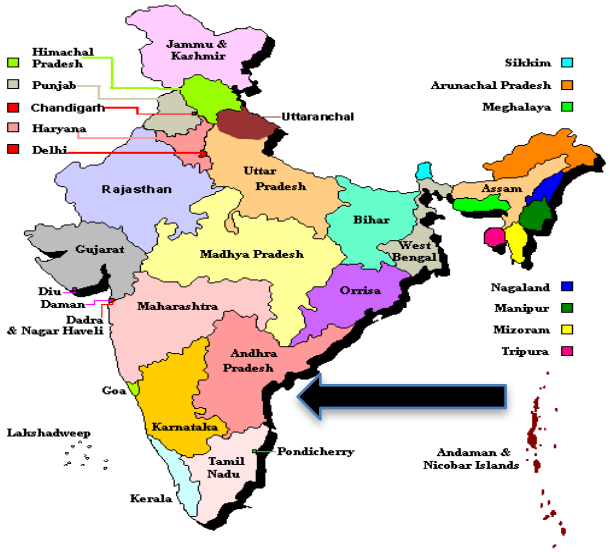
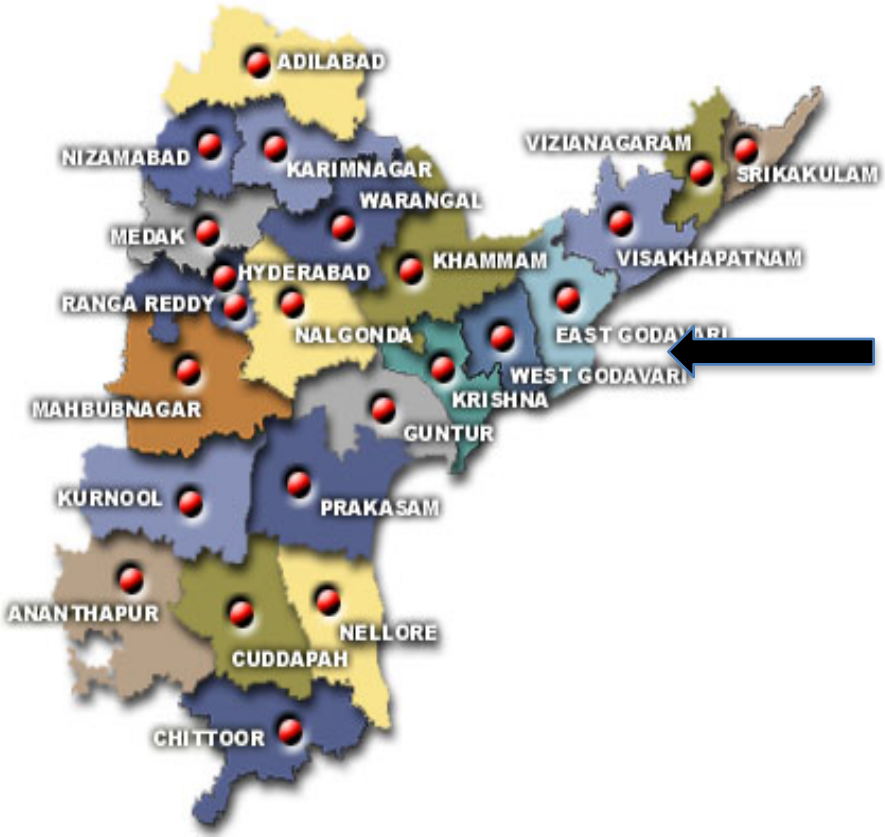
CKD – Epidemic – India

Dr. Gangadhar Taduri
MD(NIMS),DM(NIMS), MNAMS, FISN (Harvard)

Professor & HOD (Unit-1)
Department of Nephrology
Nizams institute of medical sciences, Hyderabad



- **8.4 % of India's territory**
- **76.2 million**
- **Population : Urban 27% ; Rural 73%**

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OF
MEDICAL SCIENCES
GATE-1
IN

Table 1. Causes of chronic renal failure in Apollo Hospital

Disease	Percentage
Diabetic nephropathy	29.60
Chronic interstitial nephritis	20.39
Chronic glomerulonephritis	17.44
Arteriolar nephrosclerosis	11.00
Chronic pyelonephritis	9.70
Focal and segmental glomerulosclerosis	3.73
Autosomal dominant polycystic disease	2.32
Obstructive nephropathy	1.86
Percentage of total	96.04

A total of 6420 patients seen in 17 years. It is possible to do something to prevent those which are underlined, 54% of the total.

