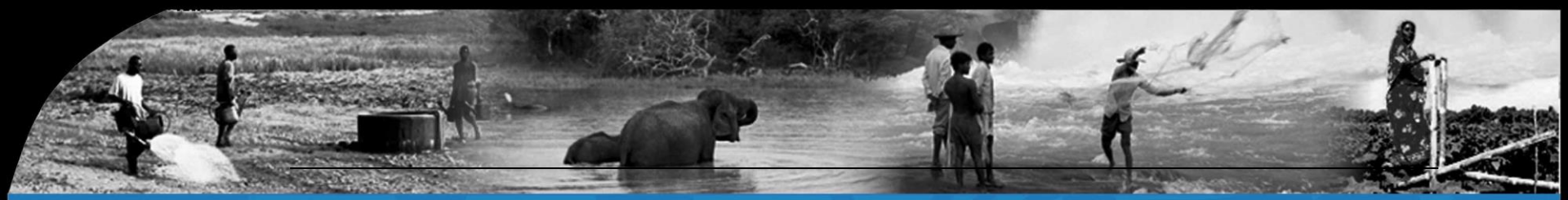

Water Security for Food Security: Gaps, Needs & Potential for Growth in SSA

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Outline

- **Situation Analysis & Key Challenges:**
  - **Water scarcity & competition**
  - **Water for food**
  - **Sub-Saharan Africa**
- **Meeting the Food Security Challenges: Options & Responses**
- **Points for Discussion**

Water Scarcity & Competition

Facts? Myths?

We are heading for water wars!

Halt to infrastructure expansion; conserve and restore ecosystems!

The problem is that water is free— pricing water is essential for sustainable water management!

There is no water crisis. There is enough food and all we need are better trade agreements!

Irrigation uses too much water! People wont have enough water to drink!!

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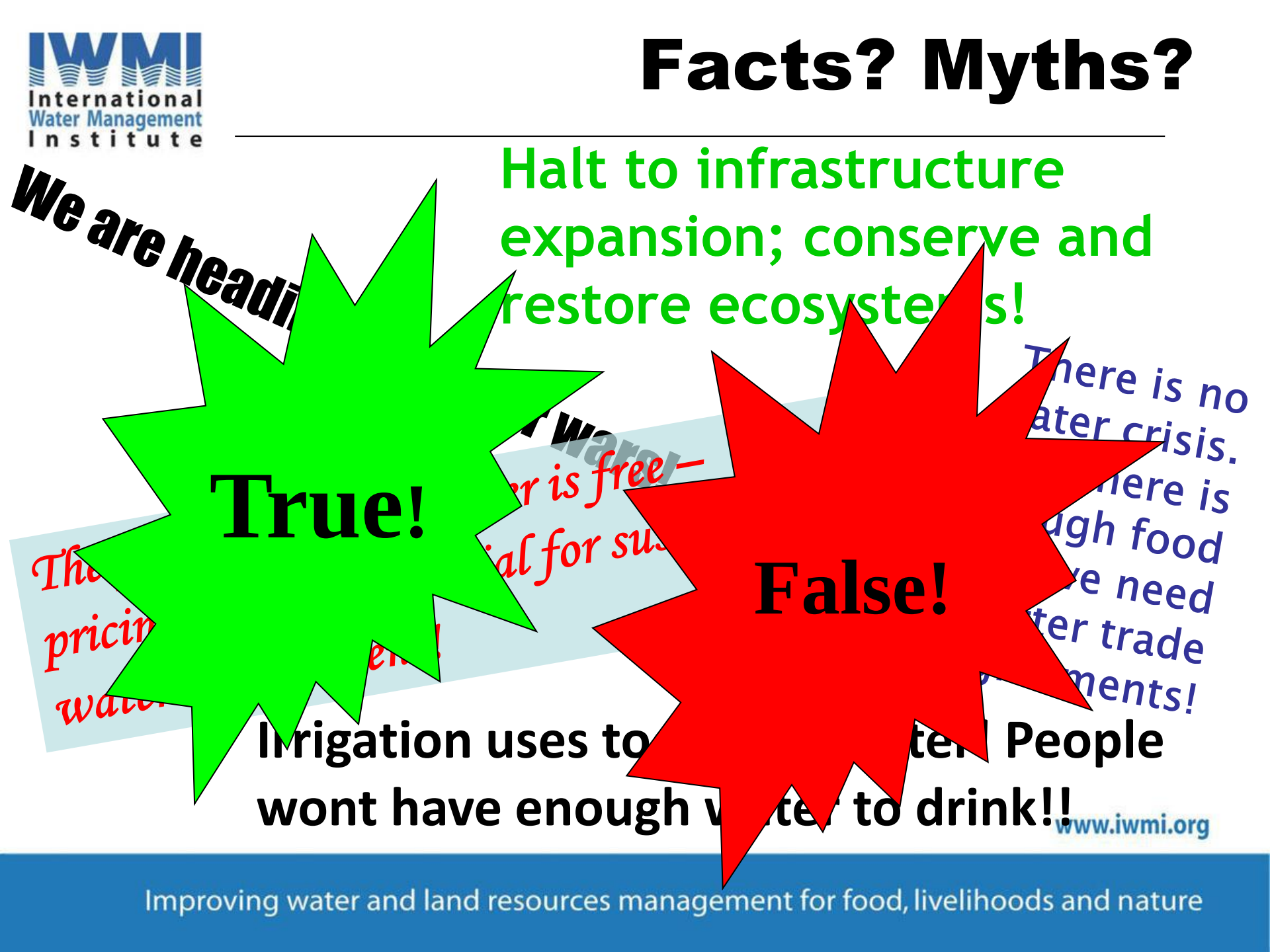
Facts? Myths?



