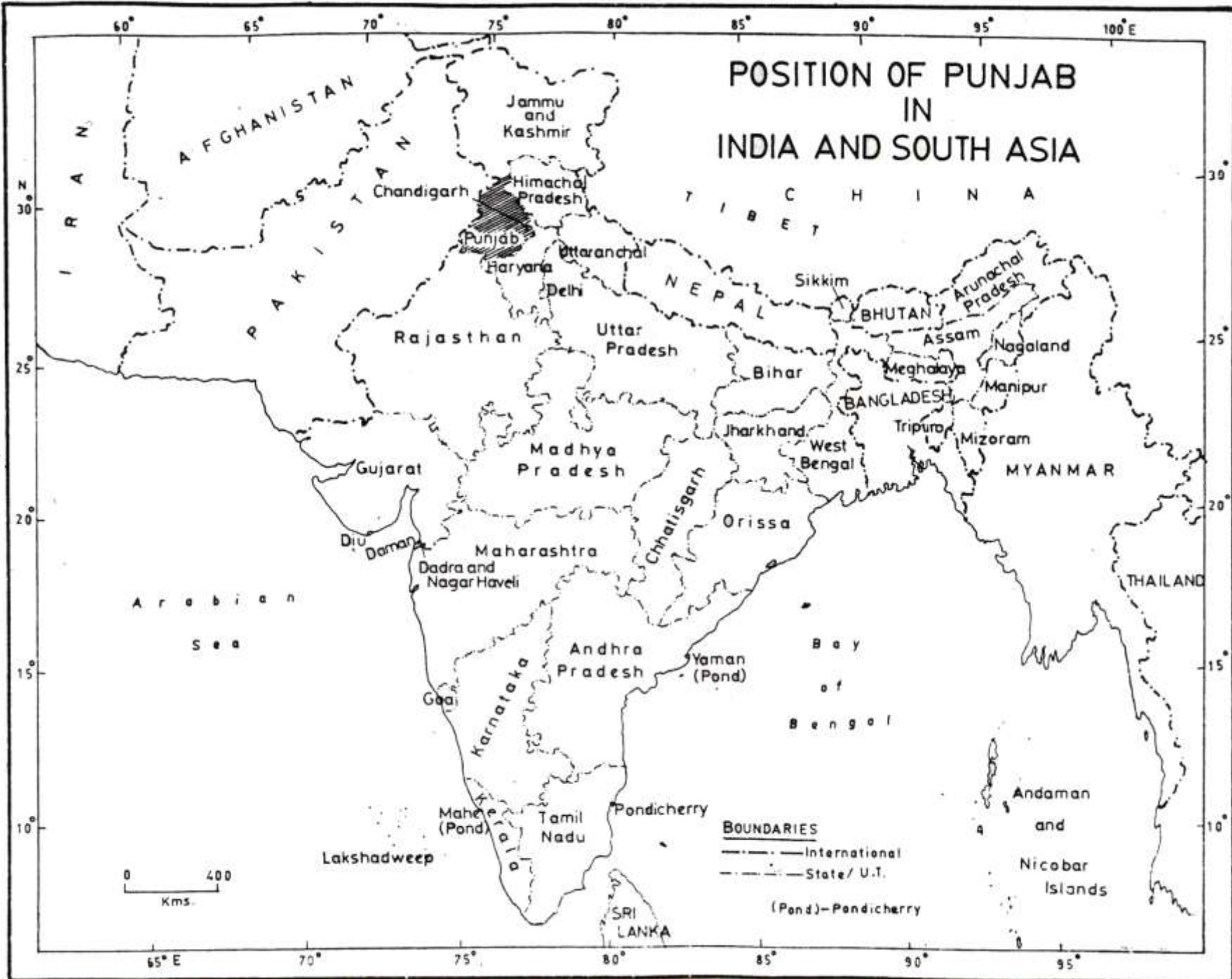


# **WATER RESOURCES OF PUNJAB**

**MANJIT SINGH**  
Assistant Professor in Geography  
GKSM Govt. College, Tanda Urmar

# POSITION OF PUNJAB IN INDIA AND SOUTH ASIA

Map 5



0 400  
Kms.

**BOUNDARIES**  
 - - - - - International  
 - - - - - State/ U.T.  
 (Pond)-Pondicherry

# About Punjab







Geographical area	50,362 sq km
No. of Districts/Blocks	20/141
Major crops	Rice, Wheat, Maize Cotton, Sugarcane
Area under rice/wheat/cotton	27/35/6 lakh ha
Net area sown	42 lakh ha
Major source of irrigation	Groundwater
No. of Tubewells	12.86 lakh
Cropping intensity	190 per cent
Groundwater development	166 per cent