MK Mani Kidney International, Vol. 63, Supplement 83 (2003), pp. S86–S89

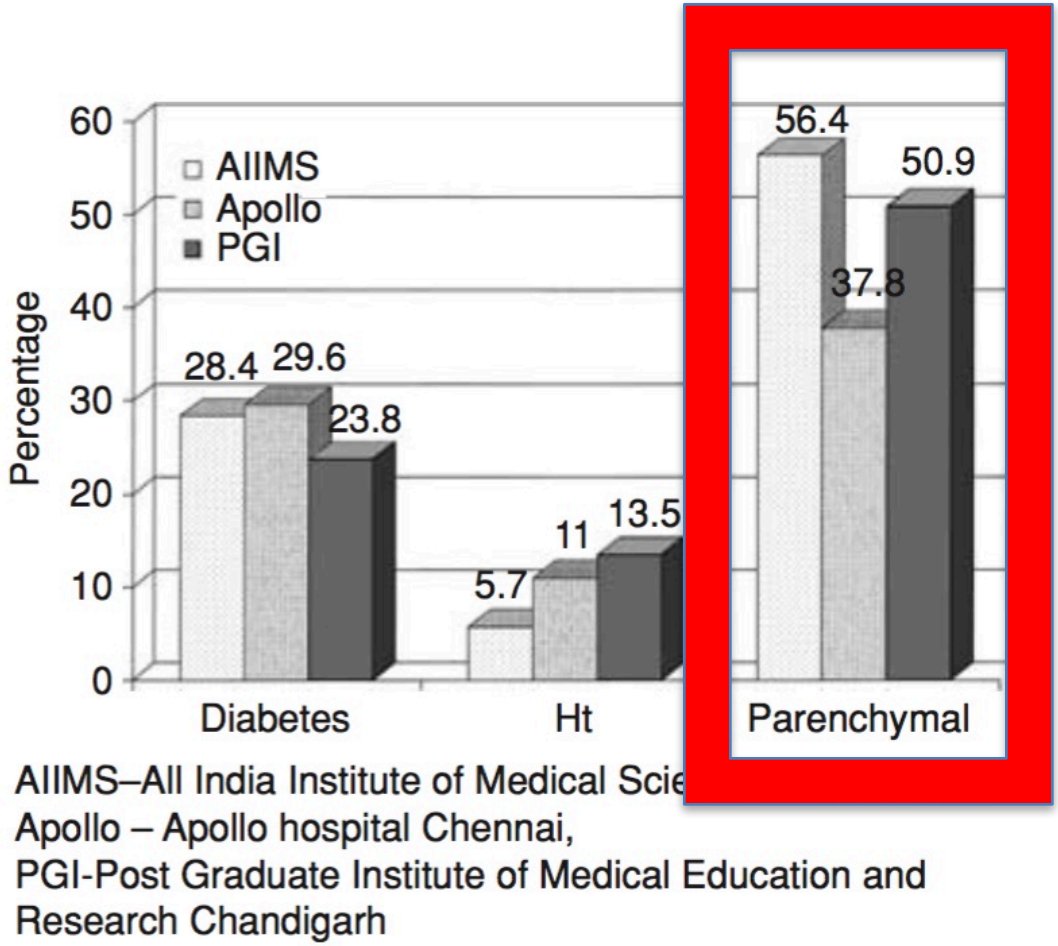


Fig. 1. Major causes of chronic renal failure in India.

Agarwal SK - Kidney International, Vol. 68, Supplement 98 (2005), pp. S41–S45

- CKD – Epidemic -?
- Etiology – 60-70% - Non – Diabetic.
- Significant contribution – Presumed CIN

CKD - - Journey

- 2006 ----------2016

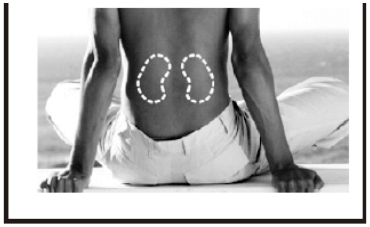
Nellore – Ongole – Srikakulam

ICMR - ISN - DST

Awareness & Detecting at Risk population

ప్రపంచంలో ప్రతి పదిమందిలో ఒకరికి
ఏదో విధమైన మూత్రపిండాల వ్యాధి ఉండవచ్చు

మీ మూత్రపిండాలు బాగున్నాయా?



