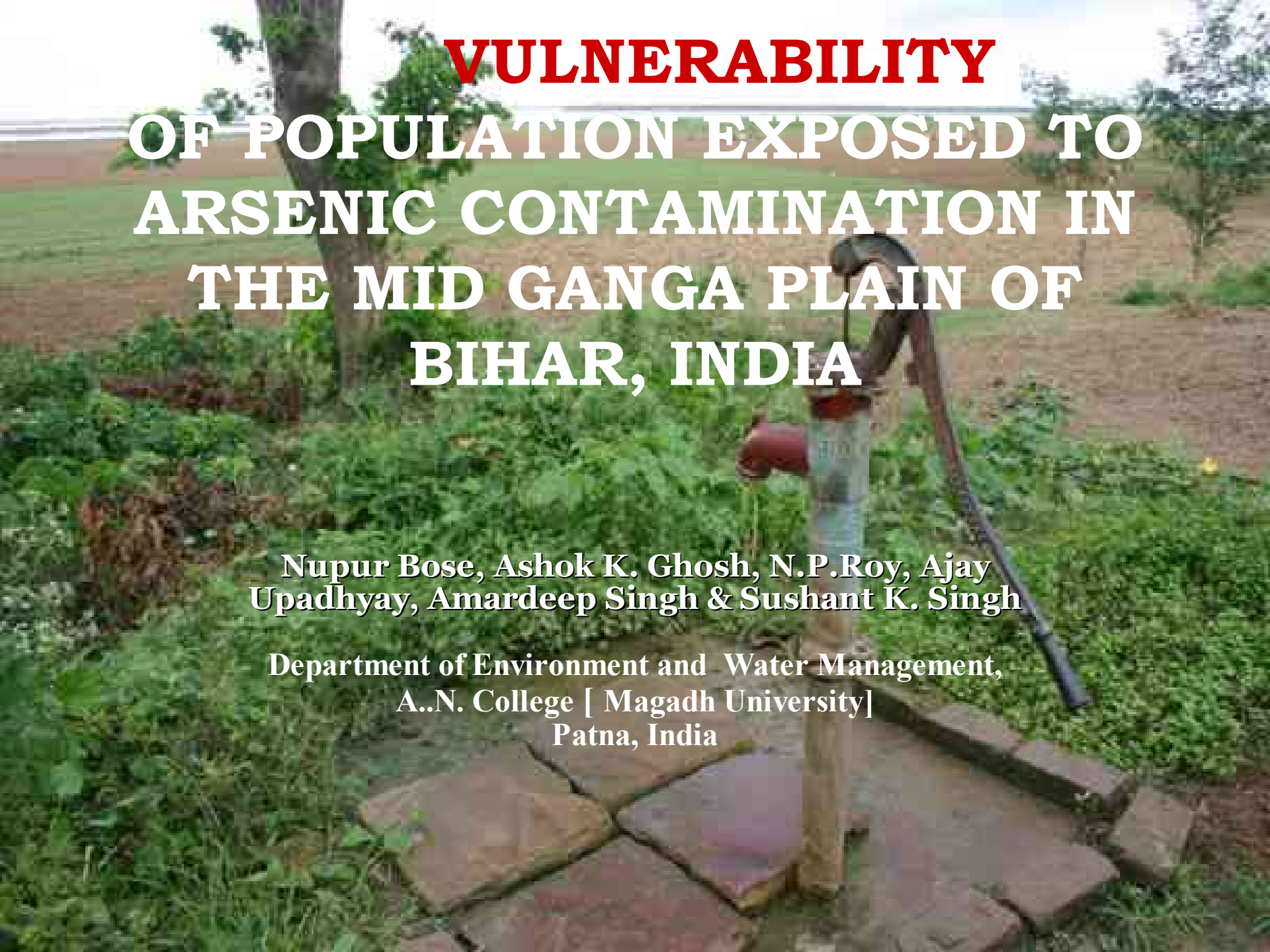
VULNERABILITY OF POPULATION EXPOSED TO ARSENIC CONTAMINATION IN THE MID GANGA PLAIN OF BIHAR, INDIA



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BACKGROUND OF THE PROBLEM

- Our studies indicate that newer alluvial deposits of the Bihar Plains are the areas of widespread and intense arsenic contaminated ground water sources.
- Detection of arseniferous aquifers in Bihar, India, in the last 4 years exemplify how ground water quality has been compromised on account of its unplanned and excessive utilization in domestic and agricultural sectors.
- It is leading to one of the most daunting health challenges to the Indian society, as it is affecting some of the densely populated impoverished rural areas.