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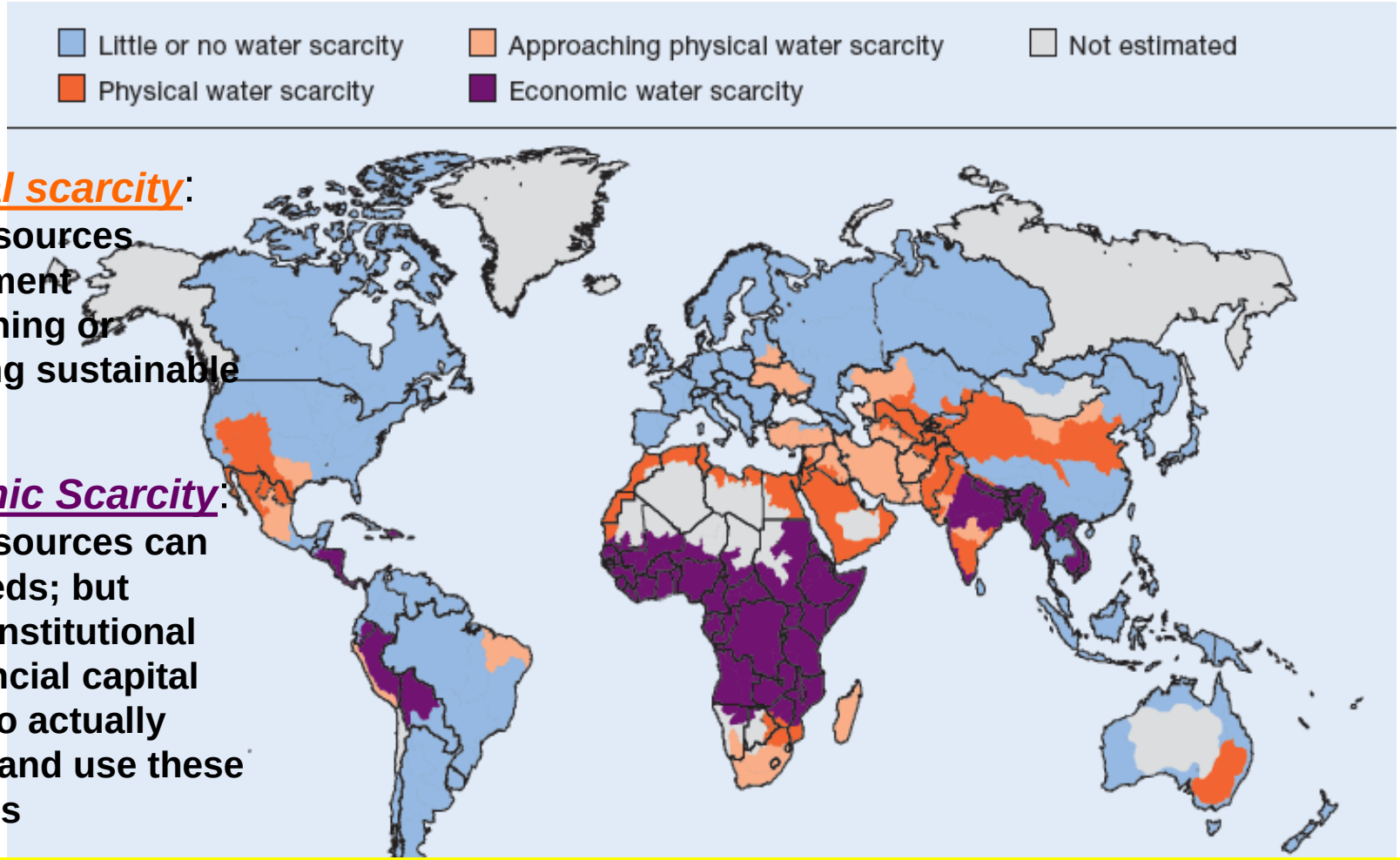
Water scarcity map



Physical scarcity:
Water resources development approaching or exceeding sustainable limits

Economic Scarcity:
Water resources can meet needs; but human, institutional and financial capital lacking to actually harness and use these resources

Note that *Country-level* scenarios could mask significant differences within countries

Source: Water for Food, Water for Life, IWMI, 2007

International Water Management Institute

Water for Food

People need many times more water for food than for domestic use.....

	Litres of Water
Daily Drinking Water	2 – 5 Litres of Water
Daily Household Use	20 – 500 Litres of Water
1kg of Grain	500 to 3,000 Litres of Evapotranspiration (ET)
Vegetarian Diet	2,000 Litres of ET Daily
Grain-fed meat Diet	5,000 Litres of ET Daily

Water for Food–Some Progress

- Average per capita daily food supply has gradually increased to 2800 kcal
- Global food production outpaced population growth; Increased access to water
- Land & water productivity improved: avg grain yields rose from 1.4 t/ha to 2.7 t/ha in past 40 yrs
- Irrigation has helped raise production and improve livelihoods