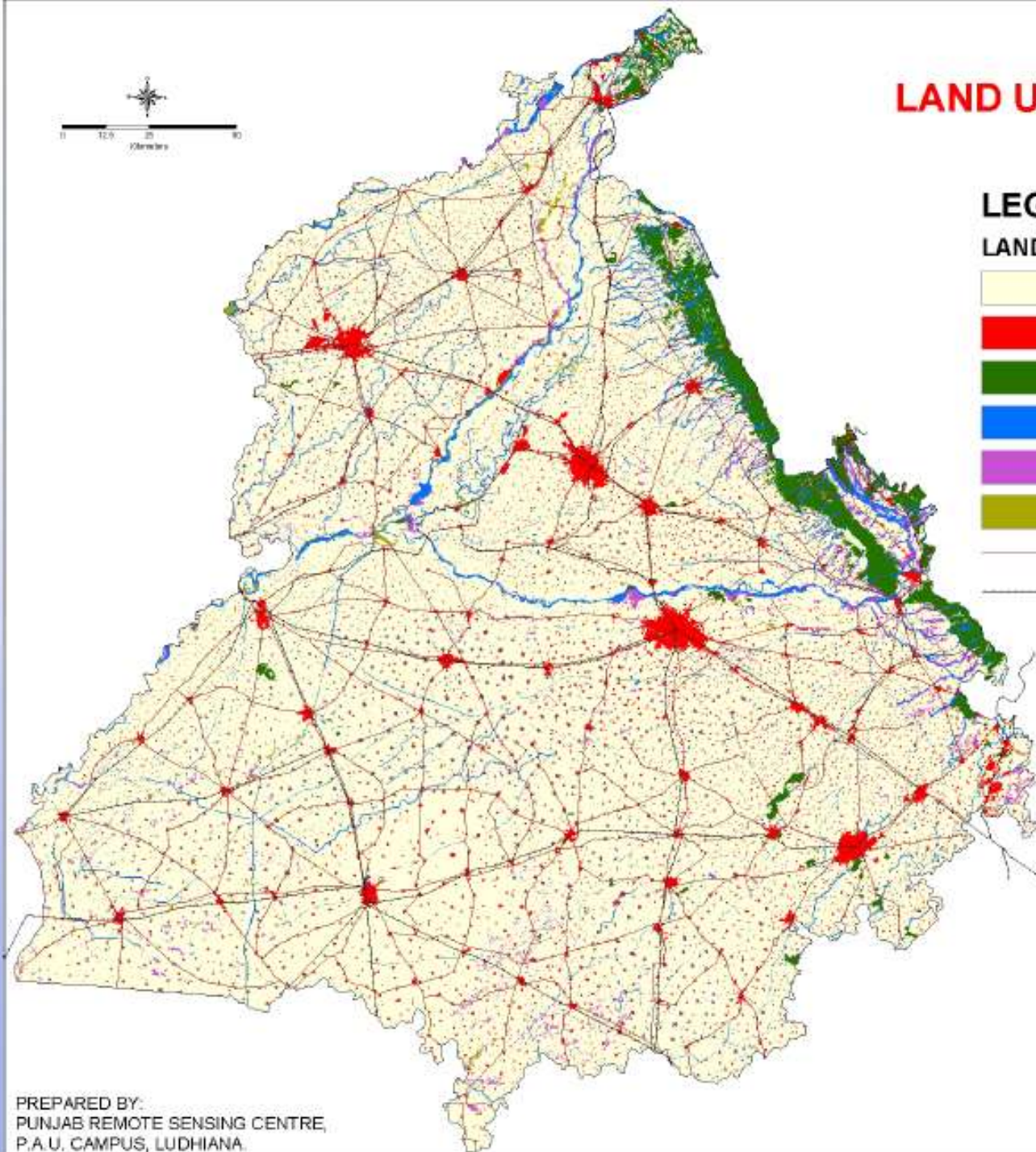


# PUNJAB

## LAND USE / LAND COVER

### LEGEND

LAND USE CATEGORY	% AREA
 AGRICULTURE	87.11
 BUILT-UP	5.88
 FOREST	3.11
 WATER BODIES	1.59
 WASTELANDS	2.01
 WETLANDS	0.30
ROAD	
RAILWAY LINE	



# WATER RESOURCES OF PUNJAB

```
graph LR; A[ ] --- B[Rain Water]; A --- C[Rivers & Canals]; A --- D[Underground Water];
```

