8th International Micro irrigation Congress

General Report

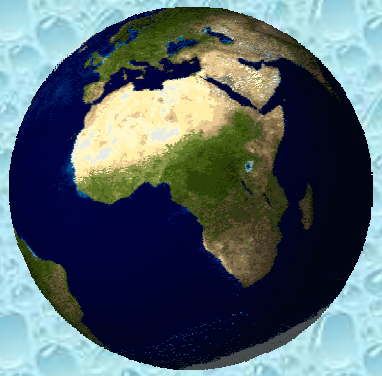
Innovation in Technology and Management of Micro irrigation for Enhanced Crop and Water Productivity

23 October 2011, Tehran, Iran

F B Reinders
South Africa

ICID•CIID

Innovation in Technology and Management of Micro irrigation
for
Enhanced Crop and Water Productivity continuously play a vital role in irrigated agriculture.



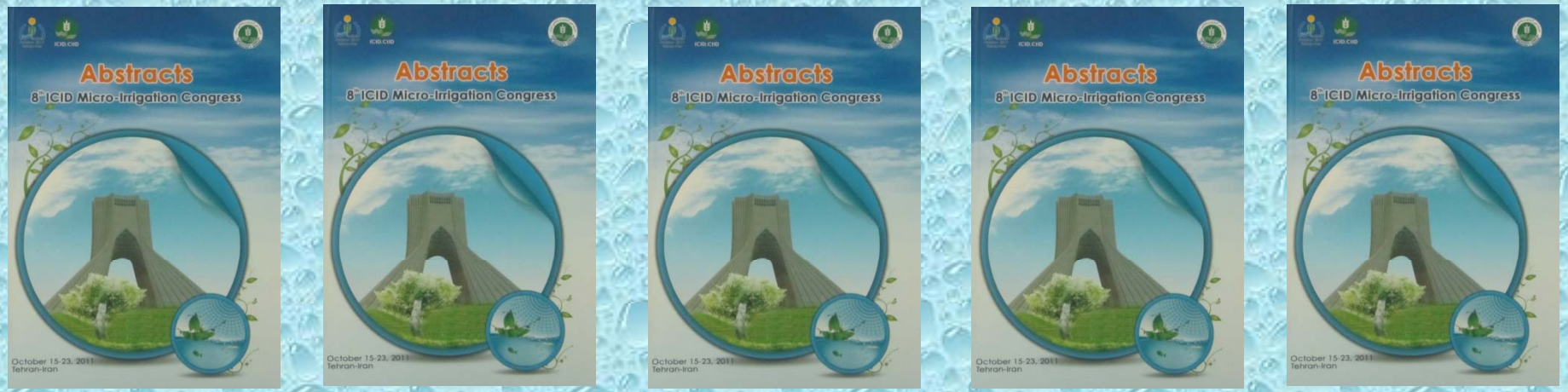
Global demand for food is likely to double in the next 25 to 30 years mainly due to population growth and change of diet.

Apart from the keynote address by the President of ICID,

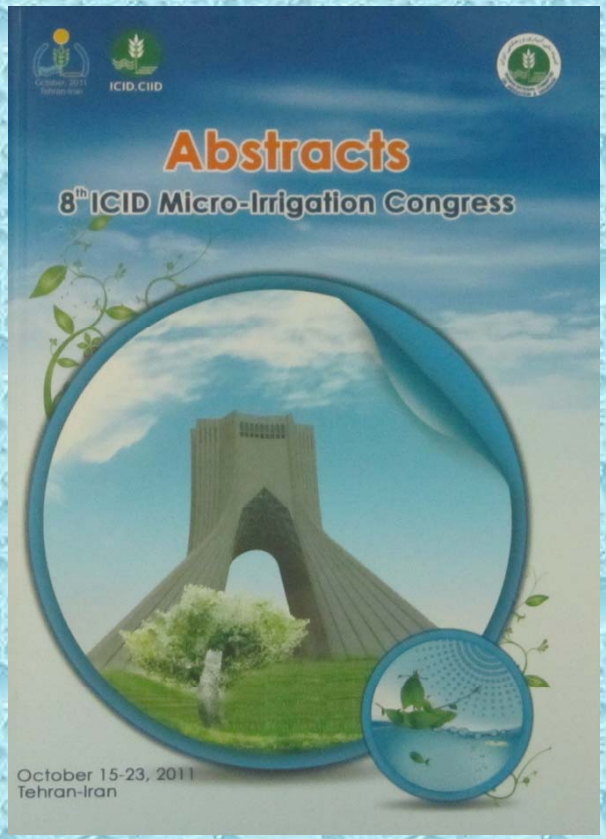
Prof Chandra Madramootoo

a total of 20 papers were delivered at the Congress.

