African Regional Working Group</td>
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<tr>
<td>Dr GR Backeberg</td>
<td>Task Force on Financing Water for Agriculture,</td>
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<td>Dr Y Beletse</td>
<td>WG on Young Irrigation Professionals Forum</td>
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<td>Ms Mary Jean Gabriel</td>
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<td>Dr N Benade</td>
<td>WG on Use of Poor Quality Water for Irrigation</td>
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<tr>
<td>Mr A T van Coller</td>
<td>WG on Water Saving for Agriculture</td>
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<tr>
<td>Prof S Walker</td>
<td>WG on Drainage</td>
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<tr>
<td>Dr M van der Laan</td>
<td>WG on Global Climate Change and Agric Water Management</td>
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<tr>
<td>Mr AS Roux</td>
<td>WG on Environment</td>
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<td>Mr F B Reinders</td>
<td>WG on Modernization of Irrigation Services</td>
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<td>Permanent Committee for Technical Activities</td>
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<td>Task Force to Guide ICID inputs to World Water</td>
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VPH Reinders, is Chairman of WG-On Farm and PCTA. Dr Backeberg is Chairman of TF-Finance, Dr Mpandeli is Chair of African WG, both Dr M van der Laan and Ms Mary Jean Gabriel are secretaries of their respective WGs.

(F) Articles Papers published in ICID Journal “Irrigation and Drainage”

A number of articles were published in Irrigation and Drainage by SANCID members. SANCID through the chairperson annually confirms the names of ICID office bearers and workbody members who are eligible to receive free hard copies of the ICID Journal Irrigation and Drainage, as well as the names of two young professionals who have free on-line access to the Journal. A link has also been established between the SANCID website and the Wiley Interscience website.

(G) ICID WatSave Awards

SANCID members received a number of ICID awards during the few years of affiliation with ICID:

i. 2003: ICID WatSave Technical Award – Dr Richard Stirzaker, *Wetting Front Detector: A New Tool to Help Farmers Save Water*

ii. 2006: ICID WatSave Innovative Water Management Award - Dr Nico Benade, *Water Administration System (WAS)*

iii. 2007: ICID WatSave Innovative Water Management - Dr Abraham Singels, *Provision of Irrigation Scheduling Advice to Small Scale Sugarcane Farmers Using a Web Based Crop Model and Cellular Technology: A South African Case Study*


v. 2011: ICID WatSave Technology Award - Messrs Pieter S van Heerden and Charles T Crosby, South Africa, *SAPWAT 3: Irrigation Water Planning Tool*

2. Agricultural Water Management in South Africa

South Africa is a water scarce country and is facing a number of water challenges and concerns, including security of supply, environmental degradation and resource pollution. The limited water resources require careful management to enable the provision of basic water services to every citizen, while meeting the needs of economic growth without threatening the environmental integrity of resources. South Africa has low levels of rainfall relative to the world average, with high variability and high levels of evaporation due to the hot climate. South Africa is the 30th driest country in the world and has less water per person than countries widely considered being much drier, such as Namibia and Botswana. The variable rainfall distribution and characteristics give rise to uneven runoff and distribution of water resources across the country, with more than 605 of the river flow arising from only 20% of the land area.
(A) Present status

The legislative framework

In South Africa there are various acts and legislation steering the management and protecting of agricultural water resources. The relationships between the Constitutions, National Development Plan: Vision 2030, the National Water Act and the National Water Policy the National Water Resource Strategy is important to understand as it provides:

- The national framework for managing water resources;
- The framework for the preparation of catchment management strategies;
- Provision of water-related information; and
- Identification of development opportunities and constraints.

The National Water Act (1998) provides the framework for water resource management and outlines the different water management institutions as well as the specific functions of the different institutions.

