Irrigation Canal Management with Support of WAS

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1-Sept-2011

This is where it all started in 1984

Osborne

- 64 kB RAM
- 2 Single sided floppy disks
- Wordstar
- Supercalc
- dBase
- Turbo Pascal

Simulation model - Procan

N BENADÉ
R J ENGELBRECHT
G W ANNANDALE

DIE OPTIMALISERING VAN DIE BEDRYF VAN BESPROEIINGSKANAALSTELSELS

Verslag aan die
WATERNAVORSINGSKOMMISSIE
deur die
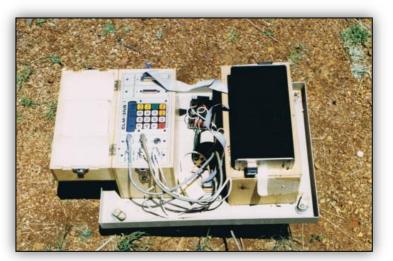LABORATORIUM VIR STELSELS
RANDSE AFRIKAANSE UNIVERSITEIT

WNK Verslag No 176/1/90

"The optimization of the management of
irrigation canal systems"

Simulation model - Procan

After 5 years …

- We had a simulation model for open channel flow
- We had a water ordering system feeding into Procan
- We received international recognition
- I received my Masters degree

But
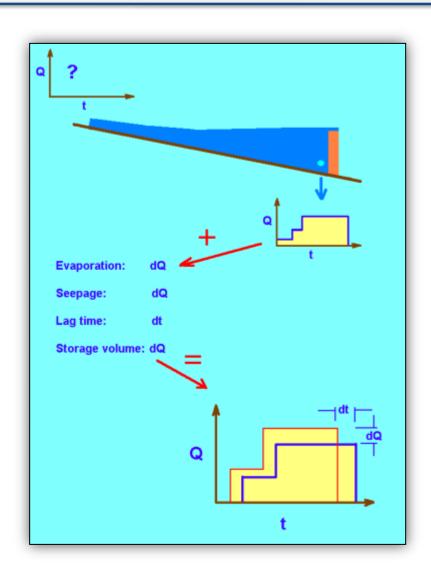
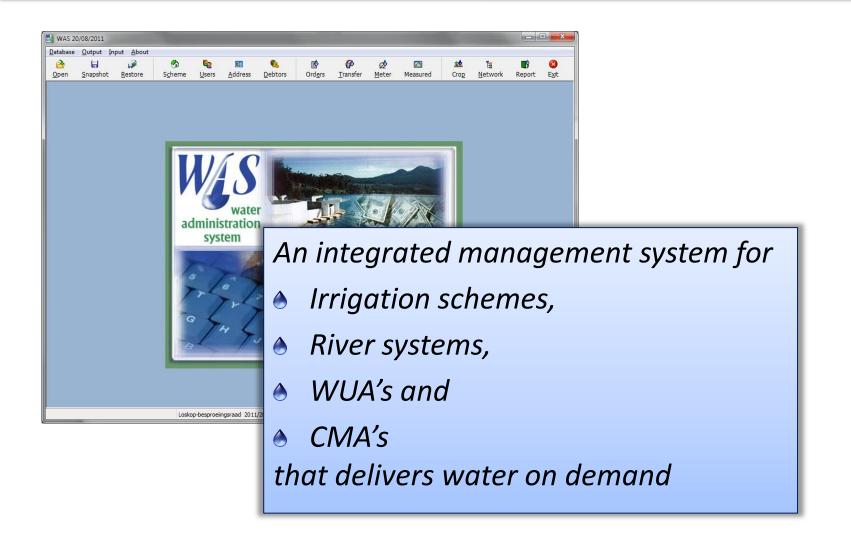## We had no solution to the problem!

Release calculation idea
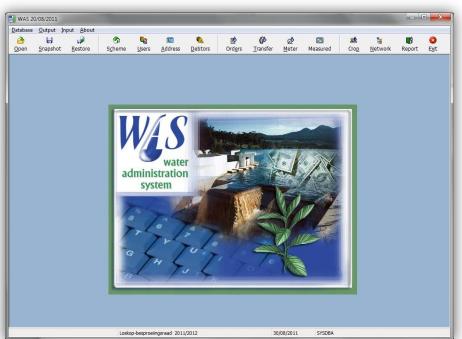
Water Administration System (WAS)

An integrated management system for

- 💧 *Irrigation schemes,*
- 💧 *River systems,*
- 💧 *WUA's and*
- 💧 *CMA's*

that delivers water on demand

Why implement **WAS**?

- 💧 Improves scheme management
- 💧 Improves financial management
- 💧 Improves productivity
- 💧 Saves water!
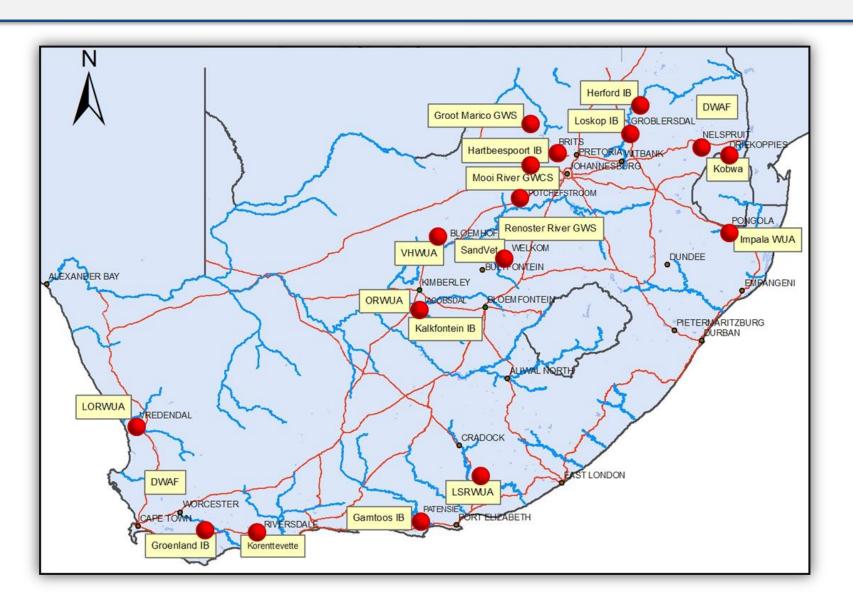
WAS deployment sites
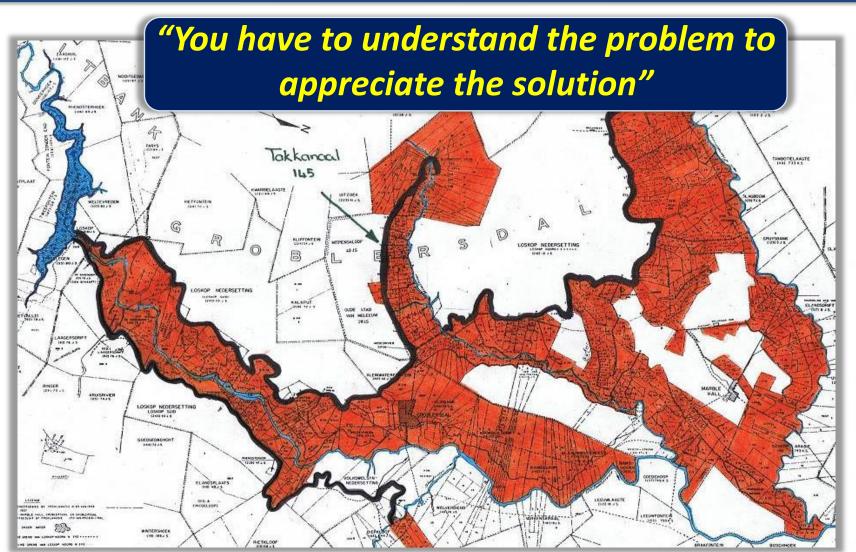
Loskop Irrigation Scheme

