

# Salty or Sweet:

## Exploring the Challenges of Groundwater Salinization within a Sustainability Framework



Population in Mewat: > one million  
Groundwater : the only source of water



**IRRAD**

INSTITUTE OF RURAL RESEARCH AND DEVELOPMENT

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## Exploring the Challenges of Groundwater Salinization within a Sustainability Framework



Only 50 of approximately 600 villages have fresh groundwater



# Water Sustainability Framework

## The Water Poverty Index

Resources

Access

Capacity

Use

Environment



# Resources

Water Availability

Water Stress/Water  
Scarcity

Typical Levels with  
Sufficient Water:

100-500 persons/mcm/yr

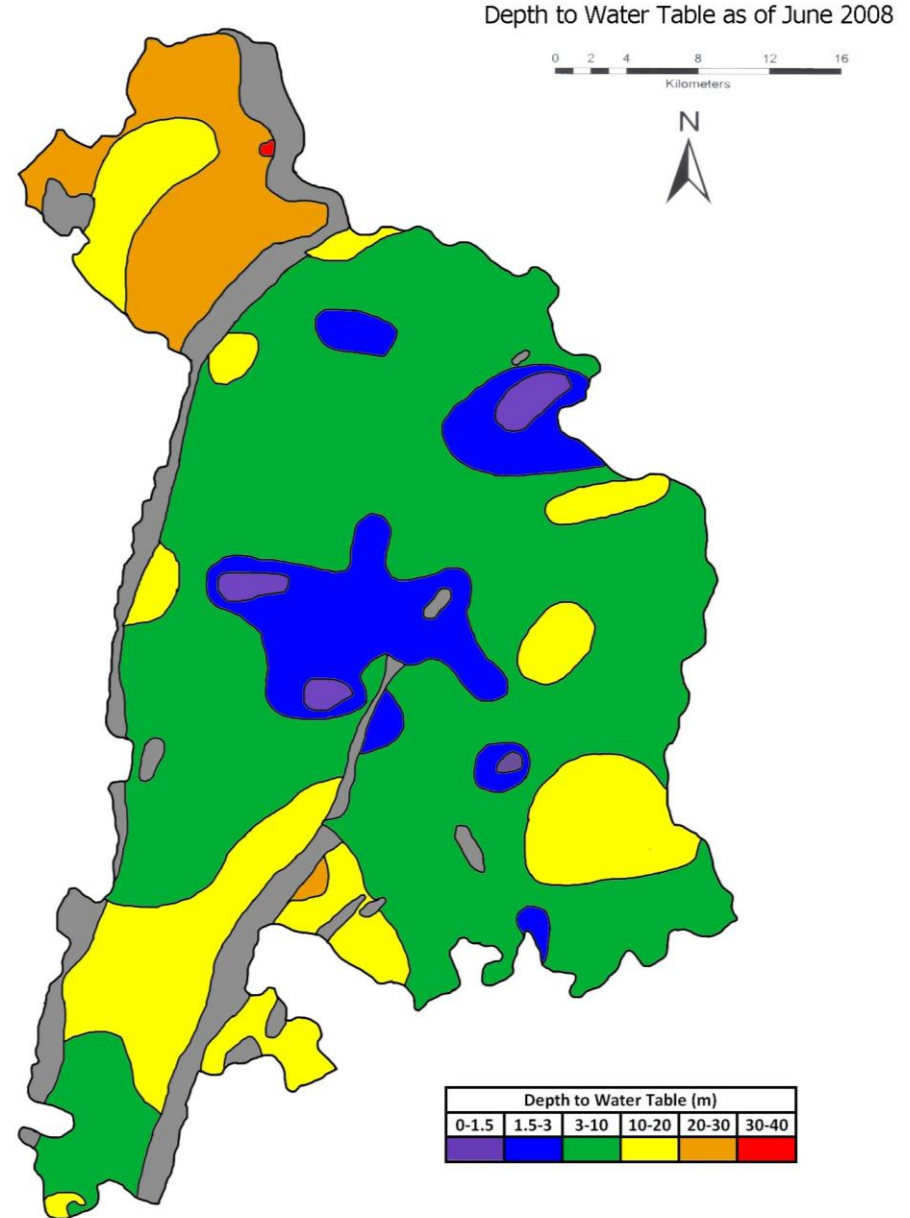
Absolute Water Scarcity:  
1500 persons/mcm/yr