The presentations were excellent and we trust that it met everybody's expectations.



For the 8th Micro Irrigation Congress in Tehran, IRAN a total of 96 papers were received from 9 countries of which 56 are oral and 40 posters. After reviewing, 55 papers were accepted- 35 for oral and 20 for posters.



Research an experiences that were shared included:

- **Best management practices/ success stories of micro irrigation adoption;**
- **Lessons learnt from failures in up scaling micro irrigation;**
- **Developments in Subsurface micro irrigation;**
- **Low cost and low energy consuming irrigation systems;**
- **Automation in micro irrigation;**
- **Micro irrigation in greenhouses;**
- **Micro-irrigation for small scale farms;**

- **Use of low quality waters in micro irrigation;**
- **Modeling, design and decision support system in micro irrigation;**
- **Advances in operation and cost effective maintenance of micro irrigation systems;**
- **Management and cost of micro-irrigation for large farms;**
- **Efficiency and productivity in micro irrigation systems;**
- **Socio-economic consequences of the conversion of traditional systems to micro irrigation systems;**

- **Analysis of long term sustainability of micro irrigation systems;**
- **Technical performance and quality assessment of micro irrigation systems;**
- **LCA (Life Cycle Analysis) applied to micro irrigation.**

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McGill

McGill Institute for Global Food Security

Institut pour la sécurité alimentaire mondiale de McGill

Keynote Presentation

8th International Micro Irrigation Congress

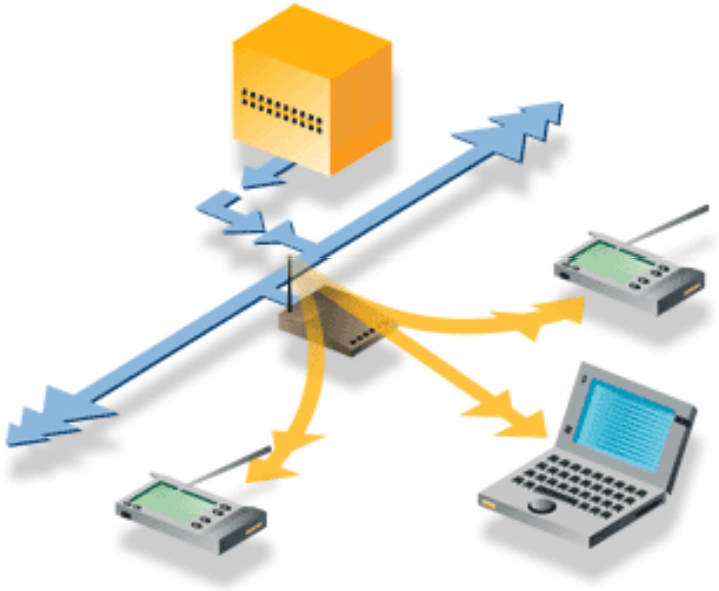
Chandra A. Madramootoo
President, ICID
Dean, Agricultural and Environmental Sciences
McGill University, Montreal, Canada

Higher crop yields and water use efficiency

Future Challenges

- Drip irrigation of rice and other cereals
- Surface vs. buried drip irrigation
- Use of nanotechnology and biotechnology in drip irrigation to control water quality and emitter clogging and improve filtration techniques
- Technology is still expensive
- Requires high technical skills for proper design, maintenance, and optimum efficiency

Future Challenges



- Application of GIS and remote sensing technologies for precision irrigation scheduling
  - To better conserve water and boost water and crop productivity, and to handle soil heterogeneity

MICROIRRIGATION IN IRAN- CURRENT STATUES AND FUTURE NEEDS

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8th International Micro Irrigation Congress
21 Oct 2011, Tehran, Iran

Improving irrigation efficiency and water productivity through the pressurized irrigation system (PIS)

crop water productivity (WP)

$$WP = \frac{\text{yield produced} - \text{marketable product}}{\text{water used}}$$

