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Rainwater management for the rural poor

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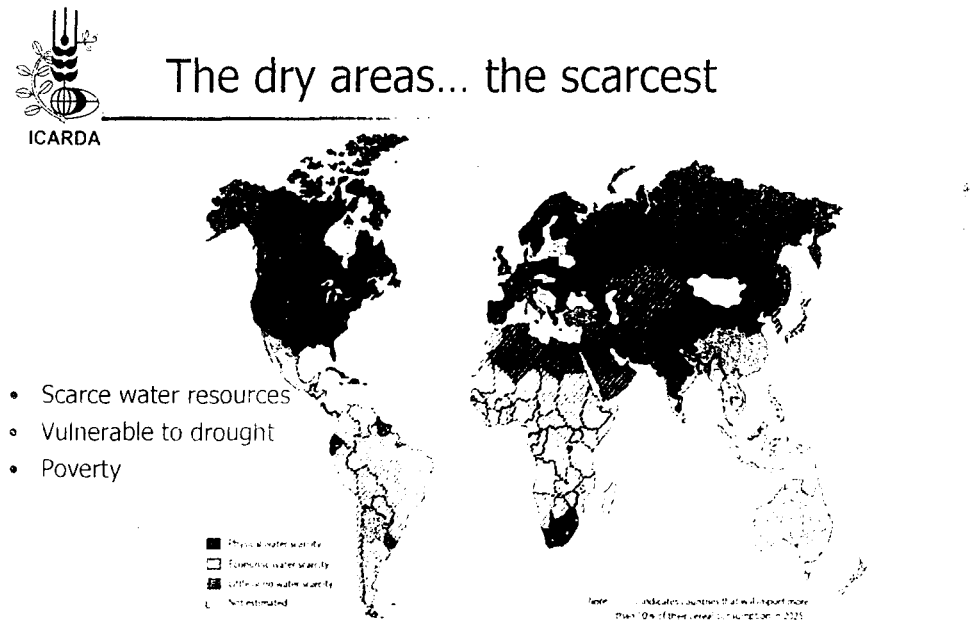
Workshop on: "Strategic Directions for IFAD's Support to the Rural Water Sector in the NENA Region" Rome, 28-29 June 2006

1. About 80% of the world agricultural land is rainfed producing over 60 % of the world food. NENA region is not and exception where most of the poor live in rural rainfed areas. This presentation focuses on two agro ecosystems within rainfed areas of NENA region: 1st. the favorite rainfed systems in basically semi arid areas where direct rainwater support economic crop production but suboptimal amounts, distribution and management pause constraints to improved and stabilized production and livelihoods; and 2nd. the rainfed marginal rangelands where direct rainwater is too low to support sustainable economic rangeland-livestock agricultural systems and historic mismanagement caused continuous degradation and declining livelihoods.

2. Increasing rainwater productivity in these areas is vital to improve the poor livelihoods. Currently rainwater productivity is low due to the lack of sufficient investment and mismanagement. The Comprehensive Assessment for Water Management has found that rainfed production can be tripled by using exiting technologies and that improving the management alone can double rainfed production. To achieve the 2015 MDGs hunger targets, it is envisaged that 75% of the return should come from enhancing the productivity of rainfed systems through improving rainwater capture, concentration, effectiveness and productivity. It has been shown that the investment in rainfed agriculture has large payoffs in terms of both productivity improvements and poverty reduction through income generation and environmental sustainability. This includes investment in water management such as supplemental irrigation, soil nutrition, crop and land management. In many areas the reallocation of blue water to be used conjunctively with rainwater in supplemental irrigation system is a better option than using it downstream in full irrigation.

3. In the drier marginal rangelands, rainwater does not find favorable environments to be productive. ICARDA had found that over 90% of rainwater in this environment is lost in evaporation with no benefits. Only by concentrating water to specific targets, through macro and micro catchments water harvesting, rainwater productivity can be increased to 50 and 60% respectively. To halt desertification and to rehabilitate the rangelands an integrated approach including grazing management need to be implemented. Land tenor institutional setups and lack of appropriate policies are real constraints but above all the lack of sufficient investment is probably the most important. Since development benefits in these areas are mostly social (employment, settlement, etc) and environmental (combating desertification, carbon sequestration) there is little interest by both the private and the public sector in the developing countries. The social, economic and environmental costs of the people migrating from these areas is very high and suggest that investments be made by the whole society to combat desertification and provide sustainable livelihoods for the people to stay where they are.