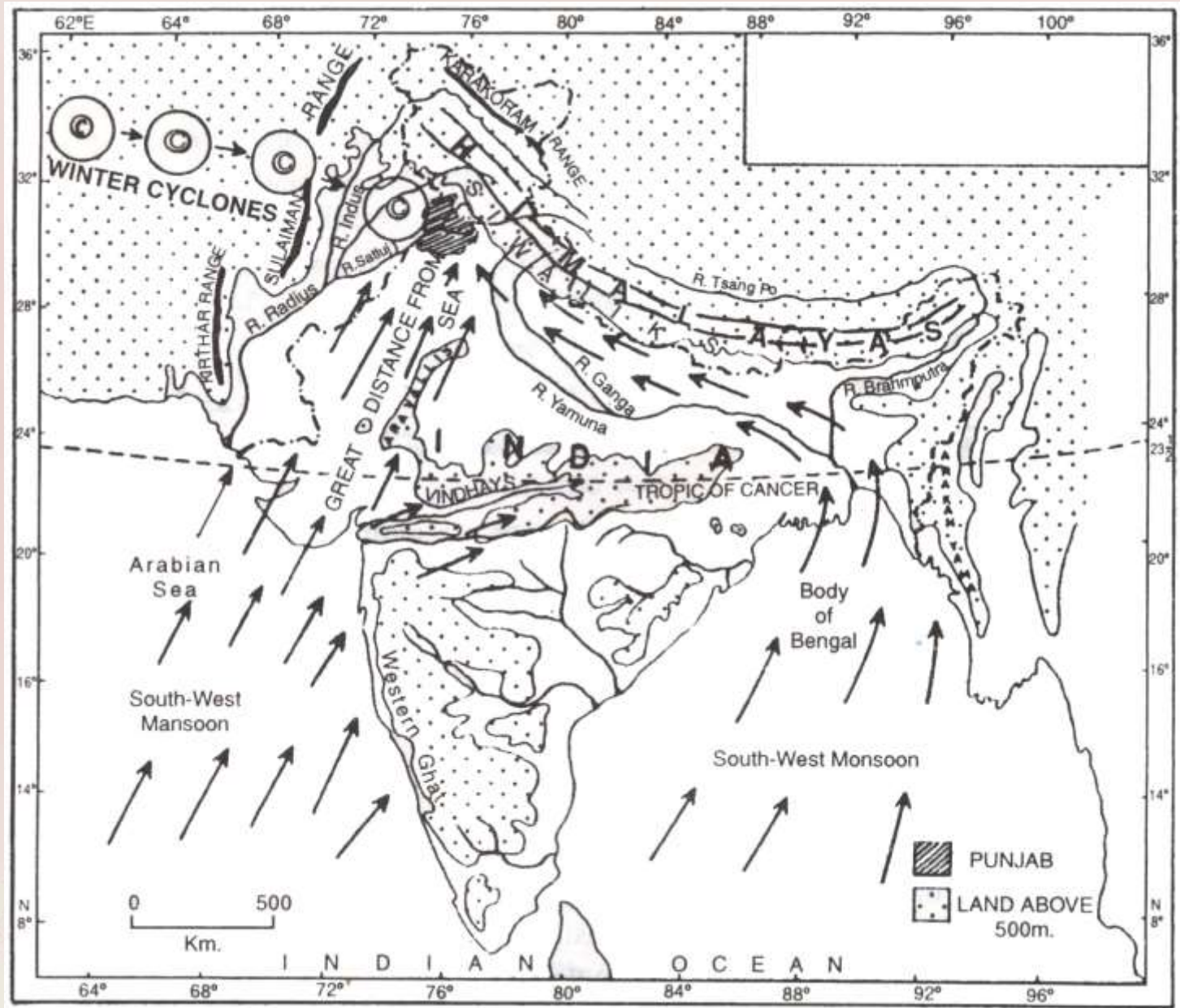
**Rain Water**

**Rivers & Canals**

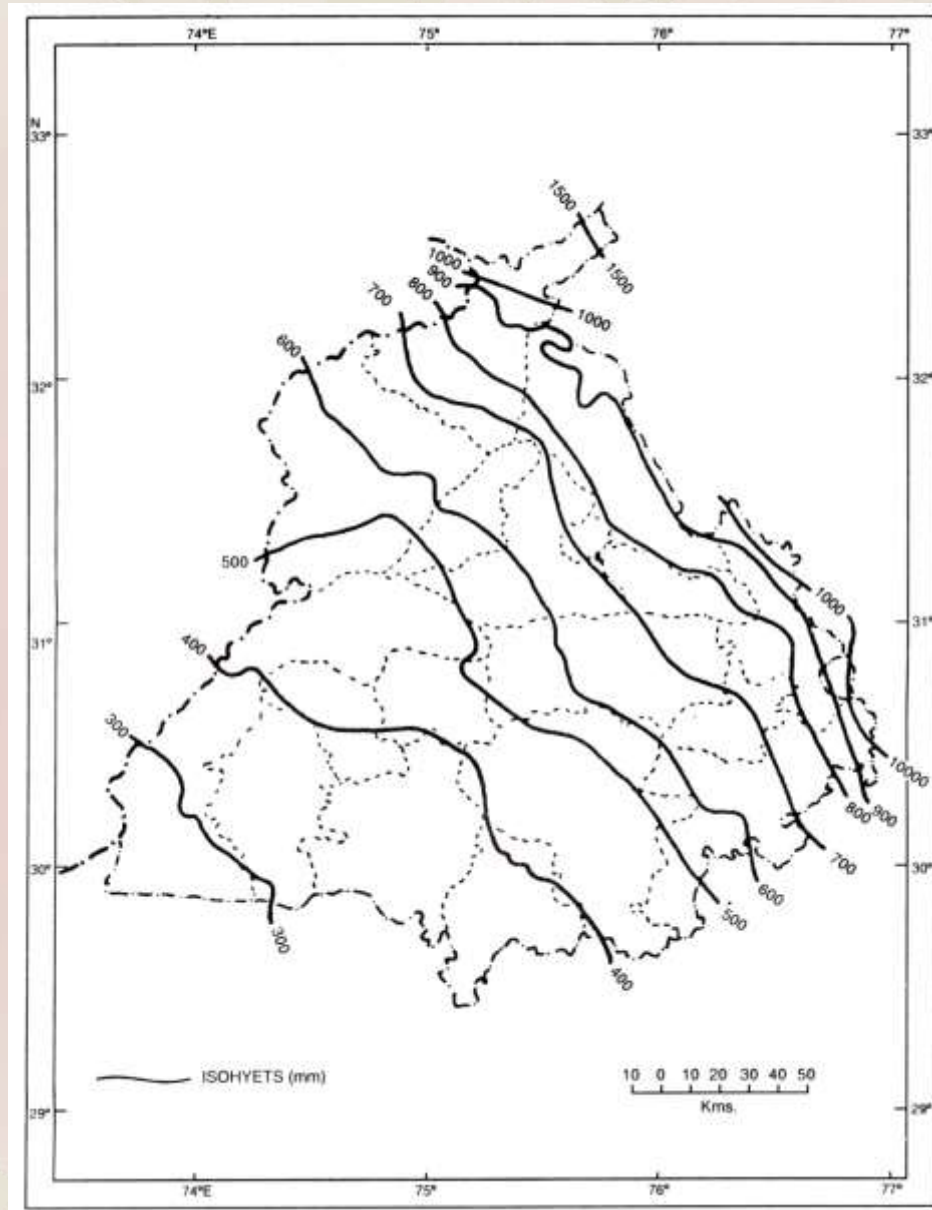
**Underground Water**



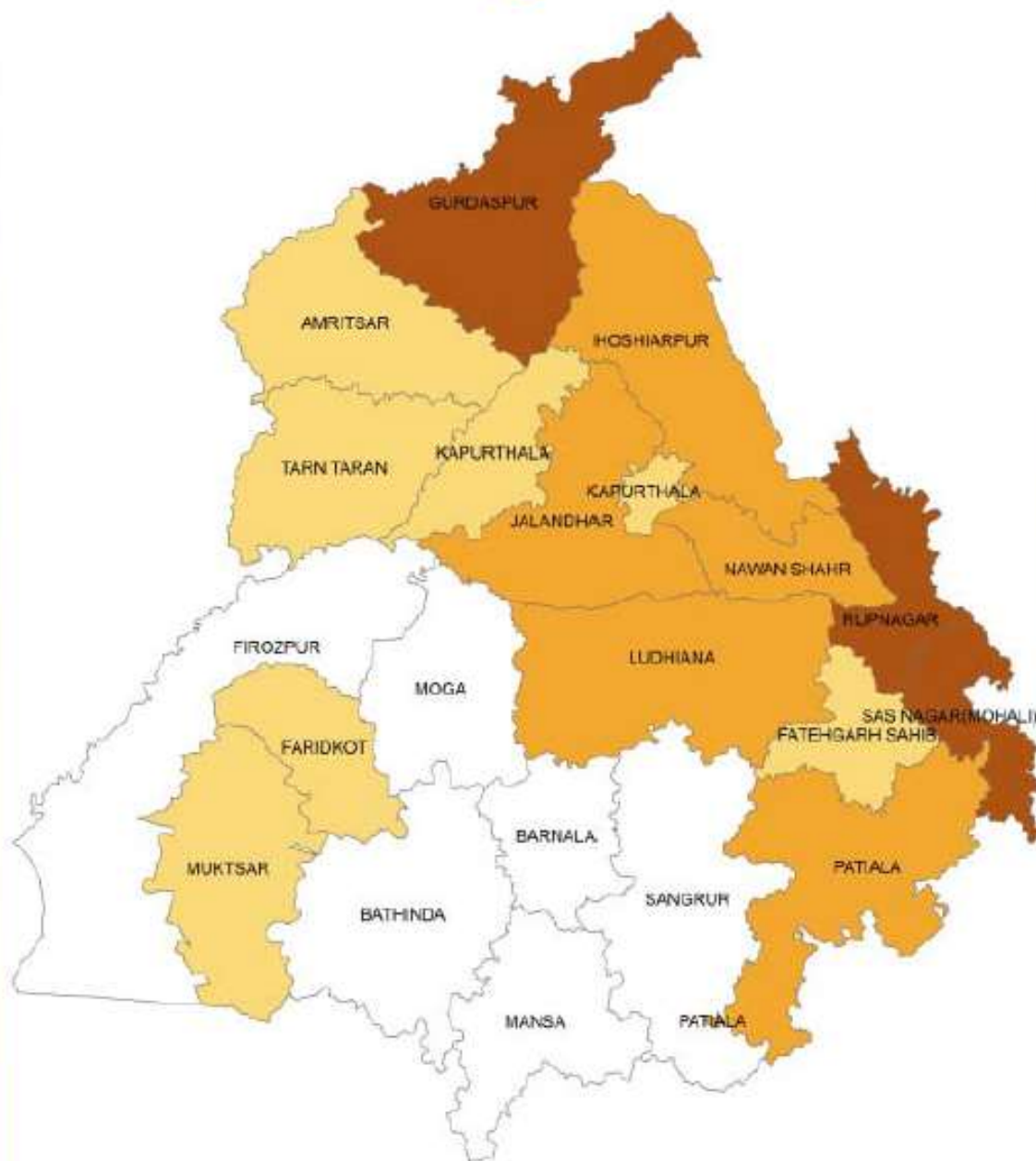
# PUNJAB : Summer & Winter Rainfall



# PUNJAB: Normal Mean Annual Rainfall



# Average Rainfall



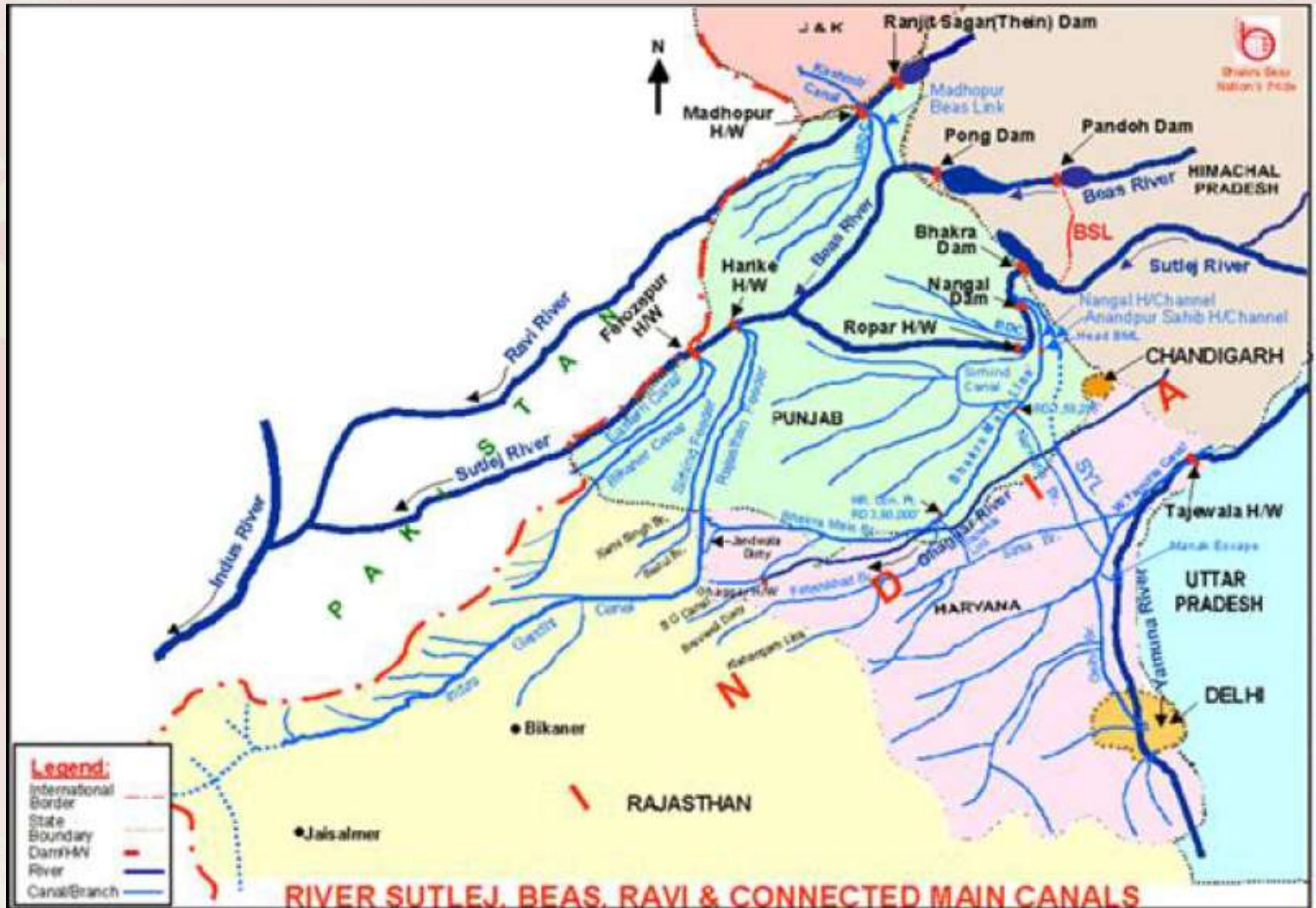
## Legend

### Average Annual Rainfall





# PUNJAB: Rivers & Canals



# PUNJAB: River Water System

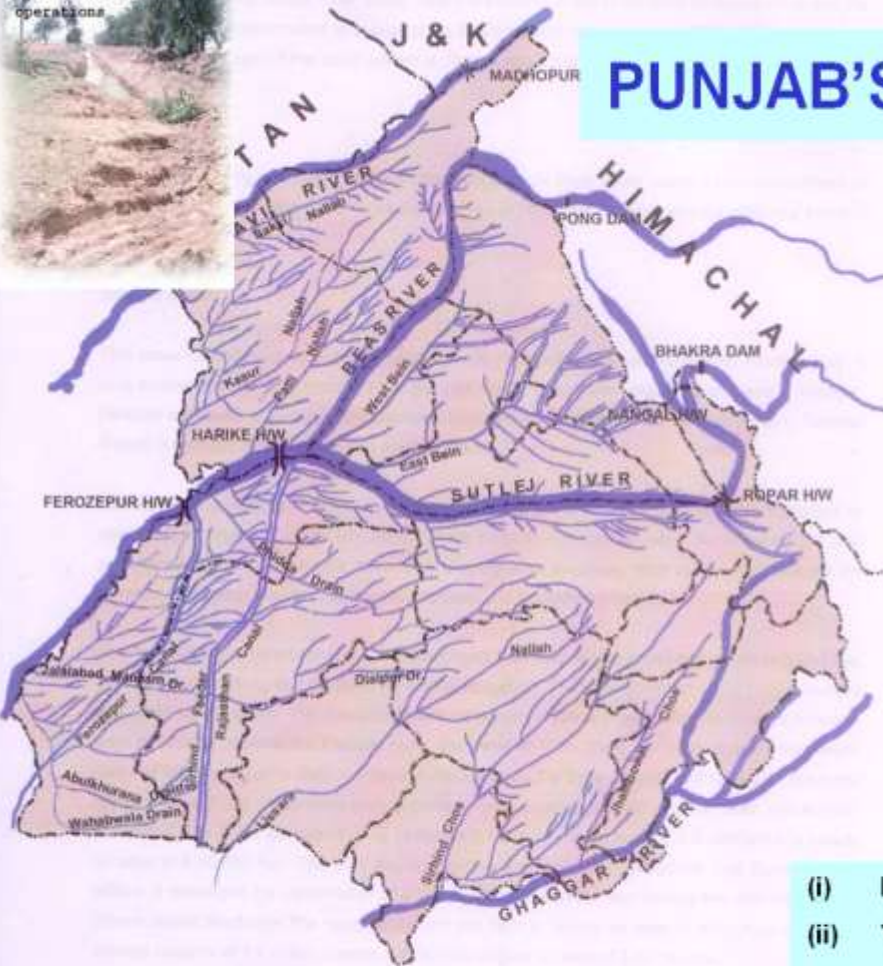
Headwork	River	Canals
Nangal Headwork	Satluj	Bhakra Main Line Anandpur Hydel Channel
Ropar Headwork	Satluj	Sirhind Canal Bist Doab Canal