మీకు

- సుగర్ ఉందా?
- బిపి ఉందా?
- గుండెవ్యాధి ఉందా?
- పక్షవాతం ఉందా?
- స్థూలకాయం ఉందా?
- కాళ్ళ వాపులు ఉన్నయా?
- మూత్రంలో మంట ఉందా?
- మూత్రపిండాలలో రాళ్లు ఉన్నయా?
- మూత్రం రావడంలో కష్టం ఉందా?
- కుటుంబంలో మూత్రపిండ వ్యాధి ఉందా?

తెలుసుకోవాలంటే ప్రశ్నావళికి సమాదానాలు ఆలోచించడి !

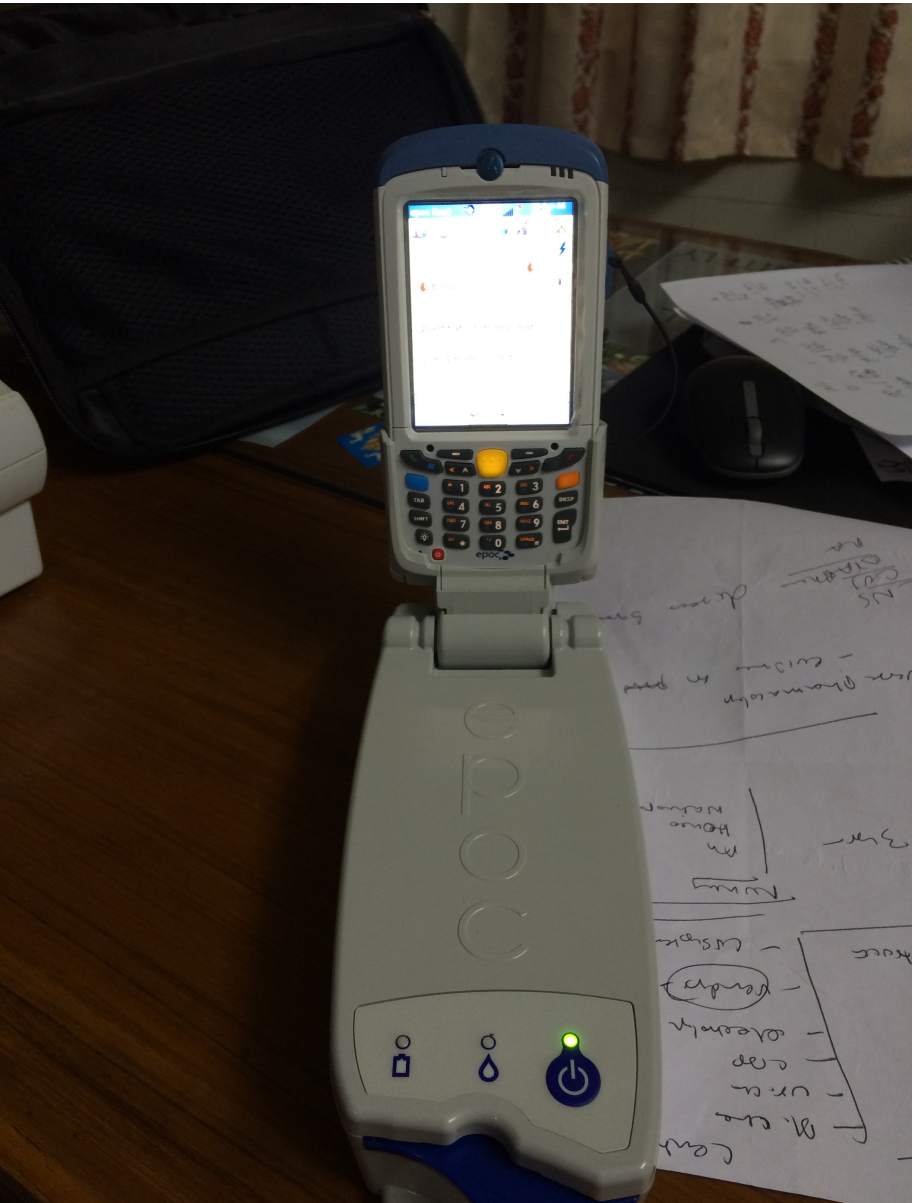
పై ప్రశ్నలలో దేనికైనా సమాధానం అవును అయితే
మూత్రపిండ వ్యాధి నిపుణులను సంప్రదించండి

Men and Machines


18-Oct-06
11:39:47 AM
+ Length 7.85 cm
RTKIDNEY


+ Length
LTKIDNEY

Mobile medical van with equipment


epoc


Kernel
Uric Acid 25
Test Strips
Suitable For Self-Test
Kernel
M S
8494

2006

Tuesday October 31 2006

Andhra Pradesh - Nellore

Outbreak of kidney ailments stumps medical experts

Staff Reporter

32 villagers with chronic renal failure admitted to hospital NICD team to look into role of pesticide residuals

NELLORE: Cases of kidney ailments in Usapalli village of Podalkur mandal is puzzling medical experts. Eight persons have died while hundreds of villagers have been suffering from the ailments for the last few months.

