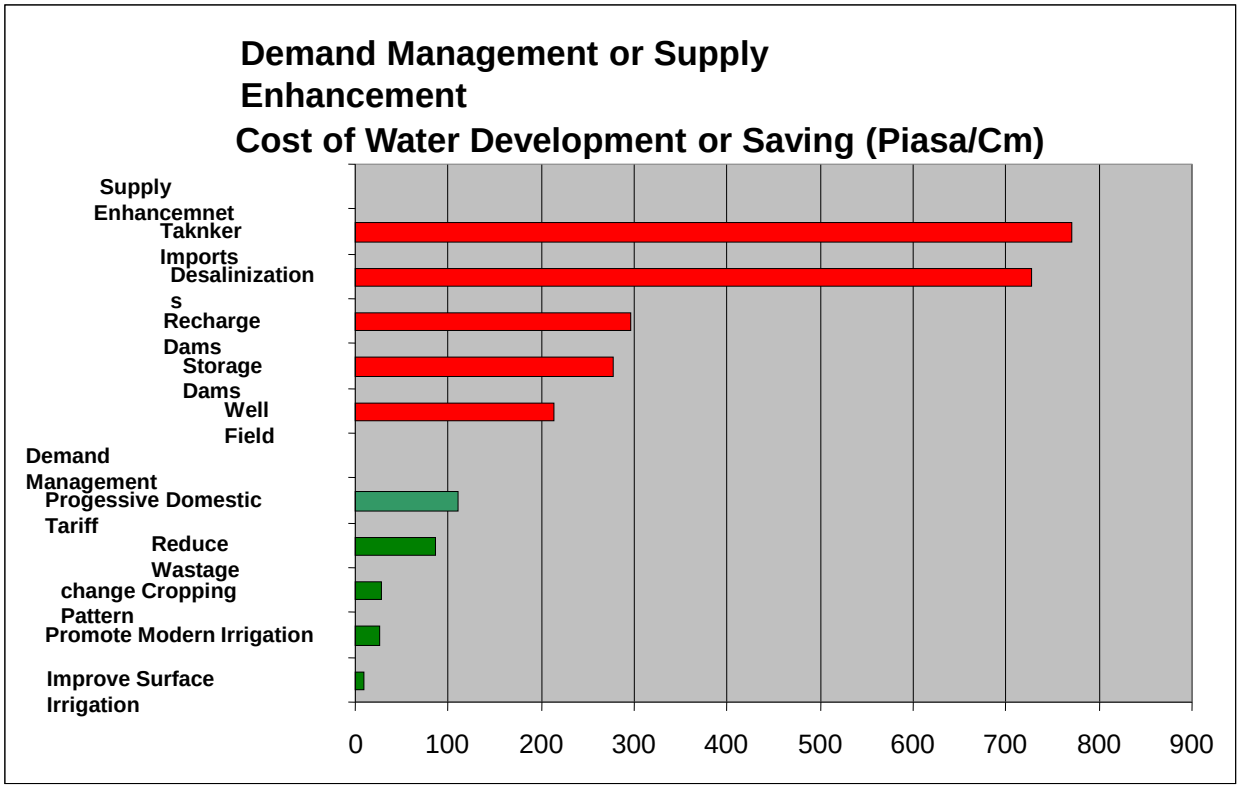
Capacity Building in Agriculture and Water Policy in the COMCEC Region



Dr. Mahmood Ahmad

International Consultant on agriculture water policy

Senior Policy Officer ,

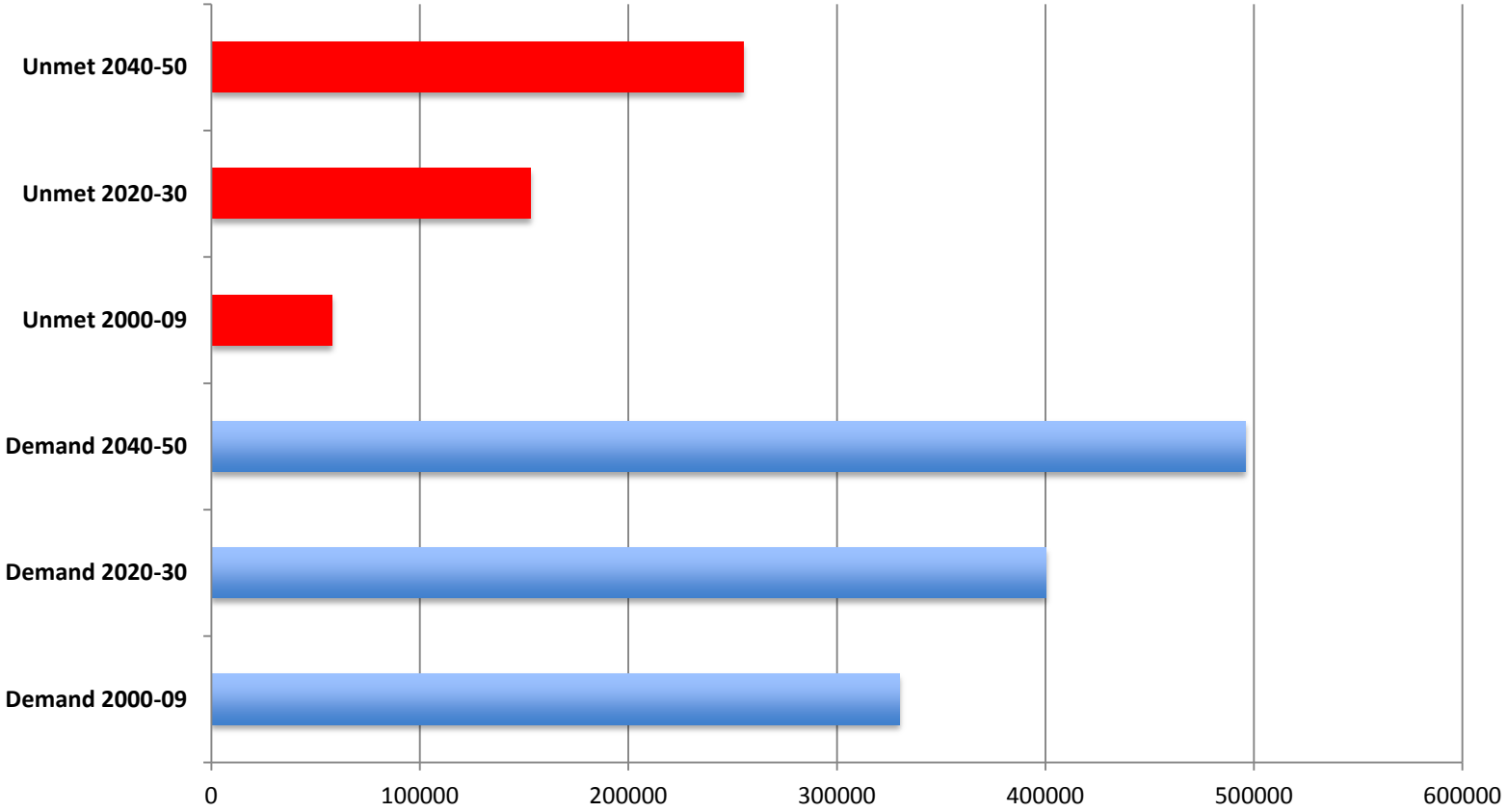
FAO Regional Office, Cairo (Retired)

Water/Irrigation Issues at Macro levels

- Supply and Demand Gap Growing
- Massive investment in water/irrigation with impact less than expected
- Agriculture use good 86 % of water and wastes the most and pays the least
- Massive subsidy which is unsustainable
- Water wastage at all levels
- Climatic changes are putting added pressure
- Food security, water and energy nexus

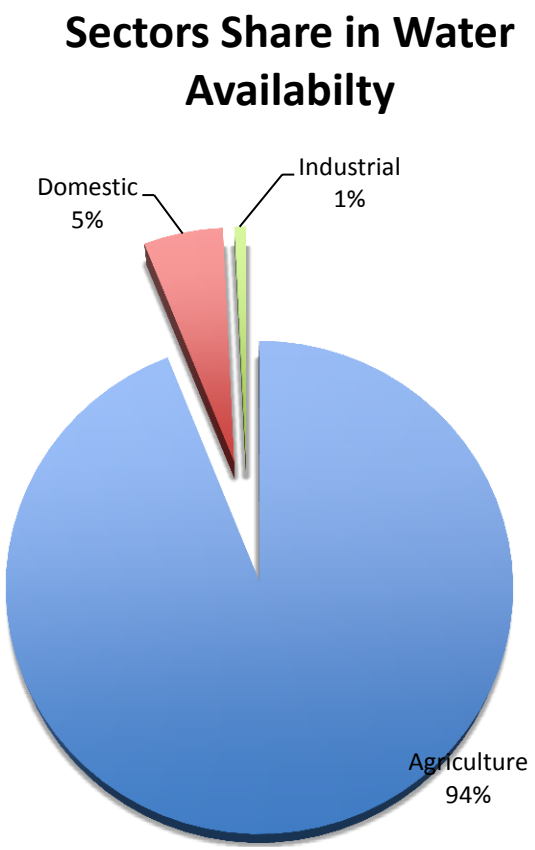
The Growing Unmet Demand

Figure: Current and Future Water Demand and Unmet Demand Gap under Average Climate Projection *(MCM)*



How we use our water

- *Population growth and nutritional improvements are driving up demand for agricultural water.*
- *Water Demand in competing sectors is increasing*
- *We hardly talk about water for environments*



Role of International Institution

In the context of today topic on Agriculture Productivity and Capacity building

- FAO is concerned with sustainable use and conservation of water in agriculture. It has acknowledged the need to address issues of water in a cross-sectoral way

We supported

- Integrated water resources management (IWRM)
- We initiated water policy support to member countries

Provided Support

- Information and knowledge (AQUSTAT)
- Policy advice
- Technical support to countries and their constituents.

