ICID2015
26th ERC & 66th IEC

RESTITUTION OF ICID2015 SESSIONS AND WORKSHOPS

BY THE CHAIRMEN

THEME DRIP

THEME DRIP : Drip irrigation for water saving : the winning formula ?

Jochen Froebrich

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THEME DRIP

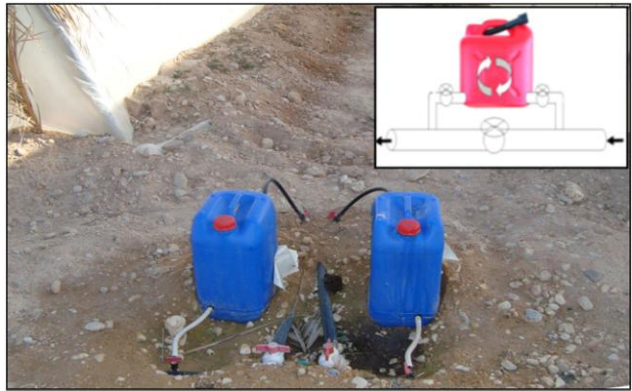
Contents of the session

11 papers and 2 posters presented

From Morocco, Algeria, Jordan, Tunisia, Lybia, France, Spain, South Africa, Nepal, Burkina Faso

50-60 people attended

Diversity of situations



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Main themes

- Collective shift in public irrigation system
- Capacity of farmers to innovate
- Putting water saving in a basin perspective
- Reasons to adopt drip irrigation or not in FMIS
- C/B analysis of drip irrigation versus other technology
- Performance assessment (beyond technical indicators)
- Low cost drip irrigation in sub-Saharan Africa

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Key messages

- On-field performance is lower than lab performance and specifications
- Technical performance is linked to farmers logics (i.e. there might be reasons why farmers managed their system in a way that is not technical sound)
- In some context, using drip irrigation does not seem relevant (depends on incentives and farmers' demands)
- Using drip irrigation leads to higher yield, hence higher ET

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Key messages

- Need to do C/B analysis in an integrated matter (supply chain, system analysis) + look at sustainability and environmental issues (groundwater abstraction + used pipes)
- Need to listen to the farmers to work towards an innovation system that sustain itself ➔ it might mean that drip will not play a part in it.
- Use of drip irrigation by smallholders in sub-Saharan Africa remains very limited (lack of after sale service, support, too small areas)

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Openings…

How do you design public irrigation systems to account for the diversity of farming situations and their evolution ?

- Path dependency of collective modernization

See drip irrigation in a system perspective

- Need to look beyond the drip emitters to look at social and human dynamics at basin scale
- Distributors play a crucial role

Exploring ways to improve the re-use/recycling of materials

THEME DRIP

To conclude

The question is not whether drip is good or not but where and how it can be best used

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Theme REUSE

What potential for wastewater use in agriculture

Tom Soo

Theme REUSE

Contents of the session

- 13 Oral Presentations, 4 x 90 min sessions
- speakers from China, India, France, Italy, Indonesia, South Africa

Presentations addressed:

-High tech to low tech
-Technical performance aspects of irrigation techniques with wastewater (health, flow)
- Technical performance aspects of wastewater treatment techniques (showing conform to standards or general improvement of water quality)
-studies on economic value of wastewater re-use from an international and local perspective)
- Implementation of treatment systems (guidelines on greywater in South Africa to constructed wetlands in India)

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Theme REUSE

conclusions / recommandations / key messages

The diversity of the presentations and debate showed multidisciplinary nature of the topic: technical, economic, legal, social and institutional

-There remains a lot to be better understood, for example global volumes available, cost/benefit analysis, economic value, yield potential etc.

-Debate highlighted that asides from technical know-how, institutional arrangements, social acceptance and building confidence (including youth!), private sector involvement and political factors remain important areas for progresss

-Water must be fit for purpose

- looking to the role of resuse in the longer term (water scarcity, how to keep nutrients in the loop (phospate))

- how to integrate this important water source to the mainstream water management paradigm

AFEID – ICID WG PQW ROUNDTABLE REUSE
Water Reuse in Agriculture

Akissa Bahri

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ROUNDTABLE REUSE

Questions

1. **Which practices, technologies and methodologies to create effective, safe and cost effective water reuse chain?**