"You have to understand the problem to appreciate the solution"

Loskop dam

348 million m^3

Left bank main canal

$Q_{max} = 10 \ m^3/s$

Abstraction points

794 abstractions

Farms
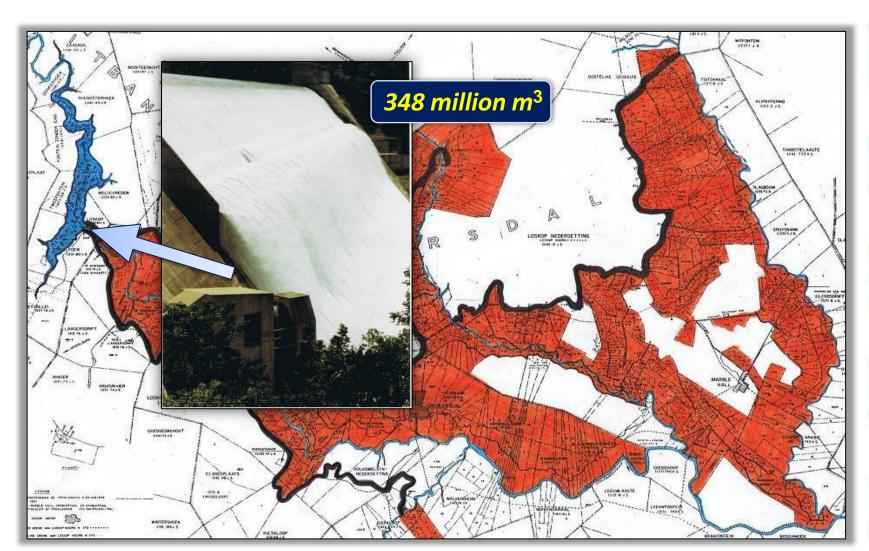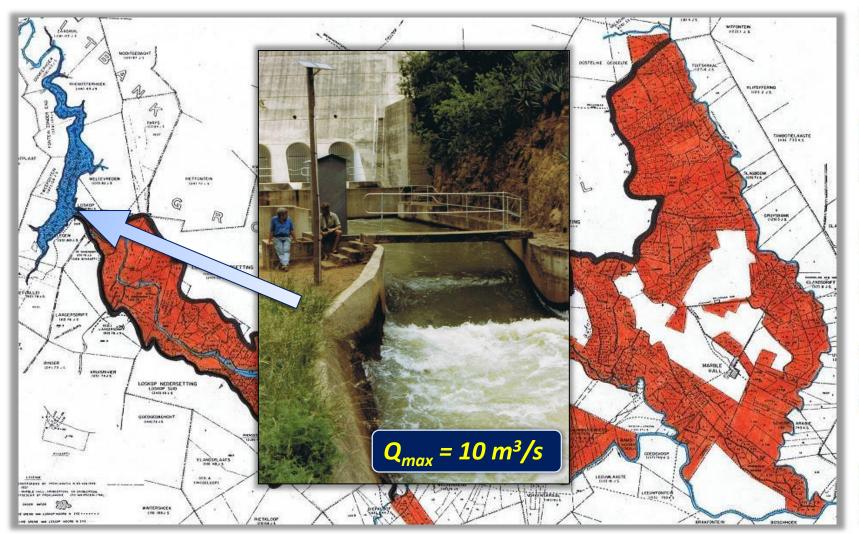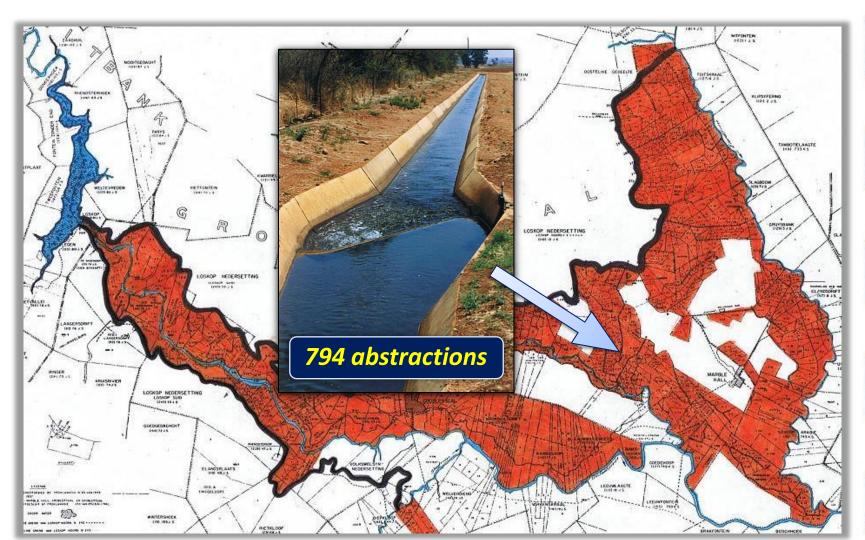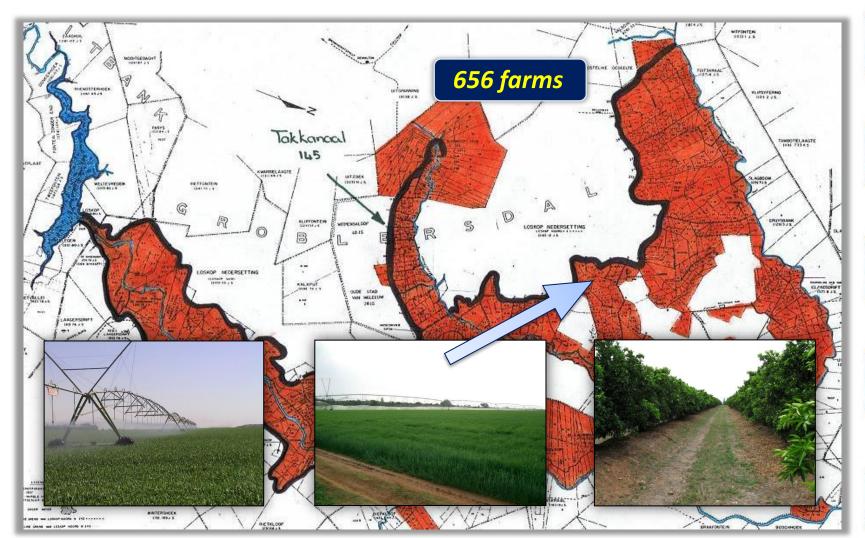
656 farms
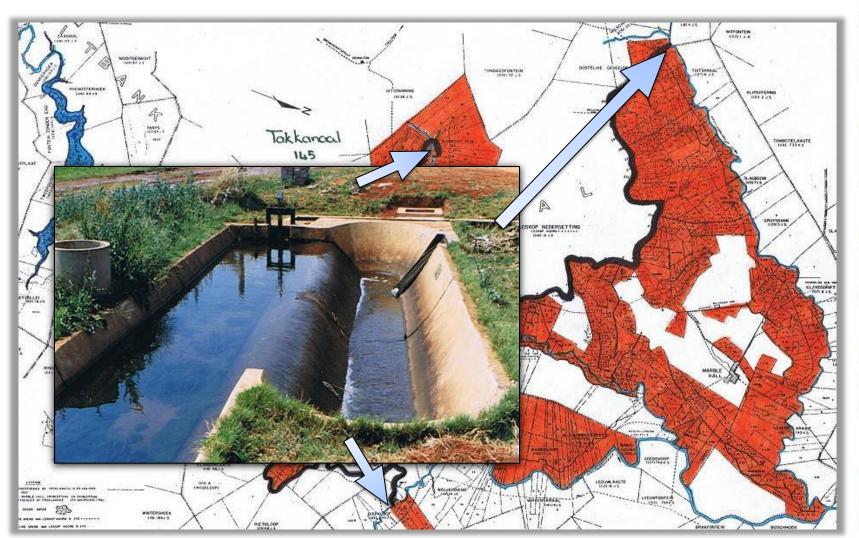
Tail ends

