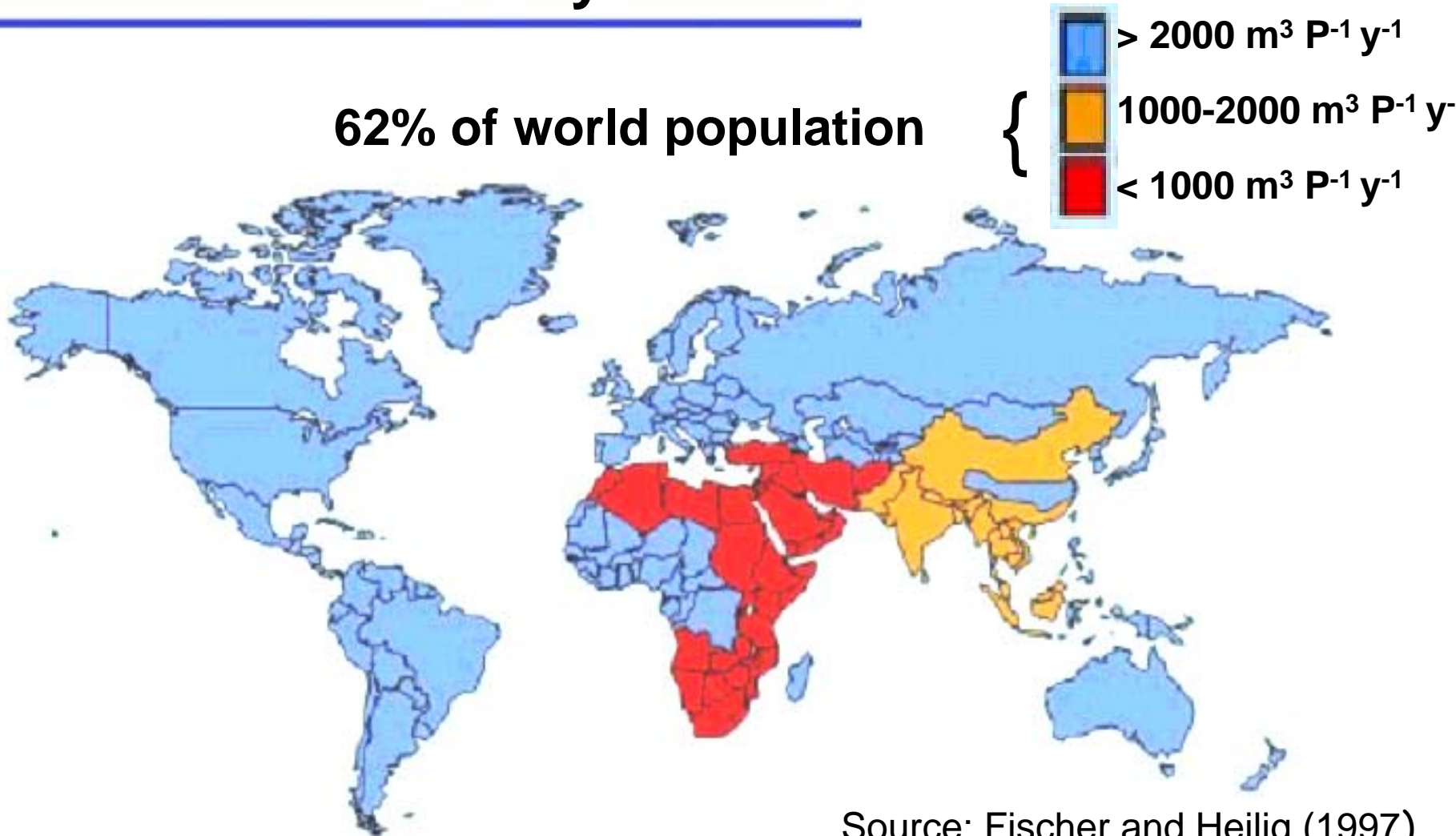


Potential irrigation water management strategies for arid and semi-arid regions: a review of proposed interventions