Catchment management agencies (CMAs) represent the second tier of the water resource management framework. Initially it was envisaged that a CMA for each of the 19 water management areas will be established to take care of development and implementation of a catchment management strategy. The catchment management strategy should be consistent with the National Water Resource Strategy, within its water management area. Currently two CMAs are well functioning namely Inkomati and Breede Overberg CMAs and because of the relative slow progress, the NWRS Version 2 (2013) recommended that the 19 water management areas should be consolidated into 9 new WMAs and therefore also 9 instead of 19 CMAs for the country.
Figure 1. Water management areas in South Africa

Transboundary water resources

The bulk of SA water resources are transboundary in nature and therefore has implications for quality, quantity and environmental and disaster management. South Africa shares four international river basins, namely Orange, Inkomati, Limpopo and Maputo with six neighbouring countries, i.e., Botswana, Lesotho, Namibia, Swaziland, Mozambique and Zimbabwe. To ensure good management of water resources, bilateral cooperation agreements applied between South Africa and each of the countries involved. South Africa is signatory to the South African Development Community (SADC) Protocol on Shared Water Courses, making an obligation to cooperate with its neighbours in the management of water resources.

In addition to CMAs and WUAs, the Act also provides for the following bodies responsible for international water management:

(ii). Swaziland/RSA Joint Water Commission
(iii). Orange/Senqu River Basin Commission (Botswana, Lesotho, Namibia and RSA)
(iv). Limpopo Basin Permanent Technical Committee (LBPTC) (Botswana, Mozambique, RSA and Zimbabwe)
(vi). Mozambique/RSA Joint Water Commission. (Joint development and Utilisation of water Resources of the Komati River Basin)
(viii). Swaziland/Mozambique/RSA Tripartite Permanent Technical Committee (TPTC).

(B) Irrigation, drainage and flood management

Despite good infrastructure, floods and droughts are part of the normal water cycle and water restrictions and flood management are a critical part of water business. For the purpose of water planning, the Department of Water Affairs (DWA) plans with available water and uses a 98% assurance of supply, which means that water can be abstracted at the determined yield, 98 out of 100 years, on average. There is about 10 000 million m³ per year available with this level assurance from a total mean annual runoff of 49 000 million m³ (meaning approximately 20% of total run off available as assured yield). In areas where water deficits occur, the probability is that water shortages are experienced 2 out of 100 years. The National Water Resource
Strategy Edition 2 (NWRS2) provides strategies that should be timeously implemented to avoid water shortages, of which the most important aspects are protection of water resources, efficient water use, investment in water infrastructure where required to mention a few.

The proportional water needs per main economic sector is highlighted in Figure 2.

![Diagram showing proportional water use per main economic sector]

**Figure 2.** Proportional water use per main economic sector

About 8.5 million people are directly or indirectly dependent on agriculture for employment and income, and contribute about 3% to GDP and 7% to formal employment. The agriculture sector is made up of commercial and subsistence farmers and approximately 1.5 million ha is registered for irrigation, of which 1 252 601 ha is annually irrigated. Irrigated agriculture is the largest single water user in South Africa (60%) and it has huge potential socio-economic impact in rural communities. The NWRS2 indicated that additional water for an increase in irrigation is very limited, and a potential of 80 000 ha irrigation can be developed, based on current available surface water resources. The country has a sustainable groundwater potential yield of 7 500 million m$^3$, of which South Africa uses between 2 and 4 million m$^3$/a mainly for household use in remote areas, and also for supplementing irrigation in areas where required. The National Water Act requires the development of Water Management Plans (WMA) by irrigation schemes, which involve the analysis of current water use, setting of targets for improved water efficiency and planning of realistic means to reach such targets. It is therefore important that irrigation agriculture will be enforced to ensure that all water supplies and uses are measured, as this will also have implications for the pricing strategy of raw water. Due to water scarcity, water usage is regulated through the general authorisation and licensing process. The water management areas are responsible for the management of the specific area, which include the setting of charges for making water available to users. The objective with these charges are to recover real cost of water resource management; recover real cost of water resource development and use of waterworks and to achieve equitable and efficient allocation of water. Water management charges vary according to location and are calculated on a system, catchment and sub-catchment basis. It includes operation, maintenance and capital cost and where appropriate also a resource management levy and resource conservation charge. Water charges are invoiced monthly according to a farm’s water allocation and regardless of the amount of water used during that specific month.