This was achieved through technical assistance and backstopping and the provision of Consultants and Experts according to needs

FAO Regional Office supported

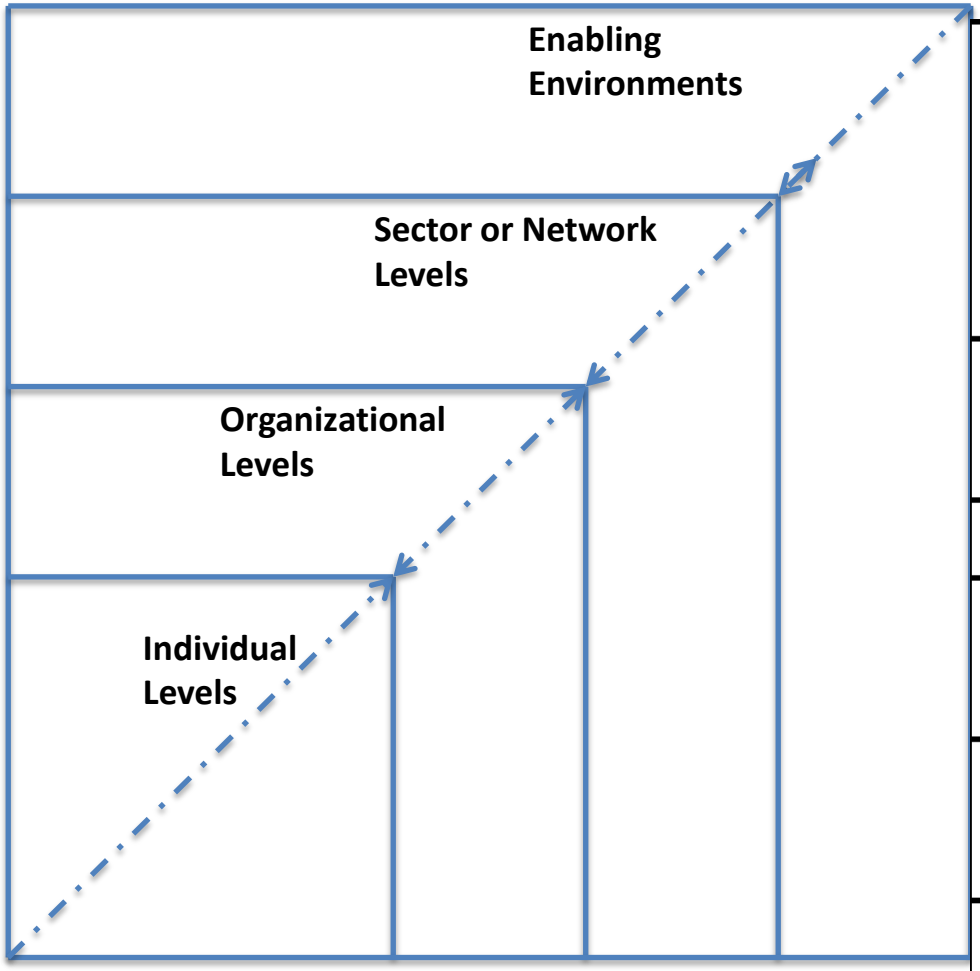
- Selected members countries in analyzing irrigation/water policies issues as part of preparing agriculture strategies. These were donar supported activates
- FAO/RNEP/others, also supported capacity building in water policy by organizing training courses at
- Regional levels
- Sub-regional levels and
- National levels

Take pride: In developing activity in support with other donors was initiated by FAO Regional office lead by the speaker with focus on demand management

The perspectives of international institutions

- Past emphasis of institution was to support supply enhancement, with growing water scarcity the role of integrated approach and more specifically on water demand management was clear and scope for sizable work
- Emphasis is placed on capacity building through training programmes, seminars, networking and information sharing among national and regional research and development agencies.
- Inlight our programme

Framework for Capacity Building in Water



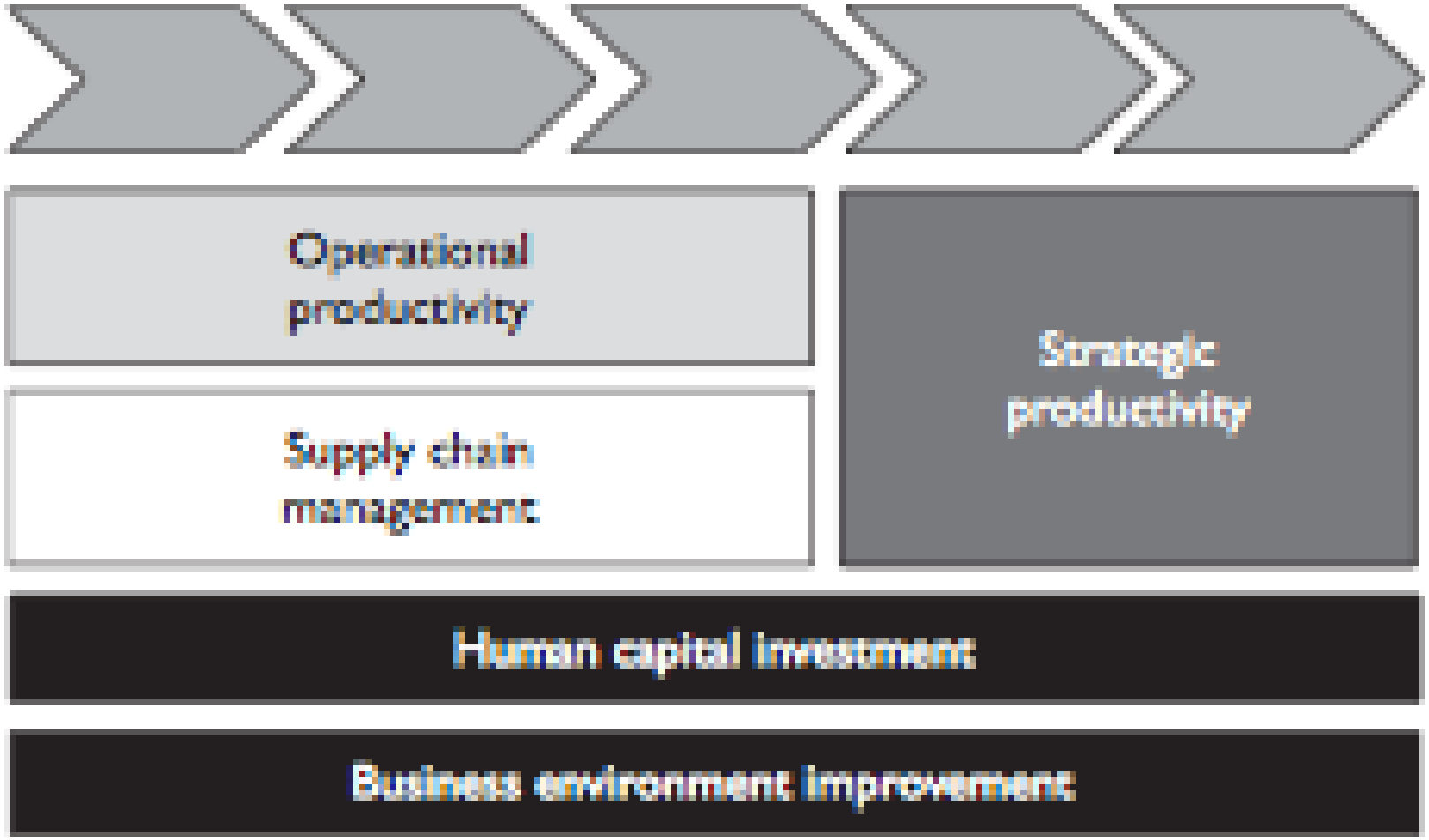
Capacity Levels	Irrigated Agriculture Activity						
	Research	Education and Training	Planning	Design	Construction	O&M	Networks
Enabling Environments							
Sector Levels							
Organizational Levels							
Individual Levels							

Capacity Building- Key Area

- Improving agriculture productivity
- Integrated Approach to water management (EE)
- Water demand management (EE)
- IMT (OR)
- New areas (Climatic Changes, Water-Energy-Agriculture Nexus)

Improving agriculture productivity

Productivity in Supply Chain

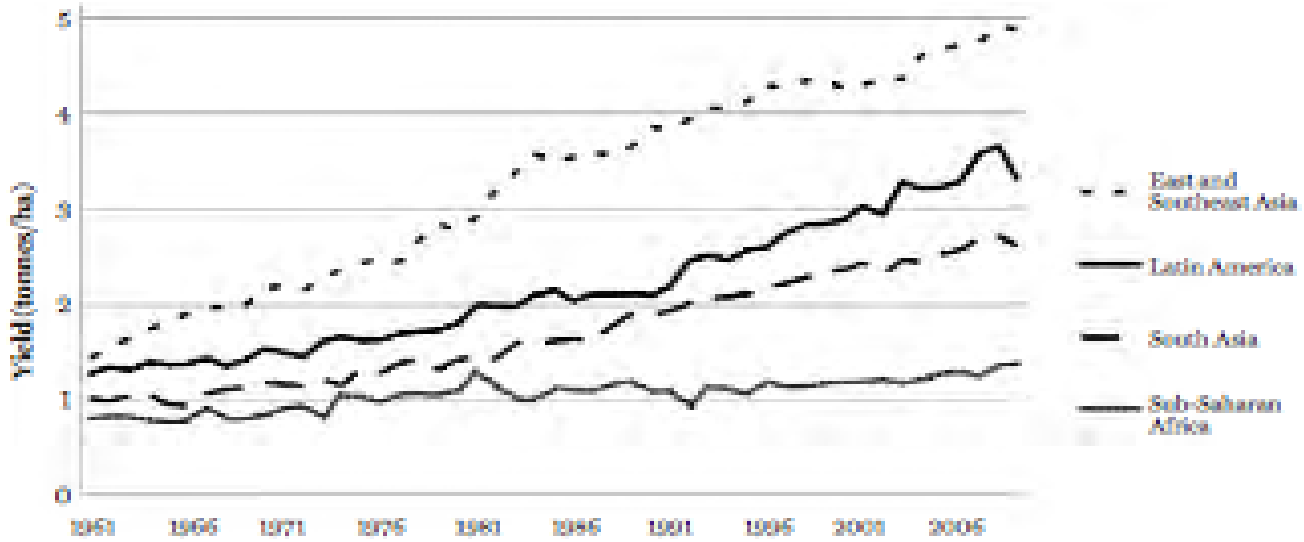


Productivity in Agriculture is central Issue

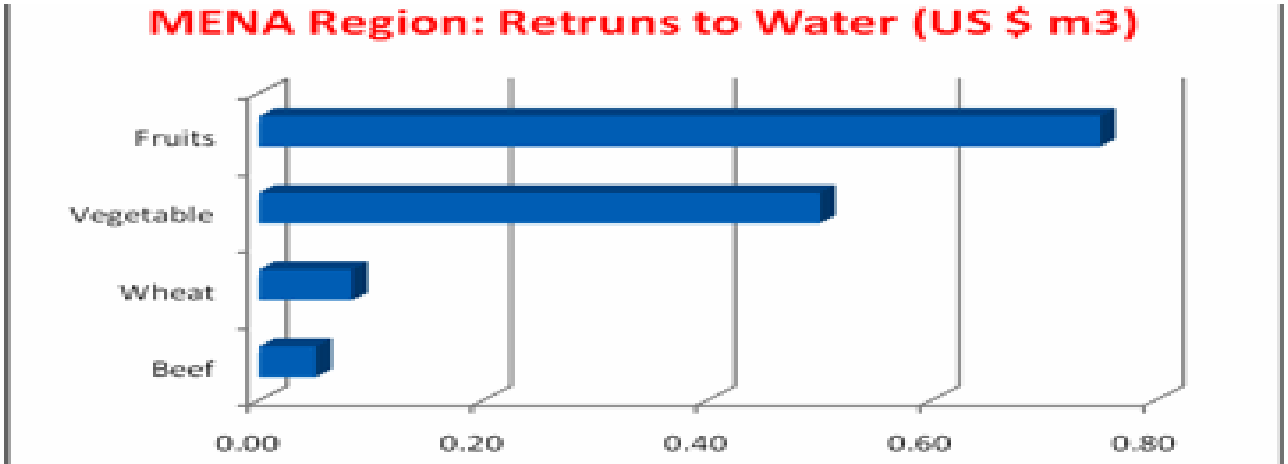
- **Productivity is the main determinant of economic welfare (I.e. living standards)**
- **Reduce reliance on comparative advantage**
- **Strive to create sustainable competitive advantage**
- **Move toward higher value-added**