# Water Scarcity

Firozpur Jhirka	3188
Nagina	3147
Nuh	3185
Punhara	3817
Taoru	2966

persons per million cubic meters water





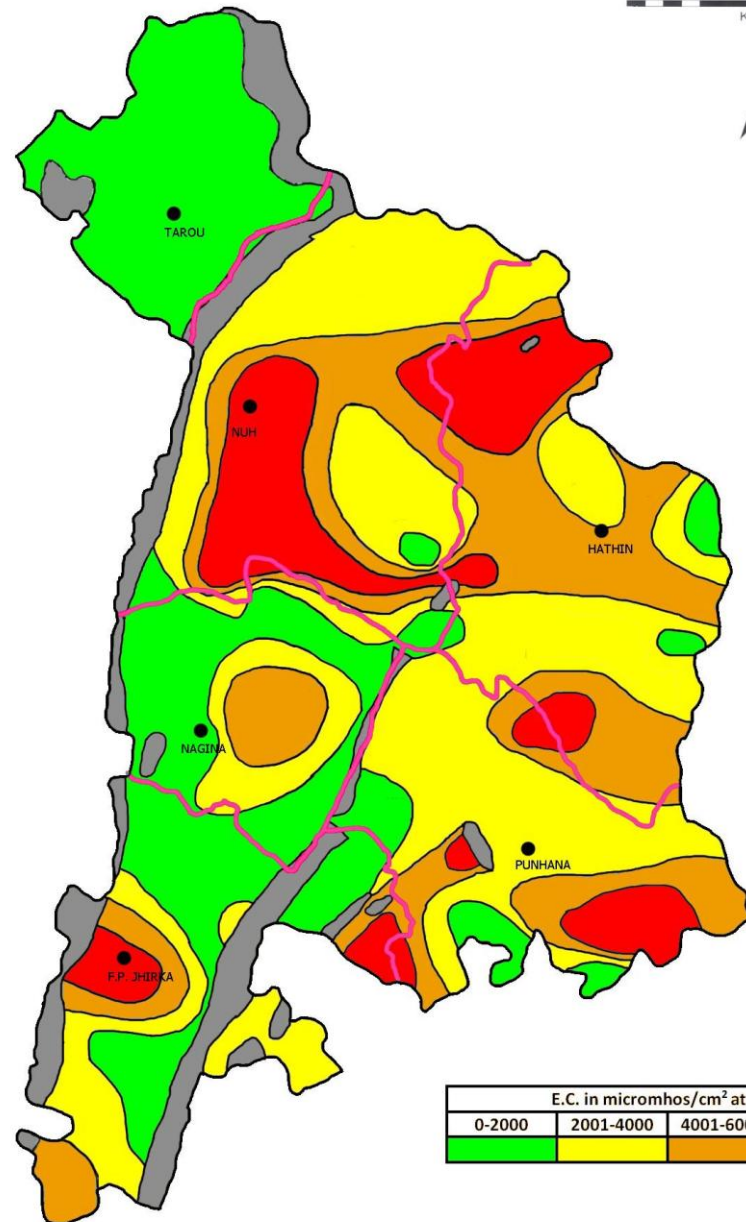
# Water Scarcity

		with salinity correction
Firozpur Jhirka	3188	3601
Nagina	3147	3844
Nuh	3185	9955
Punhara	3817	5364
Taoru	2966	2966