Irrigation: A mixed record

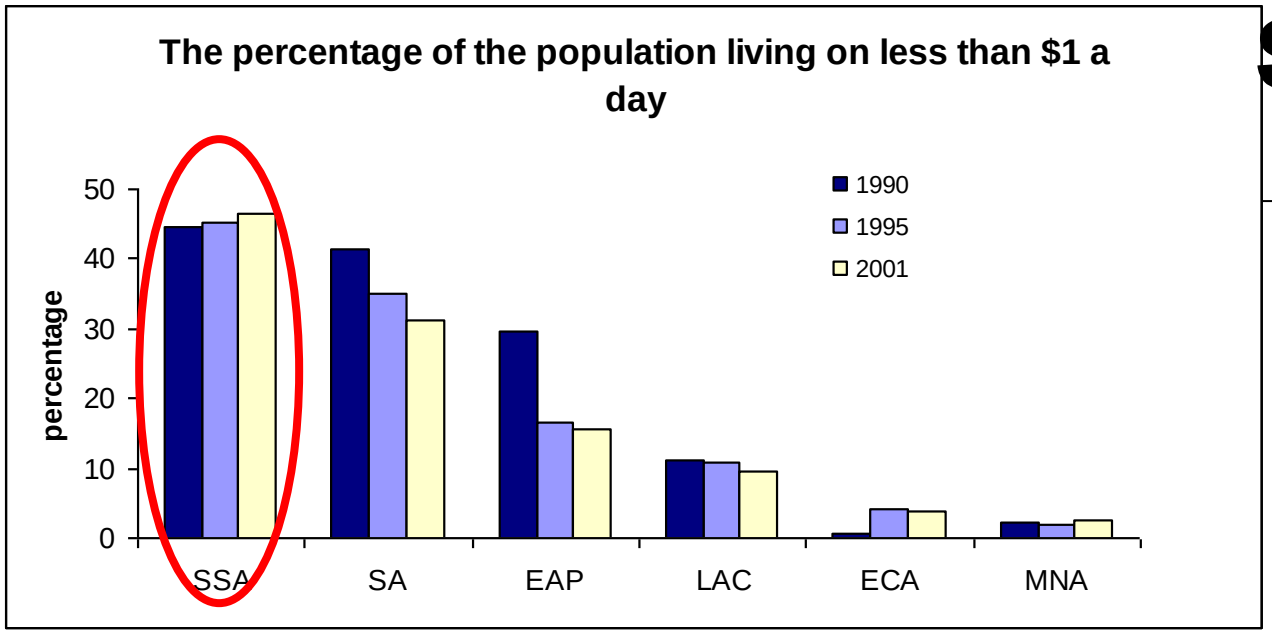
- Irrigation is a valuable agricultural practice:
  - Providing food security at affordable prices
  - Provides a means and pathway for rural and economic development
- Era of rapid expansion is over
- Returns to public investment generally disappointing esp. in large public systems
- Investments now more focused on rehabilitation & improvement of existing schemes
- Ecological impact record is not good (problems of drainage, waterlogging & salinization adversely affect productivity)

Water for food: Some unfinished business

- Globally, over 850 million malnourished people; major food security issues
- Persistent poverty, unequal distribution of benefits
- How to enhance livelihoods of rural poor (e.g. in sub-Saharan Africa, 65% of rural household income derived from farming or farm labour)
- Need to maintain or increase resilience of food providing ecosystems
- Minimize/prevent environmental degradation e.g. loss of wetlands (drainage for agriculture); polluted rivers
- Deal with rising food prices & costs of energy