As many as 32 villagers with chronic renal failure were admitted to District Government Hospital on October 14. Alarmed over the outbreak, villagers took up the issue with Rapur MLA Anam Ramnarayana Reddy and Zilla Parishad Chairperson Kakani Goverdhan Reddy who, in turn, brought the issue to the notice of Union Minister of State for Health Panabaka Lakshmi.

The Minister rushed a team from the Indian Council of Medical Research (ICMR) which visited the village on October 17 to analyse the cause. A team led by Deputy Director of the National Institute of Epidemiology (NIE) B. Nagaraju of Chennai collected samples of drinking water and soil in the fields as well as blood and urine samples from the affected persons for testing, besides conducting various tests on patients.

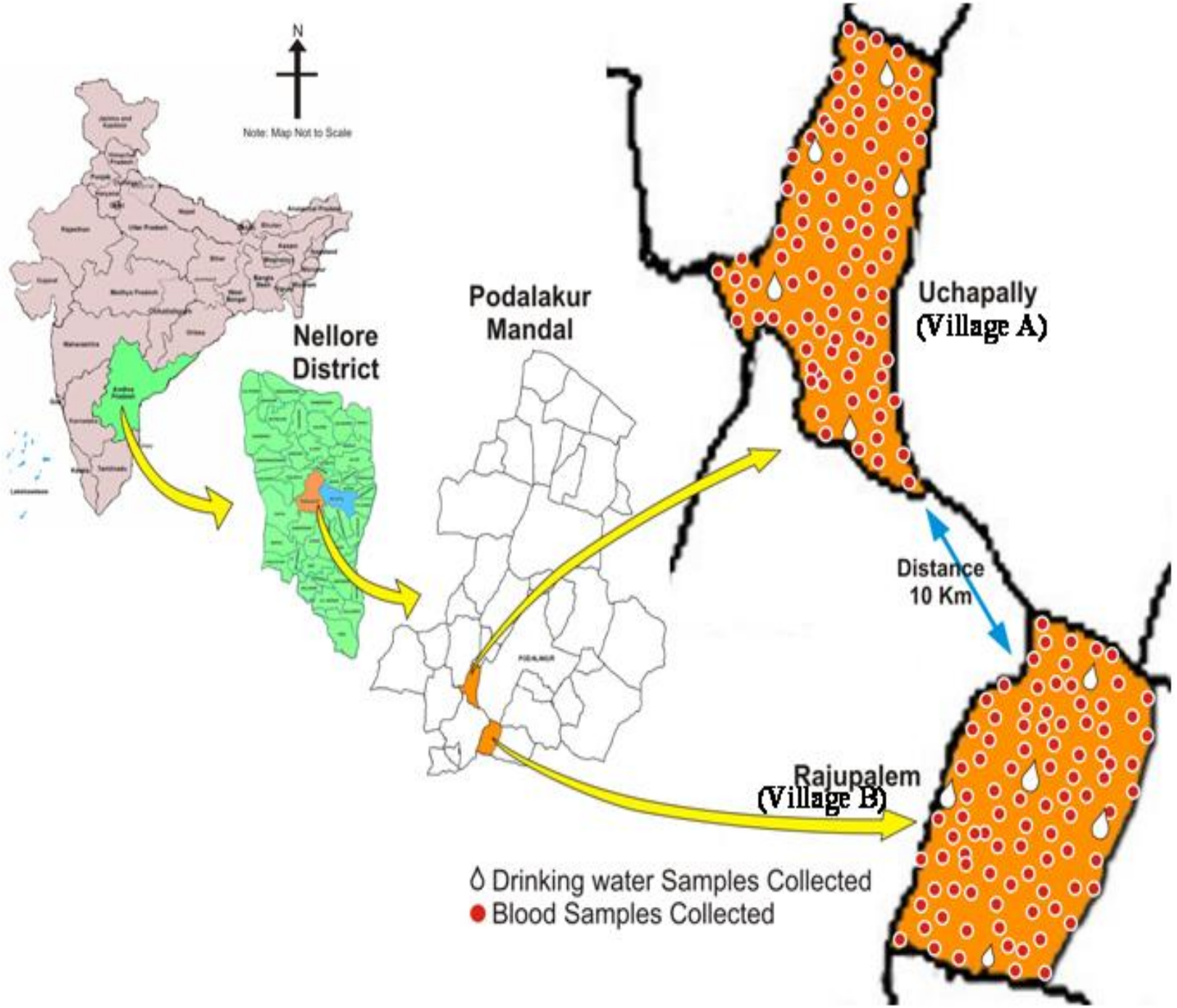
Use of chemicals

Some team members observed that consuming farm products by excessive use of chemicals and contaminated water might have led to the outbreak. "The team will submit a report to the Government and recommend the necessary treatment," the Minister said.

An environmental research team, comprising experts from the National Institute of Communicable Diseases (NICD), visited Kaligiri, Kota and Usapalli on Saturday and Sunday. The team examined patients and collected water samples.

However, results of the tests ruled out the possibility of fluorosis. The preliminary tests pointed out that there was no problem with the water as it had only 0.98 ppm of chlorine, the team observed.

"We will investigate further to examine the role of pesticide residuals as well as painkillers, which have been consumed beyond the prescribed limits by affected persons, besides other factors," Joint Director of NICD R.S. Gupta said.


N
Note: Map Not to Scale
Nellore District
Podalakur Mandal
Uchapally (Village A)
Distance 10 Km
Rajupalem (Village B)
Drinking water Samples Collected
Blood Samples Collected

Nellore

Villages	Total population screened	Patients with Scr>1.5mg%	Prevalence of disease %
uchapally	124	51	41.12903
Kongaluru	74	6	8.108108
Kalichedu	127	20	15.74803
Vutukuru	174	27	15.51724
	499	**104**	**20.84168**

ORIGINAL ARTICLE

Role of drinking water with high Silica and Strontium in Chronic Kidney Disease: An Exploratory Community-based Study in an Indian Village

Arjun L Khandare[1], Yathapu Srinivasa Reddy[2], Nagalla Balakrishna[3], Gourineni Shankar Rao[4], Taduri Gangadhar[5], Nimmathota Arlappa[6]

