

A New Paradigm for Rainfed Agriculture for Improving Livelihoods and Sustainable Development in India



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Importance of Rainfed Agriculture



- **Contributes 60% of world's food from 80% of cultivated land**
- **Home of world's poor and malnourished people**
- **Yields from rain-fed agriculture are low in semi-arid tropical agroecosystems**
- **Green revolution drove away food shortage of 1960's but at a cost**



Comprehensive Assessment of Water for Food and Reducing Poverty

- Irrigation cannot do it alone
- Irrigated agriculture accounts >70% of water withdrawals
- Competing demands for water
- Rainfed agriculture depends on rainfall infiltrated in the soil
- Green water consumption is almost 3-fold more than blue water consumed for food production (5000 vs 1800 km³ yr⁻¹)





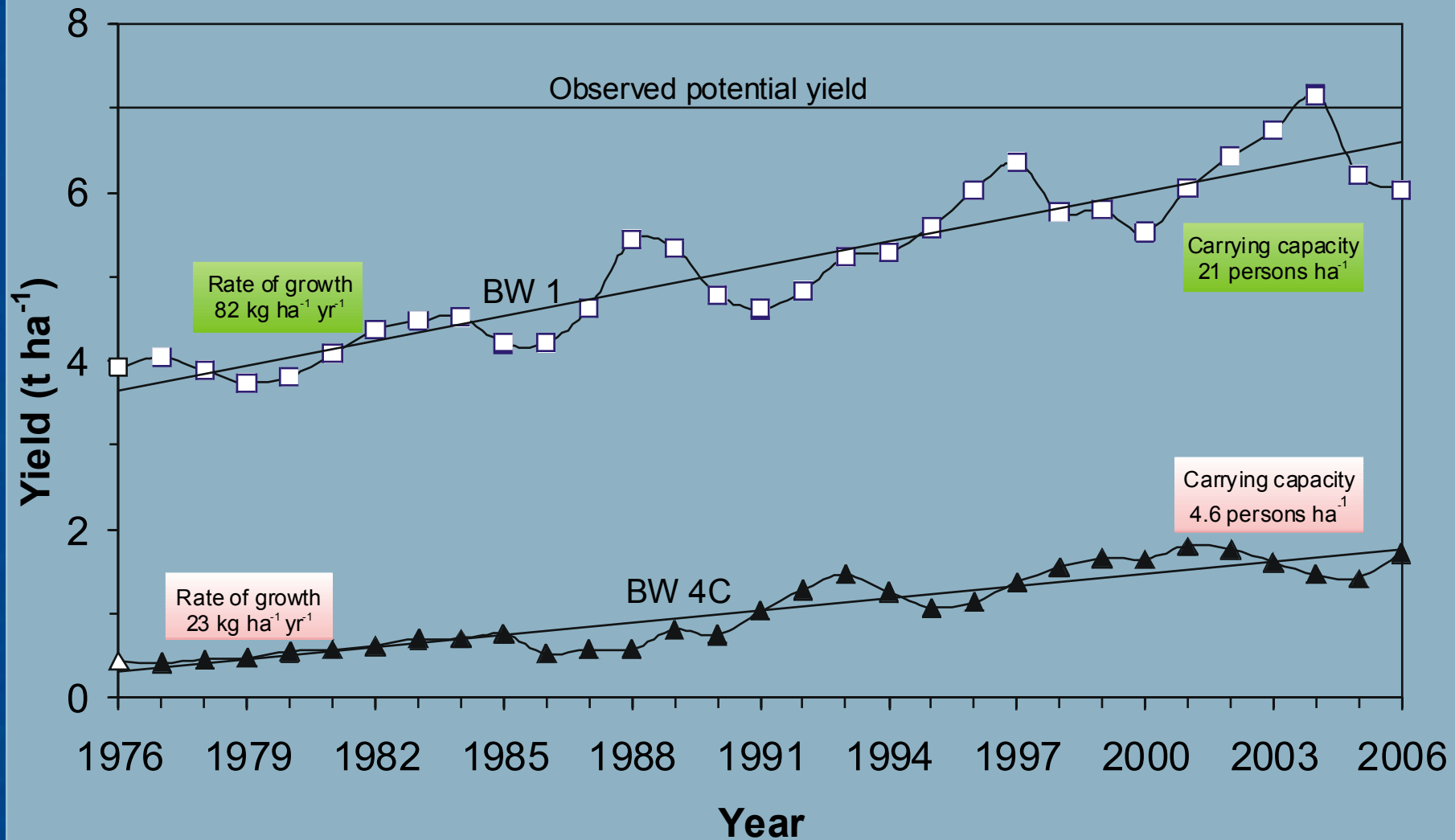
A Comprehensive Assessment of Water Management in Agriculture