Raj Kumar Jhorar
Dept of Soil and Water Engineering,
CCS HAU Hisar

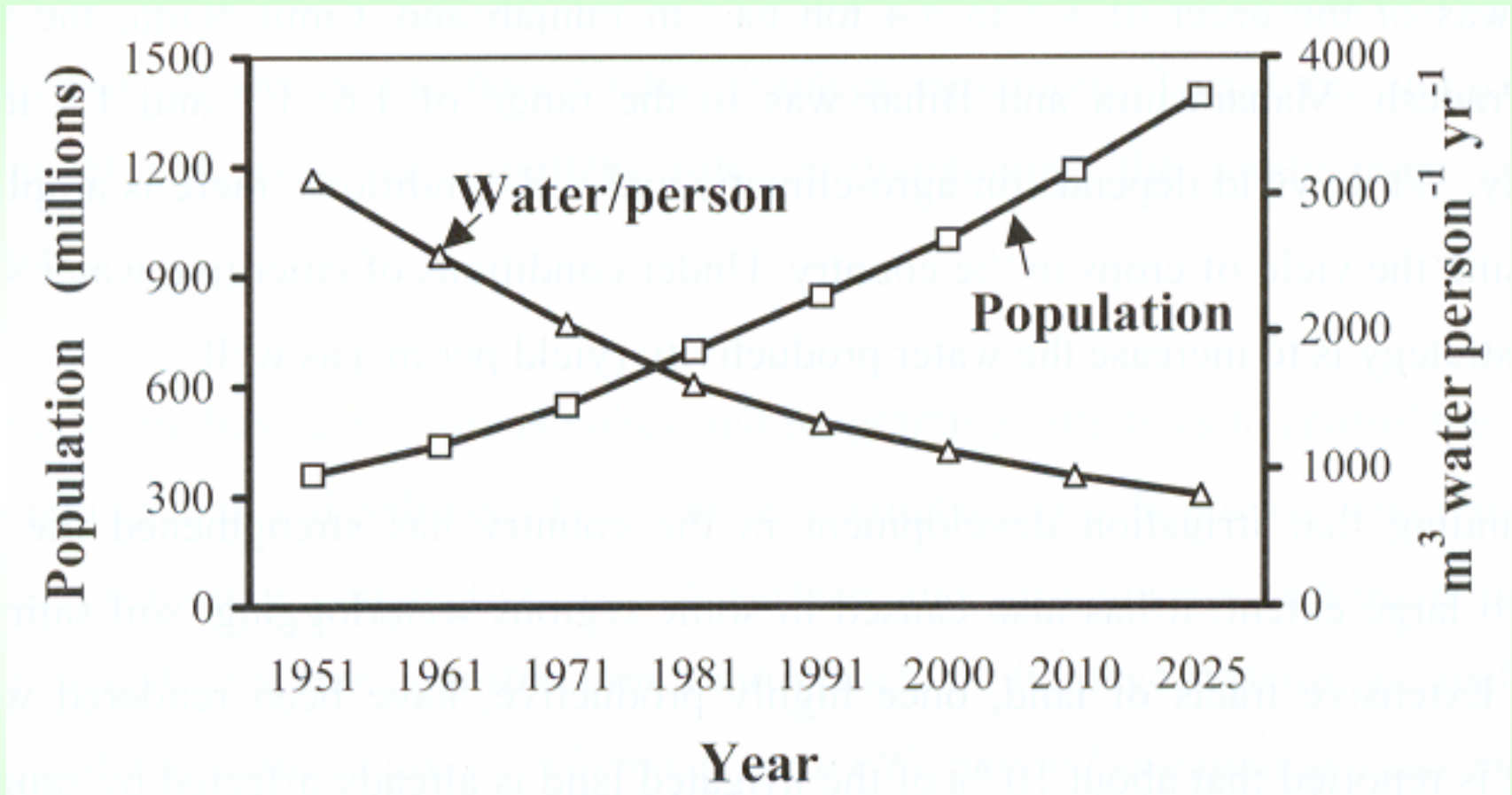
Global water scarcity - 2030

62% of world population



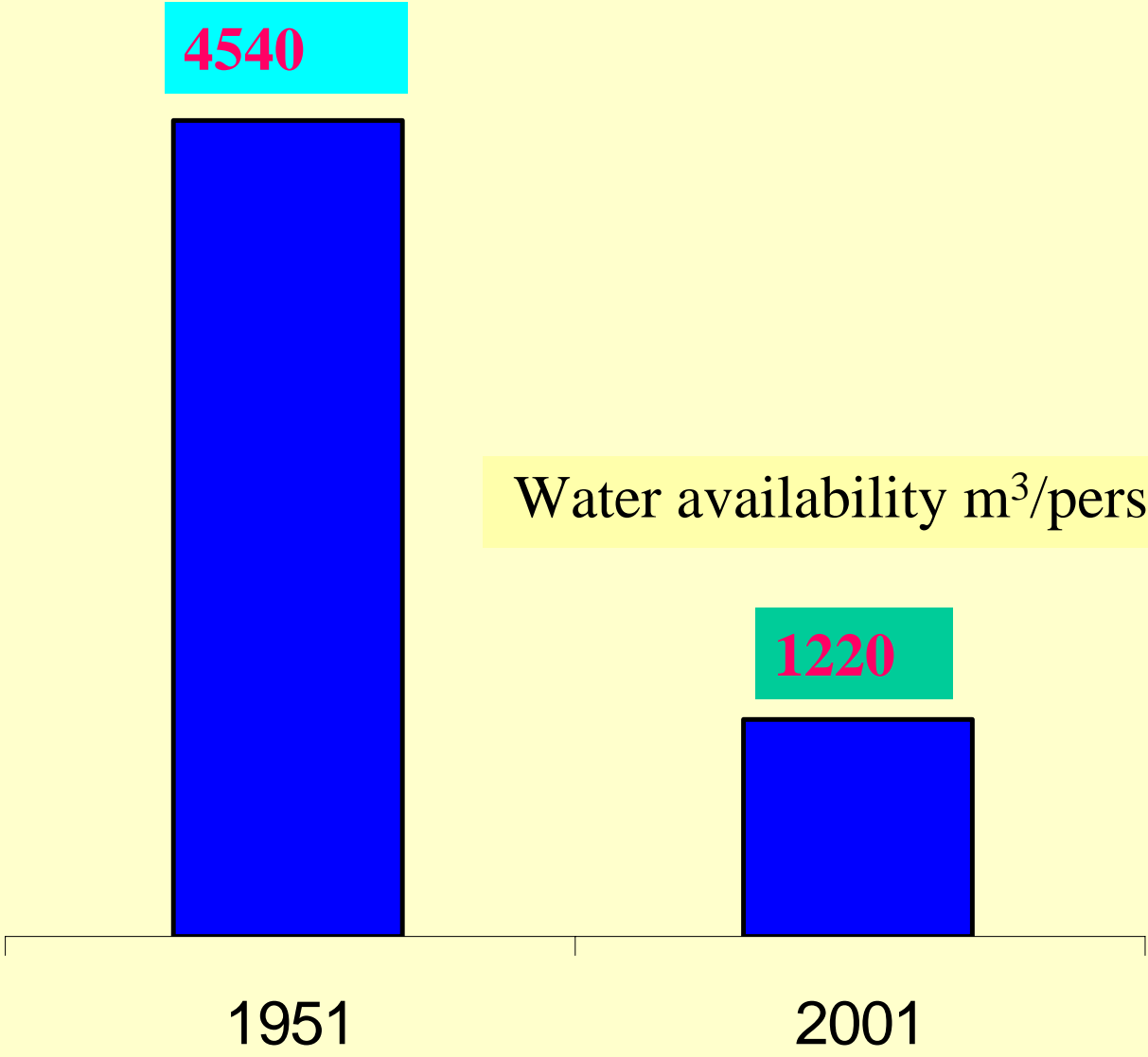
Source: Fischer and Heilig (1997)

India



Based on potentially utilizable amount of 1122 billion m³

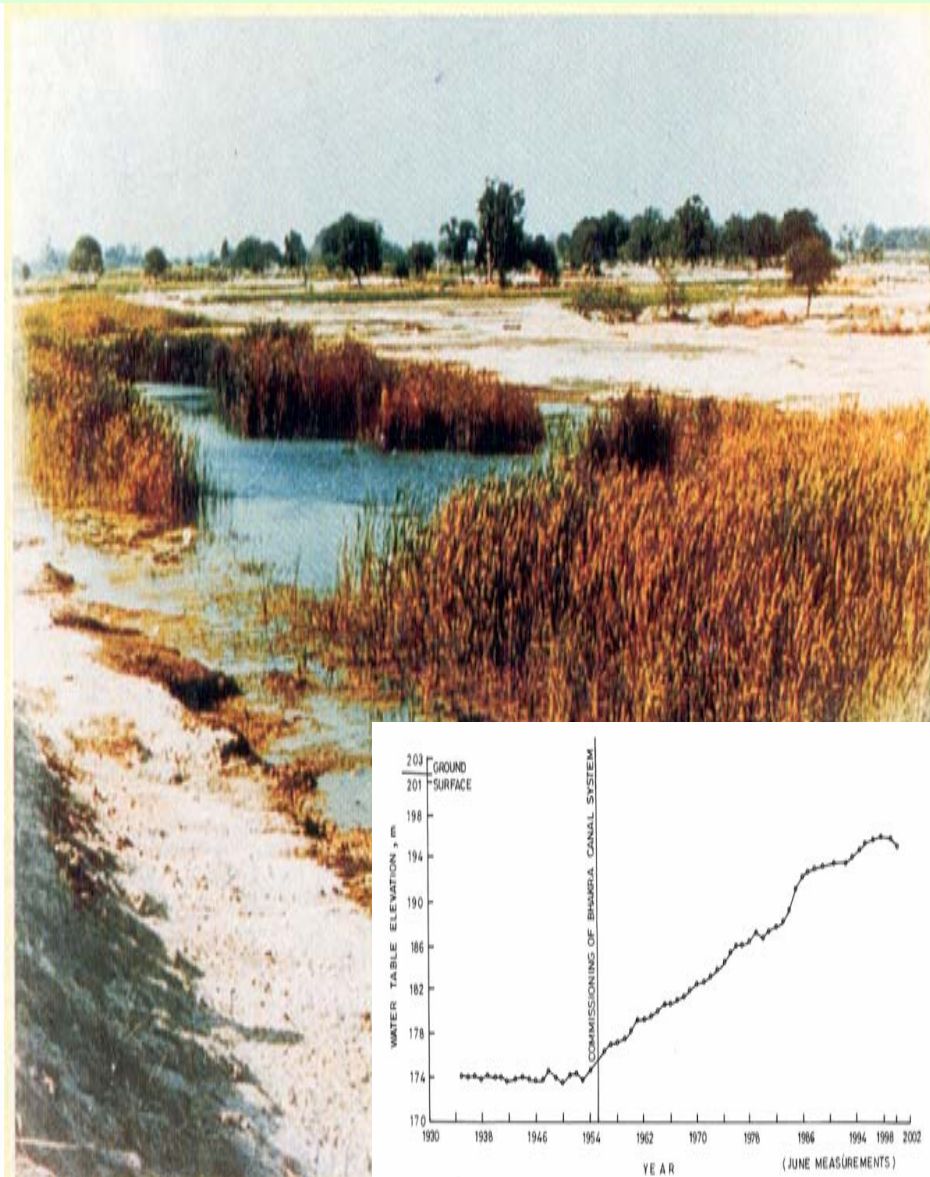
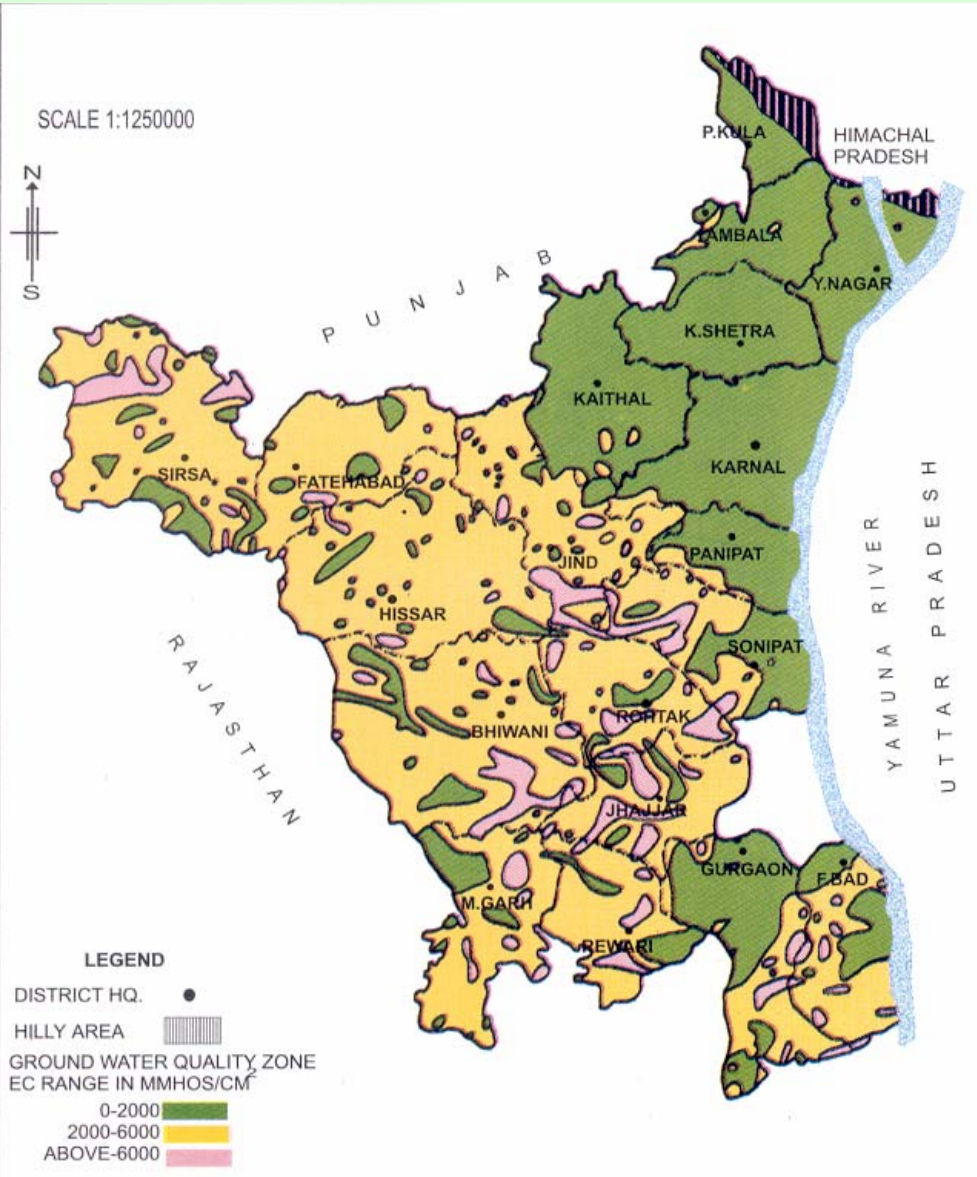
Haryana