4. Investment in improving rainwater productivity in rural areas is a worthwhile strategic option for IFAD as well as public sectors in the NENA region. There is more potential for increase productivity in rainfed areas than in fully irrigated areas. It should be indicated that improving rainwater productivity can not be attained by investing only in water projects but the whole system should be lifted up for any meaningful development. Investment areas include technical (water, crop, and soil), institutional strengthening, capacity building and policy development. Tested research outputs that are feasible for investment in the rainfed systems of NENA will be discussed where research is needed to develop new venues to unlock the rainwater potential for improved livelihoods.



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Dry Areas
Major systems, constraints & themes

Irrigated systems

Low WUE
Salinization
Marginal water

Rainfed systems
300-500 mm annual

Rangelands systems
– 300 annual
nuniform rainwater

on

Improve WUE
Sustainable use
of marginal water

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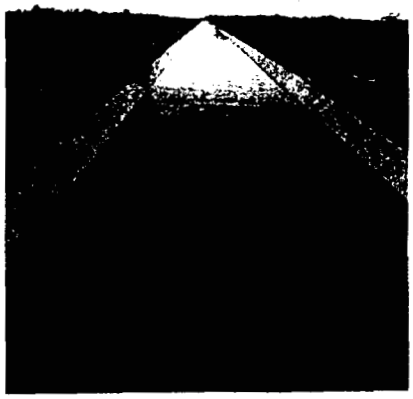
New water ... limited !!!!

- Surface, mostly tapped
- Ground, over exploited
- Marginal-quality, small amounts, environment, health
- Desalination, costly, environment, transport
- Water transfer, cost and politics



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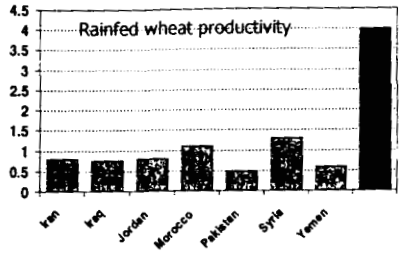
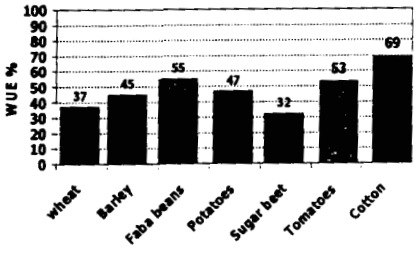
Opportunities:
Increasing water productivity

Green water
rainfed agriculture



Blue water
Irrigation productivity



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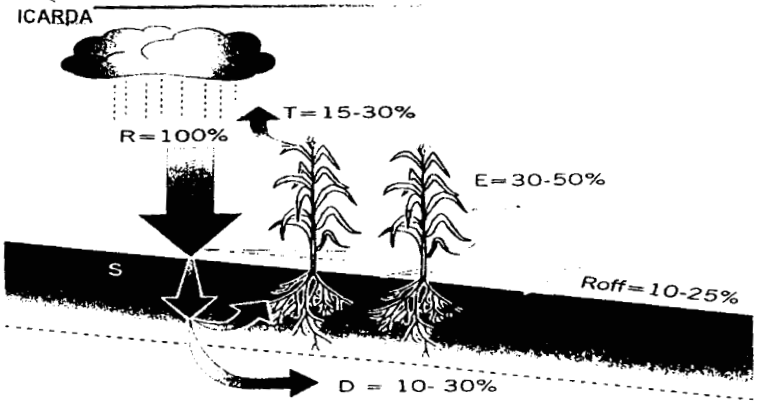
The green and Blue waters



Supplemental irrigation: The concept

Application of a limited amount of water to rainfed crops, which produce normally without irrigation, to improve and stabilize production

