Drinking Water Security in Pakistan: Issues and Options

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What is water security?

- When an individual does not have access to safe and affordable water to satisfy her or his needs for drinking, washing or their livelihoods we call that person water insecure
- When a large number of people in an area are water insecure for a significant period of time, that area is water insecure
- Water quality (both for drinking and agricultural purposes) also leads to water insecurity

Background

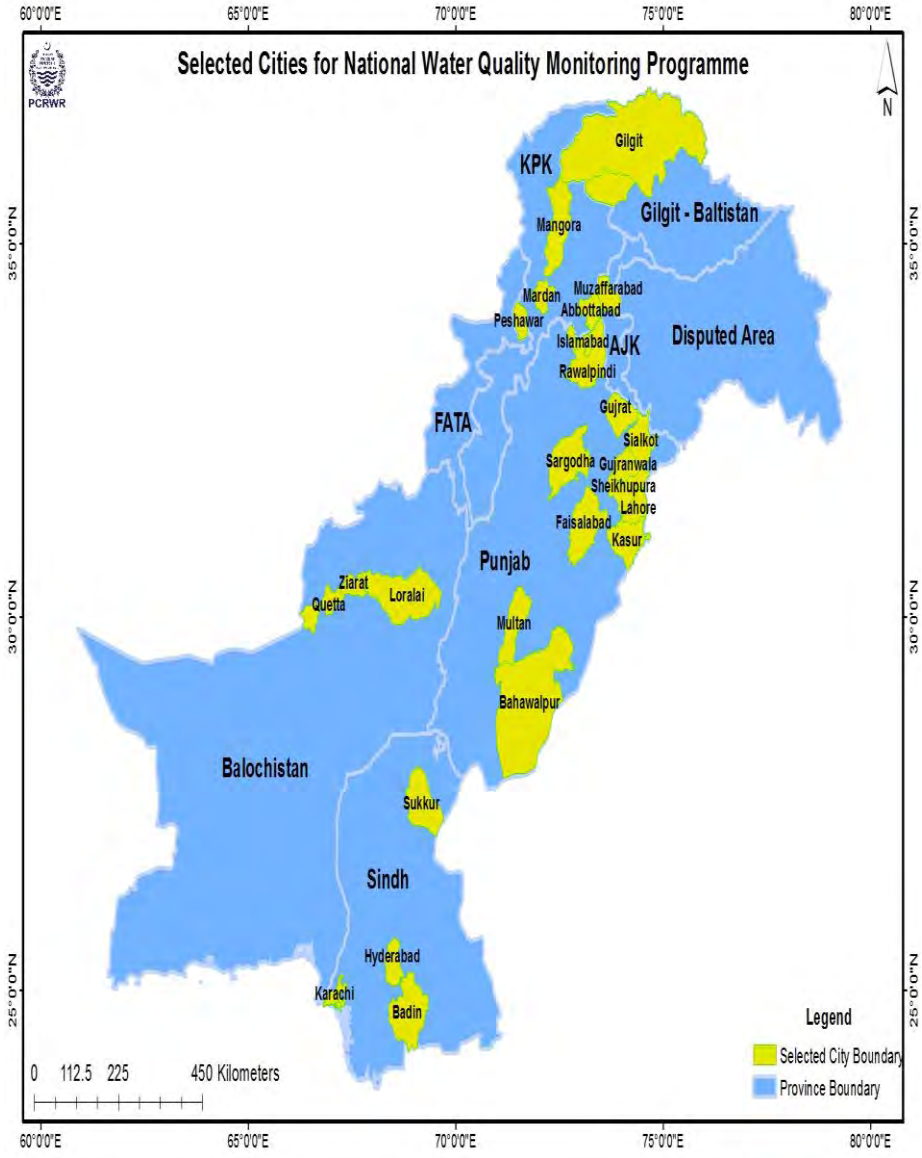
- By all indicators, Pakistan is fast becoming a water scarce country
- Groundwater is a major source of drinking water which is being recharged by the extensive irrigation network of the Indus basin
- Rapid increase in population, urbanization, industrialization and agricultural activities has imposed a great pressure on the existing water resources both qualitatively and quantitatively
- Quality of surface and groundwater has direct impact on the health and well-being of the people of any country and Pakistan has no exemption
- The Agenda 2030 for Sustainable Development includes a focused goal (SDG 6) on water and sanitation. The target 6.1 is “by 2030, achieve universal and equitable access to safe and affordable drinking water for all”
- However, there is no baseline/benchmark data on which this goal could be based. Therefore, this study was under taken to assess its drinking water resources and to establish benchmarks for achieving the goals set in Pakistan Vision 2025 and the SDG 6