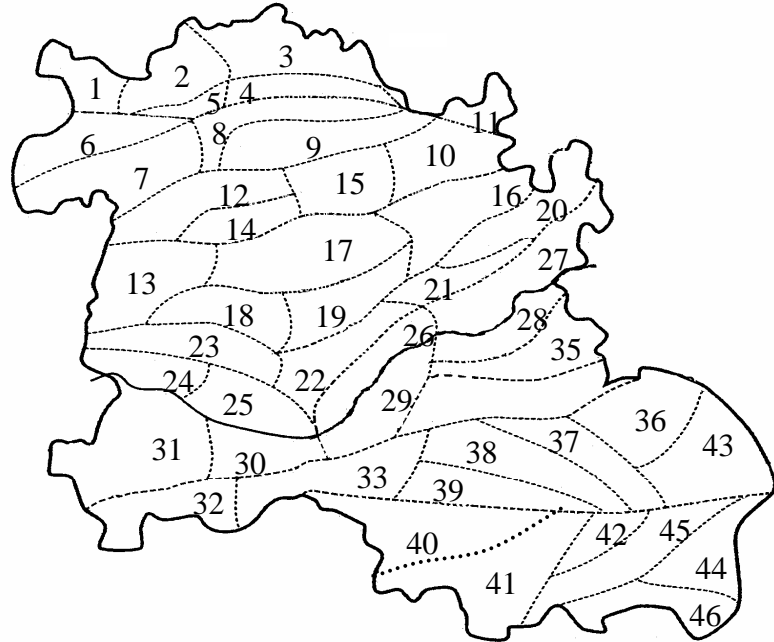


Major issues related to water management and crop production

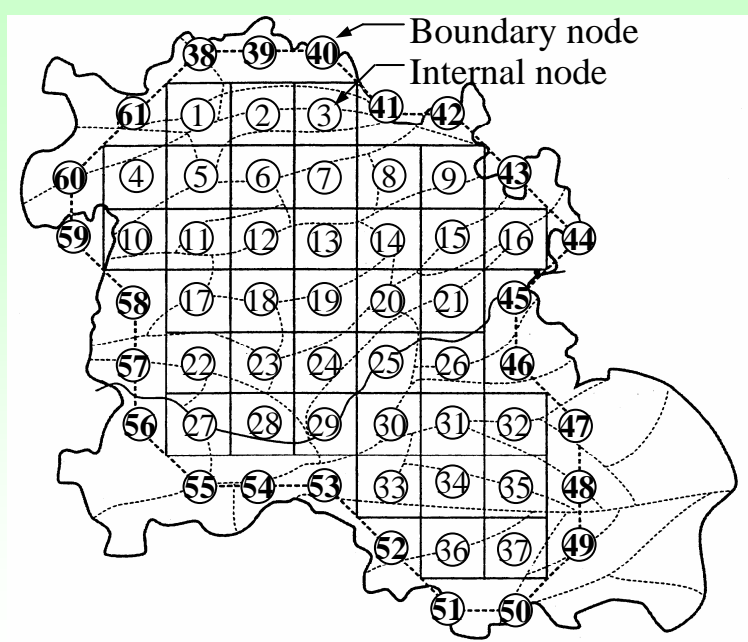
- ✦ Rising groundwater levels in areas underlain with marginal to poor quality groundwater due to water losses from the irrigation system;
- ✦ Declining groundwater level in the good quality groundwater zones due to over exploitation;
- ✦ Waterlogging risks (groundwater depth < 3.0 m) in a few pockets, associated with secondary soil salinization;
- ✦ Inflexible canal water supply and shortage of water to irrigate all agricultural crops;
- ✦ Less than optimum production.
- ✦ Improper method of irrigation.

Issue: Rising groundwater levels in areas underlain with marginal to poor quality groundwater due to water losses from the irrigation system