The country has 47 Government owned irrigation schemes with 6553 km canal systems for the distribution and supply of irrigation. Many of these canals are very long, some more than 200 km long. Furthermore there are over 300 irrigation schemes in South Africa. A wide variety of irrigation systems are used for irrigation as displayed in Figure 3.

(C) **Challenges and issues over the next 10 years**

While South Africa has well developed water resources infrastructure (with approximately 5122 dams registered of which 320 are under the control of the Department of Water Affairs), the country is fast approaching full utilisation of available surface water yields, and are running out of suitable sites for new
South Africa is experiencing a growing population, with an enormous pressure put on water resources by fast-growing economic sectors (mining, energy, and agriculture). Water serves as an important enabler for inclusive economic and social development as being articulated in the National Development Plan of 2030 for South Africa. Over the last 10 years, the water consumption of the domestic sector increased from 22% to 27% of the total resource.

Figure 3. Irrigation systems used in South Africa

In addition, climate change outcomes in terms of altered rainfall patterns and higher temperature will have negative impact on water storage. Water demand is likely to increase at 1.2% over the next 10 years, and therefore new innovative ways of reducing water demand and increasing availability—which move beyond the “traditional engineering solutions: of infrastructure development ” are required. To ensure sustainable water balance requires a multitude of strategies, including water conservation and water demand management, further utilisation of groundwater, desalination, water re-use, rainwater harvesting, treated acid mine water desalination, and catchment rehabilitation.

Despite being a water scarce country, South Africa faces high levels of water wastage and inefficient water use. In municipalities, Non-Revenue Water (NRW) is at more than 37% on average, while in many irrigation supply schemes losses of between 35% and 45% occur.

Water quality problems occur in nearly all the water management areas of South Africa, and the main contributors are mining (acidity and increased metals content), urban development (salinity, nutrients, and microbiological) industries (chemical and toxins) and agriculture (sediments, nutrients, agro-chemicals and salinity through irrigation return flows).

Competent people should be available to implement the Ware Act as well as the National Water Resource Strategy 2. Therefore it is imperative that sufficient capacity is created in the water sector to implement and sustain the implementation of the water policy and legislation. A shortage of critical skills within various institutions across the water value chain exists (engineering skills, artisans, management skills, irrigation advisors). One of the major short comings is the lack of capacity to deliver training that meet the needs of the water sector among education and training organisations. Furthermore, a lack of a succession planning, weak retention strategies and inadequate introduction of professional entrants are contributing to this challenge.

3. New major developments or projects with interesting features

Water mix

Currently in more than half of the water management areas deficits occur, over the next 30 years and it is showed that surface water resources would be fully committed. A mix of water resources will be required to reconcile supply and demand through managing of groundwater resources, re-use of water (grey water), re-allocation of water, inter-catchment transfers, water harvesting (rain and fog), management of acid mine drainage and desalination of seawater.
**Functionality and infrastructure management**

Many storage dams and associated water resources infrastructure components were built 40 years ago. While main concrete and heavy steel structures may have an extremely long functional life, spillways, gates, pumps, pipelines and canals need regular maintenance- and in some cases major refurbishment to ensure reliable operating capability over extended. Through the Infrastructure Asset Management Policy for water trading, Department of Water Affairs (DWA) has implemented a Dam Safety Rehabilitation Program, and so far, 18 major dams under the jurisdiction of DWA have been rehabilitated. Since 2007, more than 24 canals have been rehabilitated.

**Investment in infrastructure**

DWA is currently involved in the construction of 9 major water resource infrastructure projects, which include:

a. building of new dams:
   - De Hoop Dam on the Steelpoort River, an important tributary of the Olifantsriver, Mpumalanga;
   - Spring Grove Dam on the Mooi River, KwaZulu Natal
   - Nwamitwa Damon the Groot Letaba river, Limpopo
   - Raising of Tzaneen Dam, Limpopo
   - Raising of Clanwilliam Dam, Western Cape

b. major pipelines for water distribution

c. new pump stations

17 mega projects (over 40 million USD) and 4 large scale projects (between 9 and 40 USD) are scheduled for the next 10 years.