Key Productivity Indicators

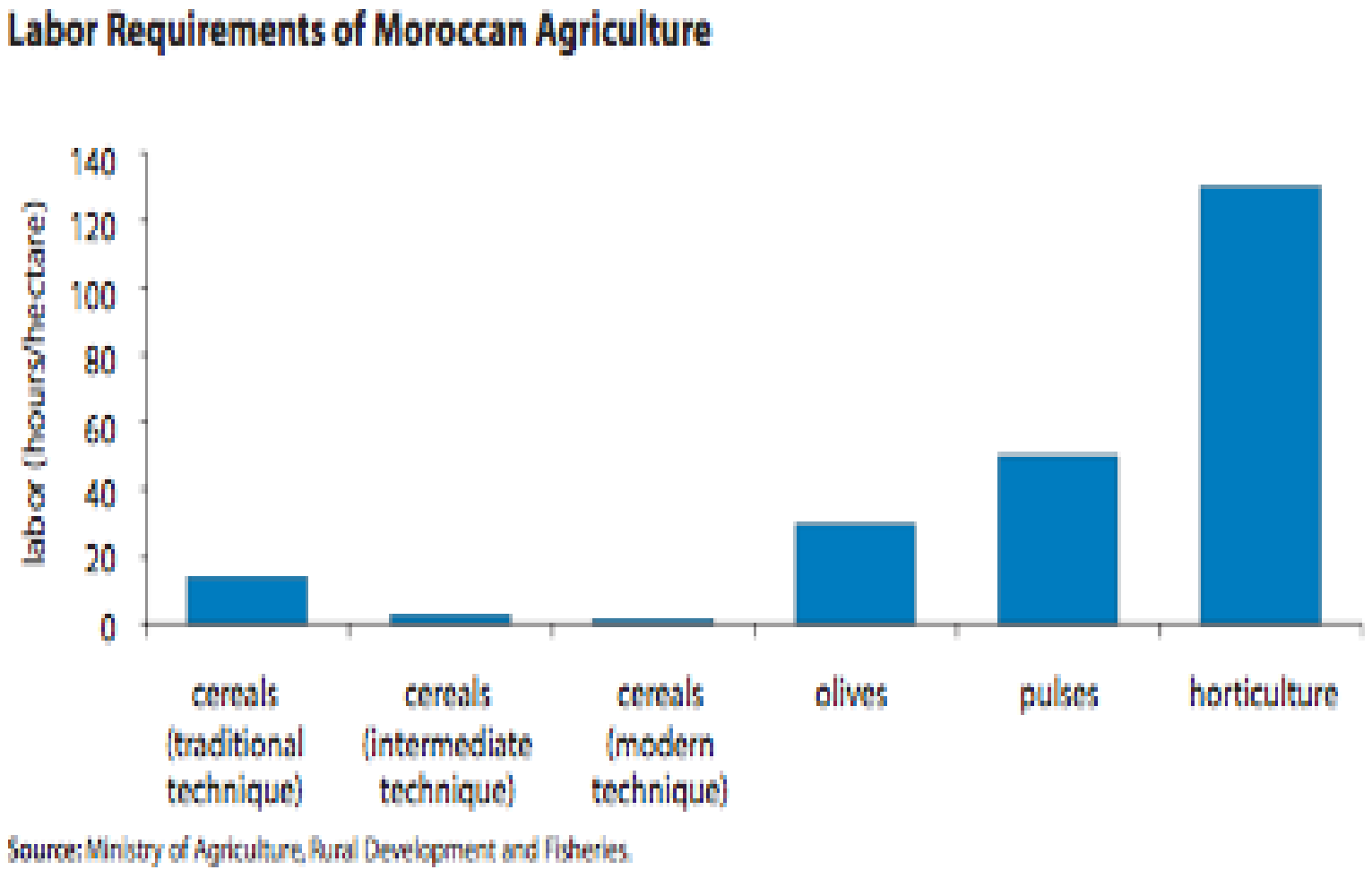
Land Productivity- Yield per unit of land