Bihar – Districts studied for Arsenic contaminations

AIM OF THIS STUDY

To facilitate the recently introduced mitigation strategies by-

b. Determining the quantum of population at risk in villages with arsenic contaminated aquifers.

c. Classifying the villages on the basis of an *index of vulnerability to arsenic poisoning.*

d. Obtaining feedbacks regarding the sustainability of recently initiated mitigation strategies.

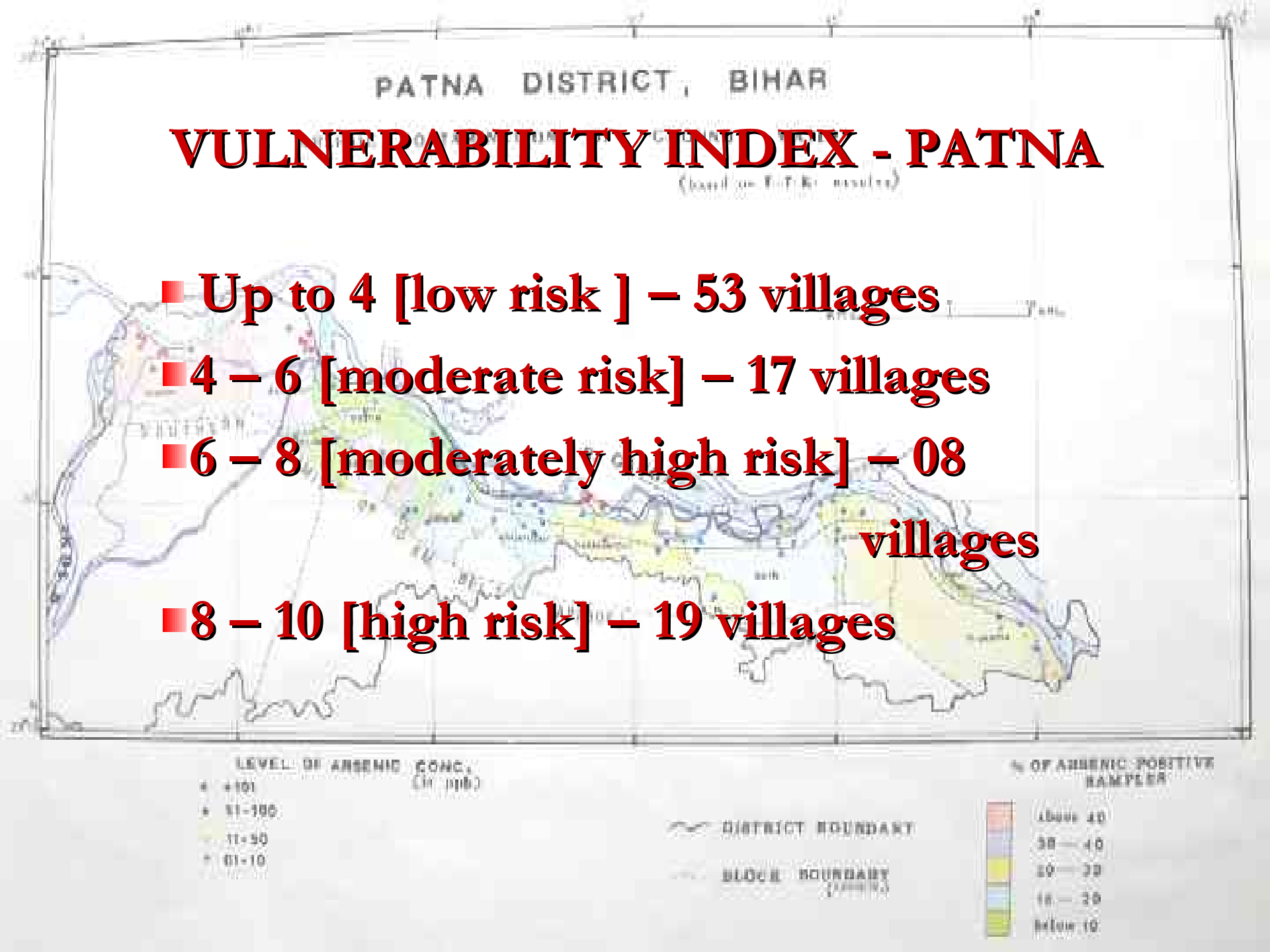
Methodology

- Water samples from about 27,061 hand pumps were tested, first by Field Test Kits and then subject to confirmatory UV/AAS tests.
- Index of Vulnerability from 1-10 was derived on the basis of total population [Census data] and percentage of contaminated pumps in study area.
- Questionnaires distributed in areas of arsenic hotspots for information on the duration of consumption of contaminated water, depth of hand pumps, nutrition and health problems

POPULATION AT RISK IN THE STUDY AREA

DISTRICTS	NO. OF CONTAMNATED SOURCES IN AFFECTED VILLAGES	POPULATION VULNERABLE TO ARSENIC TOXICITY	% OF POPULATION IN THE STUDY BELT
PATNA	600	251,788	32.27
BHOJPUR	2496	117,609	33.84
VAISHALI	1612	65,062	28.75
BHAGALPUR	2510	294,338	45.35
TOTAL	7218	728,787	43.57