4. **Conclusion**

Irrigated agriculture is practised successfully in South-Africa and is based on excellent research, innovation and manufacturing with designers which carefully select, plan and design effective irrigation systems and farmers that manage their systems effectively.
South African National Committee on Irrigation and Drainage

Felix Reinders
Vice President Honoraire: ICID
SANCID Immediate past Chairman

South African National Committee on Irrigation and Drainage

2015

1993
Over 700 participants from 65 countries have registered for the ICID 2015 Conference
South African National Committee on Irrigation and Drainage
1984
Fort Collins, Colorado, USA

The beginning

Proceedings of the Southern African Irrigation Symposium
4-6 June 1991
Elangeni Hotel, Durban
Approval of South Africa’s application to become a member of ICID

The South African Committee on Irrigation and Drainage (SANCID) represents South Africa at the International Commission on Irrigation and Drainage (ICID) and became a member in 1993.
Objectives of SANCID

- To serve as the South African National Committee of ICID.
- To act as the liaison body for ICID activities in South Africa.
- To be a body in South Africa concerned with irrigation and drainage and flood control.
- To act as the co-ordinating center for individuals, organisations, institutions, other National Committees of ICID.
- To liaise with local institutions and bodies.
- To promote South Africa and African participation in the activities of ICID.
- To actively contribute to the stimulation and promotion of research and the development of technology.
- To initiate and organise specialised and regional ICID conferences.
- To encourage the submission of papers for presentation at the ICID congresses, conferences, symposia and workshops.
- To keep members informed on international activities.
- To exchange technical information with ICID and its member countries.
SANCID Members

SANCID is widely representative of governmental, quasi-governmental and private organisations, as well as learned societies involved in various fields of irrigation, drainage and flood control.

The founder members of SANCID are:
- The Agricultural Research Council
- The Department of Agriculture, Fisheries and Forestry
- The Department of Water and Sanitation and
- The Water Research Commission

The honorary member of SANCID is:
- The South African Irrigation Institute

Other members of SANCID are:
- Agri South Africa
- Agricultural Economics Association of South Africa
- Grassland Society of South Africa
- International Water Management Institute (SA Office)
- Landbank
- MBB Consulting Engineers
- National African Farmers Union/ AFASA
- Soil Science Society of South Africa
- South African Association of Water User Associations
- South African Institute of Agricultural Engineers
- Southern African Regional Irrigation Association
- South African Society for Agricultural Extension
- South African Society for Crop Production
- South African Society of Horticultural Science
- South African Sugar cane Association
- South African Society of Enology and Viticulture
Florida, USA

Micro Congress, 1995
16-18 November 2010
Second African Regional Conference

Date: 6 - 9 November 2007
Place: Glenburn Lodge, Johannesburg, South Africa

The theme of the conference:
Contribution of rainfed and irrigated agriculture to poverty alleviation through increased productivity in Africa

will be explored through sub-themes which focus on:

- Natural capital, referring to harvesting of food and fibre, utilising available soils, water supply, occurrence of drought and floods, with existing pests and diseases, climate variability, wildlife, wetlands and bio-diversity.
- Social capital, including collective action based on cohesiveness of people in society, networks and groups, norms and values, local and tribal authority, land tenure and water rights, policy and legislation, accountability, governance and relationships of trust which are mutually beneficial
- Human capital, highlighting the capability of individuals with accumulated knowledge, skills, health, nutrition, initiative and leadership with access to support services such as education and training, medical and spiritual care, research and extension to improve livelihoods
- Physical capital, with emphasis on improvement of transport and market infrastructure, communication, water storage and distribution, irrigation systems and drainage works, mechanization and energy supply
- Financial capital, requiring international, national and local investments, mobilization of savings and credit, urban-rural linkages with accompanying migration of labour, remittances, welfare and pensions, government grants and subsidies.

Contact: Monica Chipeza, Global Conferences Africa; e-mail: monica@globalconf.co.za
International Commission on Irrigation and Drainage (ICID), established in 1950 is the leading scientific, technical and not-for-profit Non-Governmental Organization (NGO).