Shah Nehar Canal System	Beas	Mukerian Hydel Channel Kandi Canal
Madhopur Headwork	Ravi	UBDC Canal Kashmir Canal
Harike Headwork	Satluj and Beas	Rajasthan Feeder Sirhind Feeder
Hussainiwala Headwork	Satluj and Beas	Bikaner Canal Eastern Canal



Source: Statistical Abstract, Govt. of Punjab



## Drainage Pattern of Punjab



N



Legends :

	River & Drains
	District Boundary
	State Boundary
	International Boundaries

## Canal Network of Punjab



0 10 20 30 40 50

(i)	Headworks constructed	6 Nos.
(ii)	Total Length of Canals	14,500 Km
a)	Main Canals & Bench Canals	2,200 Km
b)	Distributory & Minors	12,300 Km
(iii)	Length of Water Courses	1,00,000 Km
(iv)	C.C.A. by Canals	30.88 Lac Hactares
(v)	Overall Intensity of Irrigation by canals	93.9%



# PUNJAB

1. North-east zone
2. Central Zone
3. South-west zone



# PUNJAB: Status of Canal Water

<b>Annual canal water available at H/w</b>	<b>14.54 M ha-m</b>
<b>Annual canal water available at outlets</b>	<b>1.45 M ha-m</b>
<b>Annual ground water available</b>	<b>1.68 M ha-m</b>
<b>Total annual available water resources</b>	<b>3.13 M ha-m</b>
<b>Annual water demand</b>	<b>4.40 M ha-m</b>
<b>Annual water deficit</b>	<b>1.27 M ha-m</b>