Sub-Saharan Africa Situation & Challenges

SSA Poverty

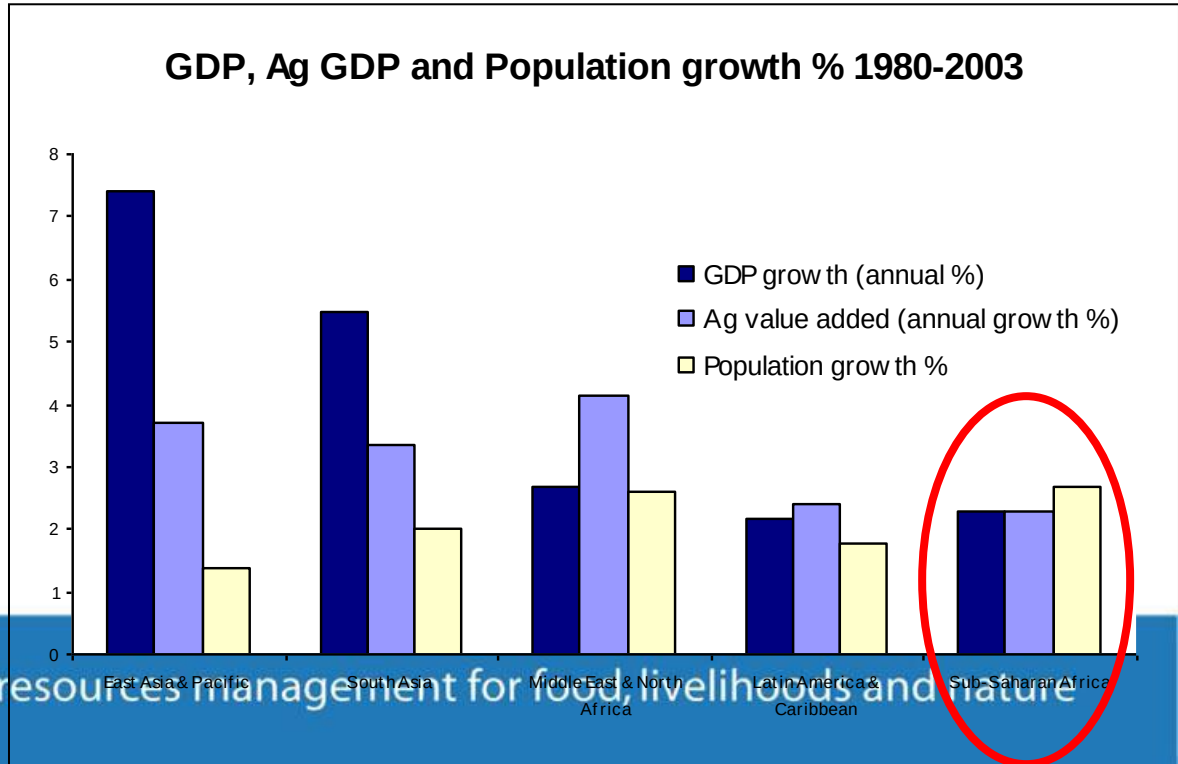


SSA is the poorest region in the world; proportion of poor people increasing

(Source: NEPAD 2005, based on WB data)

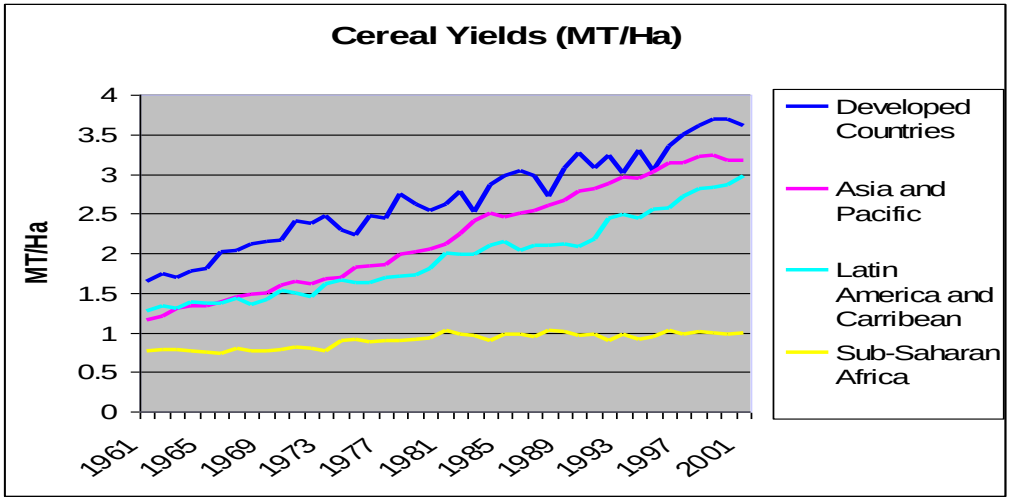
Population growth in SSA is outpacing growth of both overall & agricultural GDP; population has become poorer

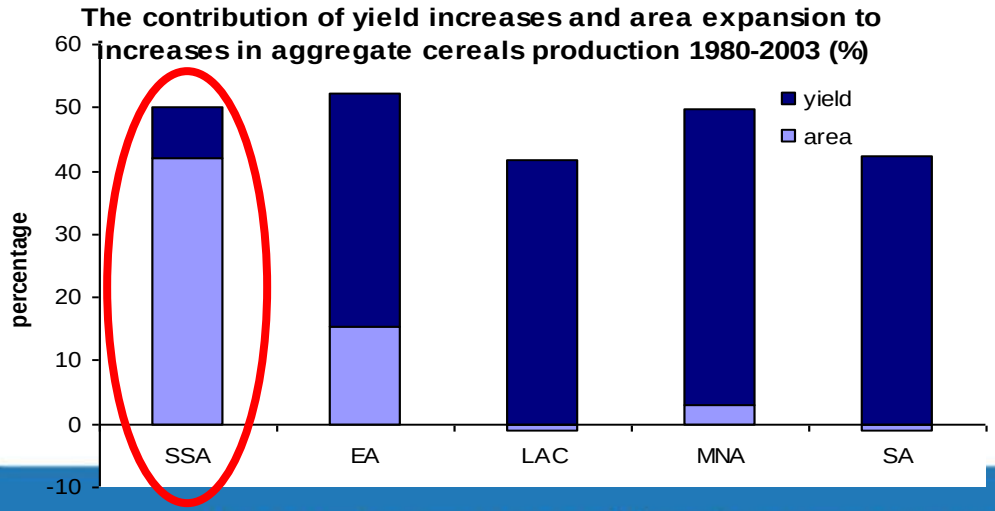
(Source: World Bank)