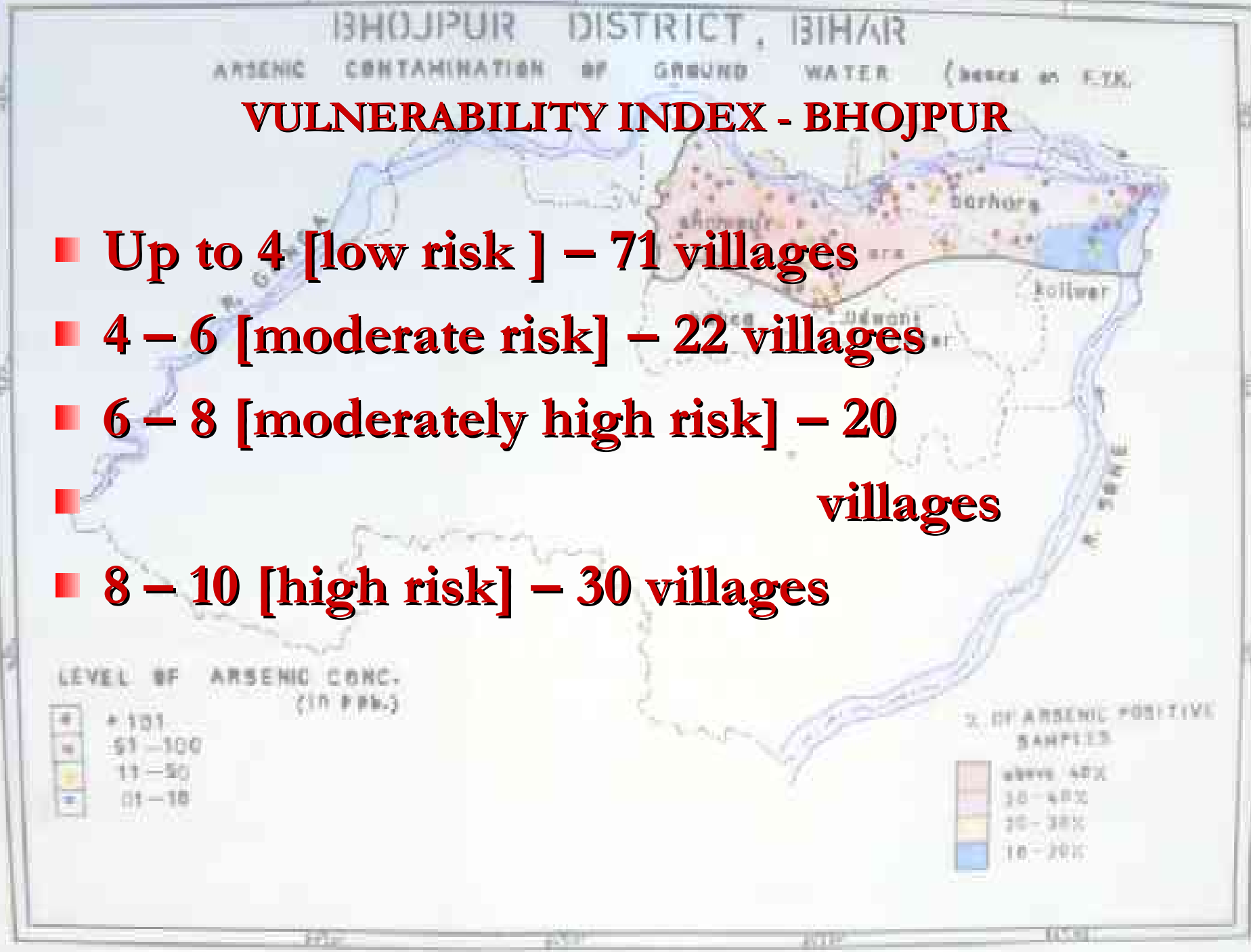
VULNERABILITY INDEX - PATNA



- Up to 4 [low risk] – 53 villages
- 4 – 6 [moderate risk] – 17 villages
- 6 – 8 [moderately high risk] – 08 villages
- 8 – 10 [high risk] – 19 villages