ICID network of professionals spread across more than a hundred countries, has facilitated sharing of experiences and transfer of water management technology for over half-a-century.

ICID was established on 24 June 1950
ICID Structure and Governance

International Executive Council

Management Board

Central Office, New Delhi

UN Organizations

International Organizations

Direct Members

Office Bearers 2015

President

Secretary General

Vice Presidents 2010-2011

Vice Presidents 2011-2012

Vice Presidents 2012-2013

Vice Presidents 2013-2014

Vice Presidents 2014-2015
Permanent Committee on Technical Activities

Knowledge

Schemes

On-Farm

Basin

Technical Working Groups
(Thematic areas)
SANCID members are actively involved on the following ICID Working Groups:

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<tr>
<td>Dr Y Beletse</td>
<td>WG on Young Irrigation Professionals Forum</td>
</tr>
<tr>
<td>Dr H Booyseen</td>
<td>WG on Comprehensive Approaches to Flood Management</td>
</tr>
<tr>
<td>Dr L van Rensburg</td>
<td>ICID Journal Editorial Board</td>
</tr>
<tr>
<td>Dr N Benade</td>
<td>WG on Water Saving for Agriculture</td>
</tr>
<tr>
<td>Mr A T van Coller</td>
<td>WG on Drainage</td>
</tr>
<tr>
<td>Dr L van Rensburg</td>
<td>WG on Use of Poor Quality Water for Irrigation</td>
</tr>
<tr>
<td>Prof S Walker</td>
<td>WG on Global Climate Change and Agricultural Water Management</td>
</tr>
</tbody>
</table>
SANCID members are actively involved on the following ICID Working Groups:

<table>
<thead>
<tr>
<th>Member</th>
<th>Working Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dr M van der Laan</td>
<td>WG on Environment</td>
</tr>
<tr>
<td>Mr AS Roux</td>
<td>WG on Modernization of Irrigation Services</td>
</tr>
<tr>
<td>Ms M J Gabriel</td>
<td>WG on the Role of Irrigation in Poverty Alleviation and Livelihood</td>
</tr>
<tr>
<td>Mr F B Reinders</td>
<td>WG on On-Farm Irrigation Systems</td>
</tr>
<tr>
<td></td>
<td>Permanent Committee for Technical Activities</td>
</tr>
</tbody>
</table>

ICID AWARDS

- **ICID WATSAVE Annual Awards**
  Instituted in the year 1997 to recognise outstanding contribution to water saving/conservation. Three categories of awards, (1) WATSAVE Technology, (2) Innovative Water Management, and (3) Young Professionals.

- **Dr Hassan Ismail Memorial International Annual Award**
  Instituted in 1996 in memory of Dr. Hassan Ismail, Professor of Hydraulics and Dean, Cairo University and Ex-Chairman of ENCID for best paper in Africa Context.

- **Best Performing National Committee – Triennial Award**
  Instituted from 2002 to recognise the best National Committee for contribution to ICID activities. The award carries a Rolling Trophy and a Momento. The first award was presented at the 18th Congress.
ICID WatSave Awards awarded to SANCID members

Innovative Water Management Award

Mr. Kobus Harbron, (2010)
Dr. Abraham Singels, (2007)
Dr. Nico Benadé, (2006)

Technology Award

Messrs Pieter van Heerden and Charles Crosby, (2011)
Dr. Richard John Stirzaker (2003)
Mr. Kobus Harbron

Innovative Water Management Award 2007

Automatic Weather Station
Web Portal
SMS Portal
My Canesim
Growers

Extension Officer
Dr. Abraham Singels
Dr. Nico Benadé

Technology Award
2011
Mr Pieter van Heerden

Technology Award 2003
Dr. Richard John Stirzaker

Wetting front Detector
South Africa’s water resources
South Africa is a semi-arid country where water is of critical strategic importance and has a potential limiting effect on all future development in the country. With the high population densities and significant competition of available water resources, this situation is exaggerated.
CONTRASTS
Rainfall and water in South Africa

Average Rainfall in South Africa
ANNUAL RAINFALL

WORLD: 857 mm

HAWAII: 10 000 mm

SOUTH AFRICA: 495 mm

80% in 5 MONTHS
RSA Water Resources

- The Orange River carries about 10% of the flow of the Zambezi River and about 1% of the flow in the Congo.
- The total surface runoff of 49 000 million m$^3$ of all the RSA rivers added together is less than half of the MAR of the Zambezi River.
- Most of the water management areas in the country face a deficit.
- We have to share many of our larger rivers with other countries.