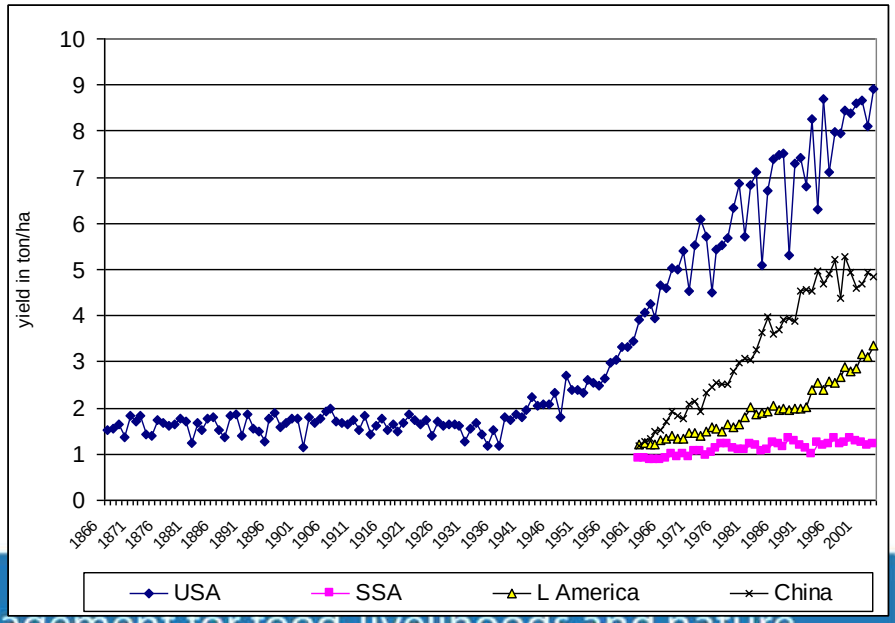


Low Agricultural Productivity

- Agricultural productivity in SSA is low & stagnant
- Production growth so far has been achieved mainly via land expansion

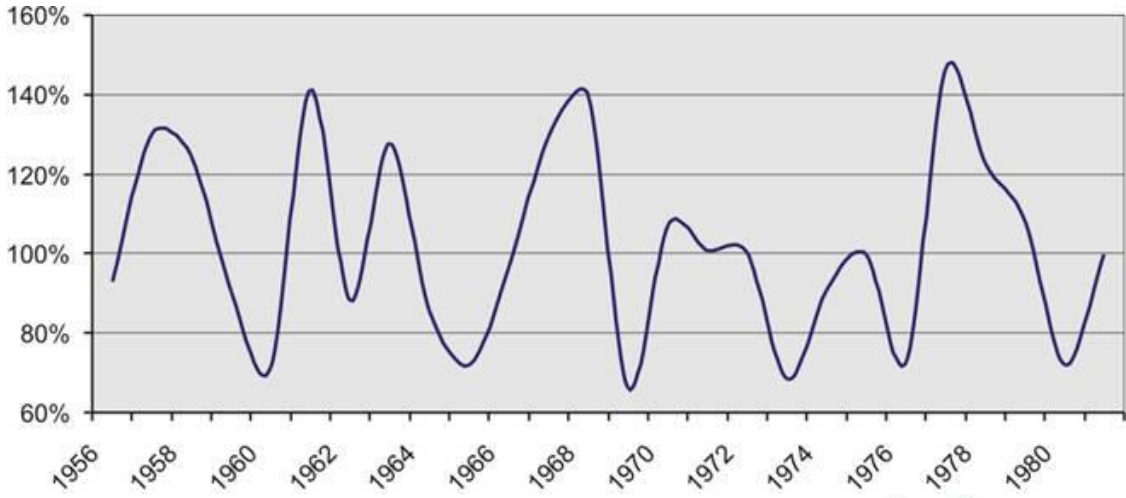






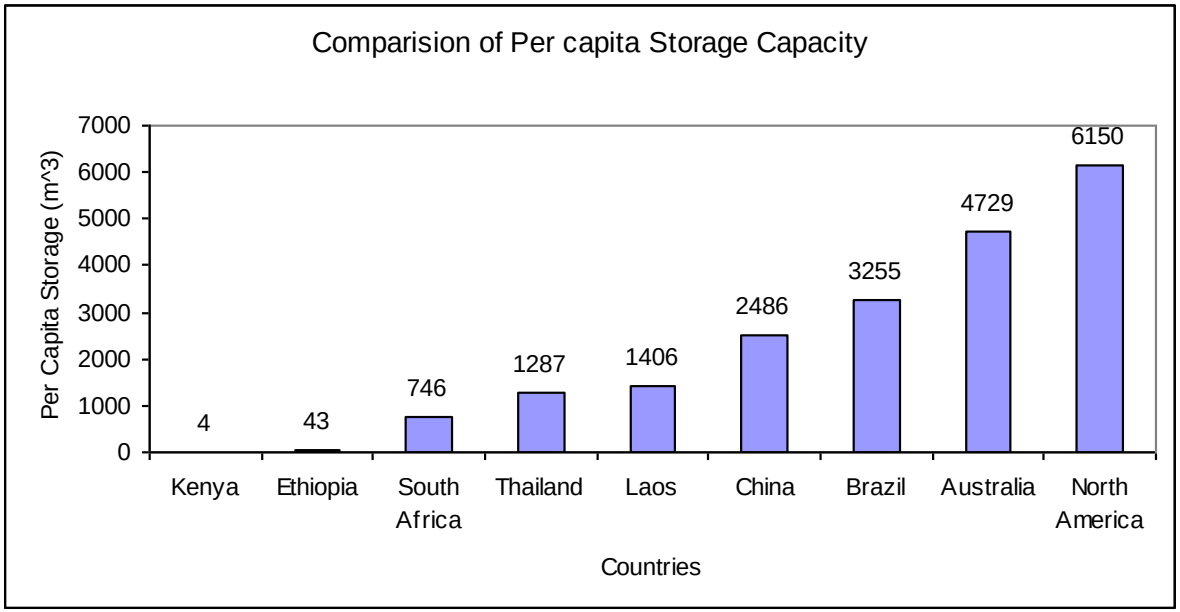
Vulnerability to Climate Shocks

- Extreme climate variability; droughts & floods ➔ complex hydrology!
- Loss in production, infrastructure, and increased poverty
- Increased dependence on food aid