Water Productivity

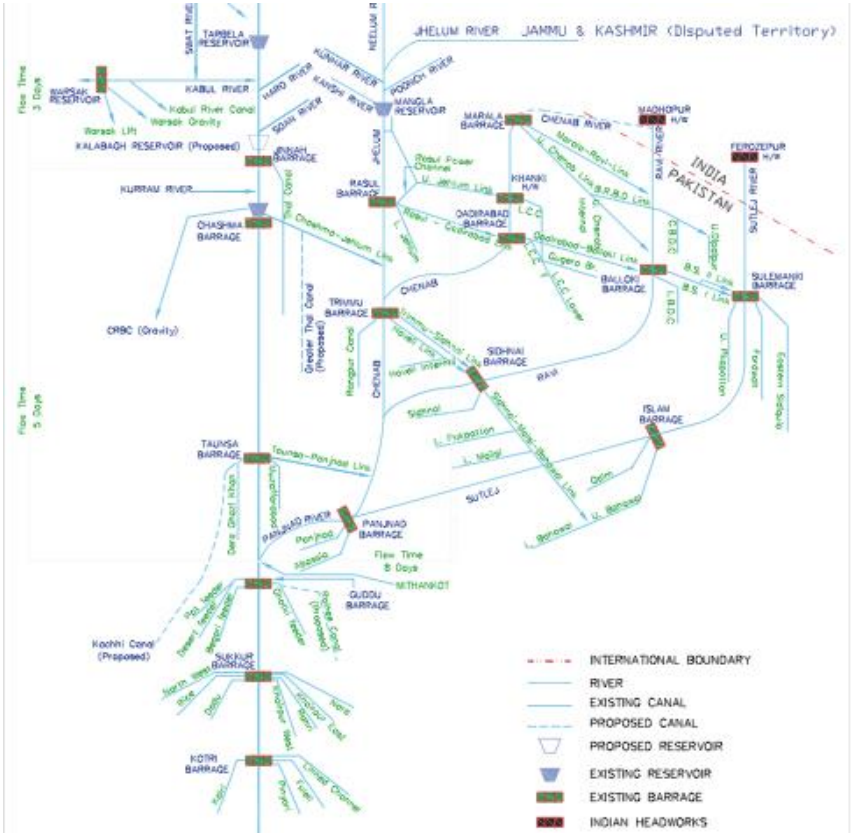


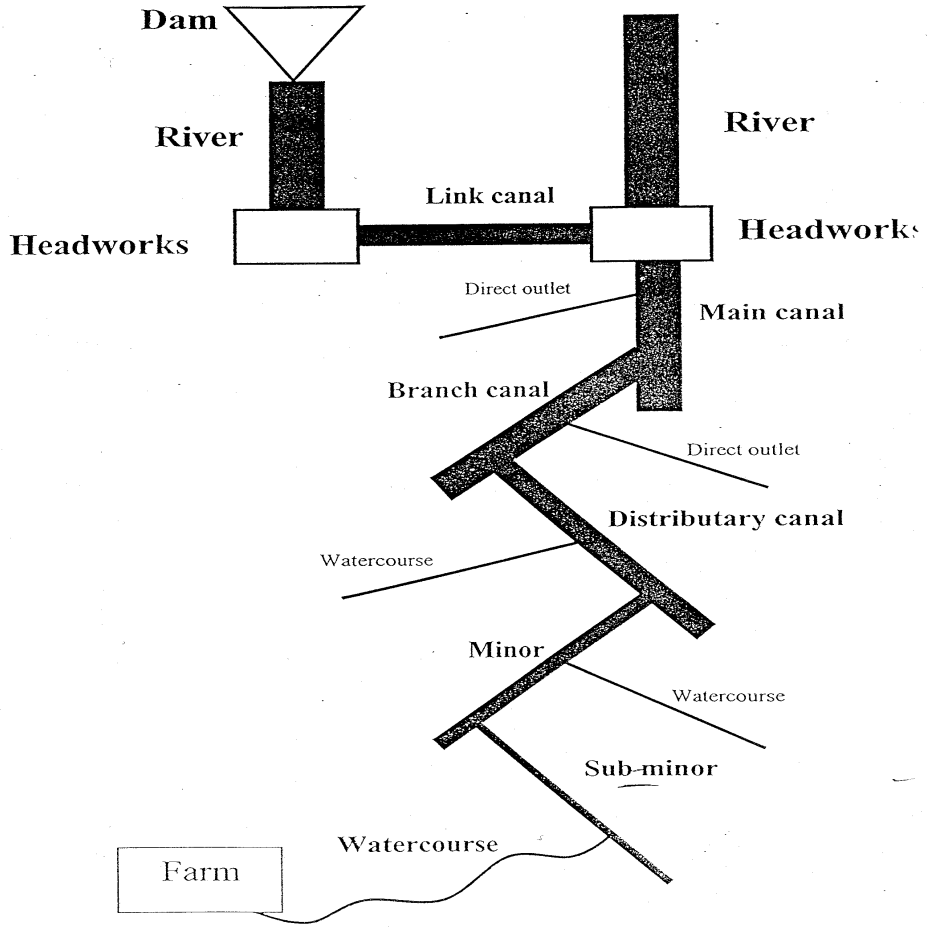
Labour Intensity



Integrated Approach in Water Resource Management

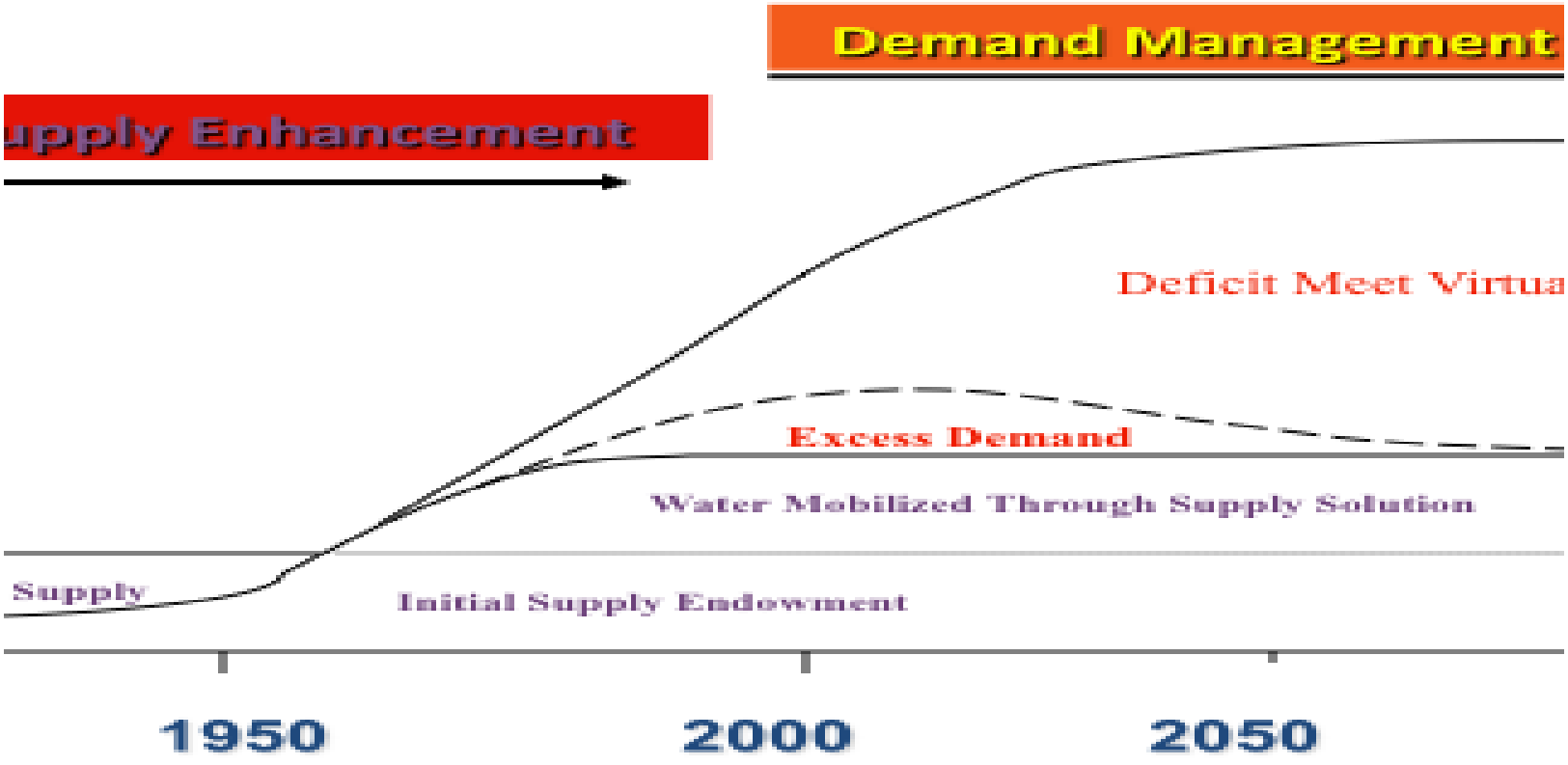
Massive Investment without view to IWRM: Supply Driven System; No substantial Improvement in performance; interventions are not carried out in coordination with each other ; poor goverance; technical improvement and management transfer are implemented without adequate capacity building across different management levels



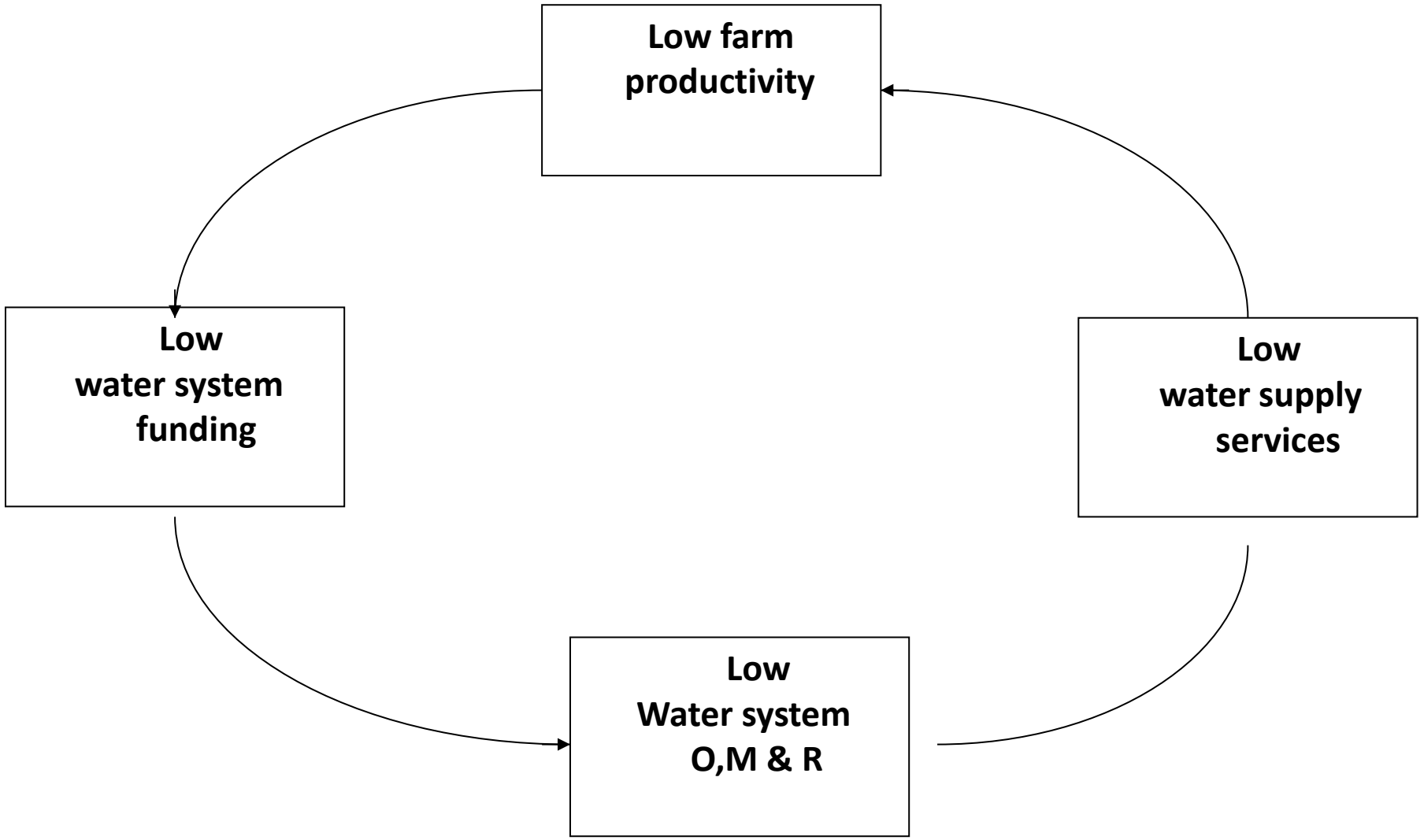


Macro Level
Push for Supply enhancement

Issues: What happened over time



Irrigation Issue at Micro Levels
Cycle of Financial Deficiency



Water Demand Management

Massive Subsidy

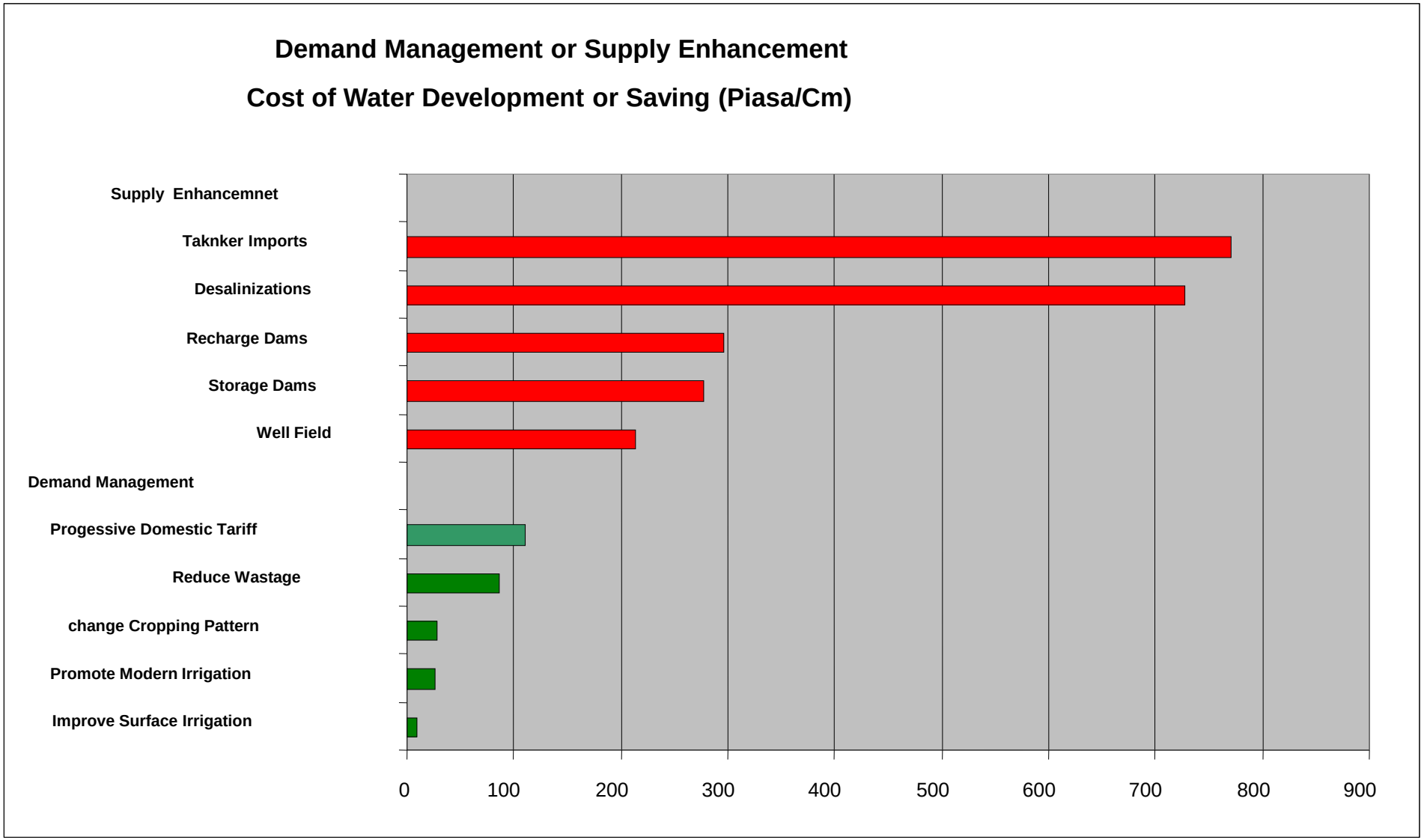
Irrigation water developed by the public sector is priced at only one-tenth of the actual cost of water produced by the private sector (Rosegrant, Gazmuri Schleyer, and Yadav 1995).
Annual irrigation subsidies are estimated at US$0.6 billion in Pakistan, US$1.2 billion in India, and US$5.0 billion in Egypt (Bhatia and Falkenmark 1993).