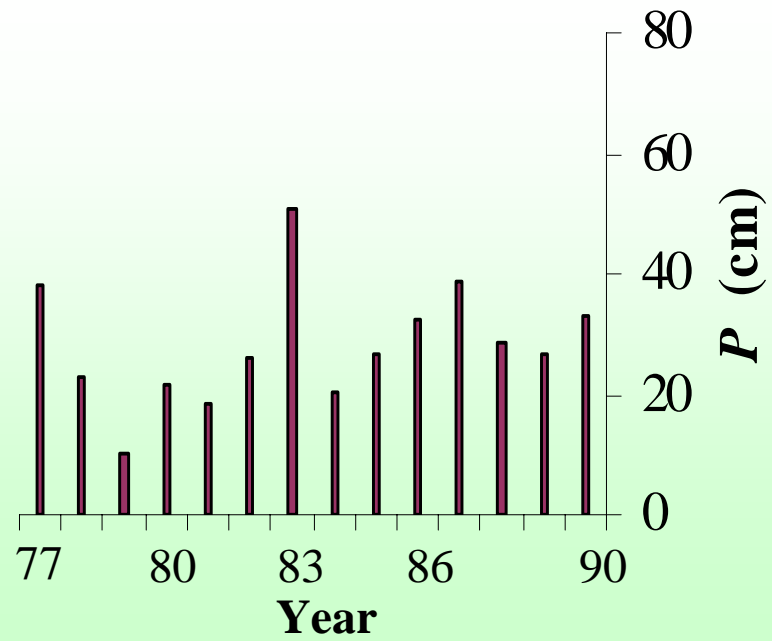
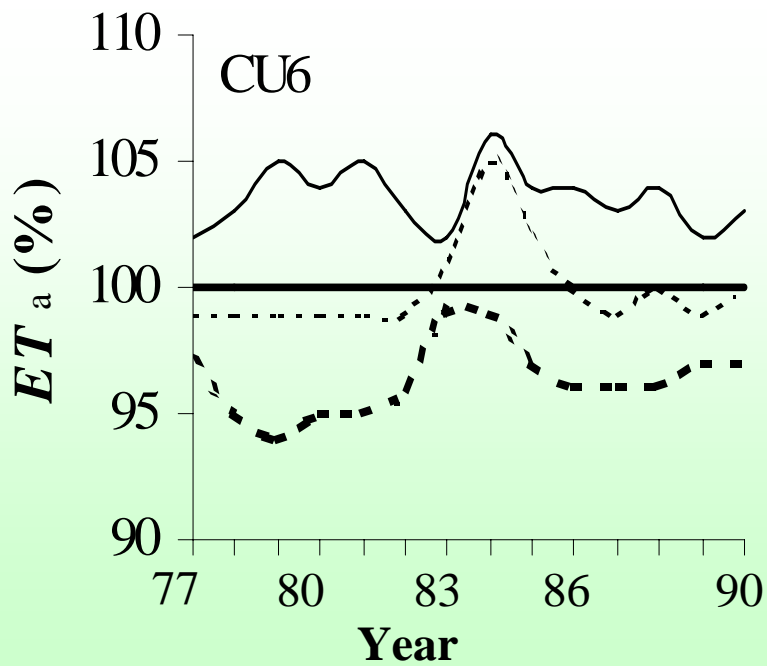
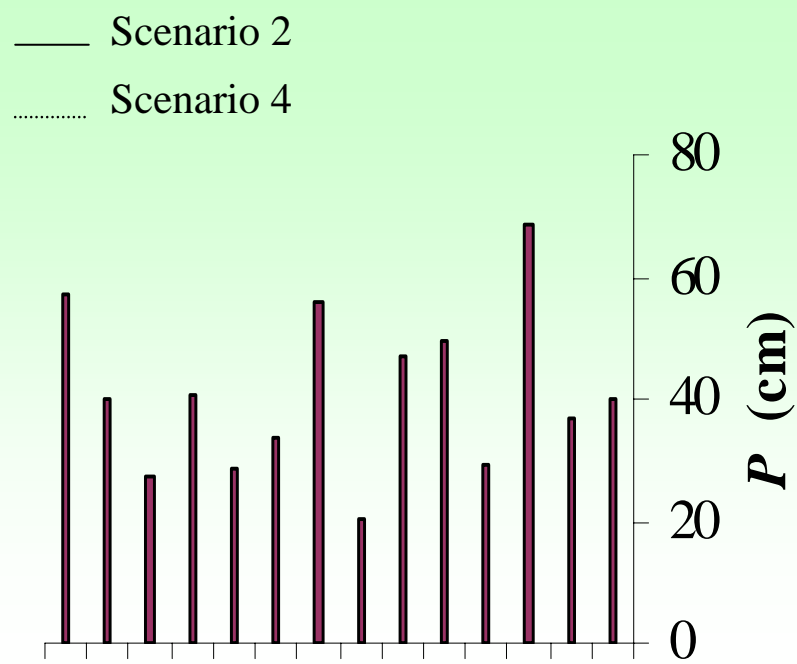
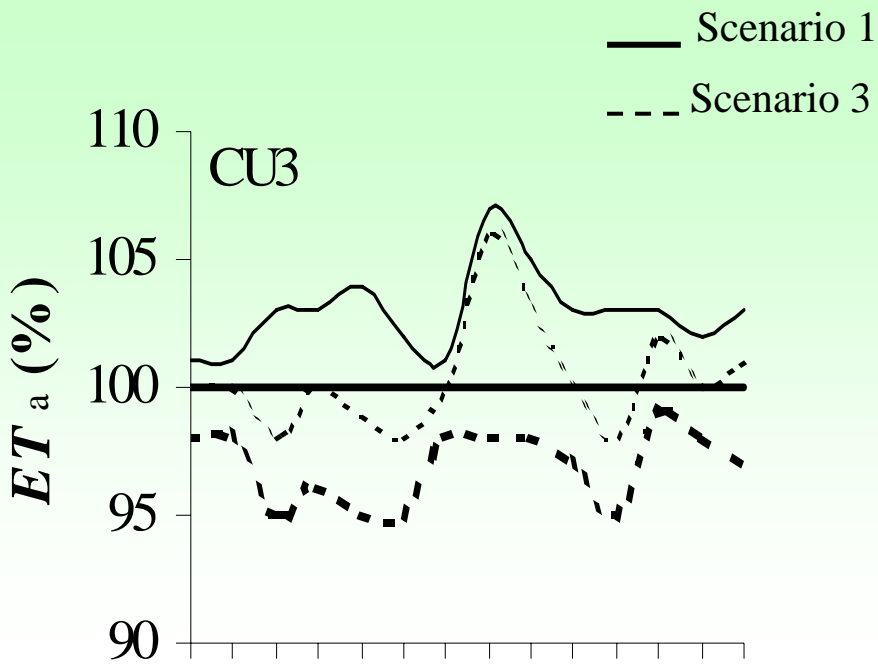