- ❖ Change the way we think about water and agriculture – Discard artificial divide between irrigated and rainfed agriculture
- ❖ Upgrade rainfed systems – a little water can go a long-way – small catchment management and holistic approach
- ❖ Fight poverty by improving access to agricultural water and its use
- ❖ Enhance water use efficiency
- ❖ Deal with trade-off and make different choices

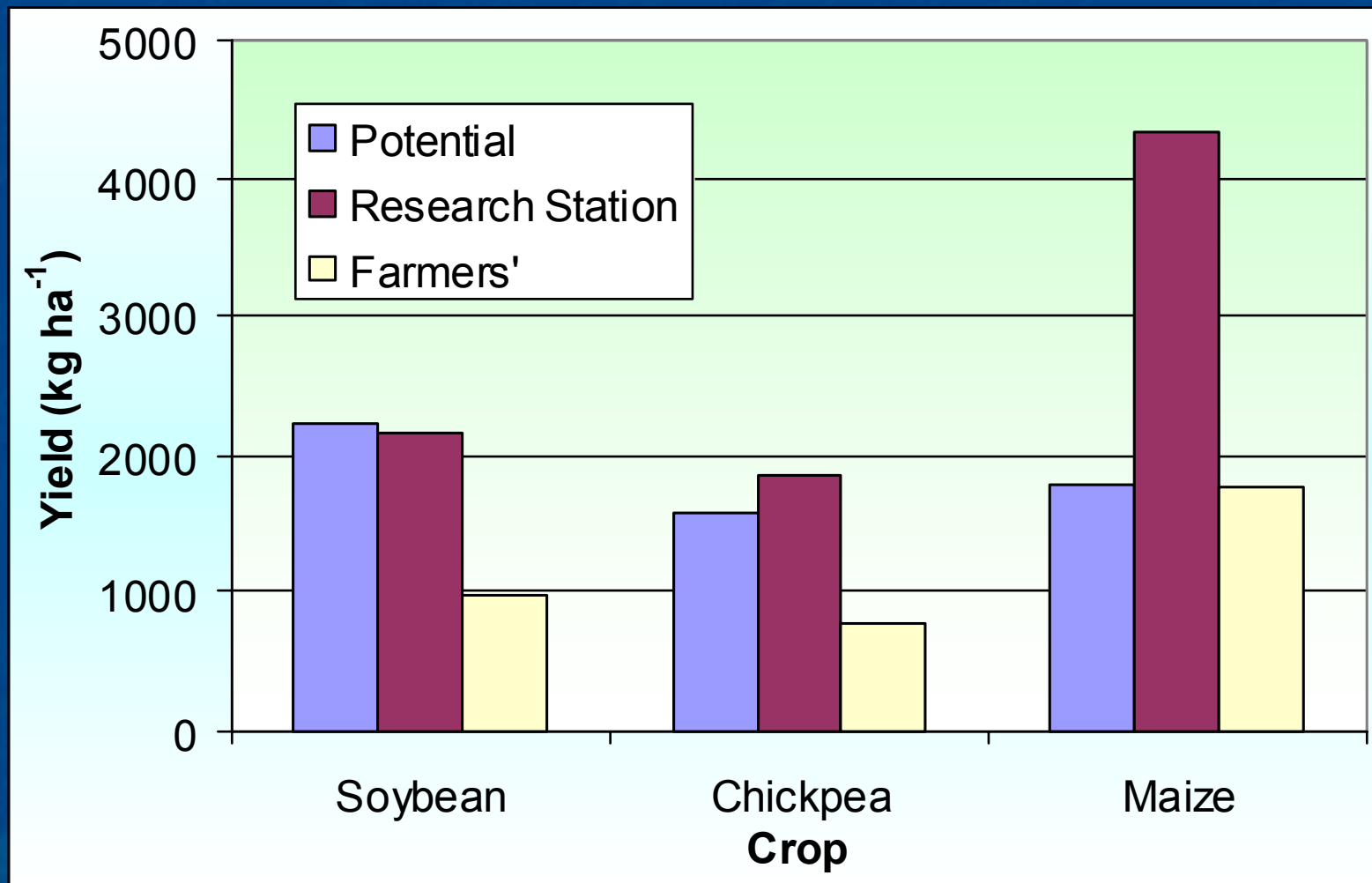


Vas Untapped Potential of Rainfed Agriculture Needs to be Harnessed





Large Potential to be Harnessed



Yield gaps of soybean, chickpea and maize in India



Community Watersheds as an Entry Point for Improving Livelihoods



- Watershed management is silently revolutionizing rainfed agriculture in India, however, lot more need to be achieved

Recommendation

- More investments in rainfed agriculture are needed to cover large area and adopt holistic livelihood approach
- Convergence of watershed programs in the country and efficient sustainable institutional mechanisms from community-district-state-national level are urgently needed
- Enabling policies for sustainable development and use of water and land resources are urgently needed



Indian Rainfed Soils are Thirsty and Hungry also



- ❖ **Analysis of 3622 soil samples from farmers' fields in Andhra Pradesh, Rajasthan, Madhya Pradesh, Gujarat, Tamil Nadu, Kerala and Karnataka. Widespread deficiency (80-100% farmers fields) of Zn, Boron and Sulphur along with Nitrogen revealed**