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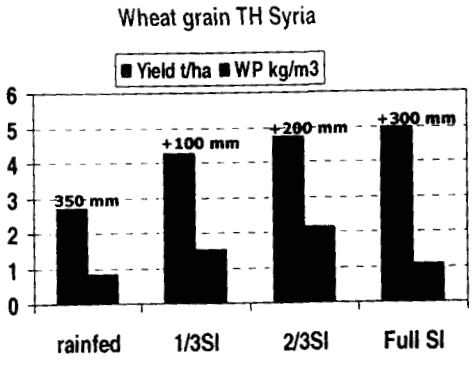
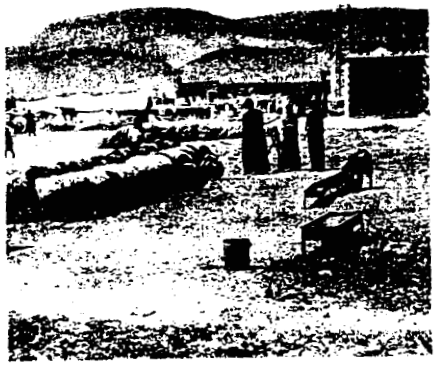
Impact of supplemental irrigation: full & deficit





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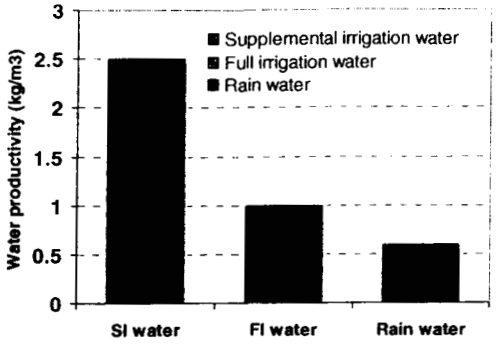
Potential water productivity



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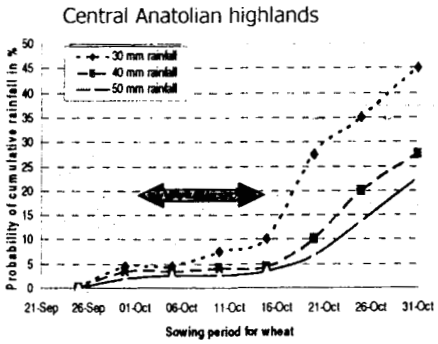
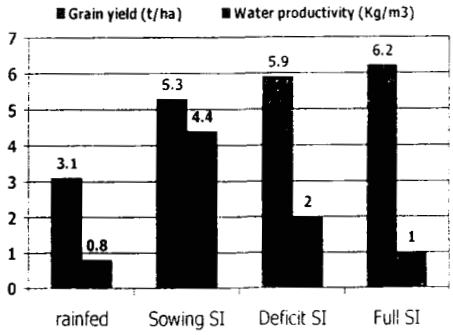
Optimal early sowing with SI





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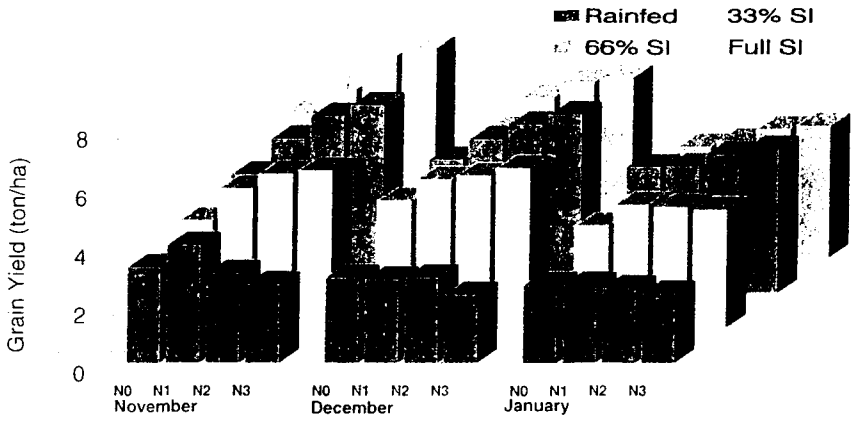
Cultural practices

Bread wheat response to supplemental irrigation, nitrogen and sowing dates in north Syria