- Overuse of irrigation water.
- Lack of resources for operation and maintenance (O&M)
- 70% budget spent on operational costs
- Poorly maintained irrigation system
- Financially non-sustainable

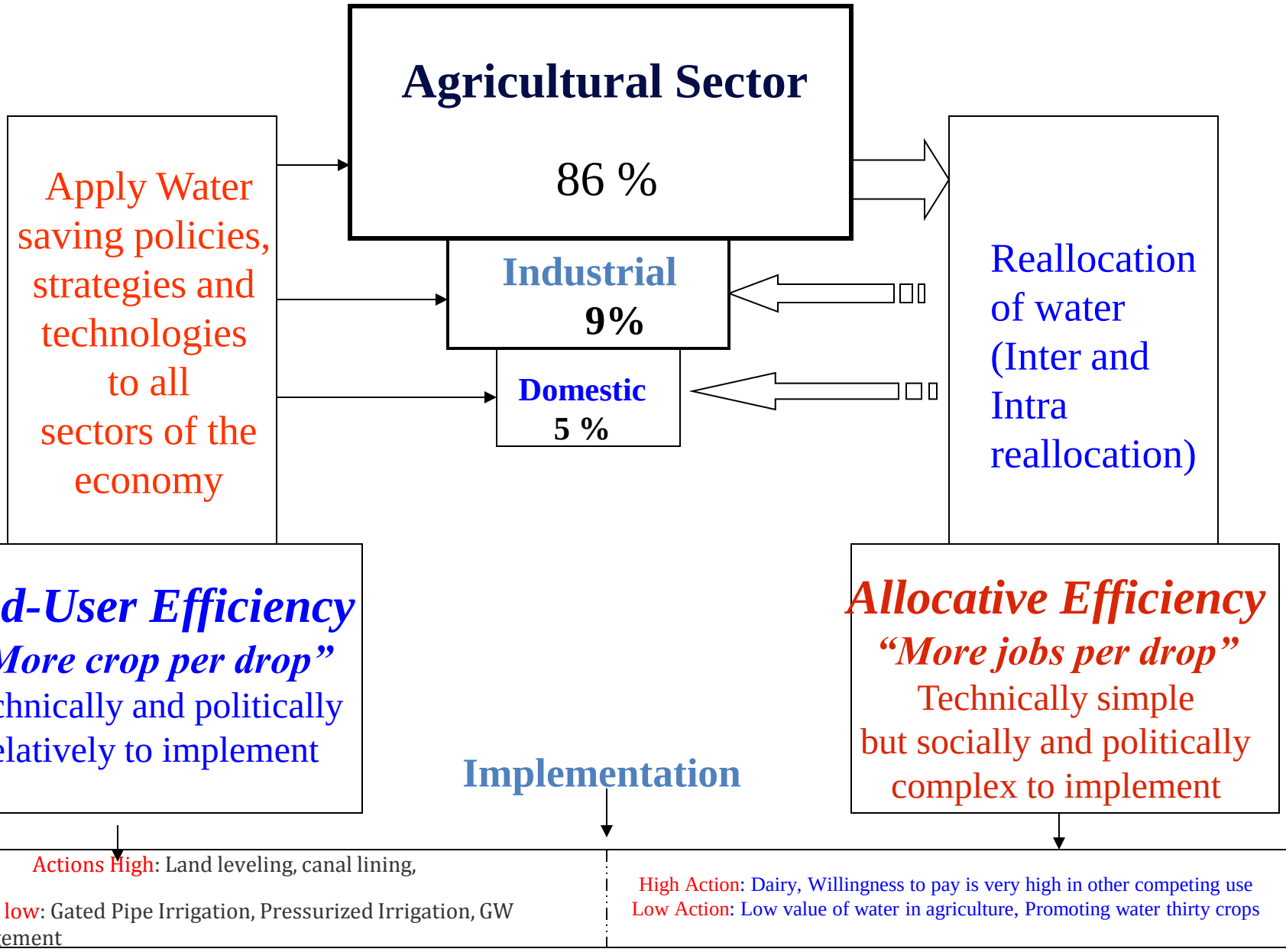
More research work needed

- In short to medium term Demand management is viable option
- According to WB, a 10 percentage point reduction in losses in the watercourse command is more than two dams on the Indus River.
- No quantitative studies exist to assess water saving that can be generated through reallocation of water within and among sectors