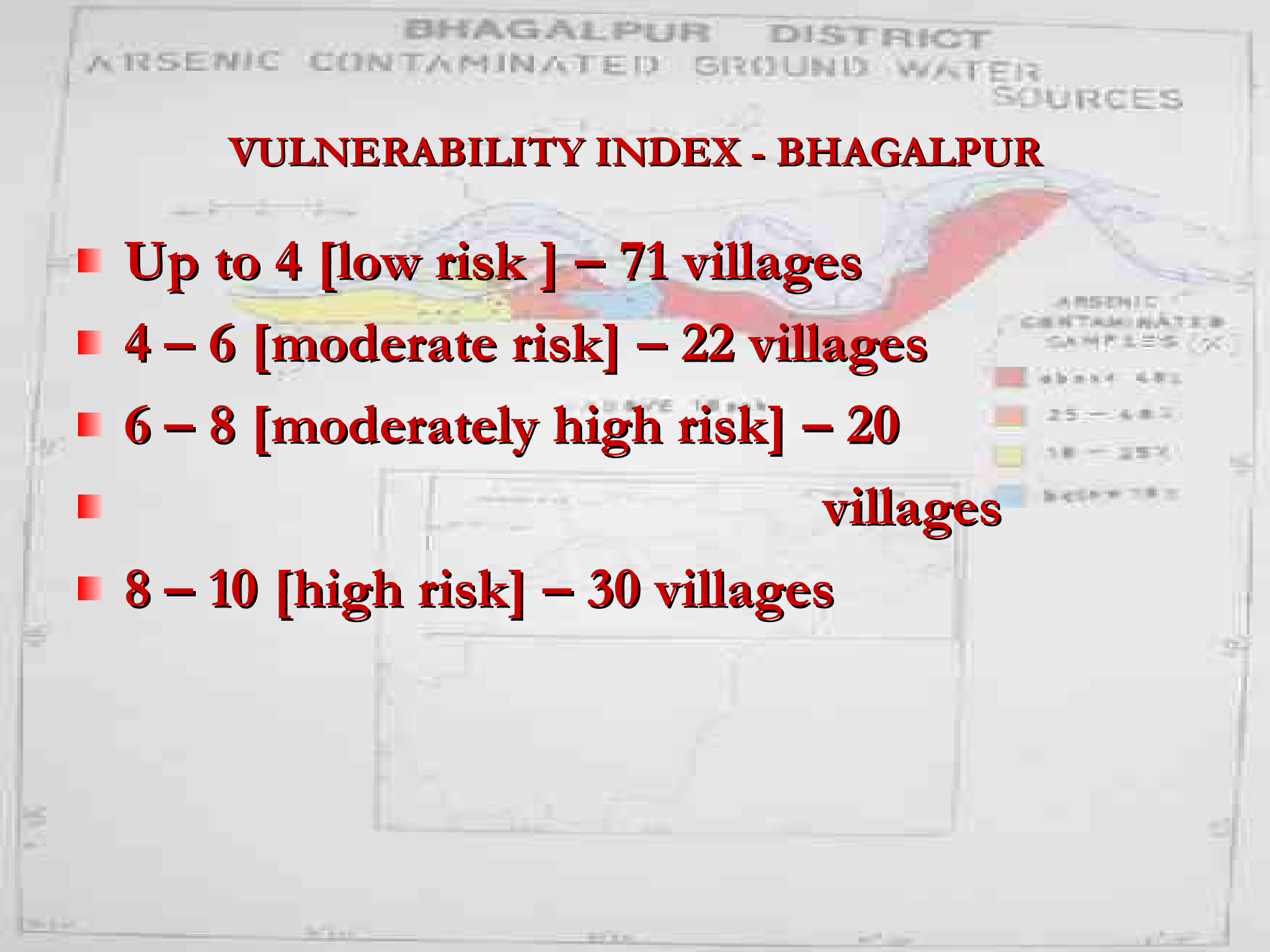
VULNERABILITY INDEX - BHOJPUR

- Up to 4 [low risk] – 71 villages
- 4 – 6 [moderate risk] – 22 villages
- 6 – 8 [moderately high risk] – 20 villages
- 8 – 10 [high risk] – 30 villages



VULNERABILITY INDEX - VAISHALI

- Up to 4 [low risk] – 59 villages
- 4 – 6 [moderate risk] – 09 villages
- 6 – 8 [moderately high risk] – 08 villages
- 8 – 10 [high risk] – 02 villages



VULNERABILITY INDEX - BHAGALPUR

- Up to 4 [low risk] – 71 villages
- 4 – 6 [moderate risk] – 22 villages
- 6 – 8 [moderately high risk] – 20 villages
- 8 – 10 [high risk] – 30 villages

DISTRICT-WISE INDEX OF VULNERABILITY

INDEX	UPTO 4 [LOW RISK]	4 – 6 [MODERATE]	6 – 8 [MODERATELY HIGH]	8 – 10 [HIGH RISK]
PATNA	53	17	08	19
BHOJPUR	75	22	20	30
VAISHALI	59	09	08	02
BHAGALPUR	69	17	27	28
TOTAL NO. OF VILLAGES	252	67	63	81

Symptoms of ARSENICOSIS?

NODULES OVER SKIN

Gayanti Devi

Laxman Munda

THICKENING AND DISCOLORATION OF THE SKIN

Alopecia

Tetary Kumari

SKIN LESIONS

Sirka Munda

Junardi Rai