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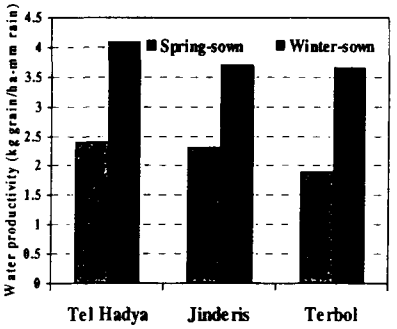
Germplasm



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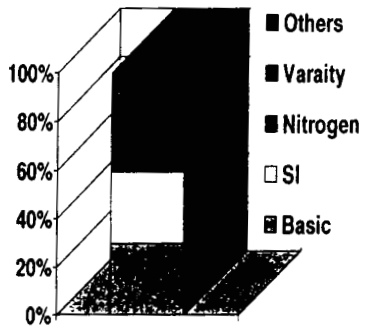
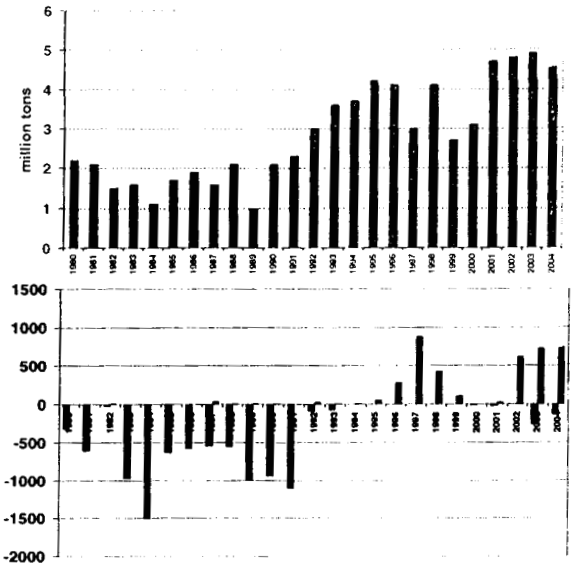
Impact: Syrian wheat production





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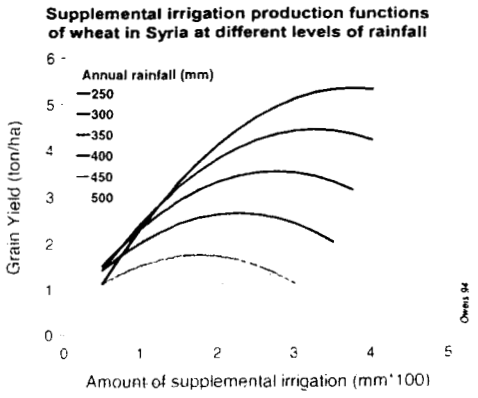
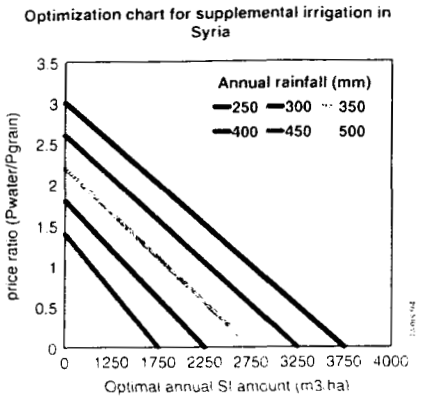
Issues: economics