Water Demand management in prudent policy largely neglected

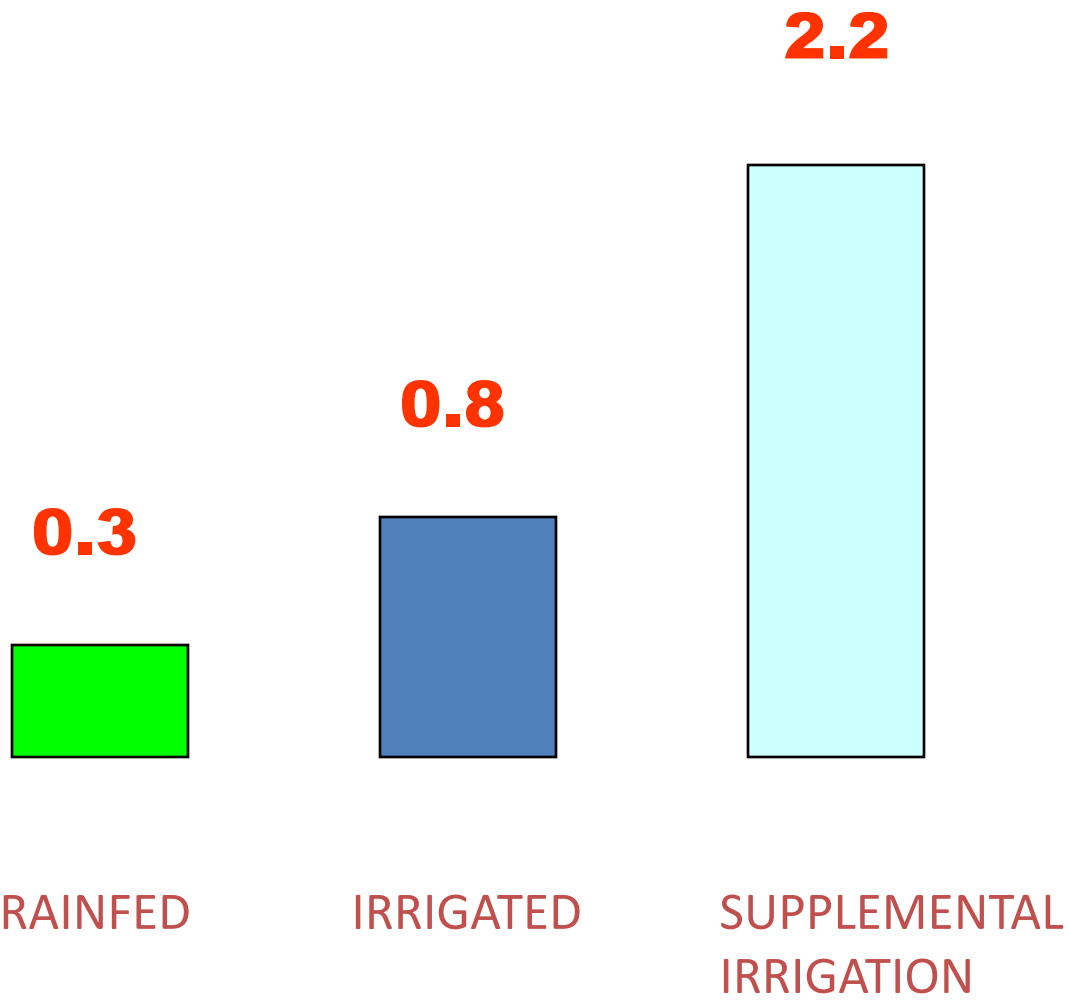


Demand Management Policies

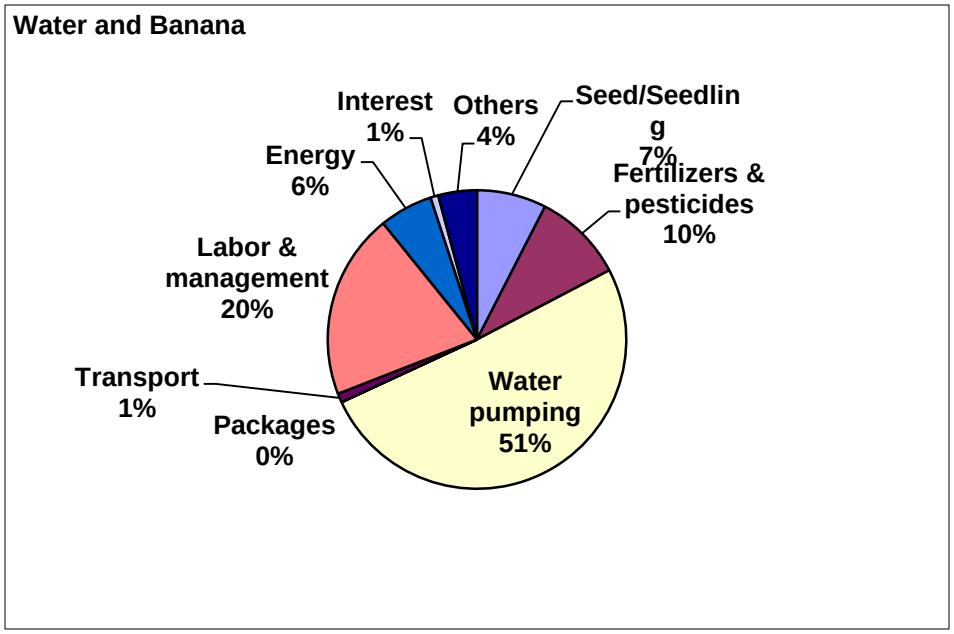


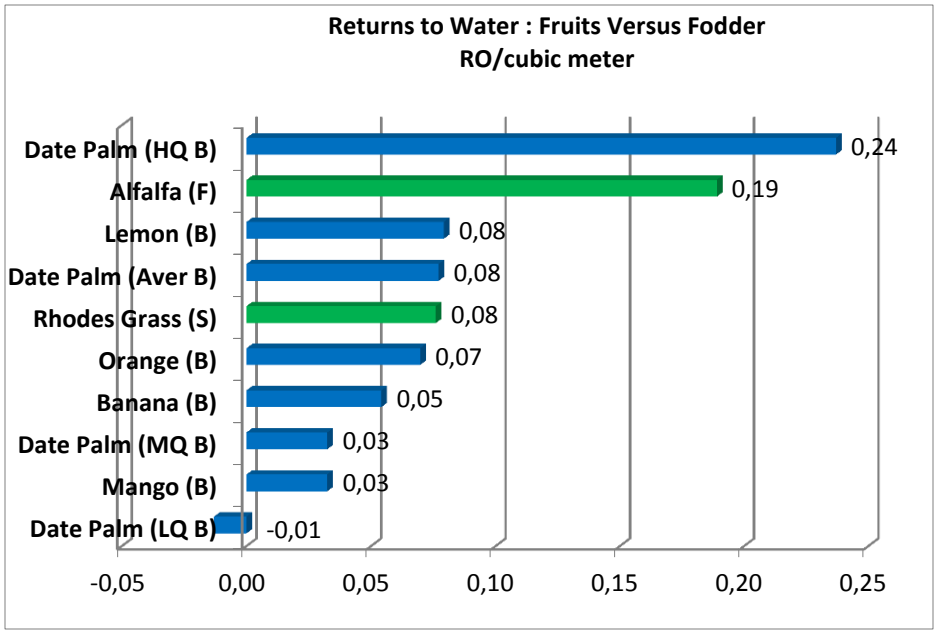
Crop yield per unit of water

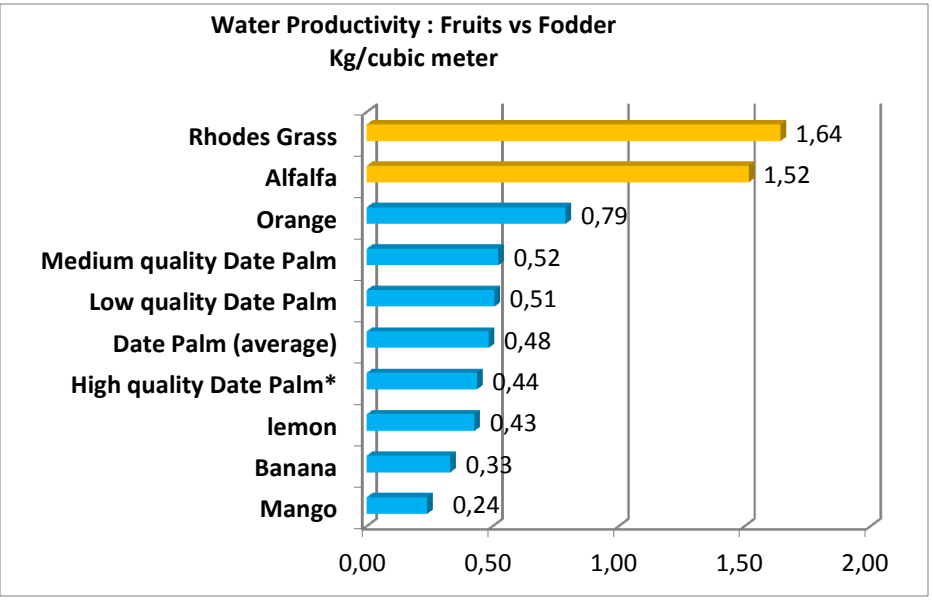
wheat kg/cu.m

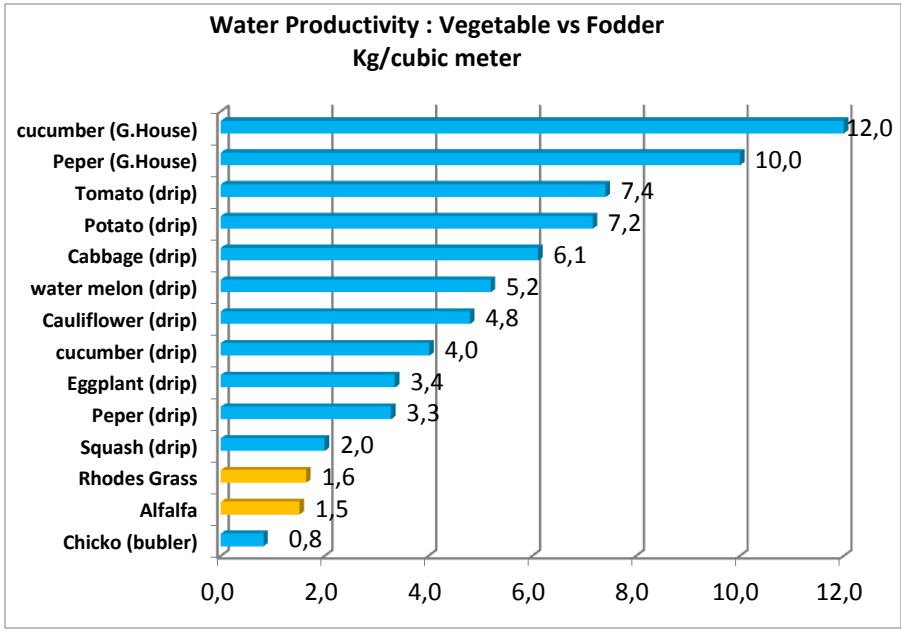


PAM Oman: Addressing Water Policy Issues

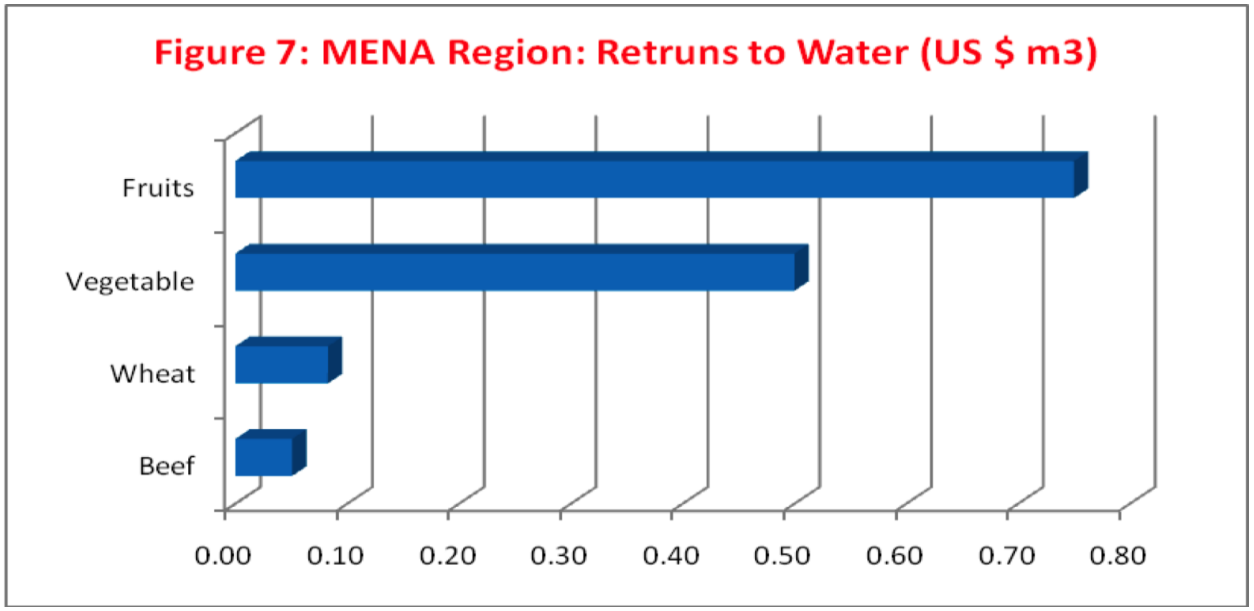


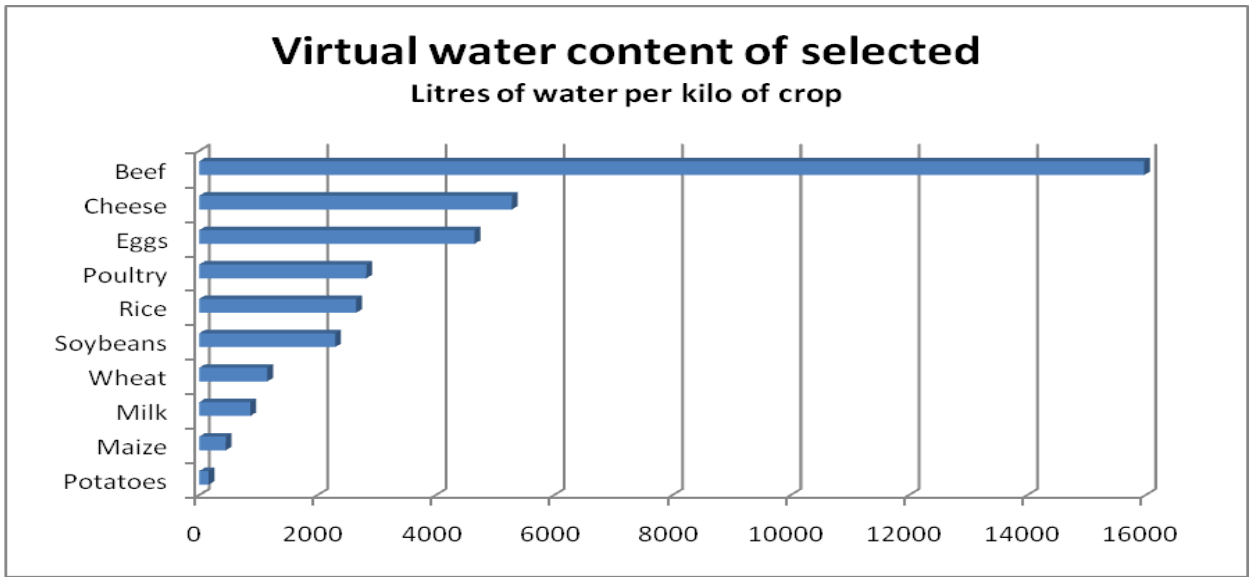






Allocative Efficiency





Agriculture-Water –Energy Nexus

Main Issues in Water Management

Water, trade and food security – Virtual Water

- √ Self-sufficiency vs. self-reliance, competitiveness
- √ Water supply met demand till early 70s
- √ Major food imports start in early 70s
- √ Food import = condensed water import
- √ FAO (1994): 86.5 km^3 of water needed to grow food equivalent to meet food imports to NE region
- √ Egypt, Saudi Arabia, Algeria and Iran import 44 km^3 of water equivalent in food
- √ Turkey is the only net exporter of cereals

FOOD SECURITY:CHANGED WORLD FOOD EQUATION
Challenge for Water

- Supply : Land Degradation, Water Scarcity, Inputs and Transport costs, Climatic changes, Farm structure, labour and technology
- Demand : Population Growth, Poverty, and inequality, consumption water intensity, bio-enginering
- Trade and Markets: Supermarket, financial markets, virtual water, policies

Climatic Change and water

Climate change introduces a risk factor into the hydrological assessment.

The effects of climate change on irrigation demand are expected to vary widely in different geographical areas.

Water storage would be needed for annual rather seasonal

Water –Agriculture-Energy

- Most of agriculture production system depend on unstable groundwater