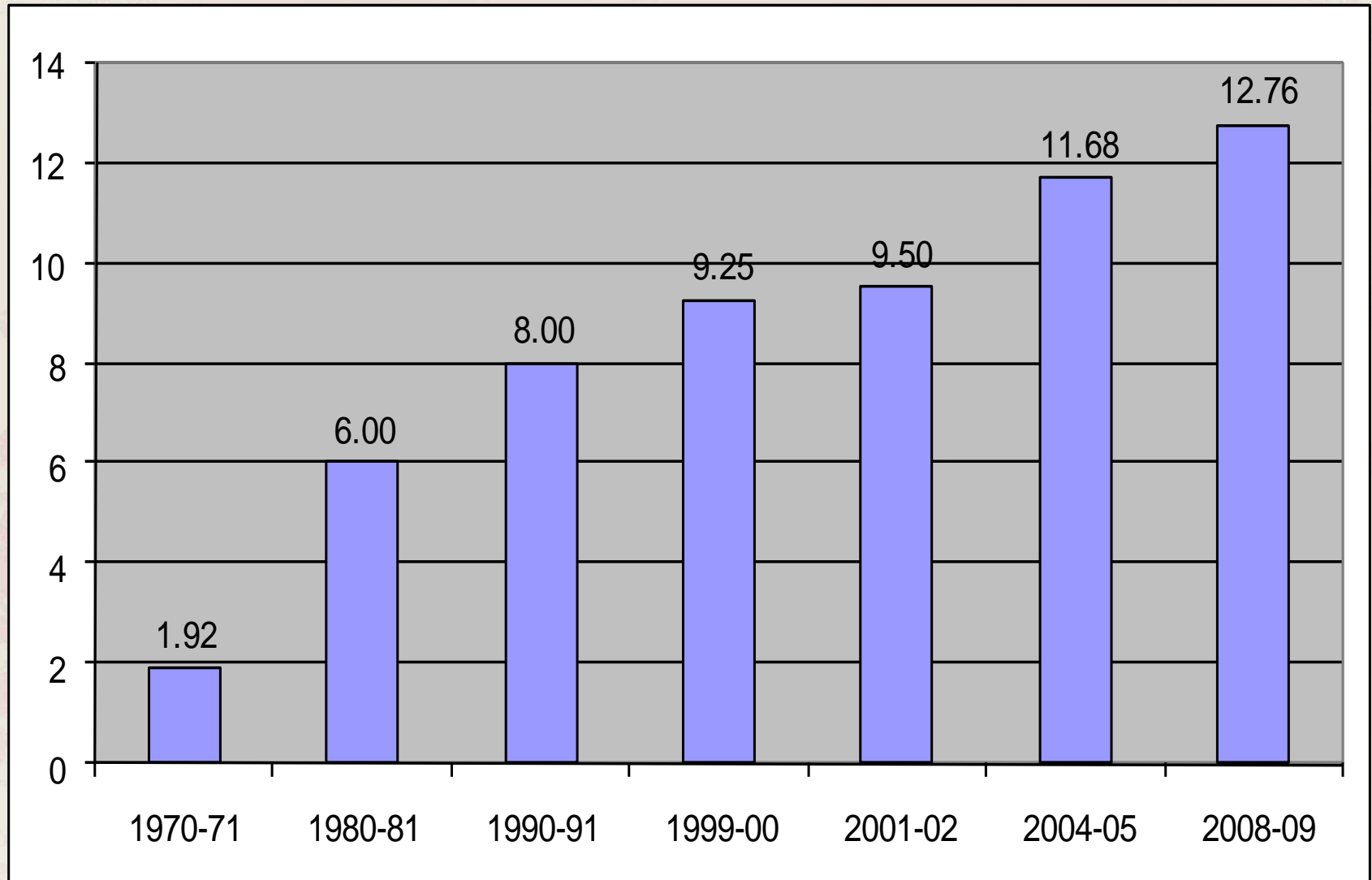
# PUNJAB: Major Source of Underground Water Exploitation

Number of Tube-wells in Punjab (Lakhs)