Kenya rainfall variability

Scope for Water Development

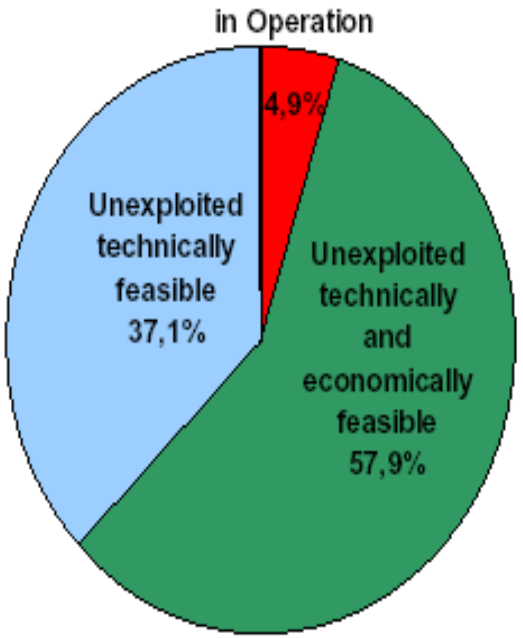


- **Low level of water withdrawal: 3.8% of water resources developed (for water supply, irrigation and hydropower use)**
- **Low per capita water storage facilities**
- **Limited ability to cope with runoff variability affects economies and GDP**
- **Increased storage (of all types) & spatial redistribution of benefits needed for meaningful development**

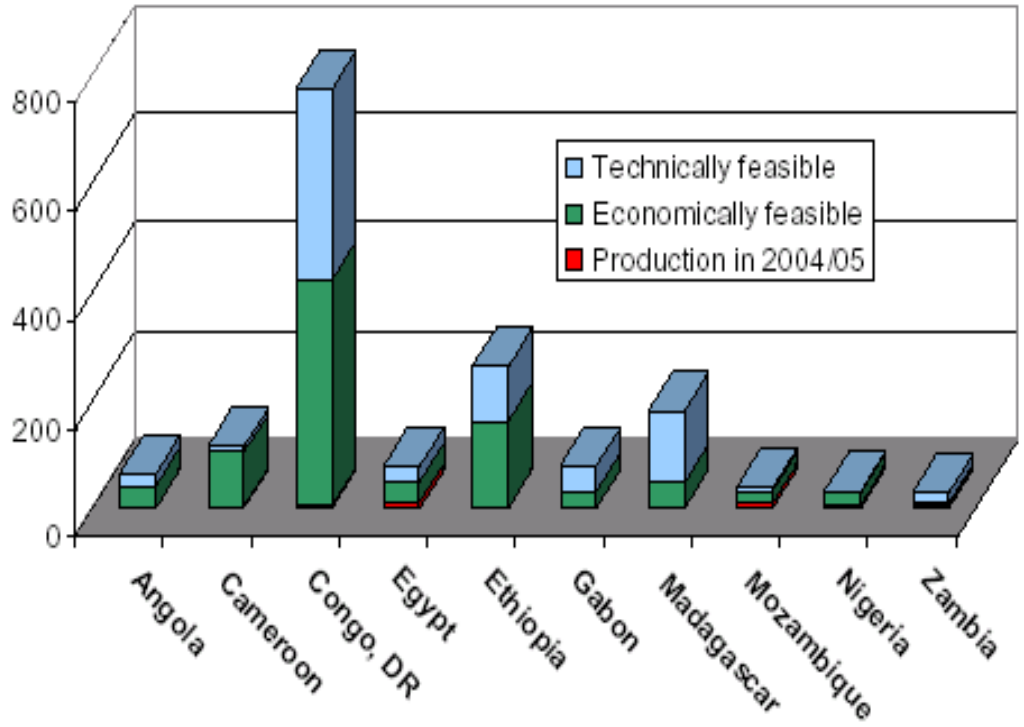
Significant HEP potential

African Hydropower Potential

Total African Potential: 1.750 TWh



Data for Top 10 Countries in TWh



Source: Hydropower Outlook for Africa (BMZ, 2007)

Development Imperatives

Meeting the Food Security Challenges: Options & Responses

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Improving water and land resources management for food, livelihoods and nature