Or/and

2. **Managing the direct recovery of raw or poorly treated waste water?**

ROUNDTABLE REUSE

Contents of the session – 13 case studies

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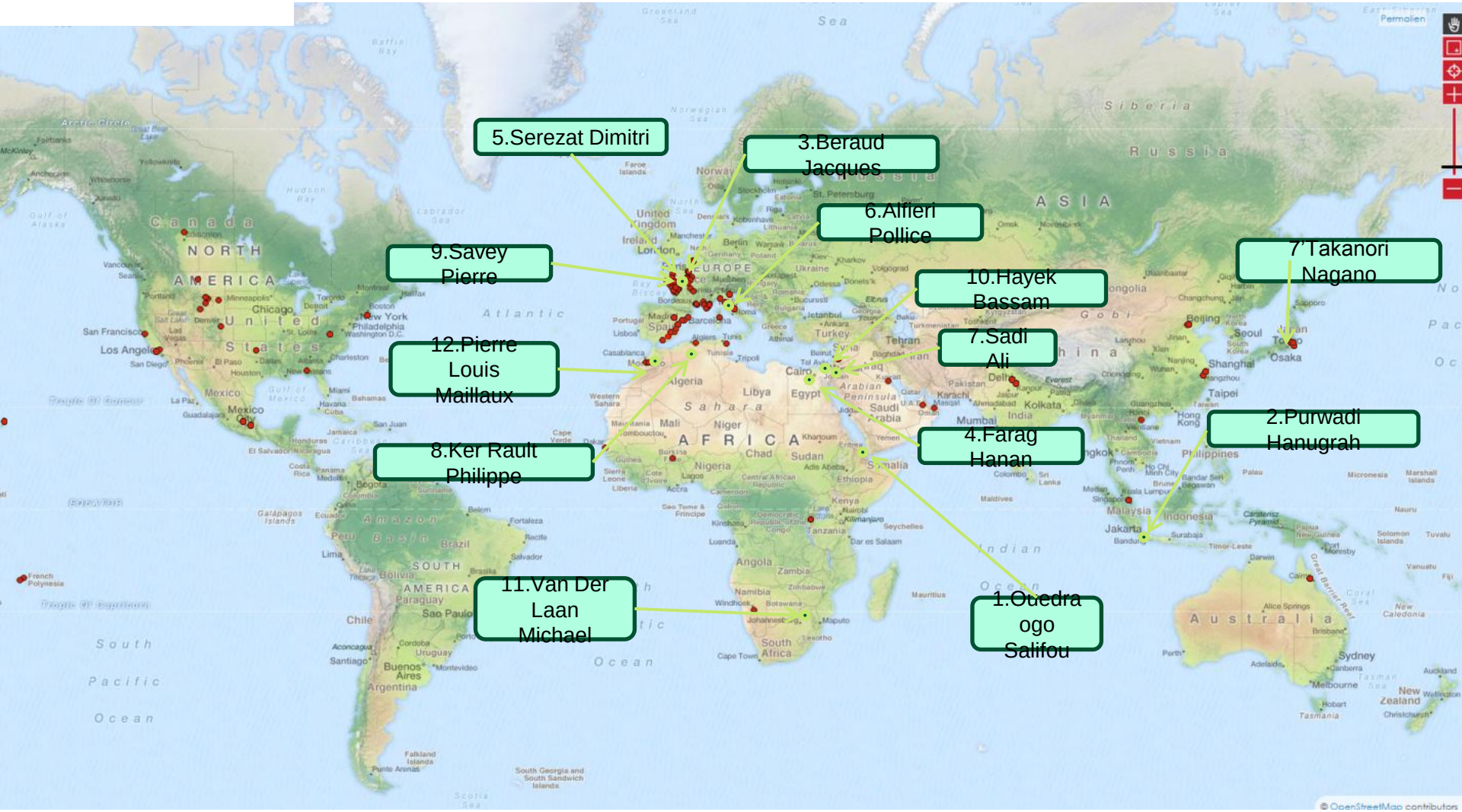

ROUNDTABLE REUSE

Contents of the session

A wide range of physical, technical, and environmental conditions, institutional settings, implementation approaches, and regulatory aspects

- Several pilot studies (a few m^2) and a few large scale reuse schemes (300 ha, 12000 ha, …): presentations mainly focused on treatment processes vs use

- Wastewater reclamation and reuse implemented along a multiple-barrier approach, combining treatment, storage and irrigation practices