persons per million cubic meters water

Groundwater Salinity as of June 2008

0 2 4 8 12 16  
Kilometers



E.C. in micromhos/cm <sup>2</sup> at 25 C			
0-2000	2001-4000	4001-6000	AD. 6000

# Water Sustainability Framework

## Resources

Access

Capacity

Use

Environment



# Water Sustainability Framework

Resources

**Access**

Capacity

Use

Environment



Access to Electricity a  
Limiting Factor

2-3 hours average/day



# Water Sustainability Framework

Resources

Access

**Capacity**

Use

Environment



Health

Education

Income

# Water Sustainability Framework

Resources

Access

Capacity

**Use**

Environment



Ratio of  
Irrigated Area to  
Total Cultivated  
Land



# Water Sustainability Framework

Resources

Access

Capacity

Use

**Environment**



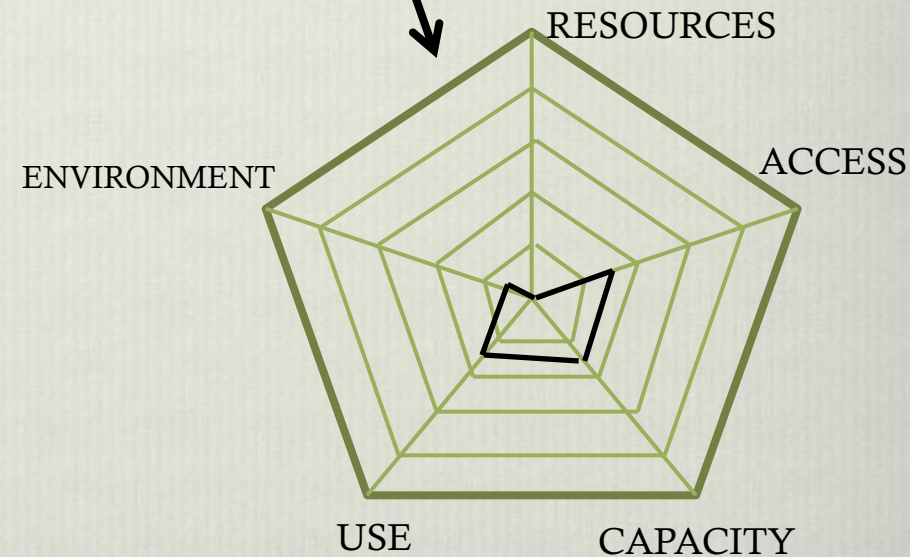
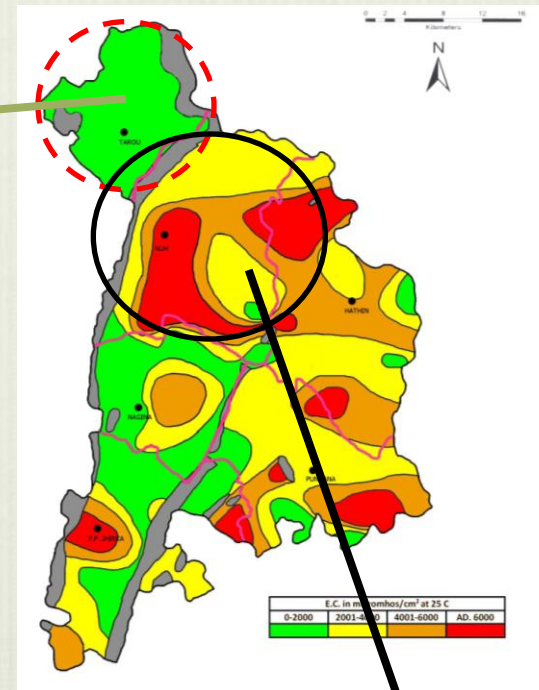
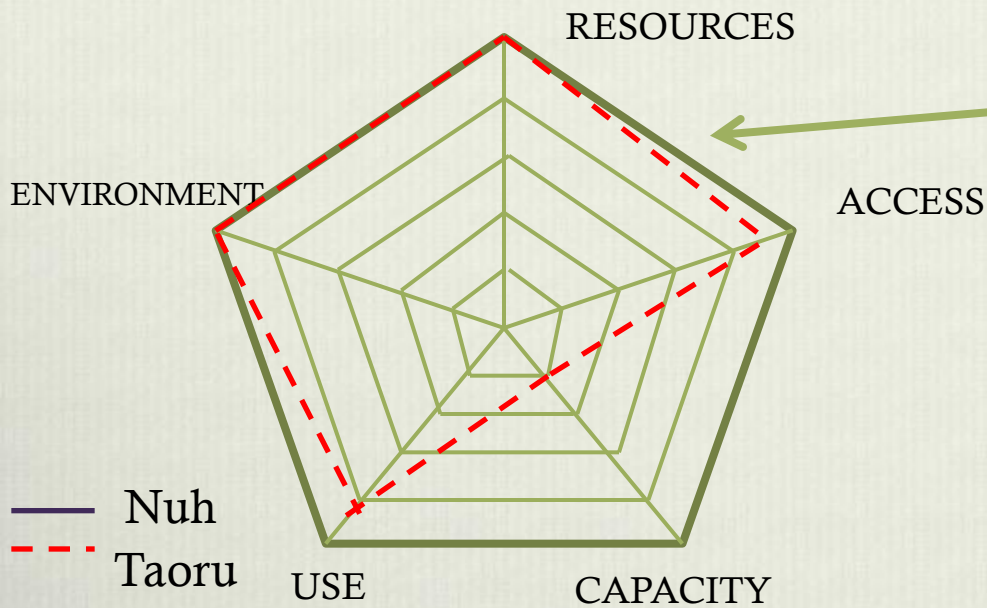
Salinity

