WATER USE EFFICIENCY

M.C. LAKER

SOUTH AFRICA A WATER SCARCE COUNTRY

Rainfall low, erratic and inefficient

Runoff low and erratic

Runoff geographically strongly skewed

Essential to maximize water use efficiency

DRYLAND CROPPING

Potential low due to low, inefficient, erratic rainfall and poor quality soils

Uses only green water

MANAGEMENT TO IMPROVE WATER USE EFFICIENCY IN DRYLAND CROPPING

Conservation tillage to improve infiltration and water storage in soil and reduce runoff

Practices to reduce surface evaporation

Elimination of soil compaction to enable plants to utilize subsoil water

Long fallow to reduce water stress and drought risk and improve water use efficiency

WATER MANAGEMENT IN SMALL-SCALE DRYLAND CROPPING

In-field rainwater harvesting

Ex-field rainwater harvesting: Runoff-runon

Deep trenching

Indigenous crops able to withstand water stress

IRRIGATED AGRICULTURE

Largest user of blue water

Less productive in terms of both gross income and jobs created per unit of water

Water rights in future to be transferred from agriculture to industry

POTENTIAL IMPACTS OF WATER TRANSFER AWAY FROM IRRIGATED AGRICULTURE

Consequences regarding food security and food prices

Compare "nutritional water productivity" of different crops and "water footprint" of food consumed

Economic and socio-economic consequences for rural areas based around irrigated agriculture

HUGE POTENTIAL FOR INCREASED WATER USE EFFICIENCIES AND WATER SAVINGS IN IRRIGATED AGRICULTURE

Use correct crop water requirements in planning and management – SAPWAT model

Further studies required to refine crop coefficients for different crops for different regions/areas

MAXIMIZING BENEFICIAL WATER USE BETWEEN SOURCE AND ROOT ZONE

Maximize beneficial water use by minimizing non-beneficial water use/losses between source and field edge

Maximize in-field beneficial water use by selection and design of appropriate irrigation systems according to soil, climate, crop and management capability

Key role of the extreme crusting of most irrigated soils throughout South Africa in irrigation system selection and design. Good information available, but not used. More research required.

MAXIMIZE IRRIGATION WATER USE EFFICIENCY BY OPTIMIZING MANAGEMENT BASED ON PROFILE-AVAILABLE WATER CAPACITY

Stretching intervals between irrigations reduces non-beneficial evaporation water losses

"Deficit" irrigation improves irrigation water use efficiency, *inter alia* by maximizing use of rainfall

Lots of data available in several WRC reports and internationally

OPTIMIZE IRRIGATION WATER USE EFFICIENCY BY MEANS OF EFFICIENT IRRIGATION SCHEDULING

Soil water measurement approaches (content and/or potential) Integrate soil water modelling with measurement

Atmospheric parameter approaches

Adoption of objective irrigation scheduling still low in South Africa – Large potential for improvement and significant water saving

SMALL HOLDER IRRIGATION SCHEMES

Most important factors management and conflict

Schemes diverse. Plotholders on same scheme diverse.

Complex designs and sophisticated technologies recipes for failure.

HOMESTEAD GARDENING SYSTEMS

Techniques to increase food production in home garden systems include rainwater harvesting used in runoff-runon systems or for filling tanks for irrigating crops during dry seasons, treadle pumps, tower drip kits, keyhole gardens for use of grey water, etc.

Use of grey water for irrigating home gardens has great potential for improving food security in poor communities, especially in peri-urban areas

DUAL WATER RETICULATION AND CLEANER PRODUCTION

Dual water reticulation enables use of non-potable water for purposes like home garden irrigation, etc. – Implementation very limited in South Africa

Cleaner production enhances the potential for non-potable water use

AQUACULTURE AND FISHERIES AS BENEFICIAL WATER USE

Subsistence level aquaculture not viable

Fisheries have potential to develop rural livelihoods

STATUS AND USE OF POTABLE WATER CONSERVATION DEVICES IN THE DOMESTIC AND COMMERCIAL SECTORS

Awareness among public, building profession and municipalities low

Government a major building owner and should lead by example

POTABLE WATER LOSSES IN MUNICIPAL SUPPLY SYSTEMS

- **RSA has world class water supply network – but it is deteriorating**
- **WDM needs basic input & not always sophisticated models**
- **Huge potential for job creation – "Working to save water"**