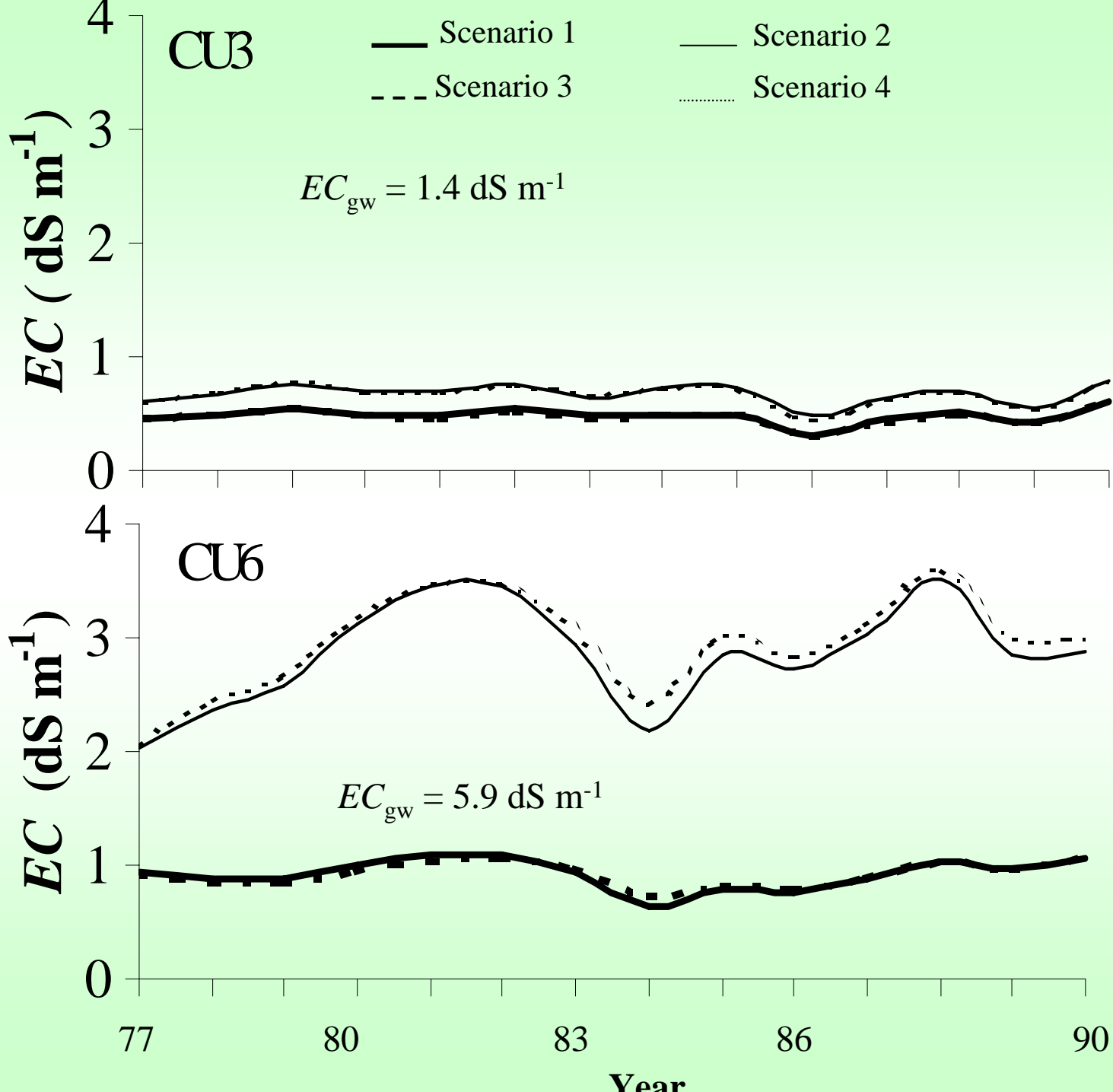
CUs of surface water model



Nodes of groundwater model

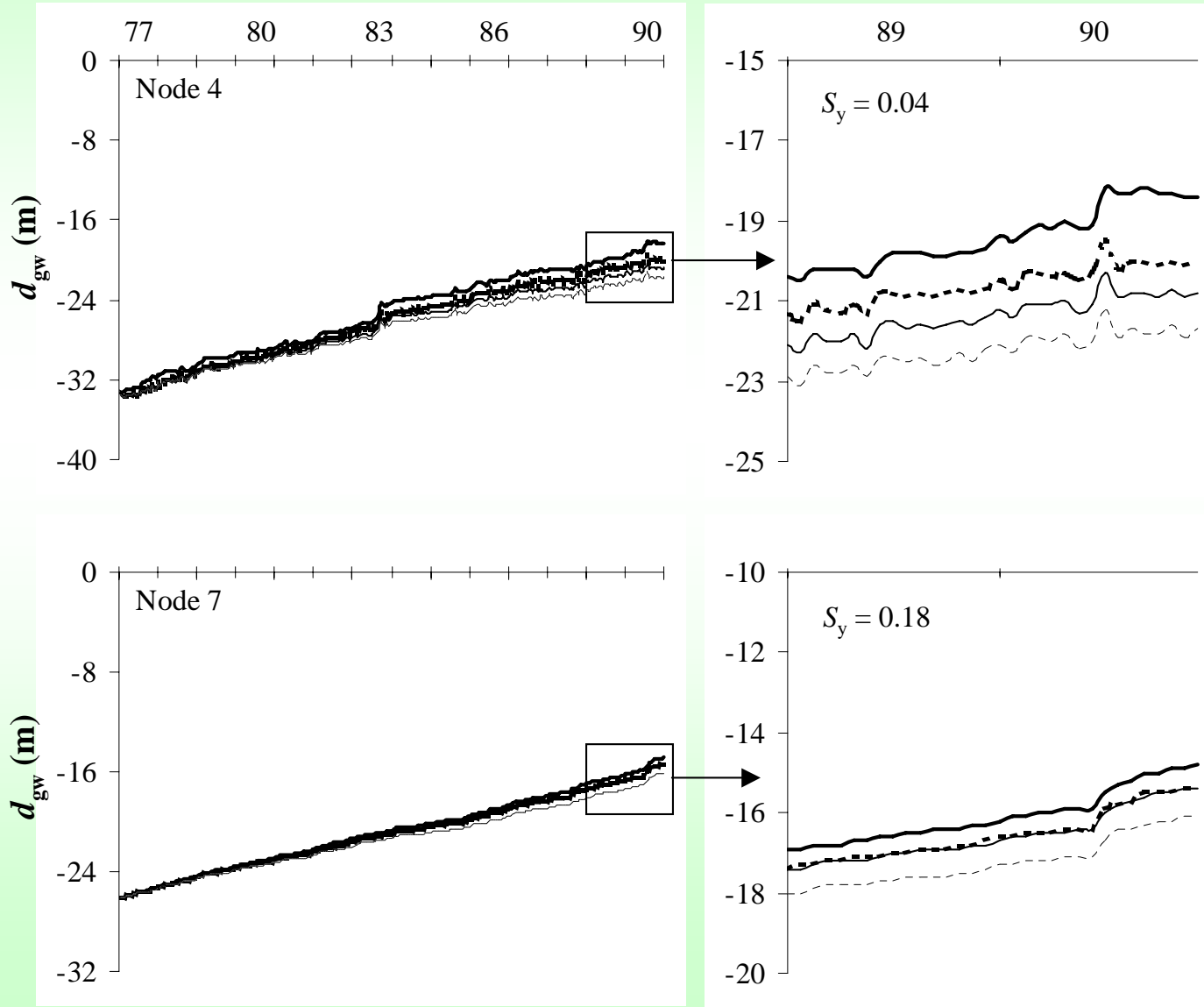
Scn	Description
1	Reference situation
2	Increase in groundwater extraction by 60 mm in areas facing rising groundwater levels.
3	Reduction in canal water supply by 25 % (rainy season)
4	Scenario 2 + Scenario 3