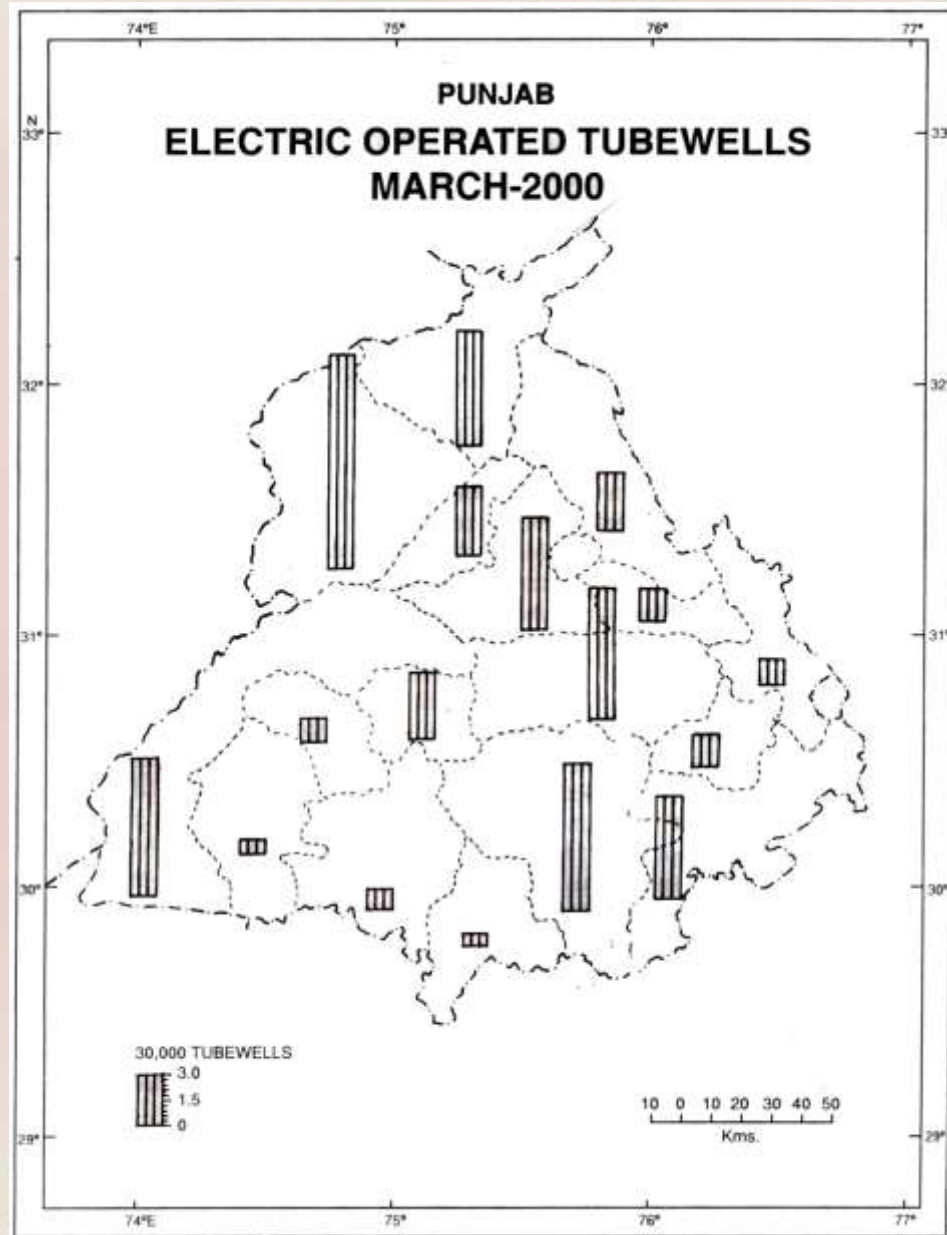
Year	Diesel Operated		Electricity Operated		Total
	No.	Percent	No.	Percent	
1970-71	1.01	52.60	0.91	47.40	1.92
1980-81	3.20	53.33	2.80	46.67	6.00
1990-91	2.00	25.00	6.00	75.00	8.00
1998-99	1.70	88.54	7.45	81.42	1.92
1999-00	1.70	18.38	7.55	81.62	9.25
2000-01	1.70	18.18	7.65	81.82	9.35
2001-02	1.75	18.42	7.75	81.58	9.50
2002-03	2.91	25.30	8.59	74.70	11.50
2003-04	2.88	25.17	8.56	74.83	11.44
2004-05	2.88	24.66	8.80	75.34	11.68
2005-06	2.88	24.14	9.05	75.86	11.93
2006-07	2.80	22.73	9.52	77.27	12.32
2007-08	2.75	22.07	9.71	77.93	12.46
2008-09	2.80	21.94	9.96	78.06	12.76



# PUNJAB: Growth of Tubewells (in lacs)



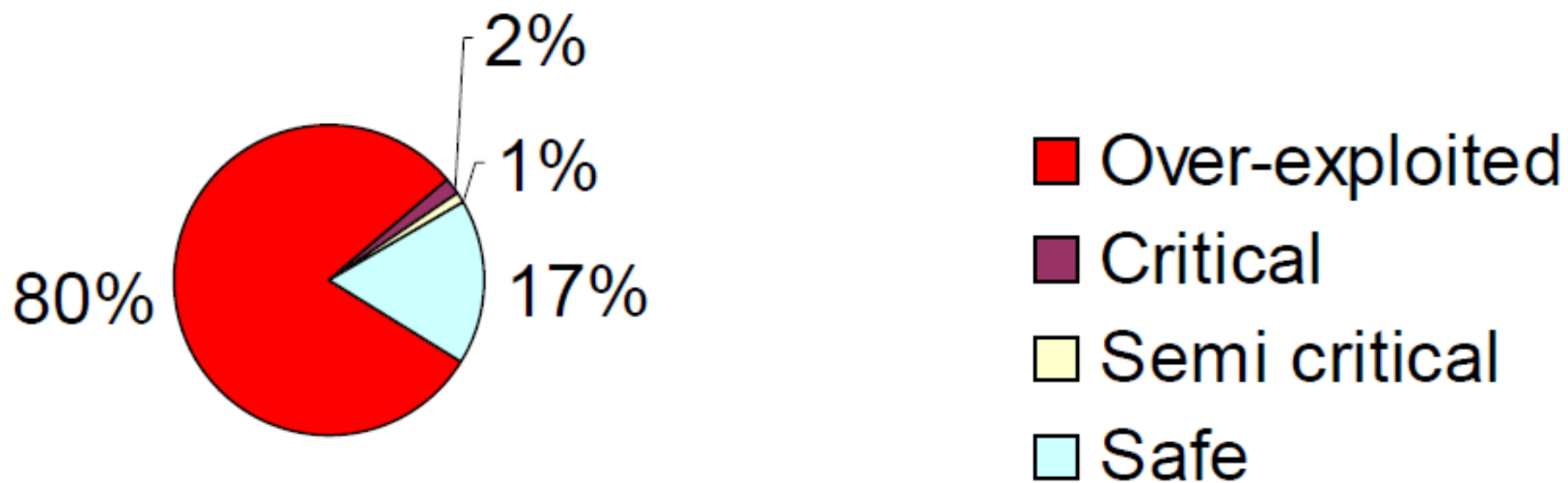
# PUNJAB: Number of Tubewells (District Wise)



# PUNJAB: Number of Blocks in different categories

<b>Category</b>	<b>2000</b>	<b>2005</b>	<b>2010</b>
Over-exploited (Dark)	73	103	110
Critical	11	5	3
Semi Critical	16	4	2
Safe	38	25	23