Water ordered weekly

Summary

Farms	*= 656*
Abstractions	*= 794*
Avg. farm size	*= 25.7 ha*
Water year starts	*= April*
Allocation/year	*= 7 700 m3/ha*
	= 197 890 m3
Scheduled area	*= 16 135 ha*
Main canal	*= 90km*
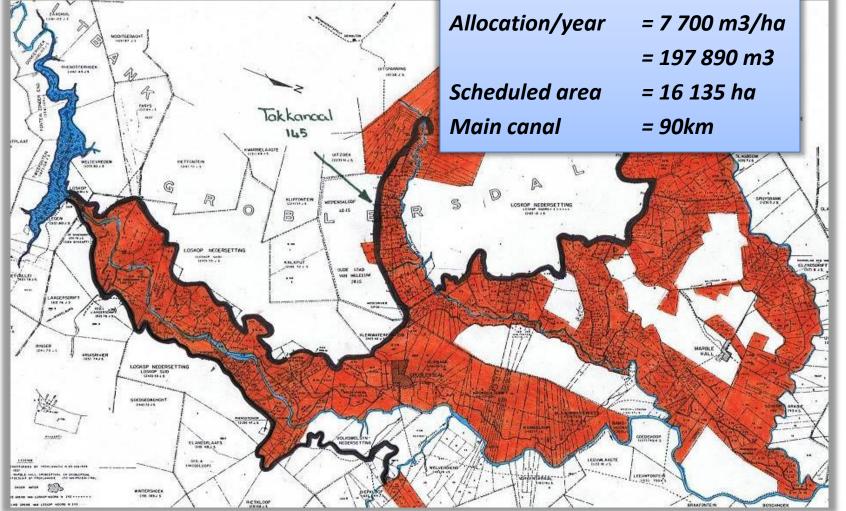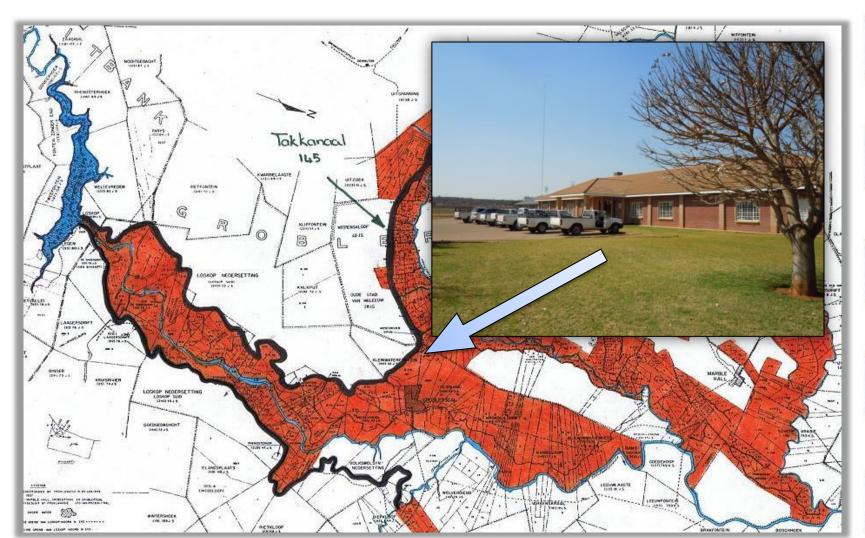
Administration office