National water act (Act 36 of 1998)

Dictates water has to be
- protected
- used
- developed
- conserved
- managed and
- controlled

in a sustainable and equitable manner.
EXISTING WATER USE

How we use our water resources in South Africa

Irrigation 60%
Urban 24%
Afforestation 3%
Power generation 2%
Industrial 3%
Mining 3%
Rural 5%
Framework for water resource management

Water usage mainly from surface water stored in dams
Extensive Water Resource Development

- 406 domestic water related dams
- >4400 dams

- 4395 dams on Dam Safety Register
  (4558 on WSAM)
  (359 DWS owned)
  (259 municipal owned)

- 2828 water supply related (includes irrigation & excludes mines, floods etc.)
- 406 for domestic supply
- Others (irrigation, waste, flood, pollution control)

DWS WR schemes

- 236 WR schemes
- Incl. transfer schemes

Legend:
- Multi-use
- Irrigation only
Map of DWS Irrigation Water Schemes

47 schemes
6 553 km canals
21 286 structures

Water Management Areas and Main Water Transfers

*Increase in yield in Upper Vaal WMA due to transfer from Thukela WMA
Transfer Systems

PONGOLA POORT DAM

<table>
<thead>
<tr>
<th>PROVINCE:</th>
<th>KwaZulu Natal</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMPLETION:</td>
<td>1973</td>
</tr>
<tr>
<td>RIVER:</td>
<td>Pongola River</td>
</tr>
<tr>
<td>WALL HEIGHT:</td>
<td>89 metres</td>
</tr>
<tr>
<td>CAPACITY (1000 cubic m):</td>
<td>2 445 900</td>
</tr>
<tr>
<td>WALL TYPE:</td>
<td>Double Curvature Concrete Arch</td>
</tr>
</tbody>
</table>

Wall Type:
- Double Curvature Concrete Arch
### VAAL DAM

- **Province:** Free State
- **Completion:** 1938 (raised in 1956 and 1983)
- **River:** Vaal River
- **Wall Height:** 63 metres
- **Capacity (1000 cubic m):** 2,536,000
- **Wall Type:** Concrete Gravity and Earth Fill

### STERKFONTEIN DAM

- **Province:** Free State
- **Completion:** 1980
- **River:** Nuwejaar Spruit
- **Wall Height:** 93 metres
- **Capacity (1000 cubic m):** 2,616,000
- **Wall Type:** Earth Fill
### VAN DER KLOOF DAM

<table>
<thead>
<tr>
<th>PROVINCE</th>
<th>FREE STATE</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMPLETION</td>
<td>1977</td>
</tr>
<tr>
<td>RIVER</td>
<td>Orange River</td>
</tr>
<tr>
<td>WALL HEIGHT</td>
<td>107 metres</td>
</tr>
<tr>
<td>CAPACITY (1000 cubic m):</td>
<td>3 187 557</td>
</tr>
<tr>
<td>WALL TYPE:</td>
<td>Double Curvature Concrete Arch</td>
</tr>
</tbody>
</table>

### GARIEP DAM

<table>
<thead>
<tr>
<th>PROVINCE</th>
<th>FREE STATE</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMPLETION</td>
<td>1971</td>
</tr>
<tr>
<td>RIVER</td>
<td>Orange River</td>
</tr>
<tr>
<td>WALL HEIGHT</td>
<td>88 metres</td>
</tr>
<tr>
<td>CAPACITY (1000 cubic m):</td>
<td>5 342 932</td>
</tr>
<tr>
<td>WALL TYPE:</td>
<td>Double Curvature Concrete Arch</td>
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</tbody>
</table>
Water Management areas percentage surplus/deficit