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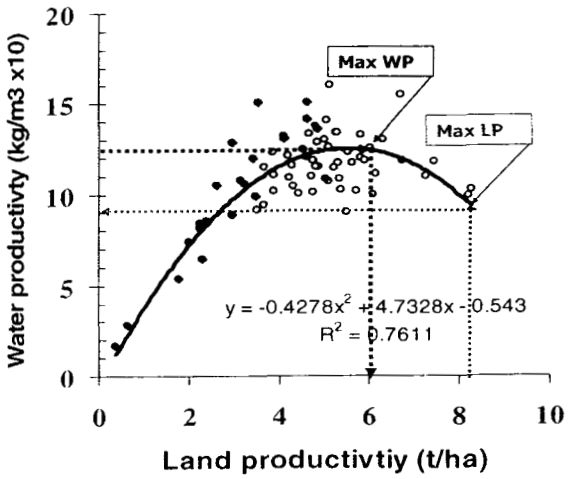
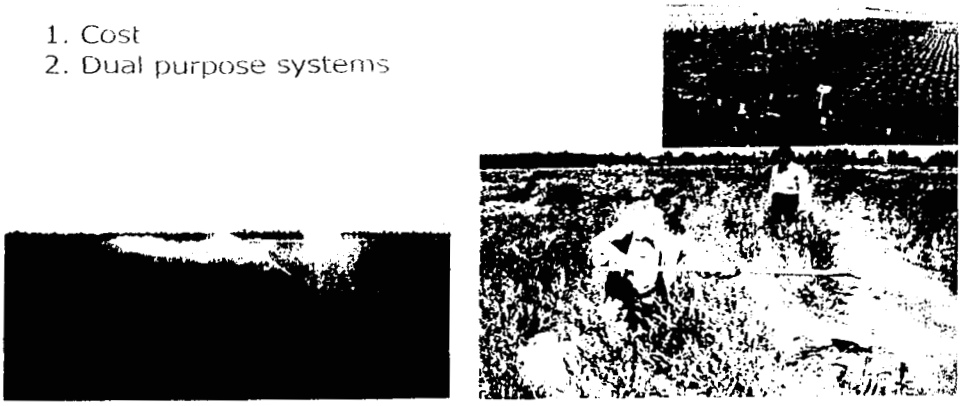
Issues: Water or land



Zhang and Oweis 1999

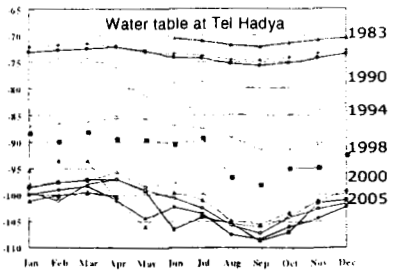
Issues: irrigation system

1. Cost
2. Dual purpose systems



Issues: Marginal quality water

Issues: over pumping



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Conclusions: Agriculture in water-scarce areas

- Water productivity can increase substantially
- Increasing water productivity is a more viable strategy to cope with scarcity
- Substantial increase in WP requires shift in focus from land to water and to integrated management

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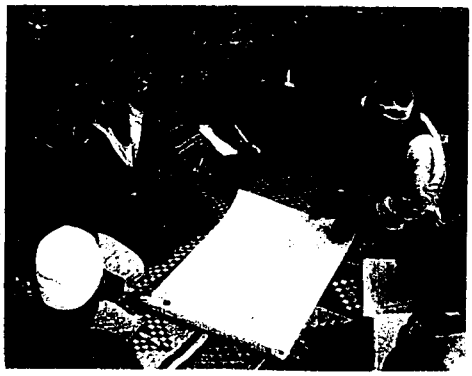
Why investing in rainfed agriculture

- Poverty
- Household scale enterprises-small investment
- Still has high potential
- Return to investment is hig
- Environmentally friendlier



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Pro-poor investment in rainfed agriculture

- Inputs to maximize productivity
- Infrastructure for supplemental irrigation and reallocation of water
- Policies to provide incentives for deficit irrigation and other efficient practices
- Institutional setup, & comunities empowerment

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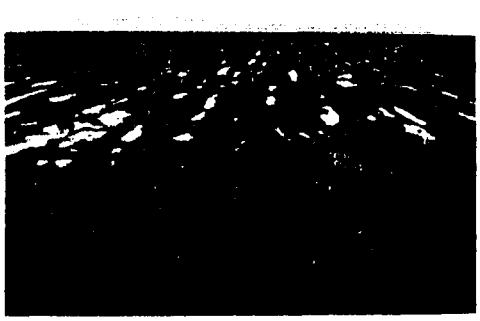
Rainwater in the marginal rangelands