WAS modules

```
                    ┌─────────────┐
                    │    Admin     │
                    └──────┬──────┘
        ┌──────────┬───────┼───────────┬──────────────┐
┌───────────────┐ ┌───────────────┐ ┌───────────────┐ ┌───────────────┐
│  Water order  │ │   Measured    │ │    Water      │ │  Crop water   │
│               │ │     data      │ │   release     │ │     use       │
└───────────────┘ └───────────────┘ └───────────────┘ └───────────────┘
┌───────────────┐ ┌───────────────┐ ┌───────────────┐
│   Accounts    │ │    Report     │ │   Bulk SMS    │
└───────────────┘ └───────────────┘ └───────────────┘
```

Water orders

◆ **Original**

◆ **Additional**

◆ **Cancellation**
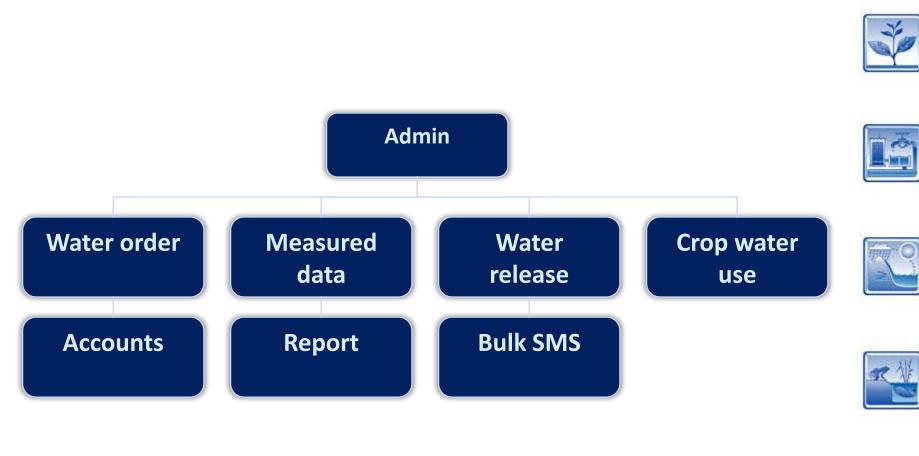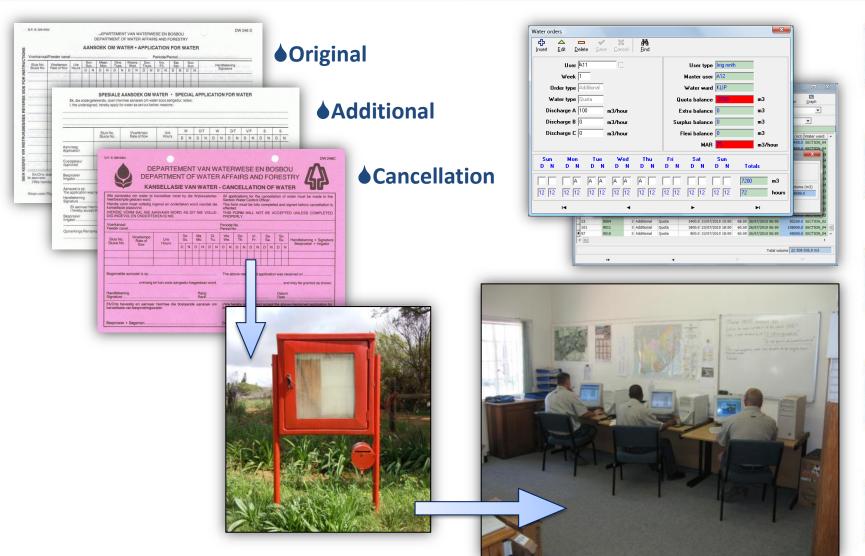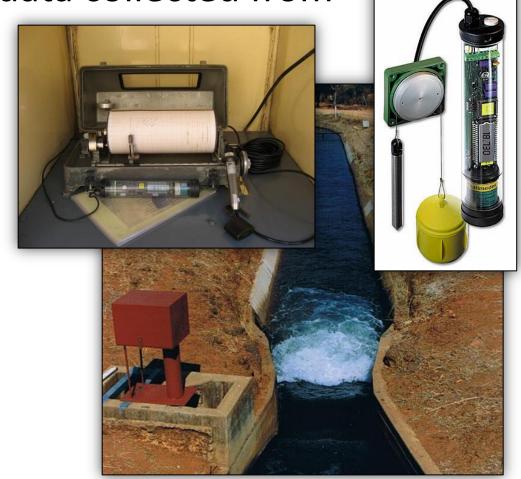
Water orders