ROUNDTABLE REUSE

Contents of the session

- A large diversity of situations:
  - Different sources and qualities of WW: ablution W, domestic, indus., mix; brackish, organic waters
  - From no treatment to advanced treatment in urban and rural settings
  - Different crops : cereals, fodder, vegetables
  - Various irrigation techniques: surface, drip (surf. and sub-surf.), and sprinkler
- Resource recovery of water, nutrients, compost, and energy
- Social acceptance/Social awareness – Institutional constraints
- Lack of data and integrated monitoring to assess the system performance

ROUNDTABLE REUSE

Requirements for sustainable water reuse

- Need to **match the quality of the reclaimed water with the reuse option(s)**
- Water reuse in agriculture requires relatively simple **treatment processes** of proven technology, with low investment costs, affordable operation and maintenance, and **safe practices**
- To **take advantage** of water and nutrient recycling opportunities, agriculture will need to be incorporated into urban sanitation concepts
- Need for **economic/risk analysis** -- together with environmental assessments and sound technical studies -- to the assessment of various options for wastewater treatment and reuse
- Consider **the various reuse options** from the outset in the design of treatment plants, as well as in their operation, and define corresponding standards
- **Local capacities have to be built** for more integrated management of the water cycle – management based on realistic standards and local solutions

ROUNDTABLE REUSE

Key recommandations

1. Adopt an **integrated framework** to manage water supply, stormwater, wastewater, nonpoint source pollution and water reuse
2. **Consider the various reuse options** (ag. water reuse being one of them) from the outset in the design of treatment plants, as well as in their operation, and define corresponding standards
3. Ensure that guidelines and policies encourage communities to determine the **most appropriate and cost-effective** wastewater treatment solutions based on local capacities and reuse options
4. **Prepare a new generation** of decision-makers and professionals (knowledge and tools development, training, …)

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ROUNDTABLE REUSE

Key recommandations

5. **Involve all stakeholders** from the start in water reuse plans and ensure multi-stakeholder platforms to facilitate dialogue, participatory technology development, innovation uptake and social learning

6. **Ensure financial stability and sustainability** by:
   - Linking water reuse management with other economic sectors for **faster cost-recovery, risk reduction and sustainable implementation**
   - Developing **mixed public/private, public/public sector solutions** for investment, service delivery, and operation and maintenance
   - Considering **social equity** when defining cost-recovery mechanism

Groundwater governance

What governance for groundwater and surface water use in agriculture?

Jean Verdier

Theme Groundwater governance

Contents of the session

- 14 papers and 4 posters presented,
-from the Mediterranean:North Africa, Turkey, Egypt, France, Spain
From other parts of the world: Mexico, India, Sub Saharan Africa, China,
-speakers from national & international research organisations, Government agencies, semi-public authorities

Subjects/problems dealt: groundwater use first due to inadequate surface water service, then groundwater opens new opportunities for agriculture
→ overexploitation of groundwater
Laws and measures to regulate groundwater use, generally not implemented
→ A problem of governance

Main discussion point was linked to the quantitative aspects of groundwater overexploitation

Theme Groundwater governance

conclusions / recommandations / key messages

Conclusions

1) Key problems in groundwater governance: 1) monitoring & logistic problems, 2) alignment of private and public interests
2) Necessity to address non-quantitative issues such as culture, social impacts, changes in agricultural models (what alternatives to intensive entrepreneurial agriculture?)
3) Some successful local (informal) arrangements, generally inconsistent with official laws, need to be linked to new governance initiatives (e.g. aquifer contract)
4) Who gets what and why? Who loses? (Sheila Jazanoff)

Recommendations

ICID should reinforce the work on governance issues, more specifically those linked to groundwater use

WG SDG workshop

Future of drainage under environmental challenges and emerging technologies

Bernard Vincent

WG SDG workshop

Contents of the session

- 10 papers presented from,
  - Asia 4 (China, 3; india, 1)
  - South America 1 (Mexico)
  - Africa 1 (Egypt)
  - Europe 4 (Finland, France, Germany) ; for terrains placed in Finland, France, Irak
- Coming from Academic organisations (6), consultants (1) , Research foundation (1), Ministry officers (2)
- Dealing with
  - Treats on traditional drainage techniques (2)
  - Wetlands (5)
  - Technology (2)
  - Salinity management under deficit irrigation (1)
  - Drainage needs

WG SDG workshop

conclusions / recommandations / key messages

- Several authors shaw the dramatic impact of irrigation water allocation reduction strategies ont the salt Balance of the soil and the of effluent.
- Drainage (process or structure) is key factor of sustainability whatever the irrigation modality
- The wetlands downstream irrigation schemes are under the treat of evolution of the drainage water in quantity and quality, so that managers allocate water (some times fresh)
- The link between irrigation, drainage and wetlands is made. Next step is to show interactions with biodiversity
- From rural engineering to to ecological engineering