19 SUB WATER MANAGEMENT AREAS AND PROVINCIAL BOUNDARIES OF SOUTH AFRICA
Is there enough where we need it? Water reconciliation scenarios

<table>
<thead>
<tr>
<th>NO</th>
<th>AREA</th>
<th>TOTAL LOCAL YIELD</th>
<th>TOTAL LOCAL REQUIREMENTS</th>
<th>IRRIGATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Limpopo</td>
<td>281</td>
<td>322</td>
<td>238</td>
</tr>
<tr>
<td>2</td>
<td>Luvuvhu and Letaba</td>
<td>310</td>
<td>333</td>
<td>248</td>
</tr>
<tr>
<td>3</td>
<td>Crocodile and Marico</td>
<td>718</td>
<td>1184</td>
<td>445</td>
</tr>
<tr>
<td>4</td>
<td>Olifants</td>
<td>609</td>
<td>965</td>
<td>557</td>
</tr>
<tr>
<td>5</td>
<td>Inkomati</td>
<td>896</td>
<td>845</td>
<td>593</td>
</tr>
<tr>
<td>6</td>
<td>Usutu to Mhlathuze</td>
<td>1110</td>
<td>717</td>
<td>432</td>
</tr>
<tr>
<td>7</td>
<td>Thukela</td>
<td>737</td>
<td>334</td>
<td>204</td>
</tr>
<tr>
<td>8</td>
<td>Upper Vaal</td>
<td>1132</td>
<td>1045</td>
<td>114</td>
</tr>
<tr>
<td>9</td>
<td>Middle Vaal</td>
<td>49</td>
<td>370</td>
<td>159</td>
</tr>
<tr>
<td>10</td>
<td>Lower Vaal</td>
<td>125</td>
<td>643</td>
<td>525</td>
</tr>
<tr>
<td>11</td>
<td>Mvoti to Umzimkulu</td>
<td>523</td>
<td>797</td>
<td>207</td>
</tr>
<tr>
<td>12</td>
<td>Mzimvubu to Keiskamma</td>
<td>854</td>
<td>374</td>
<td>190</td>
</tr>
<tr>
<td>13</td>
<td>Upper Orange</td>
<td>4447</td>
<td>968</td>
<td>780</td>
</tr>
<tr>
<td>14</td>
<td>Lower Orange</td>
<td>961</td>
<td>1028</td>
<td>977</td>
</tr>
<tr>
<td>15</td>
<td>Fish to Tsitsikama</td>
<td>423</td>
<td>901</td>
<td>765</td>
</tr>
<tr>
<td>16</td>
<td>Gouritz</td>
<td>275</td>
<td>337</td>
<td>254</td>
</tr>
<tr>
<td>17</td>
<td>Olifants/Doorn</td>
<td>335</td>
<td>373</td>
<td>356</td>
</tr>
<tr>
<td>18</td>
<td>Breede</td>
<td>864</td>
<td>632</td>
<td>576</td>
</tr>
<tr>
<td>19</td>
<td>Berg</td>
<td>482</td>
<td>704</td>
<td>301</td>
</tr>
</tbody>
</table>
• South Africa’s Vision for 2030 demands sufficient water resources
• Water must provide for growth & development
• Our water resource is already stressed
• Water scarcity threatens energy production, food security, economic growth & quality of life
• This strategy addresses current & future water demands for 2030 vision and simultaneously ensure the sustainability of our water resource
Irrigation in South Africa
Irrigation Systems in South Africa

Total irrigated area = 1.5 Mha

- Sprinkler: 31%
- Moving: 29%
- Micro: 26%
- Flood: 14%

Source: WARMS 2014, DWS, IvStoep
Irrigated agriculture is practised successfully in South-Africa and is based on excellent research, innovation and manufacturing with designers which carefully select, plan and design effective irrigation systems and farmers that manage their water and irrigation systems effectively.
Efficiency of irrigation systems is the responsibility of everyone involved in irrigation:

• The researcher, developer, and supplier for providing practical and useful technology;
• The designer, who must adapt the design so that it is technically and agriculturally appropriate;
• The producer, who must use the system properly and exercise sound irrigation practices.
Improved Flood irrigation design