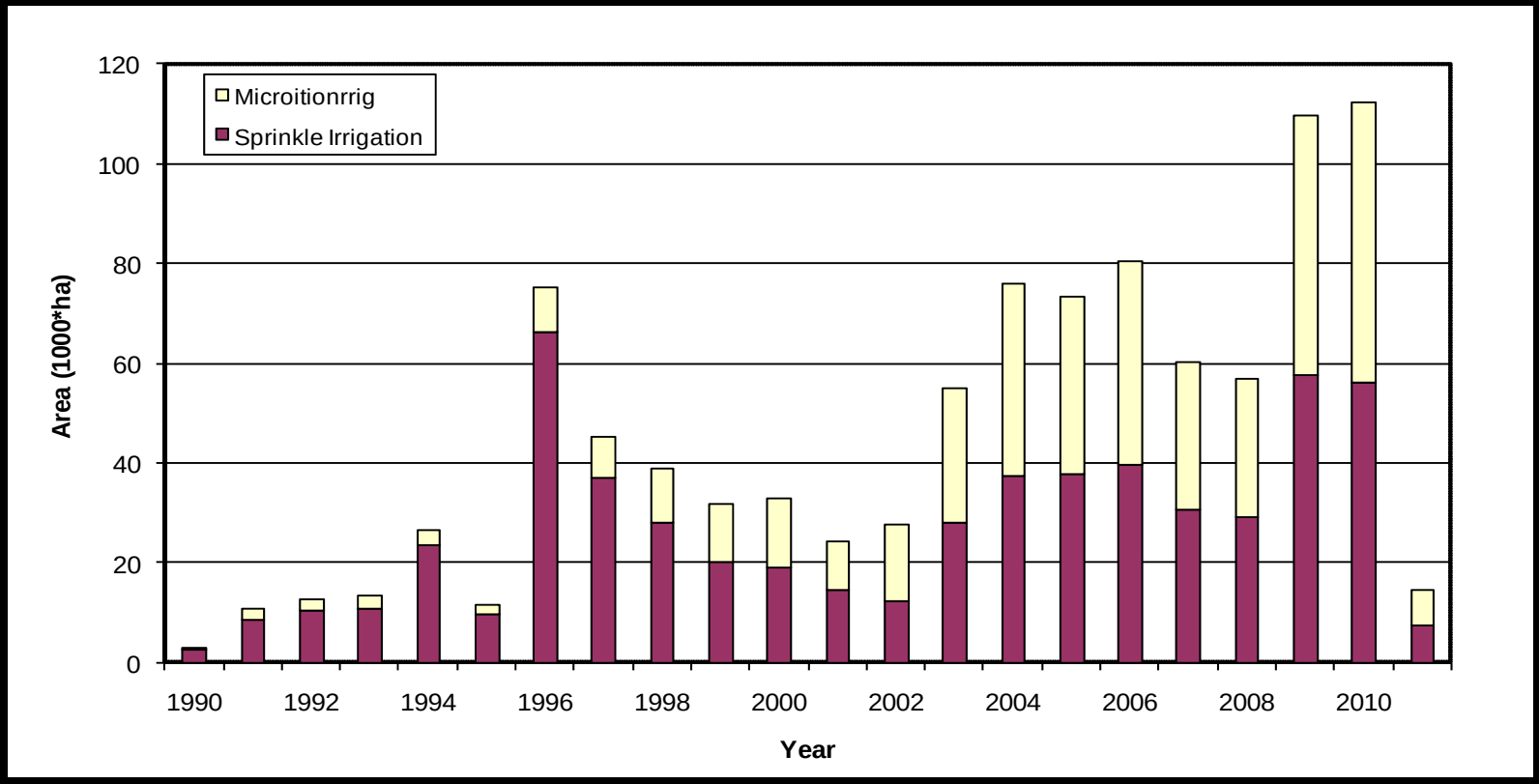
kg

m^3

ET = evapotranspiration

AERI

Microirrigation Development in Iran



Future research needs

Some of main topics listed as follows;

- **Crop water requirement; it is essential to prepare technology to measure daily water requirement at farm level considering crop. Age of crop, season and soil.**
- **Prevention of emitter clogging; appropriate filters, maintenance, emitter selection, water treatment, etc.**
- **Fertigation and chemigation; methods and scheduling**
- **Precise irrigation; automation, uniformity distribution, soil-water-crop-climate relationship.**
- **Subsurface drip irrigation; root system development and prevention of root intrusion.**
- **Water and energy consumption; low pressure irrigation system**
- **Swage and saline water use in MIS**
- **Field evaluation of MIS under operation**

Micro-irrigation survey

Use of micro-irrigation in the world over the last 30 years.

Year	1981	1986	1991	2000	2006	2010
Area (ha)	436 590	1 030 578	1 826 287	3 201 300	6 089 534	8 400 000
% increase		136.1	77.2	75.3	90.2	37,9

Over the past 30 years (1981-2010) an increase in the usage of micro-irrigation of 1 824% took place.