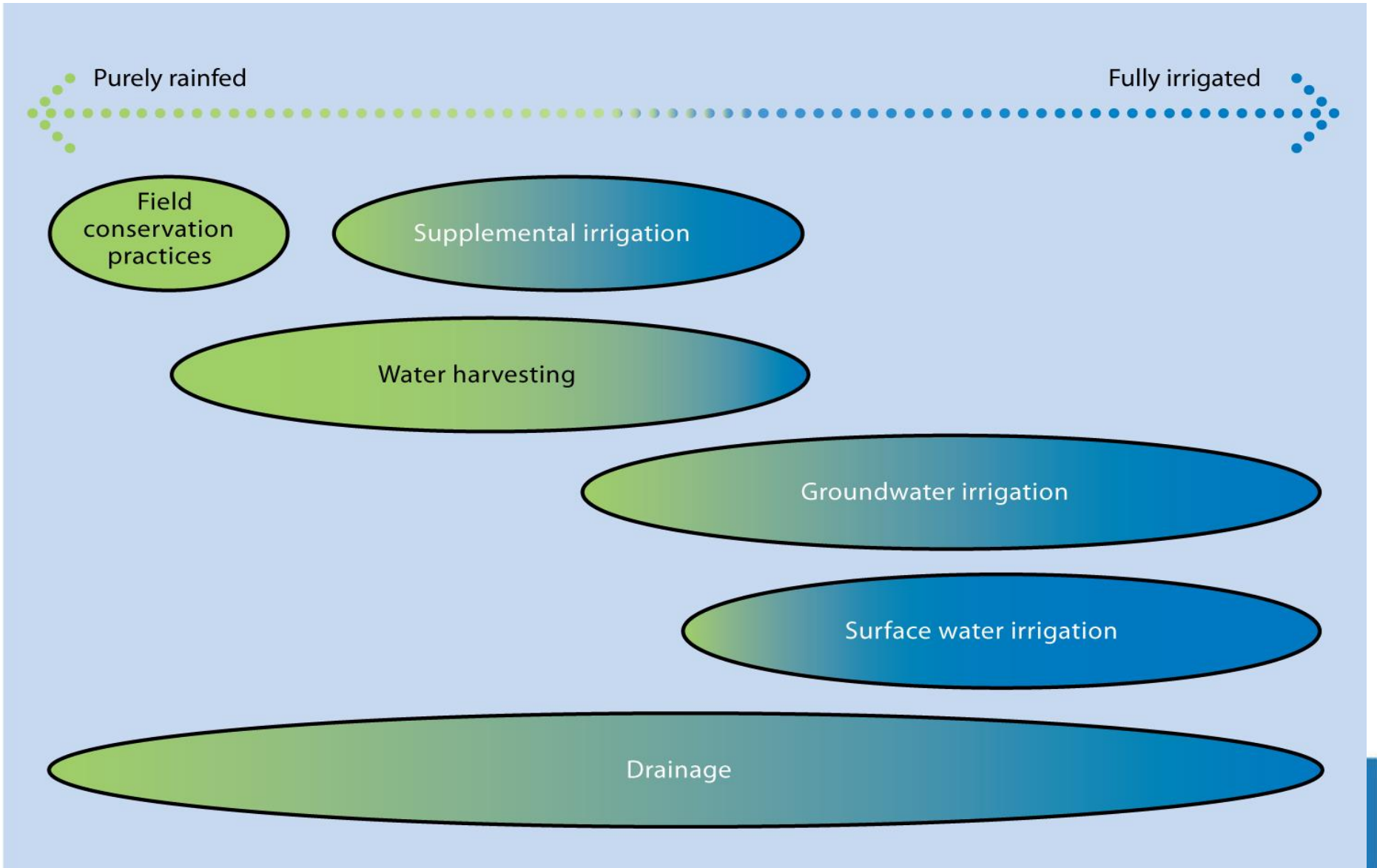
Water for food: Meeting the challenges (1)

1. Develop more water by increasing storage and diversion facilities
2. Deplete more of the developed water supply for beneficial purposes (e.g. through water saving practices)
3. Recycling & reuse of wastewater
4. Investing in irrigation ➔ *divert more «blue water» from rivers and aquifers*
   - Improved system management, infrastructure development, groundwater development
   - Increasing water productivity and value per unit of water; integrating multiple uses incl livestock & fisheries

Water for food: Meeting the challenges (2)

5. Invest in rainfed agriculture ➔ *use more «green water»*
   - Increase productivity in rainfed areas through better mgt of soil moisture & supplemental irrigation
   - Improving soil fertility mgt
6. Encouraging agric trade within & between countries (e.g. virtual water concept)
7. Manage demand: revisit diets, reduce post-harvest losses from «farm to fork»
8. Increase water productivity by producing more output per unit of water depleted

A range of agricultural water management options



Key actions to upgrade rainfed systems

- *Technology* - Make water available to crops at critical times – water harvesting, supplemental irrigation, in-situ methods to reduce evaporation.
- *Capacity* - Build capacity for water management in rainfed areas
- *Policies* - Expand water & agricultural policies and institutions to include upgrading rainfed; rainwater management needs to be specifically included in management plans at the meso (sub basin/catchment) and basin level

Micro-agricultural water management technologies

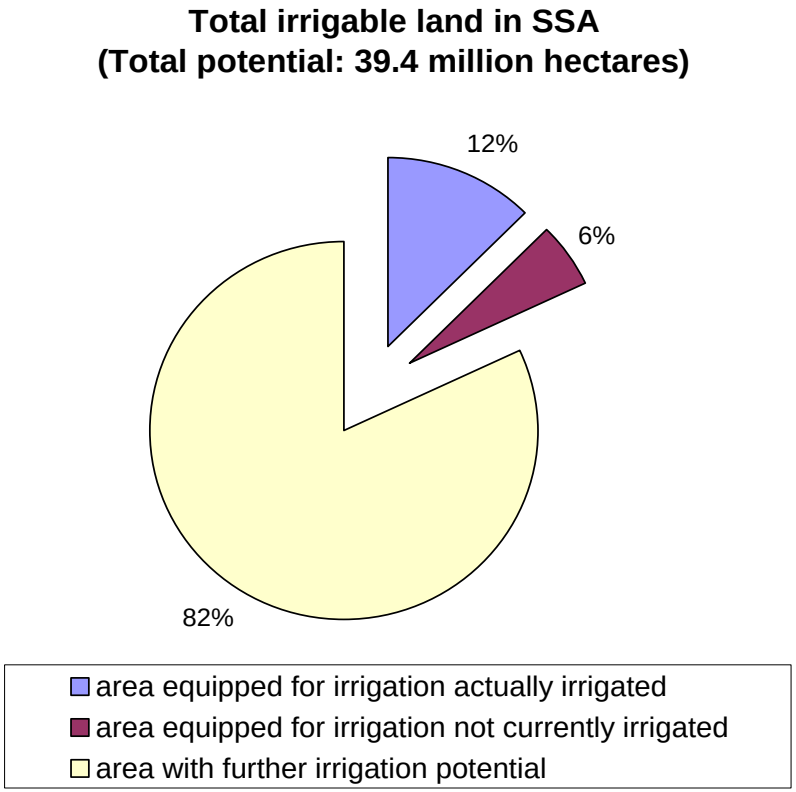
- Low-cost, small-scale technologies & practices to capture, store or drain water, lift and transport it, and apply it to crops in the field

In-field application and management of water and land is the common denominator

Why is micro-AWM important?