Meter readings

Measured data

Date & time flow data collected from

- chart recorders
- electronic loggers
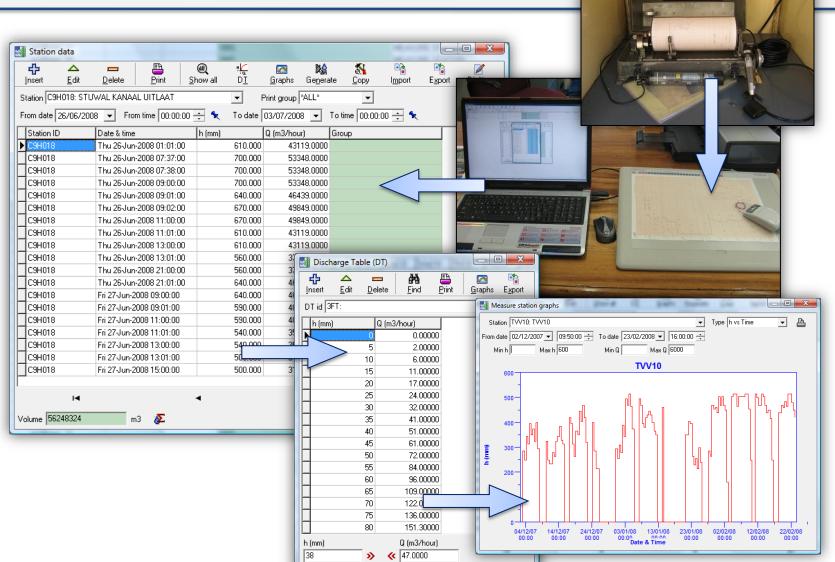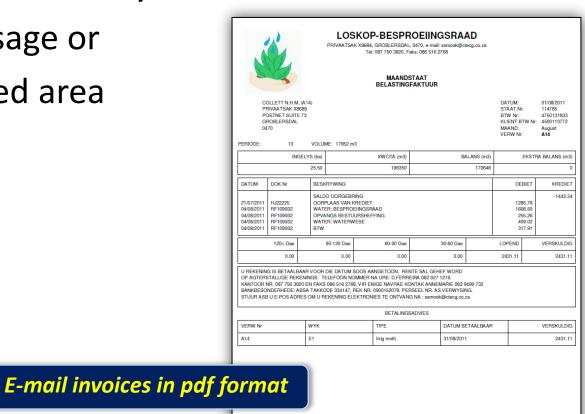
Data can be

- captured
- imported
- digitized

Digitizing tablet

Accounts

Generate monthly invoices linked to

💧 water usage or
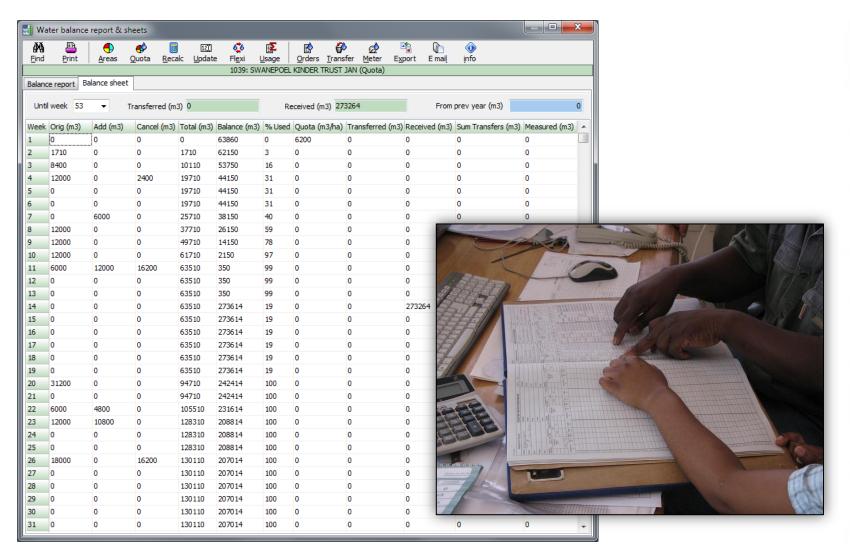
💧 scheduled area

E-mail invoices in pdf format

Water balance sheets
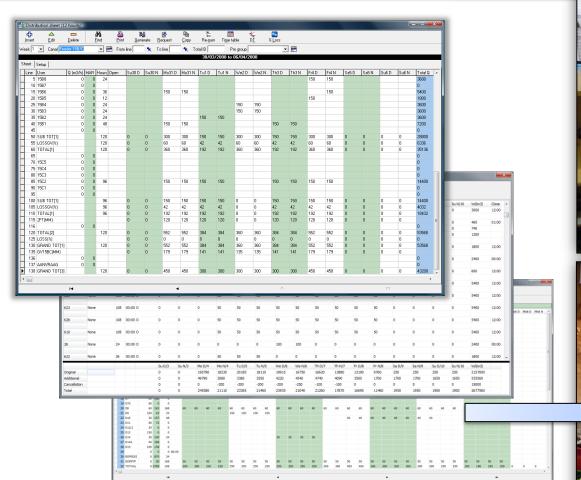
Distribution sheets

WUE Accounting report

Water Use Efficiency Accounting report

Insert | Edit | Delete | Print | Setup | Generate | Export | Graph | Close

Report ID | Weekly | Monthly

Disposal report 2007/2008 - Hartbeespoort-besproeiingsraad (2007/2008) (x10^3)

Year	Month	Agriculture (m3)	Industrial (m3)	Municipality (m3)	Household (m3)	Down stream (m3)	Other (m3)	Total (m3)
2008	Oct	2 277	4	0	25	0	0	2 306
2008	Nov	6 160	15	0	31	0	0	6 207
2008	Dec	1 466	0	0	25	0	0	1 491
2009	Jan	3 473	8	0	25	0	0	3 506
2009	Feb	3 479	7	0	25	0	0	3 511
2009	Mar	5 699	27	0	31	0	0	5 756
2009	Apr	3 173	0	0	25			
2009	May	3 721	24	0	31			
2009	Jun	5 363	16	0	25			
2009	Jul	4 289	0	0	25			
2009	Aug	10 069	28	0	31			
2009	Sep	6 491	0	0	25			