Objectives of the Study

- To assess the drinking water quality of the drinking water sources
- To establish baseline data of the drinking water quality for the achievement of SDG 6 (Target 6.1)
- To give recommendations/suggestions to the government for the improvement in the drinking water quality

Methodology

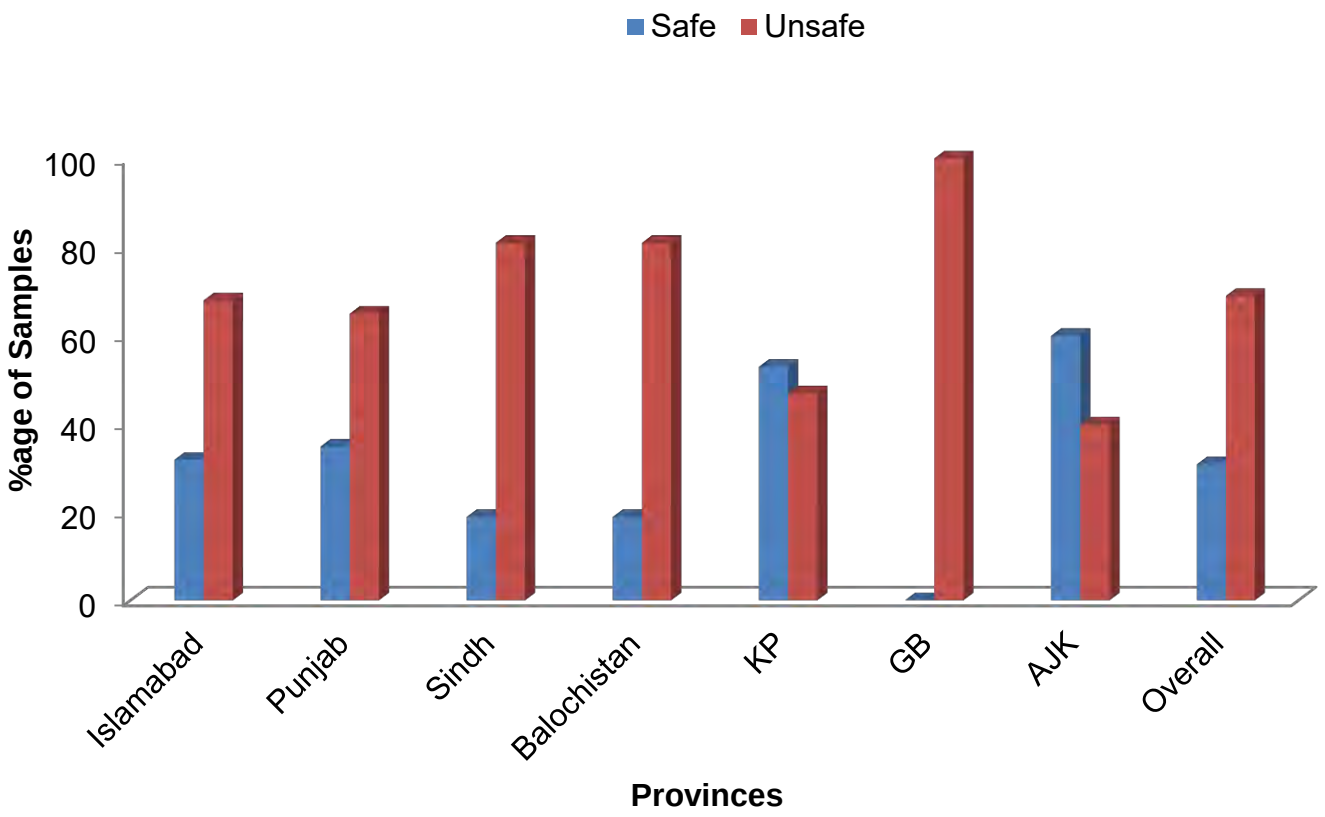
- The study covers 25 major cities, including, 11 from Punjab, 4 from Sindh, 4 from Balochistan, 4 from Khyber Pakhtunkhaw, one each from Gilgit Baltistan and AJK
- A uniform site selection criterion was adopted and a grid size of 1 km^2 (for small cities) 4 and 9 km^2 (for medium cities) and 16 and 25 km^2 (for big cities) was established
- Preference was given to permanent public points considering the long-term monitoring requirement
- Geology and depth of aquifers was also considered. A minimum distance of 1 km was maintained between the two monitoring points