- Highly variable/unreliable rainfall combined with poor soil fertility is a major impediment to improving and stabilizing agricultural production
- Possible for irrigation to address the above problem. But formal irrigation is relatively expensive & has a mixed record in Africa
- Low-cost small-scale technologies and practices are a promising alternative:
  - ✓ Relatively low cost per household
  - ✓ Rapid impacts: minimal gestation period
  - ✓ Individualized—lower transaction costs than communal or government irrigation
  - ✓ Lend themselves to targeted, market-based promotion
- Not a panacea, but high potential intervention if done right, in the right circumstances

Untapped Irrigation Potential



Only a small share of the potentially irrigable area has been developed in SSA *(Source: FAO 2005)*:

Out of the 39.4 million ha potentially irrigable, 7.1 million ha (18% of the potential) – are under irrigation.

Costs & performance of donor funded irrigation projects in SSA

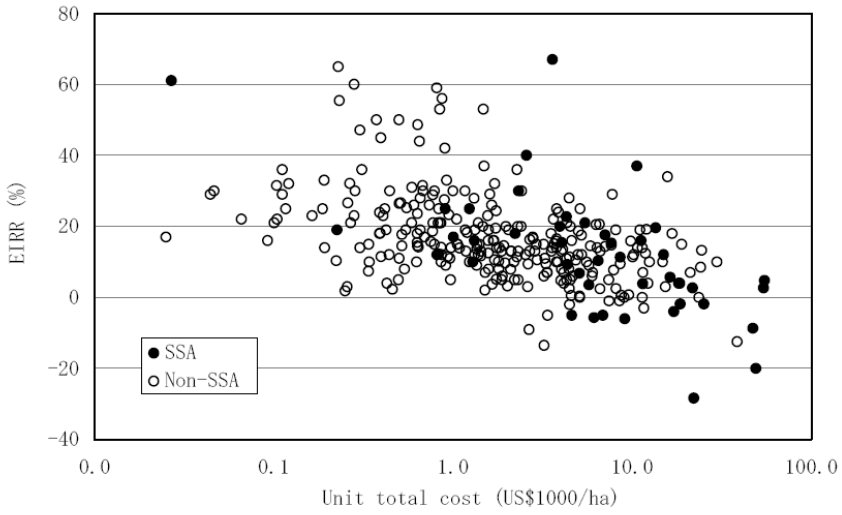


Figure 3. Unit total cost and EIRR of sample irrigation projects, r = -0.5

- Study of 314 irrigation projects completed 1965 - 2003
- Unit costs of successful projects (EIRR ≥ 10%) in SSA comparable to those in South Asia
- Project size is a key factor determining project performance
- Small-scale irrigation schemes tend to cost less with better economic returns
- Irrigation components embedded in sector-wide projects perform better & cost less
- Farmer-managed systems perform better & with lower unit costs

Source: *Collaborative Study-Ag Water Investments in SSA (AfDB/FAO/IFAD/IWMI/World Bank)*

Despite failures in the past, irrigation projects in SSA can be a good investment if properly designed & managed

Some Conclusions of Collaborative Program

- Adopt balanced approach: target investments to exploit potential in both rainfed & irrigated agriculture
- Costs of irrigation in Africa not necessarily higher than elsewhere - but must improve design, planning, implementation & monitoring of projects
- Invest in increasing productivity and profitability of existing schemes plus new construction of large, medium, small and micro-scale irrigation schemes
- Promote testing and scaling-up of technologies for rainwater management
- Harness untapped potential of private sector to complement public investments
- Improve project design, implementation and management capacities:
  - pay more attention to factors contributing to good performance
  - account for health & environment impacts
  - M&E of performance of agricultural water investments to provide the basis for scaling-up of successes
- Recognize and exploit high potential synergies from integrated approach: livestock, multiple use water systems, market-driven linkages

Points for Discussion

Improving agricultural water productivity poses many challenges …

Integrated approach to Agricultural Water Management

- Performance and productivity: how to use the water available in a basin to its greatest advantage (e.g. how to minimize outflows of water that do not contribute desired returns)?
- Consider entire spectrum of agricultural water management investment options
- Recognize multiple uses and users of water: energy, drinking water, environment, industry, agriculture ... Deal with rising competition and shift of water from agriculture to other (higher value?) uses
- Need to understand dynamics within & across field, system and basin scales

- Assess upstream-downstream interactions plus impacts of proposed interventions: scaling-up?
- How to increase the economic productivity of all sources and qualities of water – surface water, groundwater, rainfall, wastewater, ….?
- Recognise key role of reliable data as basis for sound management & decision-making
- Develop and implement appropriate policy and institutional reforms when required


Thank you