WUE Accounting report
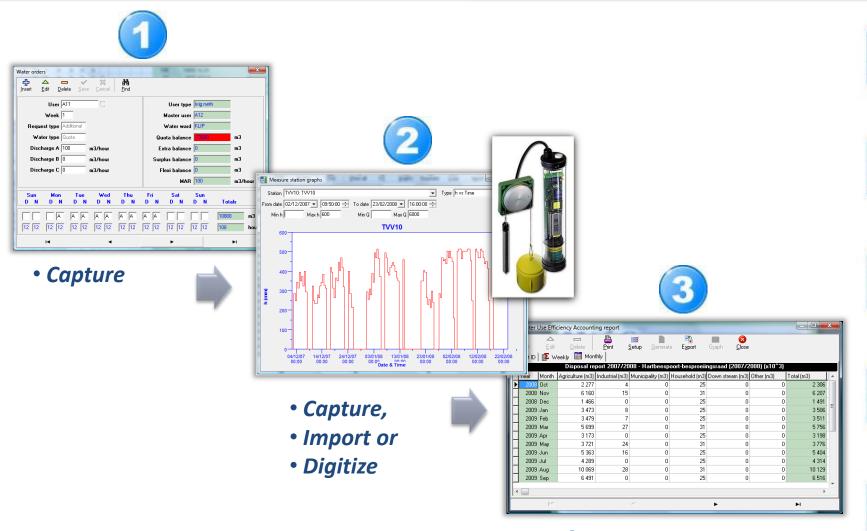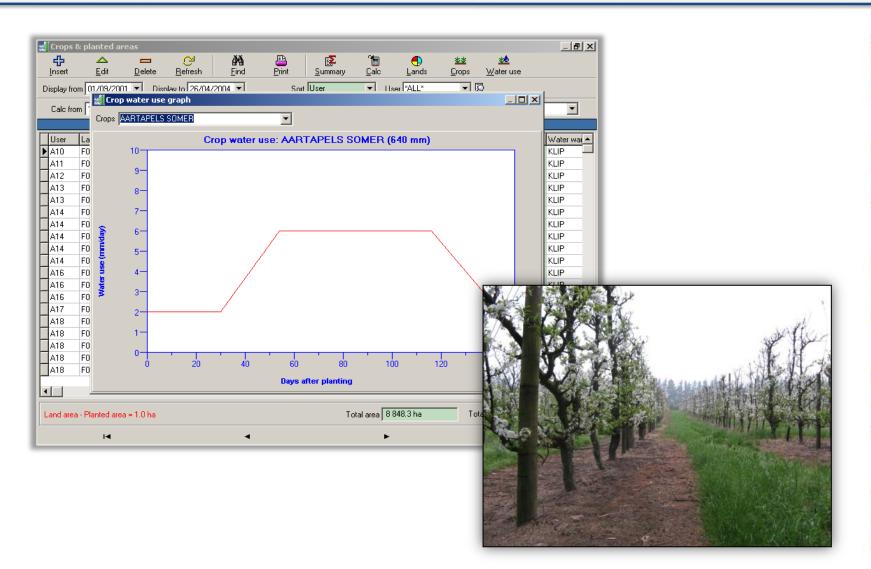

• *Capture*

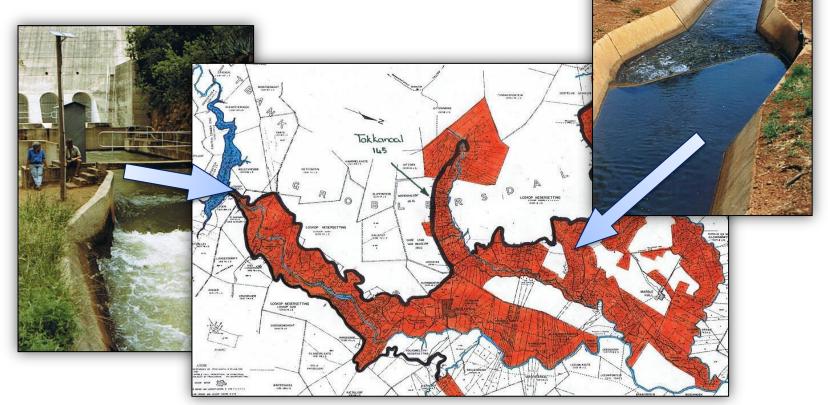• *Capture,*
• *Import or*
• *Digitize*

• *Generate*

Crop water use

Release calculation

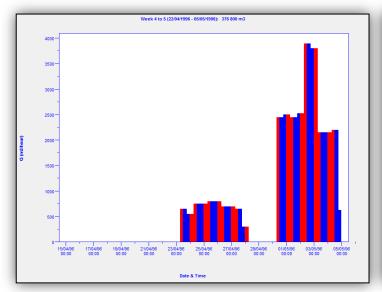- Calculate the correct amount of water
- deliver to the right place &
- at the right time