NODULES, THICKENING AND DISCOLORATION OF THE SKIN

Anita Devi

THICKENING AND DISCOLORATION OF THE SKIN

Anita Devi

Discoloration of skin and Nodules

Ritesh Kumar

Melanosis and Keratosis

Kalawati Kumari

Siajanki Devi

DISCOLORATION of the SKIN

Master Ranjeet

Agin Singh

White Spot on Skin

Kusum Kumari

Nodules and Cracks over Thickened S

Agin Singh

Diffuse varicose lesions of the soles with cracks and fissures and keratotic horns over palms/soles.

VISIBLE SYMPTOMS

The symptoms we detected in our field study resembles symptoms reported in West Bengal and Bangladesh

Suresh Roy

Kalawati Kumari

CURRENT MITIGATION ADOPTED

- RAIN WATER HARVESTING
- REVIVAL OF OLD DUGWELLS
- TAPPING WATER FROM DEEPER AQUIFERS

RECOMMENDATIONS

- ADOPTION OF AWARENESS PROGRAMS
- COMMUNITY PARTICIPATION
- REGULAR MONITORING OF HOTSPOTS
- PROPER MAINTAINENCE OF OPEN DUG WELLS
- USE OF GRAVITY DRIVEN LOW-COST FILTERS
- HEALTH CENTRES FOR VERIFICATION & TREATMENT OF ARSENIC POISONING SYMPTOMS

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THANK YOU