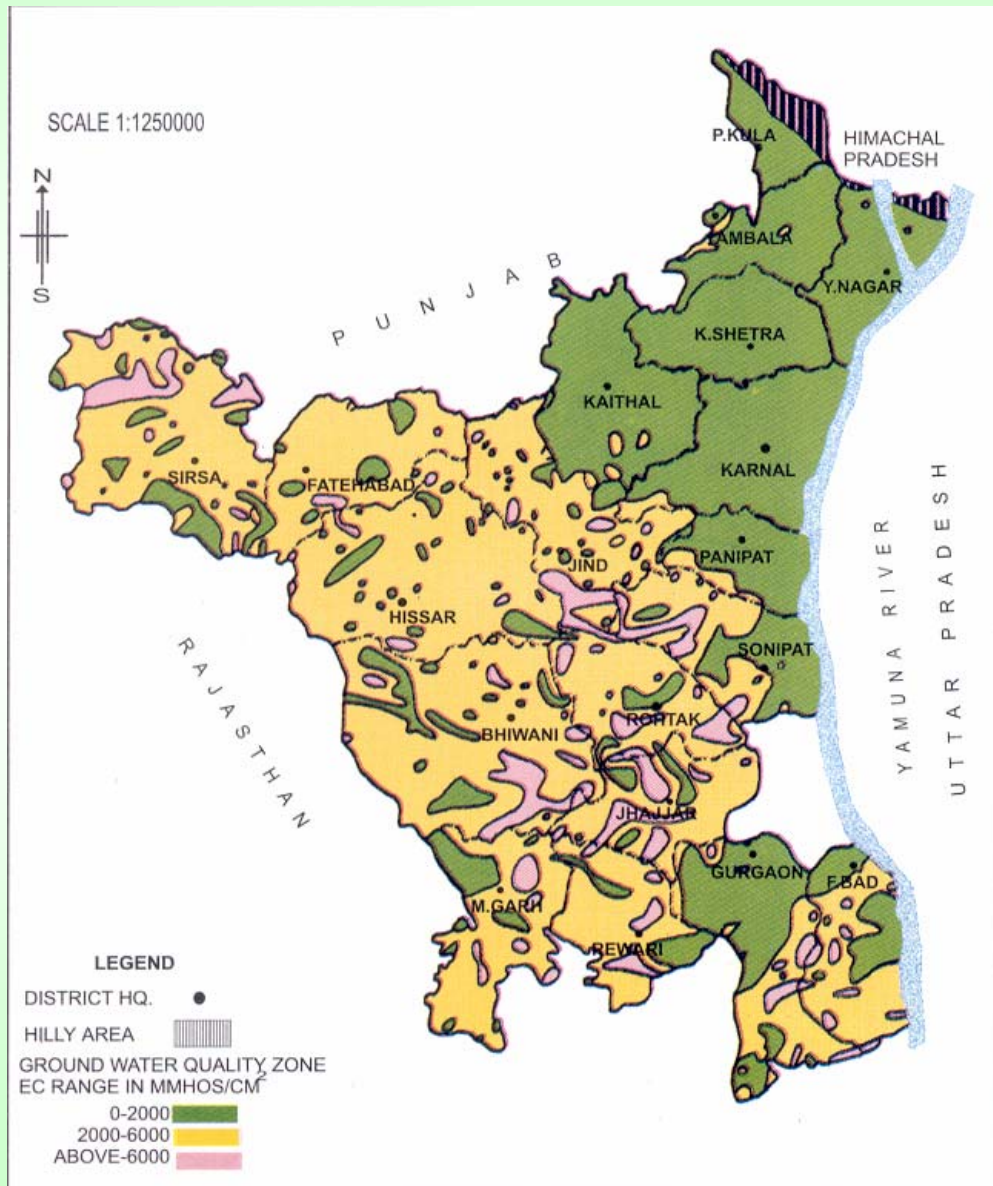




Year



Issue: Declining groundwater level in the good quality groundwater zones due to over exploitation

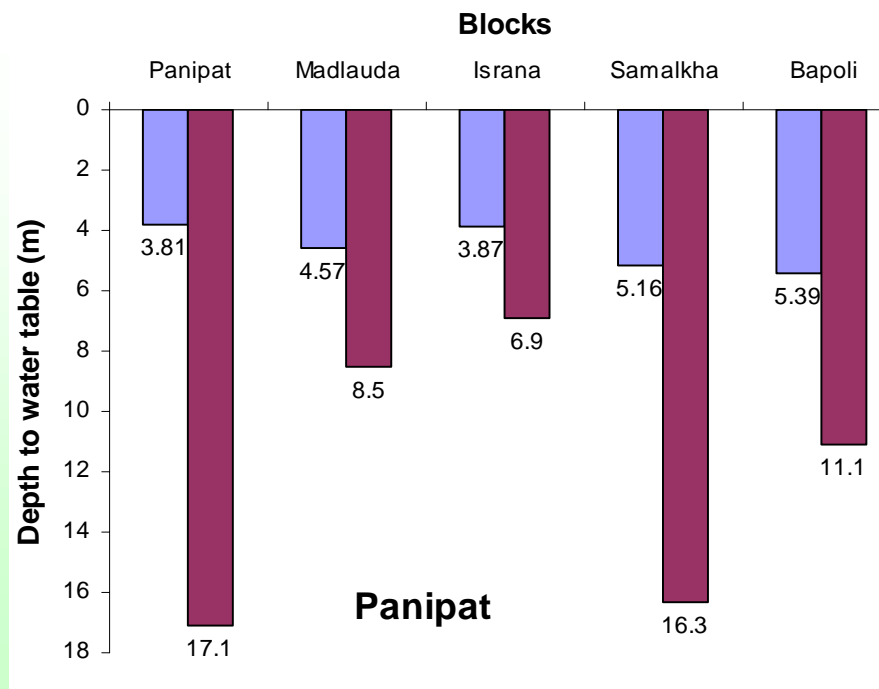
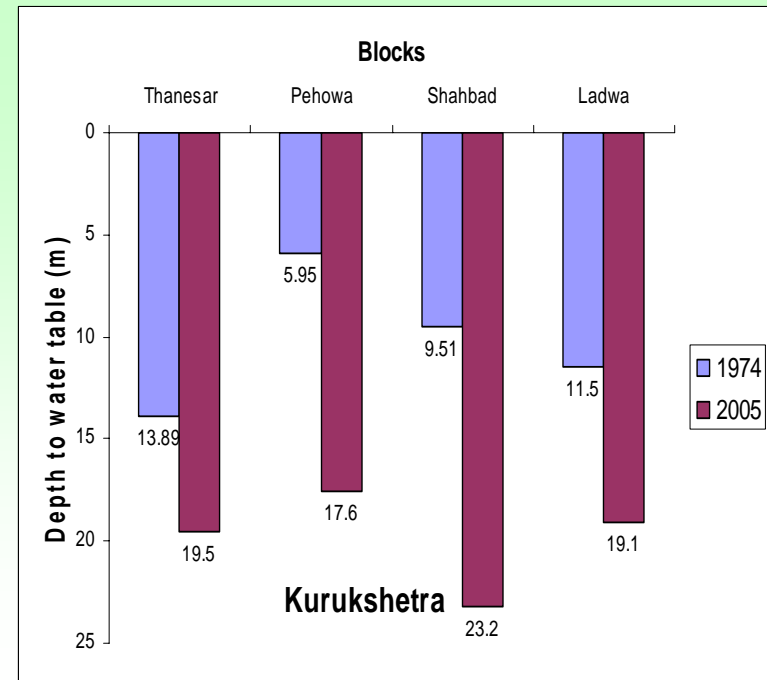
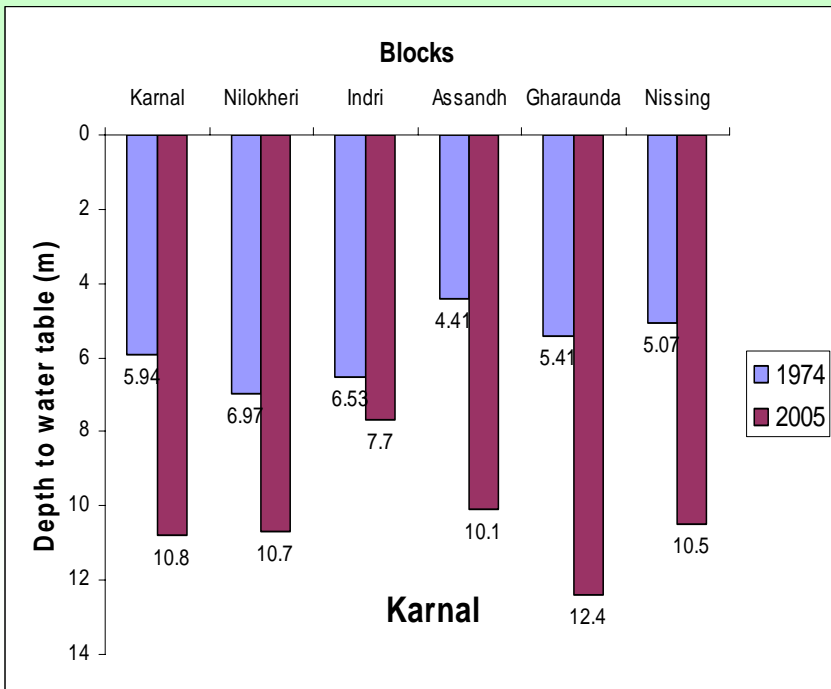