Methodology

- Samples were collected for microbiological, trace elements, nitrate (N) and general water quality parameters
- The water samples were analyzed in National Water Quality Laboratory of PCRWR which is ISO-17025 accredited, for aesthetic, physico-chemical, trace metals and bacteriological parameters
- American Public Health Association (APHA, 2012) standard methods were used for analysis

Water Quality Situation in Pakistan



Major Contaminants

Contaminants	Percentage (range)
Microbiological	57 (11-100)
Arsenic	6 (9-62)
Turbidity	8 (7-42)
Chlorides	15 (3-50)
Nitrates	6 (3-71)
TDS	11 (3-38)
Iron	10 (8-76)

Health Impacts of Contaminants

Contaminants	Health impacts
Bacteria (total Coliforms, Fecal Coliforms and *E.coli*)	Cholera, Diarrhea, Typhoid, Dysentery, Gastroenteritis and Hepatitis A & E
Arsenic	Violent stomach pain, vomiting and delirium, skin cancer, keratosis of feet, kidney failure
TDS	Stiffness in joints, hardening of arteries, kidney stone, gallstone and blockage of arteries
Nitrate	Blue-baby syndrome

Conclusions

- Overall 31 % samples were found safe whereas 69% sources still provide unsafe drinking water
- The drinking water quality situation in Sindh and Balochistan was found the worst
- In certain areas, only treatment of drinking water sources for microbiological contamination can make drinking water safe up to 100%
- Capacity of the water supply agencies to provide safe drinking water has been found one of the major constraints in the provision of safe drinking water
- The Government of Pakistan has to make significant investment to provide safer drinking water to the entire population by 2030

Thank You

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Overall Water Quality Situation

Sr. No.	City	Total No. Of Samples	Safe Samples		Un safe Samples		Type of Contamination
			No.	%age	No.	%age	
1.	Islamabad	25	**8**	**32**	**17**	**68**	Bacteriological
2.	Bahawalpur	25	1	4	24	96	Hardness, Chloride, TDS, Fe, Bacteriological
3.	Faisalabad	12	4	33	8	67	Hardness, Chloride, TDS,Fluoride, Bacteriological
4.	Gujranwala	14	3	21	11	79	Bacteriological
5.	Gujarat	9	6	67	3	33	Bacteriological
6.	Kasur	10	6	60	4	40	Bacteriological
7.	Lahore	16	12	75	4	25	Bacteriological
8.	Multan	16	3	19	13	81	Arsenic, Bacteriological
9.	Rawalpindi	13	5	38	8	62	Hardness, TDS,NO_3,Bacteriological
10.	Sargodha	24	3	13	21	87	Hardness, Chloride, TDS, Fe, Fluoride,NO_3,Bacteriological
11.	Sheikhupura	11	6	55	5	45	Hardness, TDS, Fe, Arsenic, NO_3,Bacteriological
12.	Sialkot	9	8	89	1	11	Bacteriological
	Sub-Total	**184**	**65**	**35**	**119**	**65**	**Punjab**
13.	Abbottabad	7	3	43	4	57	Turbidity, Fe, NO_3,Bacteriological
14.	Mangora	9	5	56	4	44	Bacteriological
15.	Mardan	8	4	50	4	50	Bacteriological
16.	Peshawar	10	6	60	4	40	Bacteriological
	Sub-Total	**34**	**18**	**53**	**16**	**47**	**KP**
17.	Loralai	7	2	29	5	71	Turbidity, Bacteriological
18.	Quetta	31	5	16	26	84	Turbidity, Bacteriological
19.	Ziarat	9	2	22	7	78	Turbidity, Bacteriological, NO_3
	Sub-Total	**47**	**9**	**19**	**38**	**81**	**Balochistan**
20.	Hyderabad	15	1	7	14	93	Turbidity, Hardness, TDS, Fe, Fluoride,NO_3,Bacteriological
21.	Karachi	28	4	14	24	86	Chloride, TDS, Fluoride,NO_3,Bacteriological
22.	Sukkur	12	0	0	12	100	Turbidity, Hardness, TDS, Fluoride,NO_3,Bacteriological
23.	Badin	29	11	38	18	62	Turbidity, pH, Chloride, TDS, NO_3,Bacteriological
	Sub-Total	**84**	**16**	**19**	**68**	**81**	**Sindh**
24.	Muzaffarabad	10	6	60	4	40	Bacteriological
25.	Gilgit	10	0	0	10	100	Turbidity, Bacteriological