Groundwater  
Abstraction vs.  
Availability

# Mewat Block-Level WPI Values

	Resources	Access	Capacity	Use	Environment	WPI
F. Jhirka	0.91	0.78	0.17	0.32	0.58	0.55
Nuh	0.00	0.29	0.29	0.35	.13	<b>0.21</b>
Nagina	0.87	0.51	0.10	0.15	0.56	0.44
Punhana	0.66	0.49	0.25	0.78	0.38	0.51
Taoru	1.00	0.98	0.19	0.85	1.00	<b>0.81</b>

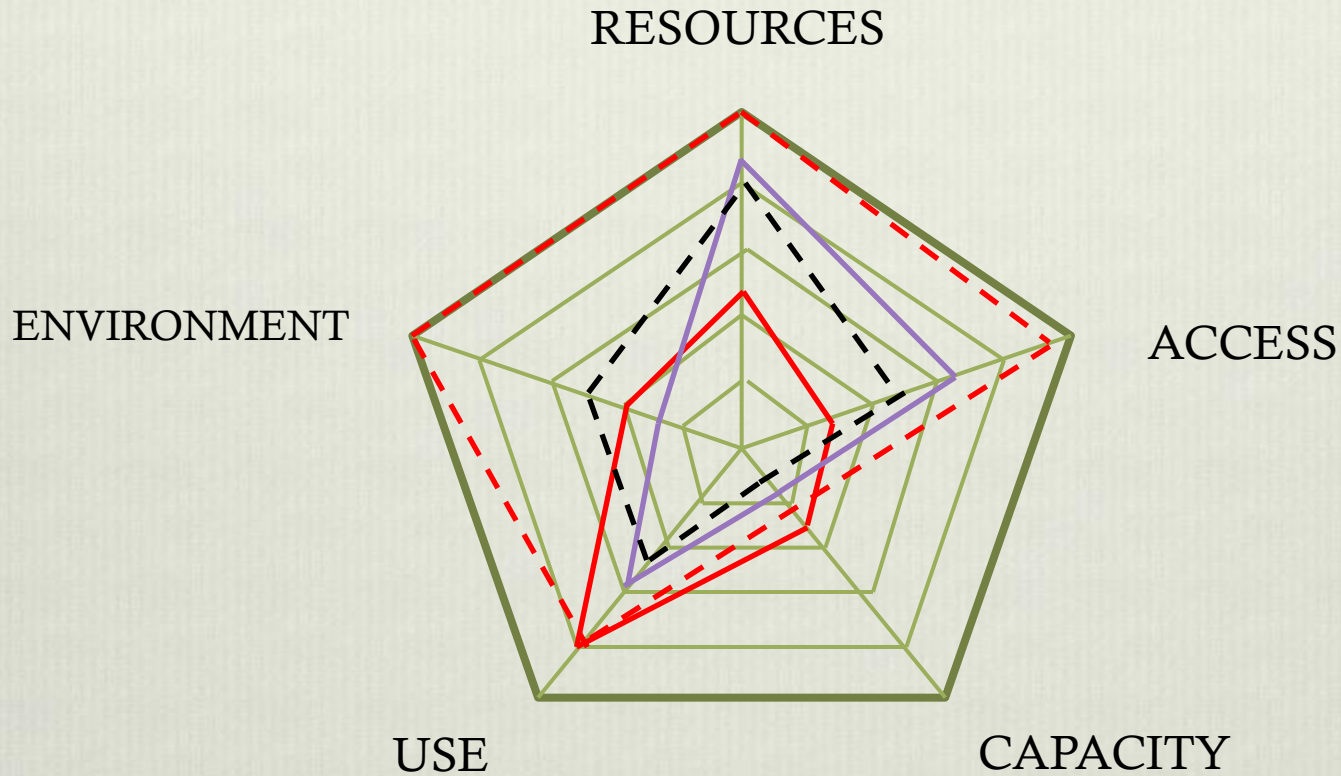




Area enclosed by the pentagon is a measure of the sustainability of the block.

Salinity of the groundwater is the strongest control on the sustainability.

# Water Sustainability Framework



- Jhirka
- - - Nagina
- Punhana
- Nuh
- - - Taoru



# Summary & Future Analysis

- ❖ WPI an effective indicator for water-related sustainability
  - ❖ Evaluating the success of NGO (IRRAD) interventions
  - ❖ Communication tool
  - ❖ Decision-making support for prioritizing future interventions
  
- ❖ Future work:
  - ❖ 2011 Census Data
  - ❖ Village-Level Analysis
  - ❖ Systematic Collection of Field Data