Change in area (M ha) under different crops in Haryana

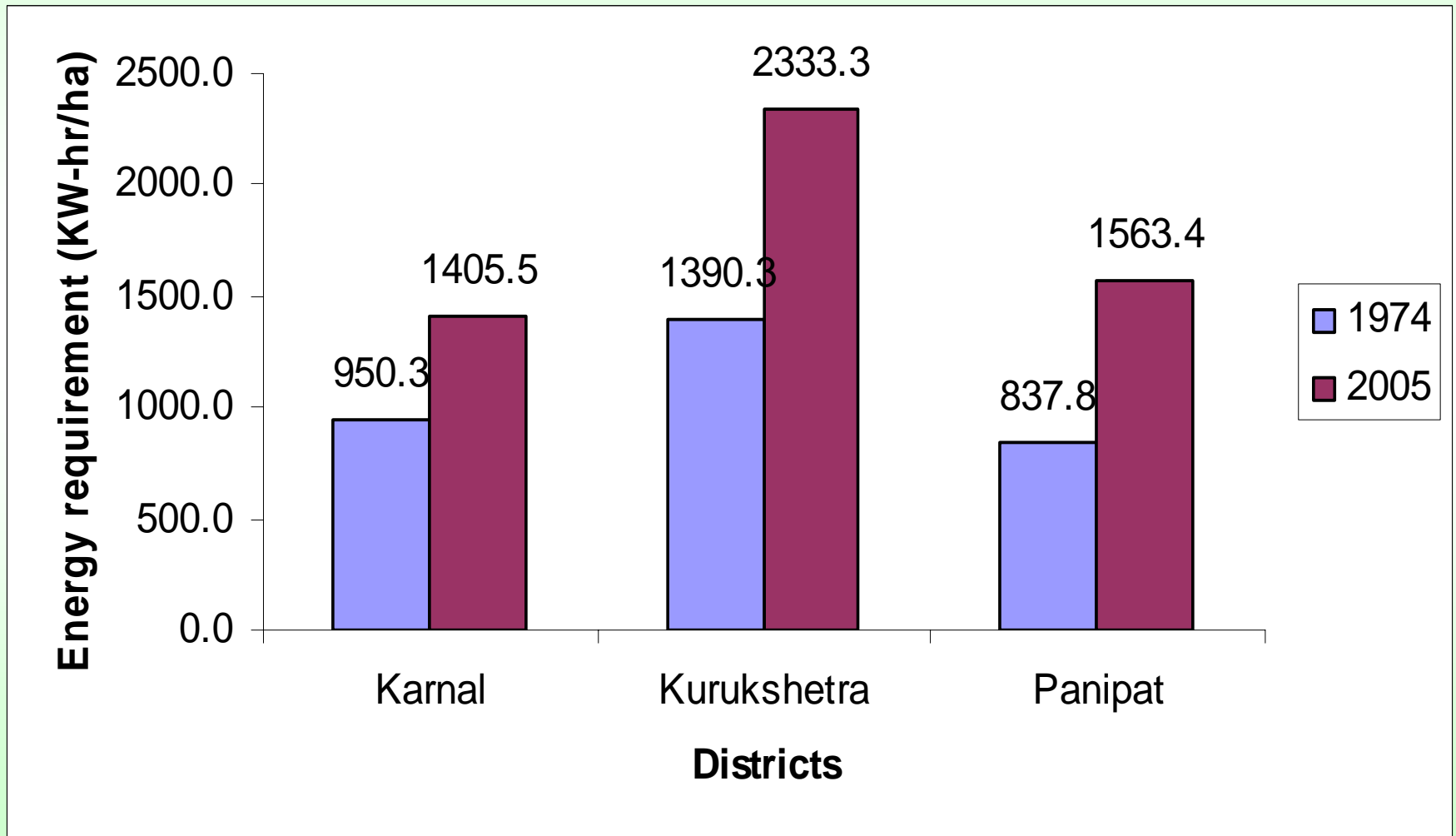
Crop	1967	2005	% change
Rice	0.192	1.024	+ 430
Wheat	0.743	2.317	+ 210
Bajra	0.893	0.565	- 37
Barley	0.182	0.022	- 80
Gram	1.062	0.108	- 80
Cotton	0.183	0.621	+ 240
Sugarcane	0.150	0.133	- 10