Cross-sections

Release results

Week 4 to 5 (22/04/1996 - 05/05/1996): 376 800 m3

Release results

Release results

Bulk SMS's

🔵 **Templates**

WAS-client

- **Scheme (WAS)**
- **Internet**
- **Farm (WAS-client)**

iScheme

- Region (iScheme)
- Scheme (WAS)
- Farm (WAS-client)
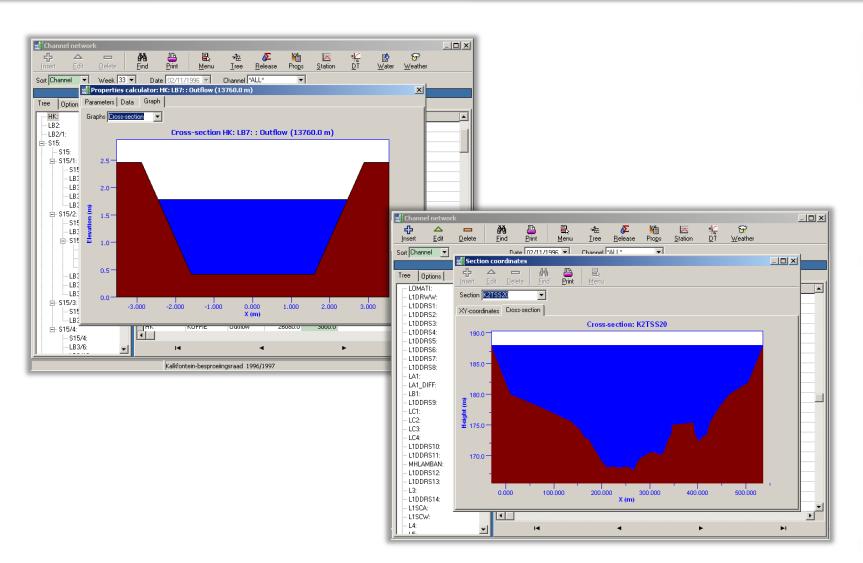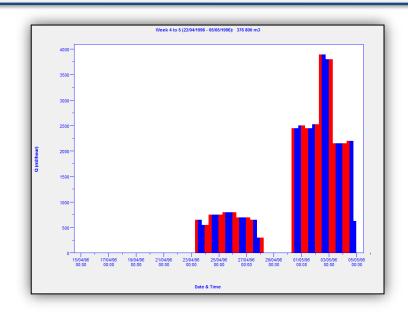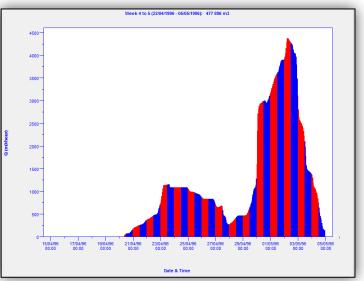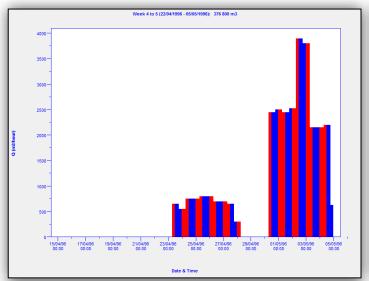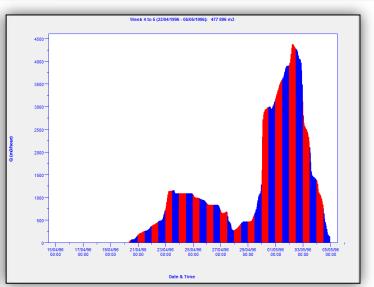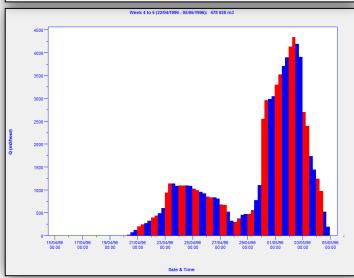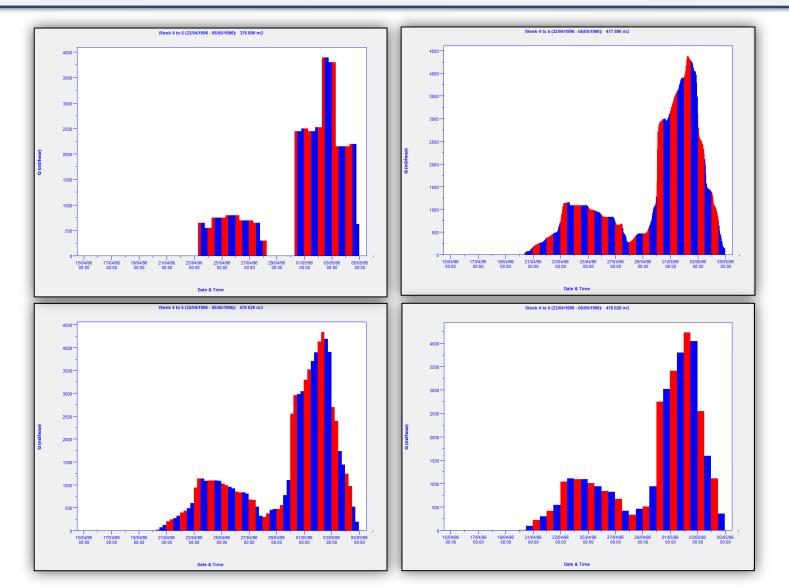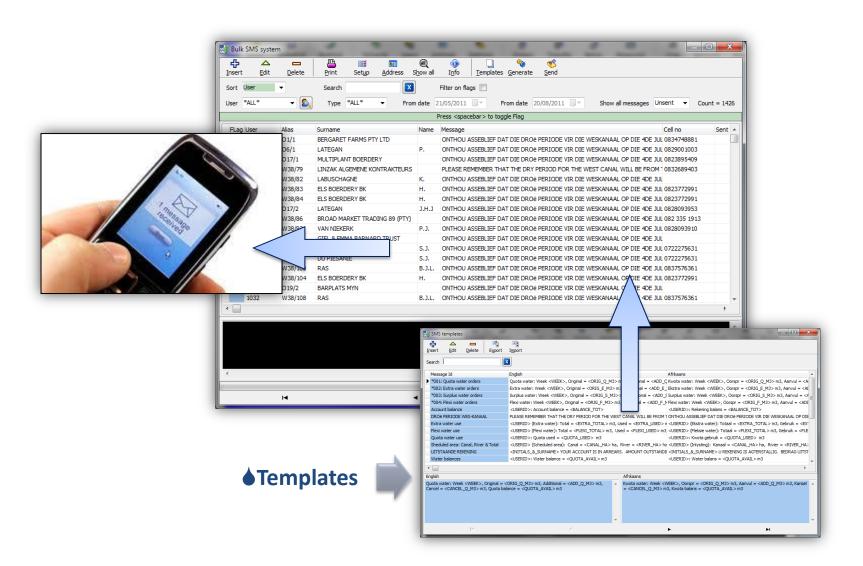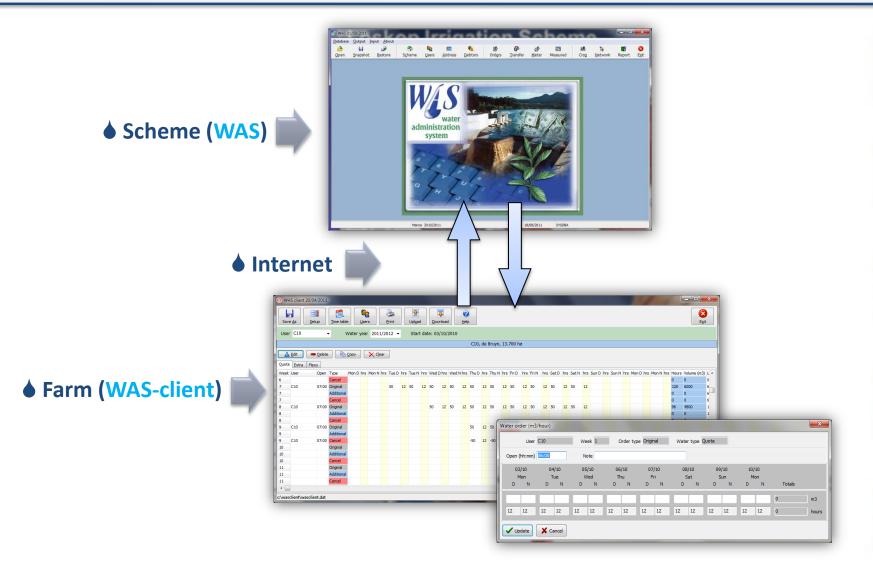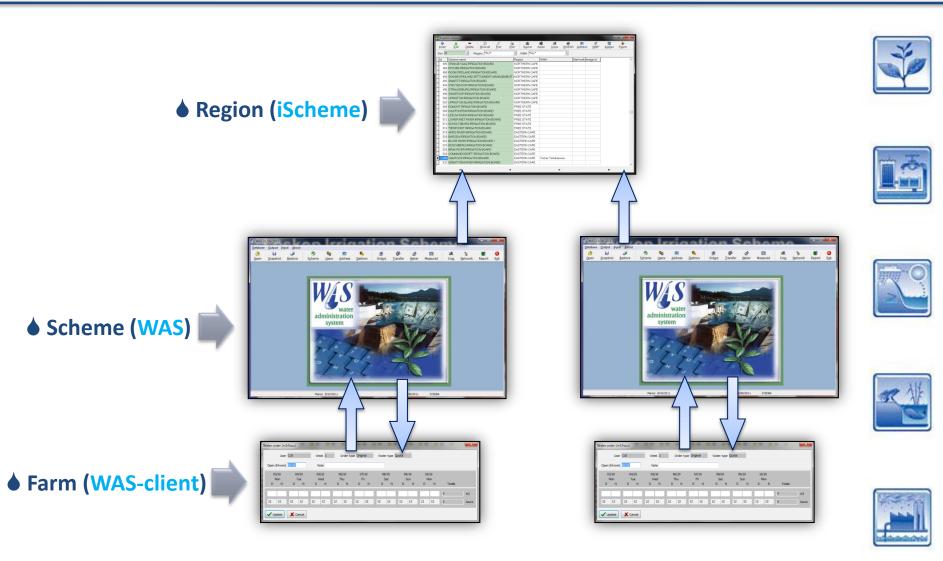
Vaalharts WUA: 5% saving in 1 year