Precision Irrigation workshop

Ragab Ragab

WG-Water & Crops workshop

Contents of the session

25 papers and 6 posters presented,
From: France, Tunisia, Mali, China, Thailand, Taiwan, Morocco, Egypt, Iran, South Africa, India, Germany & UK

Precision irrigation using sensors, new technologies, models, remote sensing and different management practices

WG-Water & Crops workshop

conclusions / recommandations / key messages

1. Applying deficit irrigation in Tunisia led to significant water saving and higher water productivity. However deficit irrigation could lead to soil salinization in areas with little or no rainfall.

2. Rice cultivation using a modified SRI and modified best management practice BMP in Taiwan is good practice if seedlings took place in February instead of January. In such case, the growing season would be 119 days instead of 140 and water use of 498mm instead of 450mm.

3. Controlled drip irrigation using measured soil water potential gave better results when compared with sprinkler and rainfed common beans in Germany.

4. Sweet potato yield in Mali produced 50% more yield under drip irrigation in comparison to the traditional basin irrigation.

5. Sensors for irrigation demand and canal supply as well as promoting water saving are of great benefit. Using sensors for water management with training farmers and providing information to the school students is bearing fruits in India.

WG-Water & Crops workshop

6. Using remote sensing technology in south Africa to obtain actual evapotranspiration estimates showed promising results in reducing, water consumption, energy and costs.

7. Subsurface drip irrigation in France indicated good water and energy saving.

8. Variable rate centre Pivot irrigation strategy in China saved around 17% water.

9. Subsurface Drip Irrigation for date palm trees in Tunisia indicated the deeper the drip line is, the better root and leaf system developments are.

10. Using models linked to GIS in Thailand showed the spatiall variability in crop water requirements.

WG-Water & Crops workshop

11. The drip irrigation in India proved to be cost effective and led to higher water productivity and less labour cost.

12. Food security in Italy requires an integrated approach that considers water, crop, and land management.

13. Using Eddy covariance and weighing lysimeters in Egypt showed that the actual evaporation measured by EC, leads to a more water saving when compared with using potential evapotranspiration.

14. The Water4crops project results showed that using Scintillometers and , Eddy Covariance for actual evapotranspiration (area based) and COSMOS for soil moisture (300-700m radius), are promising techniques to use for crop water requirement estimation. The results indicated a significant difference between actual measured ET and the potential and crop ET with the Eta being a lot less.

Ecosystem Services and Multi-Functionality of Irrigation and Drainage Systems

Sylvain Perret

Ecosystem services workshop

Contents of the session

- 6 papers and 4 posters presented (about 35 participants)
- Thailand, Korea, Taiwan, France, Malaysia
-speakers from research, government agencies
- Key note for scoping, providing definitions
- Case presentations, highlight the multiple methods available (CVM, AHP, RCA, CE…)
- A relative focus on paddy rice systems, also watershed applications
- Rich and lively discussion

Ecosystem services workshop

conclusions / recommandations / key messages

- **ES and multifunctionality** in I&D systems: definitely worth paying attention – new WG ENV mandate

ES valuation, yes but what for ? Information, awareness and educational, policy justification, compensation – viewpoint dependant

- **Scale** and scope of ES: global, regional, local ?
- **Rice and paddy fields** : challenging, multifaceted, multiscale arena for ES application
- Initial **hypotheses and methods** used do matter a lot

Crossing issues between Irrigation and Energy

Gilles Belaud

Irrigation & Energy WS

Contents of the session

13 papers and 1 posters presented,
from France (4), Spain (3), Egypt (2), India(1), Italy, Argentina, Indonesia, Morocco

Topics

Energy policies, and implications for irrigation development (3)

Investing in energy production in irrigation systems (3)

Diagnosis of energy consumption in irrigation systems (4)

Tools and technologies to reduce energy consumption (3)

Irrigation & Energy WS

conclusions / recommandations / key messages

1- Water-Energy-Food nexus

2- Irrigation and energy generation compete

3- Irrigation systems can generate energy

4- Energy consumption and costs are increasing everywhere

5- Intensive research on diagnosis, measures to increase efficiency, develop tools, study cases (e.g; BRL)

Working Group within ICID to network researchers, users and managers ?