Nature provides for everyone's need not everyone's greed

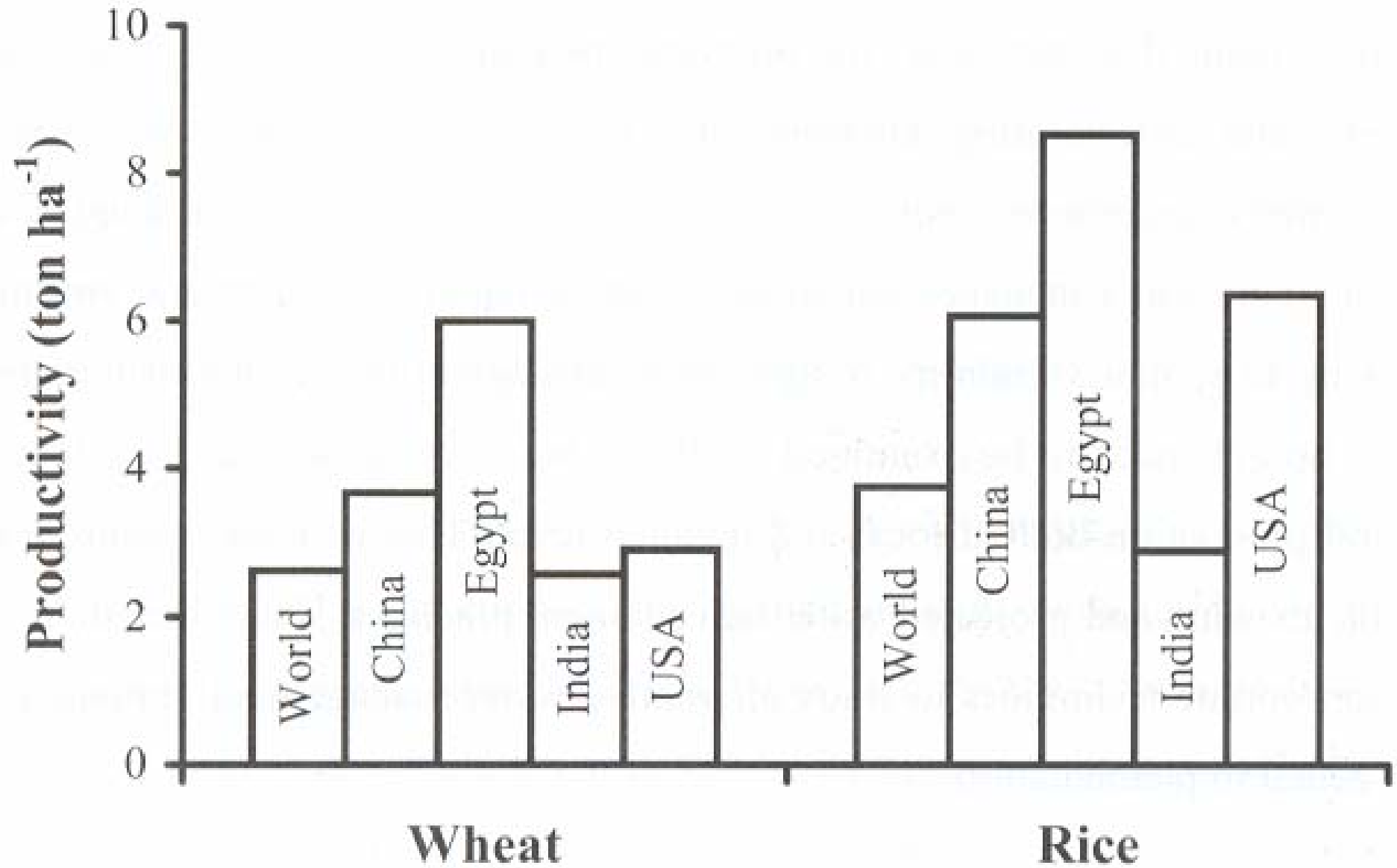
Mahatma Gandhi

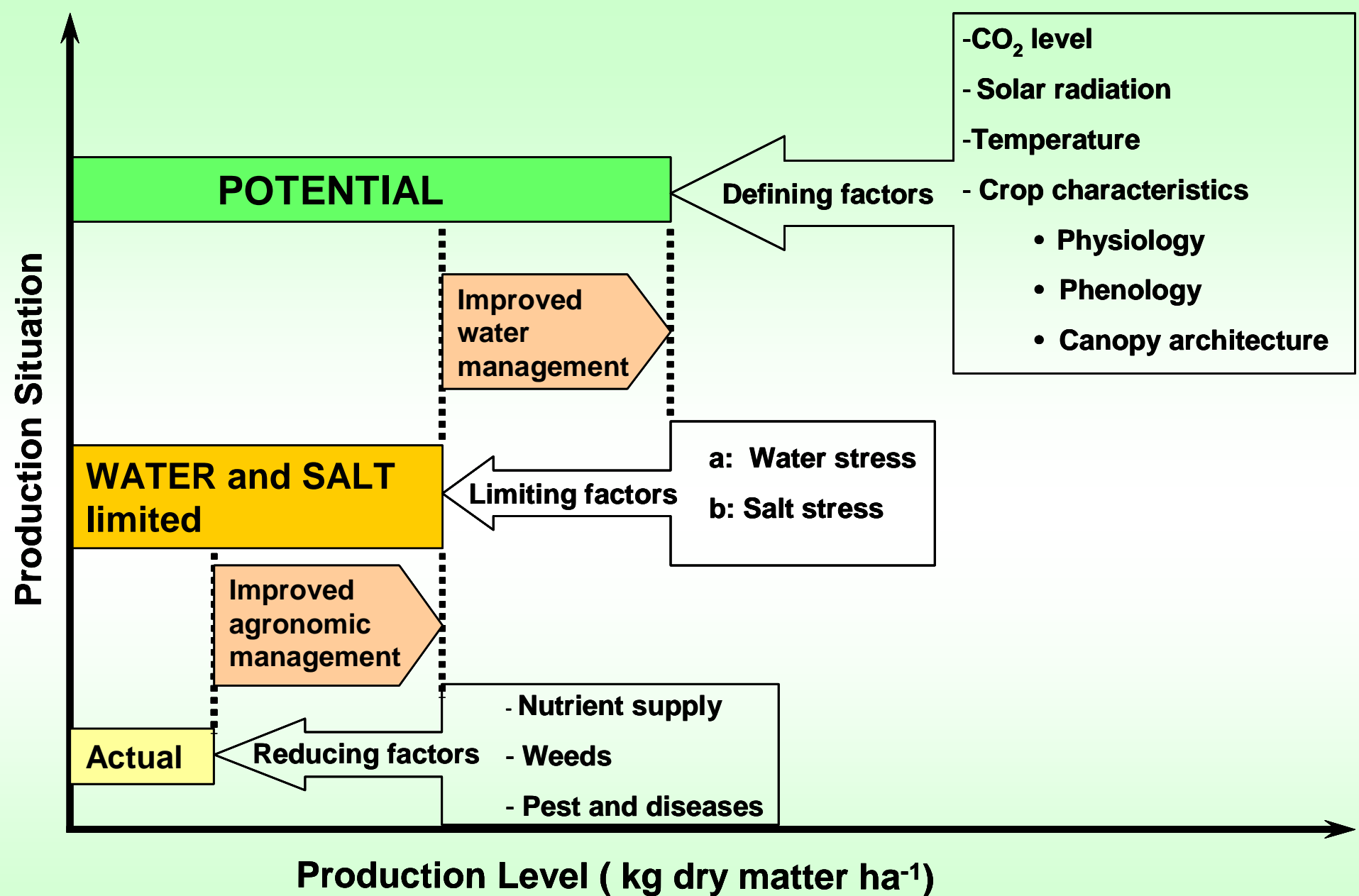


Energy requirement for paddy

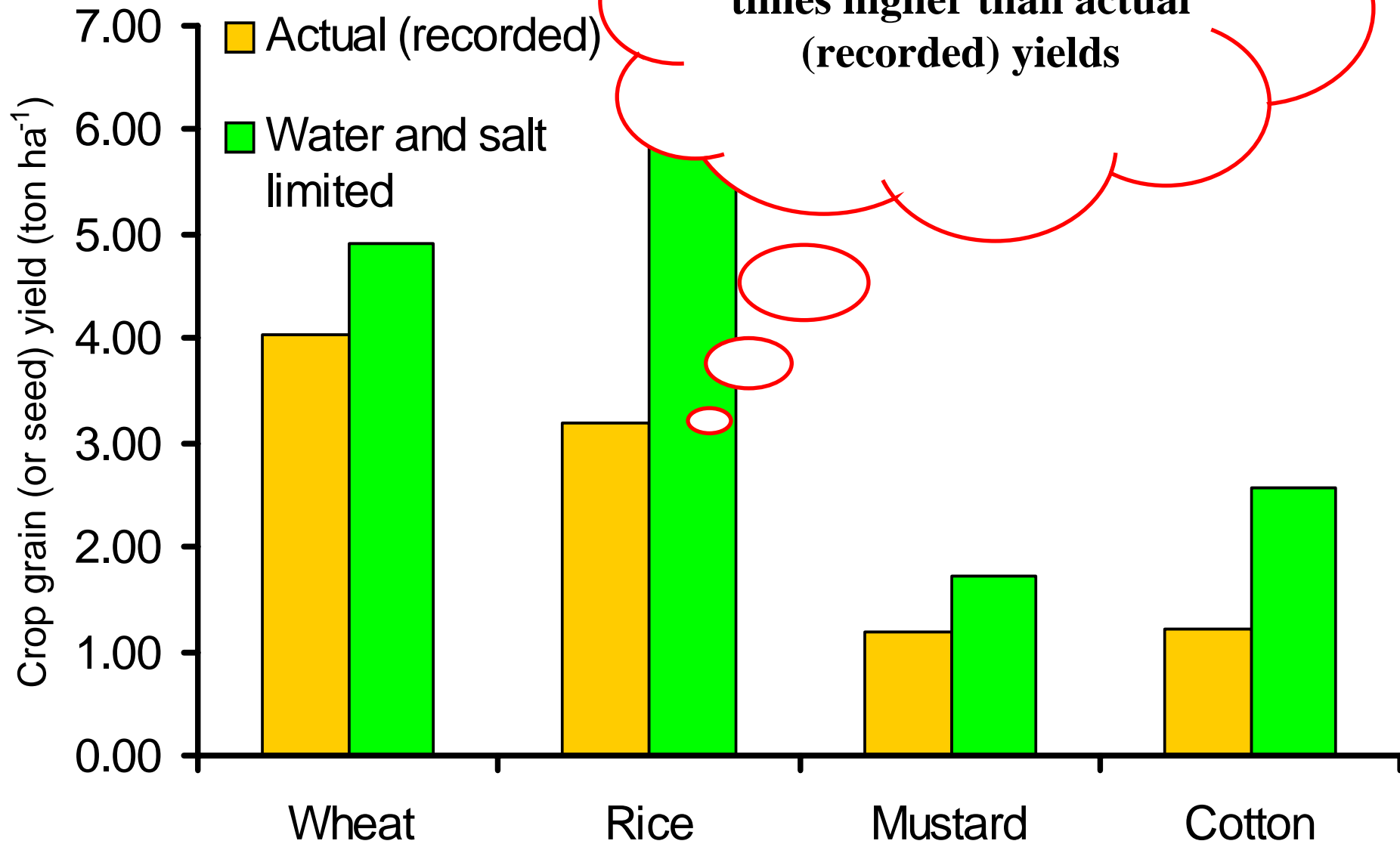


Issue: Less than optimum production





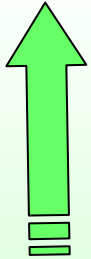
Production hierarchy in the crop production system



**Water and salt limited
crop yields are 1.2 to 2.1
times higher than actual
(recorded) yields**

Recorded crop yields at Experimental stations and Farmer fields

ton grain (or seed) ha⁻¹

Yield		Wheat	Rice	Cotton
Experimental station	9 to 60% 	6.4	7.4	2.5
Farmer's field		4.0	6.8	1.7

Actual water productivity at Farmer fields

kg grain (or seed) m⁻³ water

Water productivity	<u>Wheat</u>	<u>Rice</u>	<u>Cotton</u>
WP_T	1.88	1.73	0.29
WP_{ET}	1.39	0.94	0.23
WP_{ETQ}	1.04	0.84	0.21

A green arrow points from the Wheat value (1.88) to the Rice value (0.94) in the WP_{ET} row, with "45%" written below it. The Rice value (0.94) is circled in green.

I have often noticed that when chickens quit quarrelling over their food they often find that there is enough for all of them.

I wonder if it might not be the same with the human race.

Don Marquis

Please read the following

The explosive growth of communications and information technology has transformed our world into a global village. The acceleration of technological advances is bringing about rapid changes that deeply impact all spheres of society.

But

Without good clean water, all these profound developments will count for nothing.

Without water, we will not be focused on impressive progress, but on mere survival.

Thanks