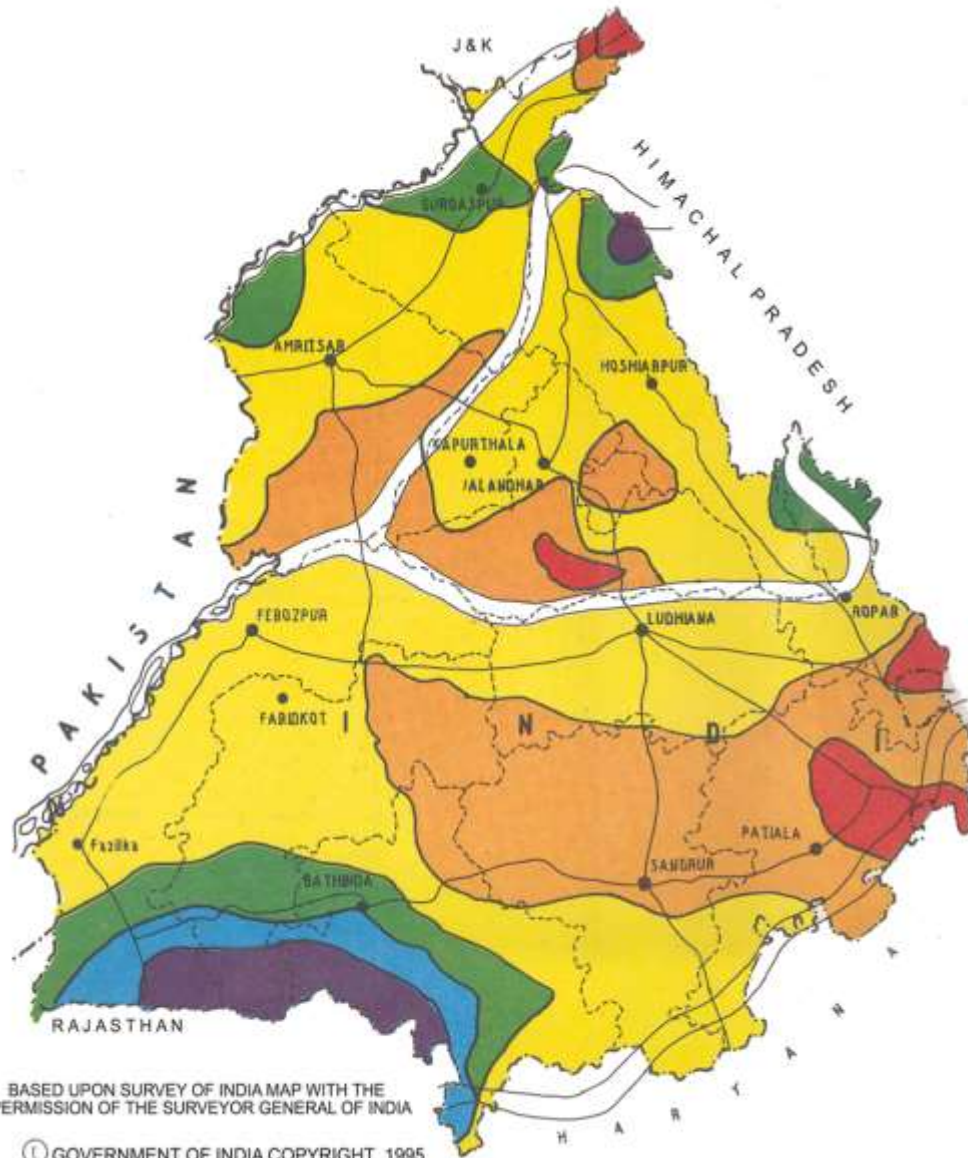




**Stage of groundwater development in Punjab (%)**



# PUNJAB: Ground Water Table Variations



## GROUND WATER TABLE VARIATIONS

(JUNE '79 TO JUNE '90)

### GROUND WATER TABLE

RISE > 5mts	
RISE 3 - 5mts	
RISE 0 - 3mts	
FALL 0 - 3mts	
FALL 3 - 5mts	
FALL > 5mts	

SOURCE: Water Resources Directorate  
Punjab, Chandigarh

### References:

BOUNDARY INTERNATIONAL

STATE

DISTRICT

ROAD

RIVER

SETTLEMENT

PUNJAB POLLUTION CONTROL BOARD  
PATIALA

BASED UPON SURVEY OF INDIA MAP WITH THE  
PERMISSION OF THE SURVEYOR GENERAL OF INDIA

GOVERNMENT OF INDIA COPYRIGHT 1995



# PUNJAB : Supply & Demand for Water Resources

Detail	m ham
Annual canal water at head-works	14.54
Annual canal water at outlets	1.45
Annual ground water available	1.68
Total annual available water resources	3.13
Annual water demand	4.40
Annual water deficit	1.27

Source: A.K. Jain and Raj Kumar (2007)

 **Annual Water Deficit 28.86 % of Total Demand**

# PUNJAB : Water Conservation

**Runoff Water Harvesting  
and Reuse**



**Check Dam &  
Percolation Tank**



# PUNJAB : Water Conservation



By Land Lavelling

By Mulching





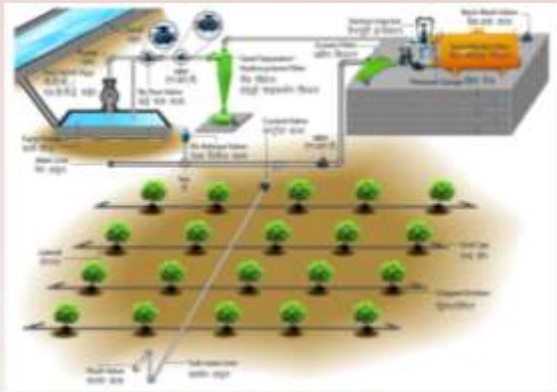
# PUNJAB : Water Conservation

## Adaptation of New Irrigation Techniques in Agriculture

Drip Irrigation

Sprinkle Irrigation

Furrow Irrigation





# PUNJAB : Water Conservation

## Recharging of Ground Water Aquifer

Renovation of Village Ponds & Fish Farm

Reuse of Waste Water

Roof Top Rain Water Harvesting

Optimum Irrigation Scheduling of Rice & Wheat

*Thank  
You*