Performance testing of equipment in the laboratory
Spray losses under Centre pivots

Infiltometer to size centre pivots
Performance testing of infield irrigation systems

Development of computer software for in-field evaluations of irrigation systems

Standardised comprehensive computer irrigation evaluation software package
to be used together with the Irrigation System Evaluation Manual as reference guide.
Estimating Crop Water Requirements

SAPWAT
- Planning and management tool
- Standardised procedure for vegetable, field, pasture and tree crops

Irrigation Design Manual & Irrigation user’s Manual
**Water Administration System (WAS)**

A complete management system for
- Irrigation Schemes,
- WUAs,
- CMAs and
- Water Management Offices
Water Administration System (WAS)

WAS simplifies the complex task of Water distribution management and reporting on Irrigation Schemes

Performance of surface and sub-surface irrigation
Guidelines for the selection and use of various micro-irrigation filters with regards to filtering and backwashing efficiency

Technical aspects and cost estimating procedures of surface and subsurface drip irrigation systems

**Volume 1**
- Main report

**Volume 2**
- Manual for irrigation designers

**Volume 3**
- Manual for irrigation farmers
Water Measurement

- Indirect measurement of flow-rates through electric power supply
- Direct measurement in canals and pipelines
- Irrigation water measurement knowledge base

Standards and guidelines for improved efficiency of irrigation water use from dam wall release to root zone application
Irrigation technologies for efficient water use

Changing to more efficient irrigation requires

• Stable water supply
• Higher capital and management inputs
• Higher crop yields
• Lower energy use
• Regular maintenance
Homestead food gardening and water use

- Fenced gardens adjacent to homesteads most widely practiced livelihood strategy
- Resource material for trainers and facilitators
- Homestead water use techniques

Revitalisation of smallholder irrigation

- Performance of smallholder irrigation schemes below potential
- Training package for farmer trainers and facilitators
- Rough guide for revitalisation of irrigation schemes
South African National Committee on Irrigation and Drainage

Photo gallery in 2 minutes

1984
Fort Collins, Colorado, USA
ICID 58th International Executive Council Meeting
USCID Fourth International Conference on Irrigation and Drainage
Sacramento, California U.S.A.
September 30 - October 3, 2007

Third Announcement
Call for Papers

Organized by
USCID
The U.S. Society for Irrigation and Drainage professionals
In Cooperation with
Bureau of Reclamation
California Department of Water Resources
Second African Regional Conference
Date: 6 - 9 November 2007
Place: Glenburn Lodge, Johannesburg, South Africa

The theme of the conference:
Contribution of rainfed and irrigated agriculture to poverty alleviation through increased productivity in Africa

will be explored through sub-themes which focus on:
- **Natural capital**, referring to harvesting of food and fibre, utilising available soils, water supply, occurrence of drought and floods, with existing pests and diseases, climate variability, wildlife, wetlands and bio-diversity.
- **Social capital**, including collective action based on cohesive-ness of people in society, networks and groups, norms and values, local and tribal authority, land tenure and water rights, policy and legislation, accountability, governance and relationships of trust which are mutually beneficial.
- **Human capital**, highlighting the capability of individuals with accumulated knowledge, skills, health, nutrition, initiative and leadership with access to support services such as education and training, medical and spiritual care, research and extension to improve livelihoods.
- **Physical capital**, with emphasis on improvement of transport and market infrastructure, communication, water storage and distribution, irrigation systems and drainage works, mechanization and energy supply.
- **Financial capital**, requiring international, national and local investments, mobilization of savings and credit, urban-rural linkages with accompanying migration of labour, remittances, welfare and pensions, government grants and subsidies.

Contact: Monica Chagati, Global Conferences Africa; e-mail: monica@globalconf.co.za
Best Performing National Committee 2008-2011
2008 SANCID Symposium
Club Mykonos
SANCID SYMPOSIUM 2012
SANCID succeeds not because it is big or because it has been long established but because there are people building it who live it, sleep it, dream it, believe in it and build great future plans for it.
Thank you