- 5% = 17.5 million m^3

- 74 Farms of 25.7 ha each
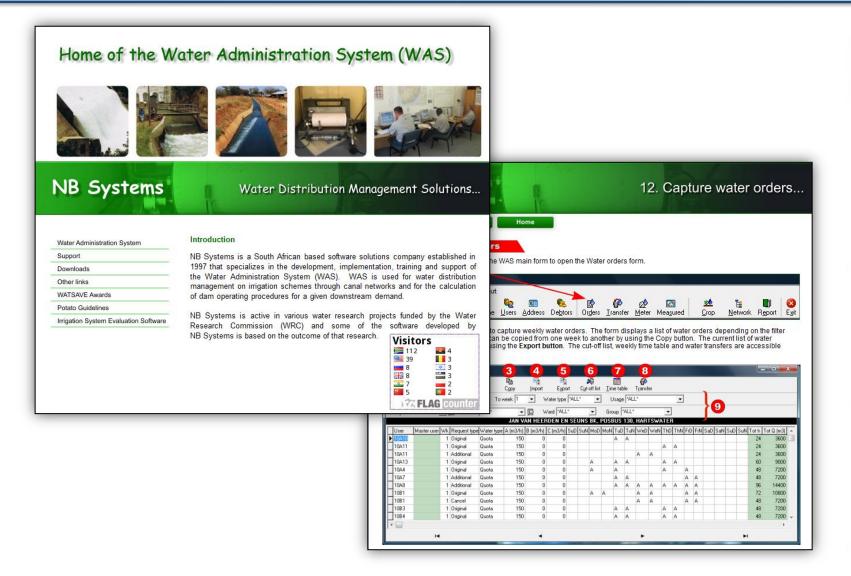
WAS website: www.nbsystems.co.za

Compliments from farmer
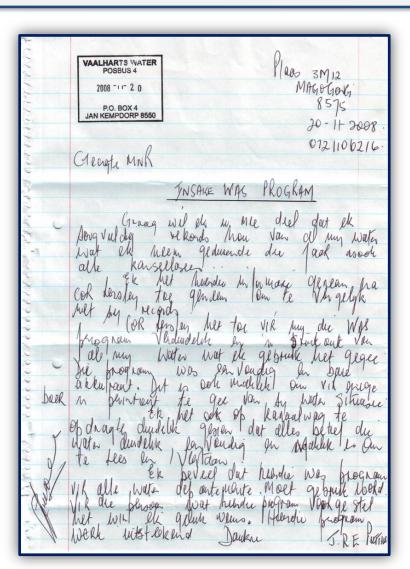
Dear Sir,

…the WAS program is easy to understand and very accurate…

… I recommend that the WAS program must be used by all water departments…

The person that introduced this program must be congratulated because it works fantastic.

ICID WatSave Award: 2007
(Innovative Water Management)

ICID WatSave Award: 2010
(Innovative Water Management)

Kobus Harbron (Vaalharts Water):
Head Water Control Officer.

ICID WatSave Award
(Innovative Water Management)

> *"for outstanding contribution to Water Savings and Water Conservation in Agriculture…"*

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+ 25 yr =

ICID·CIID

INTERNATIONAL COMMISSION ON IRRIGATION AND DRAINAGE

WATSAVE ANNUAL AWARD 2006
for
Innovative Water Management

For outstanding contribution to
Water Savings and Water Conservation in Agriculture
thereby enhancing the beneficial and
sustainable use of the critical resource
the 2006 Prize is hereby awarded to

Dr. Nico Benadé
(South Africa)

57th International Executive Council
Kuala Lumpur, Malaysia
14th September 2006

Peter S Lee
President, ICID

Way forward

- Grow NB Systems!

Way forward

- Grow NB Systems!

- Implement WAS on all schemes in SA where possible

Way forward

- Grow NB Systems!
- Implement WAS on all schemes in SA where possible
- Implement iScheme at all regions

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- Implement WAS on all schemes in SA where possible
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- Promote the use of WAS-client by farmers

SYSTEMS

Way forward

- Grow NB Systems!
- Implement WAS on all schemes in SA where possible
- Implement iScheme at all regions
- Promote the use of WAS-client by farmers
- Ongoing research and development
  - WAS
  - WAS-client
  - iScheme
  - SMS water ordering

Way forward

- Grow NB Systems!
- Implement WAS on all schemes in SA where possible
- Implement iScheme at all regions
- Promote the use of WAS-client by farmers
- Ongoing research and development
  - WAS
  - WAS-client
  - iScheme
  - SMS water ordering
- **Improve web site support documentation**