- Cost of pumping high due energy cost and deeper pumping
- Alternative energy?
- Productivity is extremly low, given expensive water,
- Willingness to pay for water is high competing use

Stories to tell

Crop water requirements according to irrigation method (cm per dunum)

Case of Palestine, one of most water scarce countries on planet

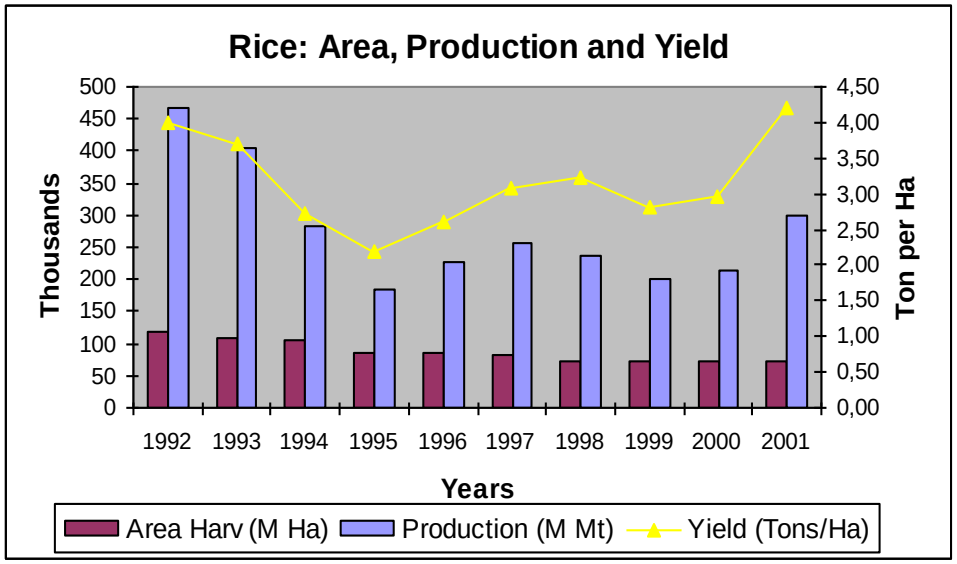
Crop	Surface	Sprinkler	Drip
Eggplant	1609	1034	905
Tomatoes	698	513	499
Peppers	1642	1056	924
Cucumbers	727	467	409
Onions/Garlic	1024	659	576
Cabbage/Cauliflower	1024	659	576
Potatoes	844	543	475
Melons	1213	780	683
Other vegetables	824	530	464
Bananas	3902	2509	2195
Citrus	2076	1334	1168
Other fruit trees	1838	1181	1034

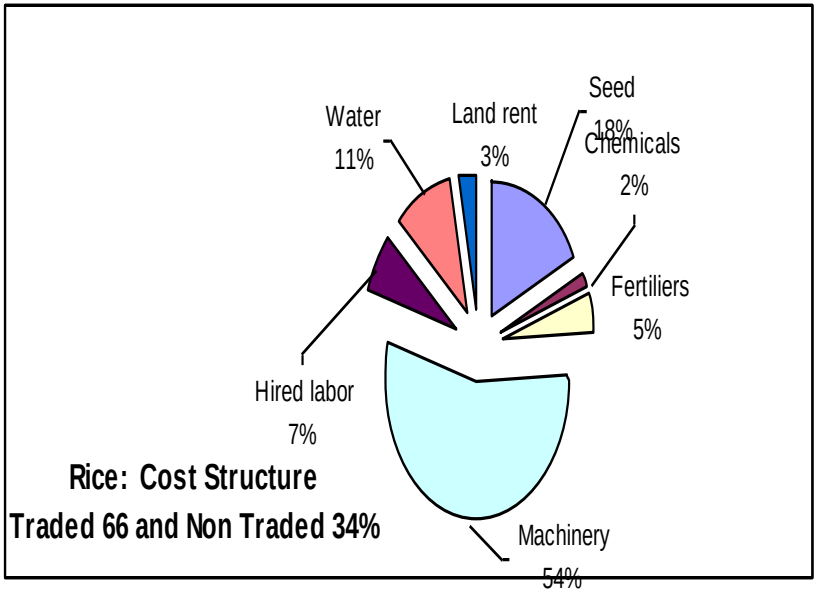
Crop	Jenin, Tulkarem, Qalqilya		Jericho	
	Saving ($)	Return (yrs)	Saving ($)	Return (yrs)
Eggplant	147.84	1.9	49.28	5.8
Tomatoes	50.4	5.7	17.43	16.4
Peppers	150.78	1.9	50.26	5.7
Cucumbers	66.78	4.3	22.26	12.8
Onions/Garlic	94.08	3	30.36	9.4
Cabbage/Cauliflower	94.08	3	30.36	9.4
Potatoes	77.49	3.7	25.83	11.1
Melons	111.3	2.3	37.1	7.7
Other vegetables	75.6	3.8	25.2	11.3
Bananas	358.47	0.8	119.49	2.4
Citrus	190.68	1.5	63.56	4.4
Other fruit trees	168.84	1.7	56.28	5.1
Average	132.20	2.80	43.95	8.46

Sugarcane: Economics of Irrigation Improvement

Policy Change		
Change in Water Use CM/ Fed	12000	9500
Enhance in Yield (tons /fed)	46.73	56.07
Water Improve ments Cost	00.00	194.00
Impact of Policy		
Private profitability Le/ fed	1482.31	2129.00
DRC	1.07	.81

Kazakhstan: Rice Policy Profile





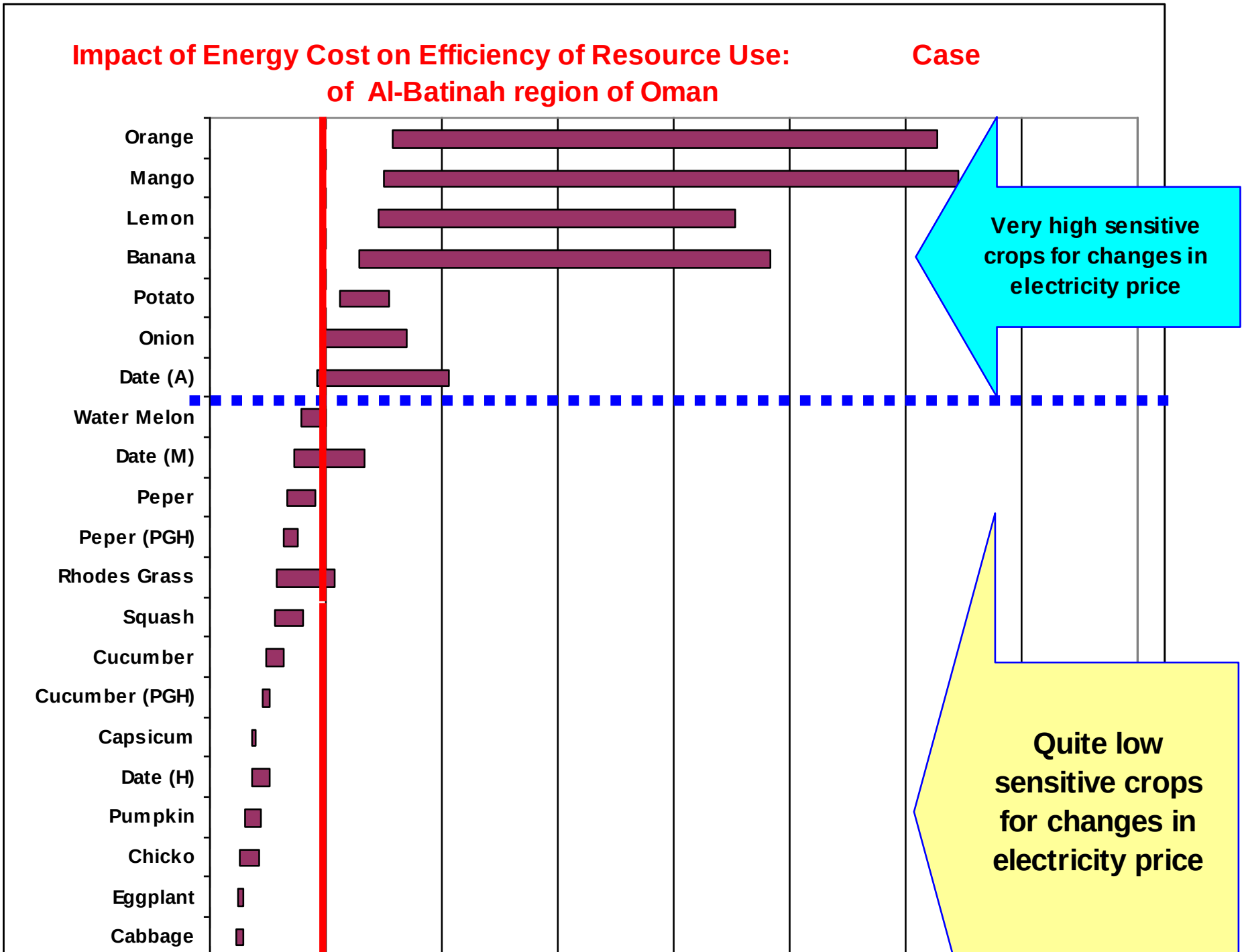
Policy Indicators	Rice Small	Rice Medium	Rice Large
Yield (c/ha)	32.36	27.52	33.57
Private Returns to Water KZT/cm	0.80	1.29	1.16
Private Profits (KTZ/ha)	6415	8953	12080
DRC	-4.38	2.71	3.36

