An Inter-State Analysis of Water condition in India using WPI

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Sub Theme: Emerging Pollutants in Aquatic Ecosystems

Introduction:

This study is based on the assessment of water condition in India using Water Poverty Index. The state level analysis have been done to understand the various aspects of Water related issues.

Objectives:

To assess the water condition of the states of India

Methodology and Data Sources

Component	Variables	Definition	Value	Data Sources
Resource	R1	Avg Annual RF	Number	IMD, Rainfall Statistics of India
	R2	Per Capita Ground water availability	Number	CGWB 2020, Estimated Pop Data 2021
	R3	Variability of Average rainfall to normal rainfall	Percent	IMD, Rainfall Statistics of India
Access	A1	% HH with access to safe drinking water	Percent	NFHS-5 (2019-21)
	A2	% HH with access to Toilet	Percent	NFHS-5 (2019-21)
Capacity	C1	Literacy Rate	Percent	Census
	C2	Gross Enrollment Rate (Primary)	Percent	Census
	C3	% of BPL HH to Total HH	Percent	Agri Stat, 2021
	C4	U-5 Mortality rate	Number	NFHS-5 (2019-21)
Use	U1	% of gross area irrigated to gross area sown/cropped.	Percent	RBI Report (2019-20)
	U2	Per capita ground water use for domestic and Industrial purpose	Number	CGWB 2020, Estimated Pop Data 2021
Environment	E1	% Forest area to total Geographical Area	Percent	Forest Survey of India, 2021
	E2	% Wetland area to total Geographical Area	Percent	SAC
	E3	Diarrhoea morbidity rate	Number	National Health Profile, 2019
	E4	Typhoid morbidity rate	Number	National Health Profile, 2019
	E5	Chemical Pesticide consupmtion to gross cropped area (kg/hectare)	Number	RBI 2019-20
	E6	Chem. Fertilizer Use (kg per Hect)	Number	RBI 2019-20

- For Water Poverty Index for States of India, 17 Indicators have been selected under 5 Components i.e. *Resource*, *Capacity*, *Access*, *Use* and *Environment*

- HDI method has been used for the normalization of data.

$$HDI = \frac{X_i - X_{min}}{X_{max} - X_{min}}$$

where X_i is the actual value of X for observation i. X_{min} is minimum value of X and X_{max} is maximum value of X.

- Aggregation of data has been done based on equal weight method.

$$WPI = \frac{w_r R + w_a A + w_c C + w_u U + w_e E}{w_r + w_a + w_c + w_u + w_e}$$

where $w_r=w_a=w_c=w_u=w_e=1$ (for equal weights) and R is Resource component, C is Capacity component, A is Access component, U is Use component and E is Environment.

- The score of WPI is between 0-100. 0 indicates the poor condition while 100 indicates best condition.

In the Use component Haryana is with highest score 88, followed by Puducherry 87, Punjab 86, Jammu & Kashmir 69; while Manipur with lowest score 3, followed by Arunanchal Pradesh 4, Mizoram 5, Maharashtra 11.

In the Environment Index Arunanchal Pradesh is with highest score 75, followed by Manipur 72, Goa 69, Mizoram 68, Gujarat 68 , Kerala 68; while Puducherry with lowest score 19, followed by Himanchal Pradesh 29, Punjab 36, Delhi 37, Uttar Pradesh 39

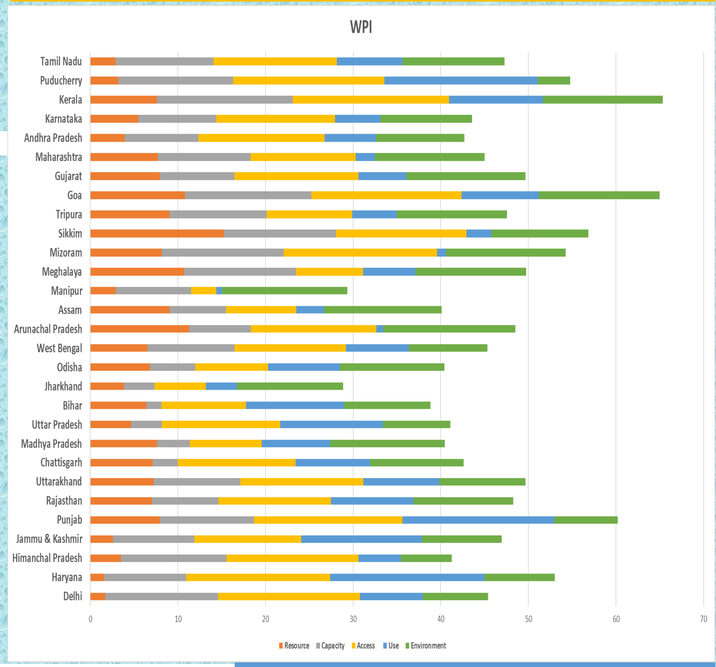
The component wise result shows that in the Resource component, Sikkim is with the highest score 76, followed by Arunachal Pradesh (56), Goa (54), Meghalaya (54), Tripura 45; while Haryana with lowest score value 8, followed by Delhi 9, Jammu & Kashmir 13, Manipur 15.

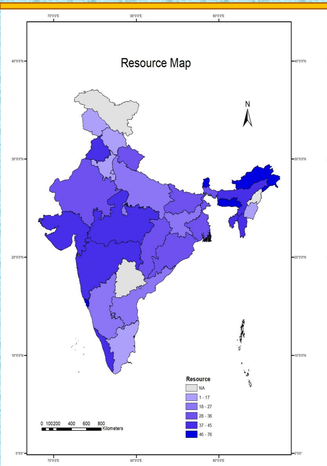
In the Capacity component Kerala is with highest score 78, followed by Goa 72, Mizoram 70, Puducherry 65, Delhi 64; while Bihar with lowest score value 9, followed by Chattisgarh 14, Jharkhand, 17, Uttar Pradesh 18.