According to Conclusion of the congress the technical

Committee's conclusions were as follows:

- **Theme 1, Micro Irrigation application in Nepal, Iran, China, Syria, as well as challenges of water productivity and crop production was discussed. the results of papers showed that micro-irrigation:**
  - ✓ **Is an effective tool to alleviate poverty and to create positive changes .**

- ✓ Can contribute to increasing crop yields of high-value crops such as vegetables and fruit has been realized as an efficient water saving irrigation
- ✓ Designing zero energy micro irrigation system is going to be very much useful for energy conservation, pollution control and carbon credits
- ✓ Could be more cost effective than the surface irrigation systems

In this theme the following topics were not considered:

- ✓ **Low energy consumption and water quality in micro-irrigation;**
- ✓ **Micro-irrigation and sustainability of irrigated agriculture;**
- ✓ **Micro-irrigation and sustainable use of water resources;**
- ✓ **Micro-irrigation and environmental consideration;**
- ✓ **Micro-irrigation management under drought condition.**

Theme 2, a large number of papers were received in this theme: Saline waters and non -conventional water usage, mulch farming in agricultural production, and comparing the effects of surface irrigation systems with pressurized ones (surface & groundwater) on the planets performance were discussed.

The results of papers are as follows:

- **Subsurface drip irrigation is recognized as a highly efficient method of water application, with minimum water losses through evaporation and deep percolation, thus assisting water and nutrient conservation;**
- **A combination of drip irrigation and mulching improve moisture conservation and different crop production quality, especially in area with limited water;**

- **Subsurface Drip-Irrigation (SDI) plays a major role in water savings while insuring an acceptable crop yield level in a Mediterranean climate;**
- **Micro-irrigation increases Water Use Efficiency (WUE) and Water Productivity (WP) especially under conditions of water scarcity;**
- **Application of micro-irrigation system was found to be economically feasible;**
- **Micro-irrigation improve yield and WUE compared with the other irrigation methods under the condition of deficit irrigation;**
- **Micro-irrigation scheduling is successful and precise**

In this theme the following topics were not discussed:

- **Design, low quality water use, practical experience from subsurface drip irrigation;**
- **Prevention and improvement of emitter clogging, chemical management;**
- **Cropping pattern and micro-irrigation;**
- **Micro-irrigation in arid and semiarid regions and environmental issues.**

Theme 3, considerable papers were received on this theme. The effect of food and irrigation fertilizers on micro-irrigation productivity; system Automation, and Drip irrigation in Greenhouse were discussed. the results of papers showed that:

- **automation of micro-irrigation system has positive effects on growing crops, saving money, and profitability increase;**
- **Mobile drip-irrigation system reduces the energy and water consumption;**

- **Micro-irrigation systems function very well during water scarcity period and also insufficient areas;**
- **Fertigation in combination with micro-irrigation is an efficient method for precisely applying nutrients close to the crop root zone which results better growing and income;**
- **A proven maintenance schedule maintains the good performance of different drippers and filters.**

In this theme the following topics were not discussed:

- **Fertigation in micro-irrigation;**
- **Cost and economical advantage in automation;**
- **Practical automation in arid and semiarid region;**
- **Micro-irrigation in greenhouse.**

Theme 4, Socio-economic issues and future of micro-irrigation systems were studied.

The results of papers are as follows:

- **Micro-irrigation gives higher yield, higher productivity, better quality production throughout the year.**
- **Solar Powered Central Pivot Irrigator is an ideal choice for the case of remote fields with no electricity.**
- **Targeted growth could be achieved without the burden of environmental degradation through micro-irrigation.**

Conclusions and recommendations:

- Recognizing the priority of training illiterate farmers to apply pressurized and micro-irrigation systems in countries with low literacy level of the farmers.
- There is an urgent need for extending & application of the results of the agricultural promoter's researches to improve designs and to increase micro-irrigation systems efficiency.

- **Considering the effect of changing surface irrigation into drip irrigation on the tree growth and recommending that the farmers follow up such change.**
- **Realizing that sub-surface drip irrigation is more effective than the other drip irrigation systems in decreasing water evaporation and deep percolation especially in warm regions and light soils.**
- **Arid and semi-arid and developing countries have encountered the critical phase quantitatively (precipitate renewable water) and qualitatively (pollution of surface and groundwater resources).**

- Recognizing that increase in water productivity based on crop for drop has got the primary importance in the 21st century.
- It is recommended that climate change factors and droughts be seriously considered. It is urgent that farmers not waste agricultural water.
- Local knowledge and modern technological information are required to increase water use efficiency.

This 8 th Micro Congress in Tehran managed :

- **To share experiences in the use of new technologies and best management practices in drip, micro-sprinkler, and other localized irrigation systems.**
- **To review the status of use of micro irrigation for smallholders;**
- **To understand socio-economic and technological factors impeding expansion of drip and micro-sprinkler irrigation area.**