Average Private Profitability	
Crops	**KZT/ha**
Potatoes	**55763,9**
Grapes	**47270,5**
Apples	**18659,9**
Cotton	**18463,6**
Sunflower	**16230,9**
Sugar beet	**9821,9**
Rice	**9149,82**
SoyaBean	**4972,5**
Wheat	**4069,35**

Kaz: Conclusions and Recommendations: Rice & Cotton

- DRC indicates no CA.Phasing out rice cultivation make economic sense.
- Soya beans , potatoes, carrots and onions can replace as crops using less water and adding more value to the region.
- create more jobs and provide sustainable food security.

Impact of Energy Cost on Efficiency of Resource Use: Case of Al-Batinah region of Oman

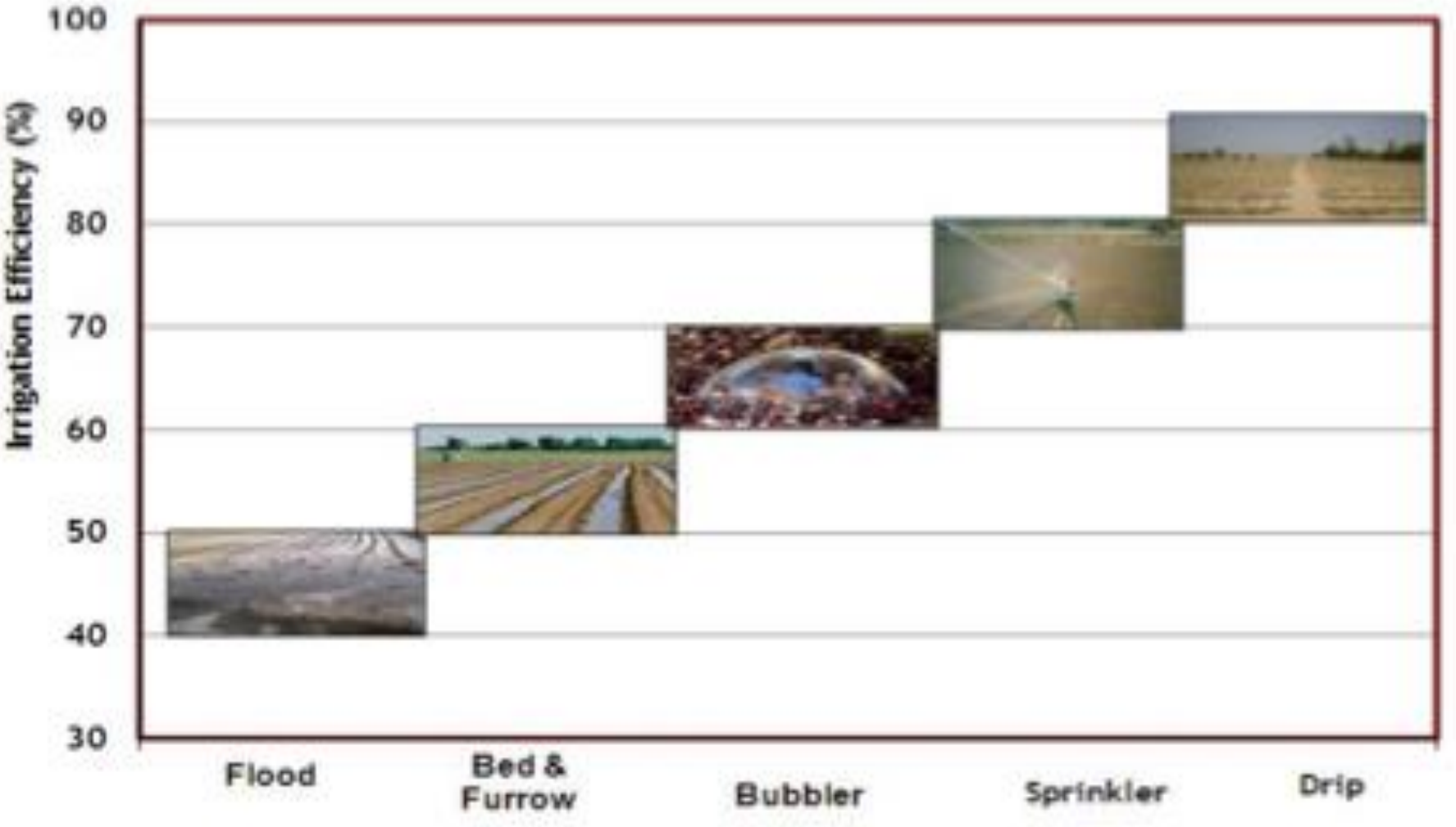


Trust of Future Work
We have think and act different

Improving Productive Efficiency
or
End User Efficiency

More crop per drop

Water Use Efficiency under various methods of irrigation



Improving Productive Efficiency: Canal Command Areas

Watercourse Improvement

(time saving 25%, labour 50 %, net income 20 %)

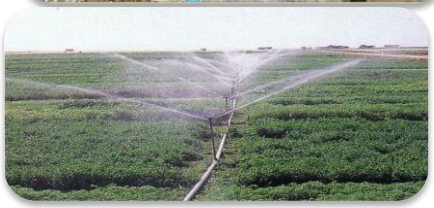
Laser Land Leveling

(Reduces irrigation Losses 25%, Labour 35 %, Yield 20 %)

Bed & Furrow Irrigation

(Water 40 %, Reduce plant submergence, improves fertilizer efficiency , Yield 10%)

Gated Pipes



Pressurized Irrigation

Improving Productive Efficiency
Non Command Area

On Farm Storage

Pressurized Irrigation

Alternative Energy

Tunnel Farming & Plasticulture

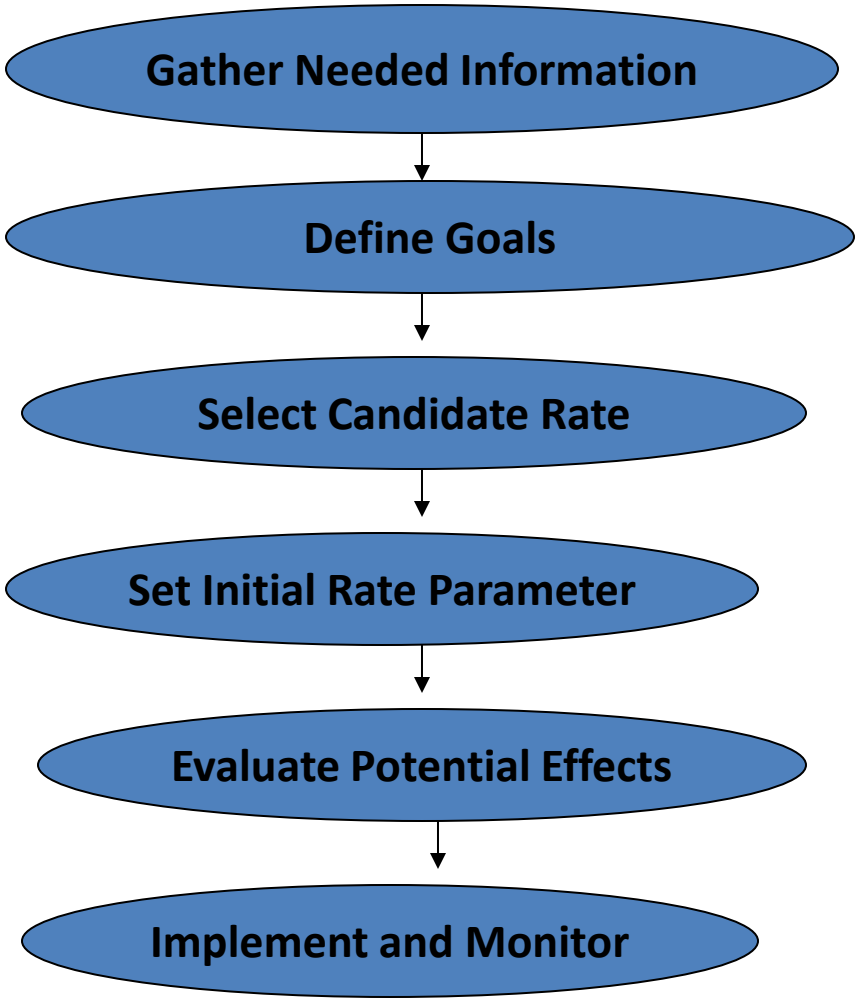
Improving Allocative Efficiency

More Jobs per drop

Major Shift in Agriculture Policy

Mahmood Ahmad
FAO, July 2001

Incentive Pricing Process



Area of Immediate Research at National and Regional Levels

Mapping water supply chain **and water prints using concept of grean, blue and gray water**

Saving Water in Agriculture

Water productivity
water saving under different cropping pattern keeping in mind the food security domestic resource cost to estimate crop and livestock profitability under economic prices with focus on water and energy.
Critical look at adopting modern irrigation technology and water pricing.

Analysis of water, agriculture, energy nexus:

Technical and economics feasibility of solar energy to run our agriculture tube wells and other farm machinery

Technical and economics feasibility of biofuel under water scarcity regime (food security crops)

Awareness program, Regional net working and water/irrigation forums

Thanks