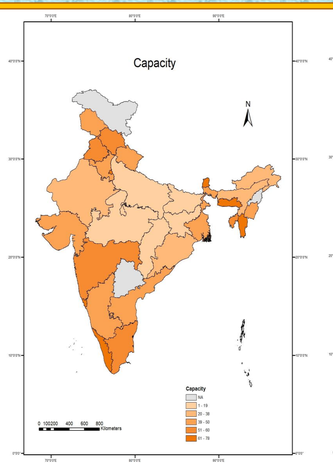
In the Access component Kerala is with highest score 89, followed by Mizoram 87, Puducherry 86, Goa 86, Punjab 85, Haryana 82, Delhi 81; while Manipur with lowest score 14, followed by Jharkhand 29, Meghalaya 38, Assam 40, Madhya Pradesh 41, Odisha 42, Bihar 48

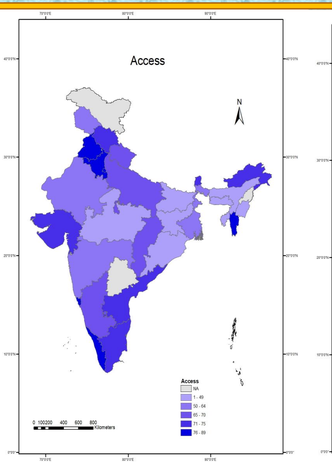
The WPI result shows that Kerala with highest score 66 followed by Goa 65, Punjab 60, Sikkim 57, Puducherry 55; while Jharkhand and Manipur with lowest score 29, followed by Bihar 39, Assam 40, Odisha 40, Madhya Pradesh 40, Uttar Pradesh 41.

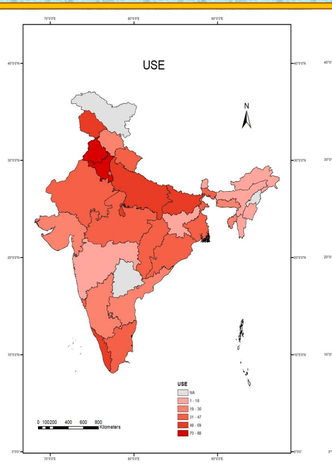
Results

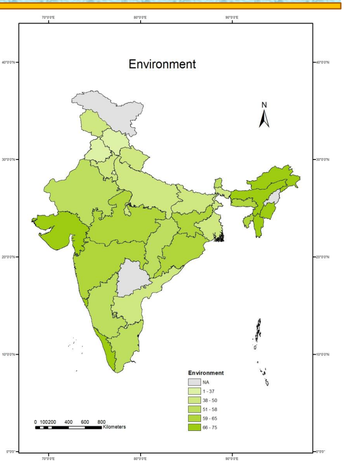


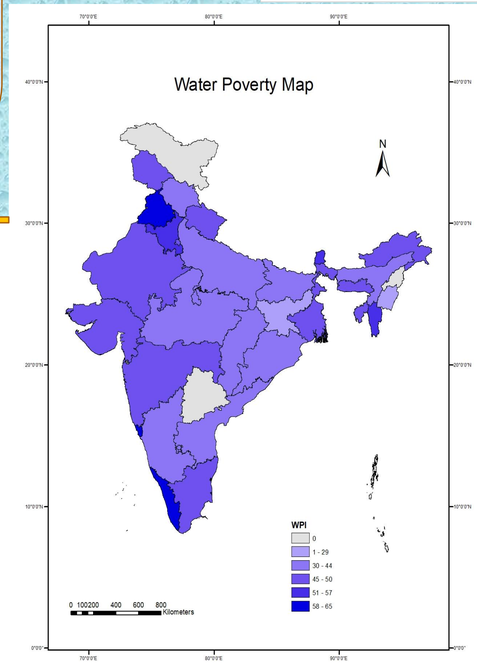












State	Resource	Capacity	Access	Use	Environment	WPI
Jharkhand	19	17	29	18	61	29
Manipur	15	43	14	3	72	29
Bihar	32	9	48	56	49	39
Assam	45	32	40	16	67	40
Odisha	34	26	42	41	60	40
Madhya Pradesh	38	19	41	39	65	40
Uttar Pradesh	23	18	68	58	39	41
Himanchal Pradesh	17	60	75	24	29	41
Chattisgarh	36	14	67	42	54	43
Andhra Pradesh	20	42	72	29	50	43
Karnataka	27	45	68	26	52	44
Maharashtra	39	53	60	11	63	45
West Bengal	33	50	64	36	45	45
Delhi	9	64	81	36	37	45
Jammu & Kashmir	13	46	61	69	46	47
Tamil Nadu	15	56	71	37	58	47
Tripura	45	55	49	25	63	48
Rajasthan	35	38	64	47	57	48
Arunachal Pradesh	56	35	72	4	75	49
Gujarat	40	43	71	27	68	50
Uttarakhand	36	49	70	43	49	50
Meghalaya	54	64	38	30	63	50
Haryana	8	47	82	88	40	53
Mizoram	41	70	87	5	68	54
Puducherry	16	65	86	87	19	55
Sikkim	76	64	74	14	56	57
Punjab	40	54	85	86	36	60
Goa	54	72	86	44	69	65
Kerala	38	78	89	54	68	65

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