Rain lost in evaporation

Runoff lost in salt sinks

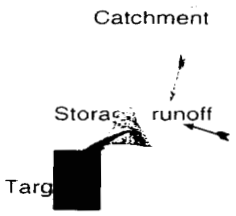


Water harvesting

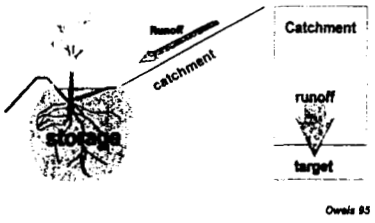
Concentration of rainfall from larger area into smaller one through runoff for beneficial use

Water harvesting techniques

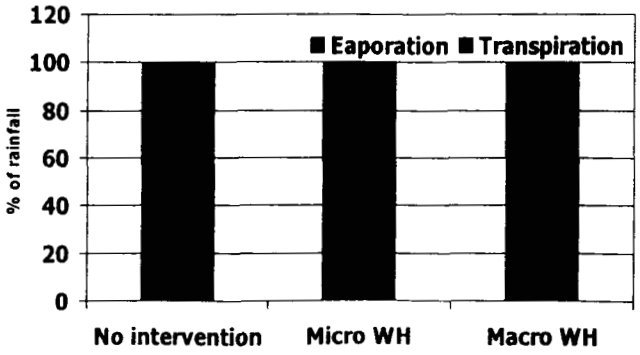
Macro-catchments



Microcatchments

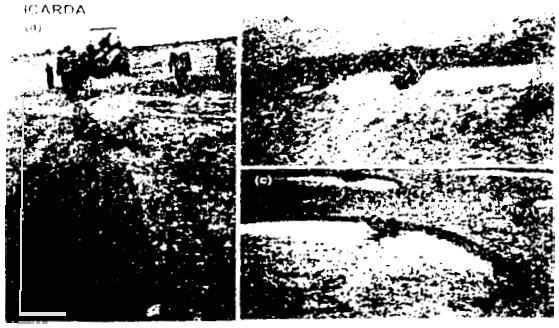


Improved rainwater productivity



Small water harvesting reservoirs

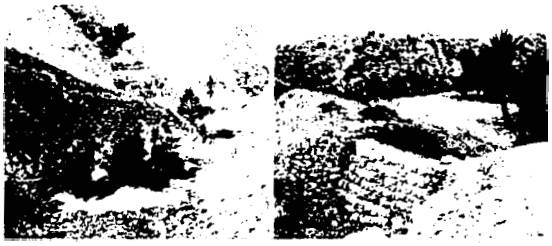
Mechanization & Community management



Cisterns

Small runoff basins (negarim)

Jessour - *Tunisia*

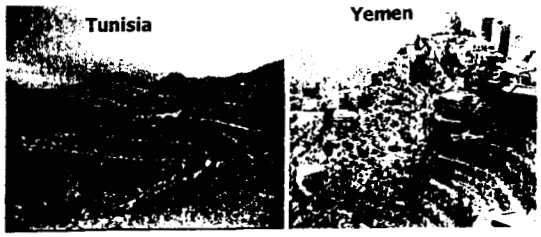


Runoff strips for field crops

Microcatchments
Contour ridges

Rooftop water harvesting

Contour bench terraces



Why public investment is essential

- Poor communities
- Rapid Land degradation
- Cost of doing nothing is high
  - Migration
  - Social and environmental
- Weak private investment
  - direct benefits small
- Long-term benefits are national & global

Water harvesting from greenhouses

Pro-poor investment in rainwater harvesting

- Appropriate Water harvesting structures
  - Micro and macrocatchments
  - Livestock watering points
  - Ground water for drinking
- Capacity building
- Policies especially re land
- Building institutions

Issues: Socioeconomics

- Land ownership
- Benefits and public support
- Users involvement
- Poor community institutions
- Upstream downstream conflic

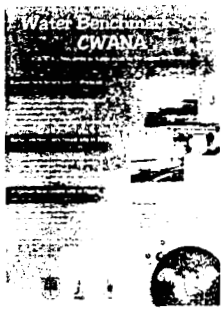
Research still needed

Community based optimization of the management of scarce water resources

Badia Benchmark
Water harvesting based
Satellites in Saudi Arabia and Libya

Rainfed Benchmark
Supplemental irrigation
Satellite in Algeria, Tunisia & Syria

Irrigation Benchmark
Water use efficiency
Satellite in Sudan and Iraq



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Thank you