- ❖ **Participatory research and demonstration trials with application of Zn, B and S increased crop yields by 30 to 80% and balanced fertilizer application increased crop yields upto 240%**

Recommendation:

- ❖ **Mapping of nutrient deficiencies country wide and measures to rectify deficiencies are needed to harness the benefits in short term. In long-term state of the art soil analysis laboratories at district level need to be established to provide necessary information to the farmers.**

Enabling Policies for Promoting Organic Sources of Fertilizer and Bio-pesticides are Needed

Grain yield response of soybean to the application of *Pongamia* press cake and inorganic fertilizers

Treatment	N applied (kg ha ⁻¹)	Yield (kg ha ⁻¹)	% increase over farmers' practice	Net benefit over farmers' practice (Rs. ha ⁻¹)	Cost of N kg ⁻¹
Farmers' practice (DAP – 100 kg)	16	900	-	-	55
<i>Pongamia</i> press cake (300 kg)	12	1340	49	4230	125
Fertilizer (Urea – 50 kg)	23	1450	61	6800	10.9
½ <i>Pongamia</i> cake (150 kg) + ½ Urea (25 kg)	17	1650	83	7950	88



Recommendation



For sustainable development and enhancing rainwater use efficiency substantial economic incentives need to be provided for promoting organic and biological nutrient sources to benefit rainfed agriculture



Conclusion

Productivity of rainfed agriculture could be doubled and livelihoods of small farmers can be improved substantially with the available technologies, however, it needs serious efforts and investments (a new paradigm) to put suitable mechanism in place to translate potential into actual yield and income



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