[1]Scientist E, [2]SRF, Food & Drug Toxicology Research Centre, National Institute of Nutrition, Indian Council of Medical Research, Tarnaka - Hyderabad- 500 007; [3]Scientist D, [4]Technical Officer, Division of Bio-Statistics, National Institute of Nutrition, Indian Council of Medical Research, Tarnaka - Hyderabad- 500 007; [5]Professor, Department of Nephrology, Nizam's Institute of Medical Sciences, Hyderabad; [6]Scientist D, Division of Community Studies, National Institute of Nutrition, Indian Council of Medical Research, Tarnaka - Hyderabad- 500 007

Abstract

Background: Ground water is the ultimate and inevitable source of drinking water in rural India. Seepage of earth's crust elements into drinking water sources may lead to adverse health effects. Media reported unusually high kidney related disorders among the population in Uchapally village of Nellore district, Andhra Pradesh, India. **Objective:** The objective of the present study was to assess the role of drinking water in chronic kidney disease (CKD). **Methods:** A community based cross-sectional study was carried out among the population residing in two villages namely Uchapally with reported cases of renal diseases (Village-A; n=52) and Pedarajupalem with no reported cases of renal diseases (Village-B; n=50) from Nellore district, Andhra Pradesh, India. Blood and urine samples were collected to estimate the renal parameters. Glomerular Filtration Rate (GFR) as calculated by Modification of Diet in Renal Disease (MDRD) equation was used to assess the staging of CKD. **Results:** Majority of subjects in village-A were suffering from different stages of CKD. Blood urea and creatinine, intact parathyroid hormone and alkaline phosphatase levels were significantly ($p<0.01$) higher among the subjects in village-A. Silicon and Strontium levels in the drinking water samples from village-A were significantly higher as compared to the water samples from Village-B. The subjects from Village-A had a history of prolonged consumption of various non-steroidal anti-inflammatory drugs (NSAIDs). **Conclusion:** The high prevalence of CKD among the population in village-A could be attributed to the synergistic effect of chronic exposure to silicon and strontium through drinking water and prolonged consumption of NSAIDs.

2007

THE HINDU

Date:27/12/2007 URL:
http://www.thehindu.com/2007/12/27/stories/2007122753740600.htm

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Back

Andhra Pradesh - Ongole

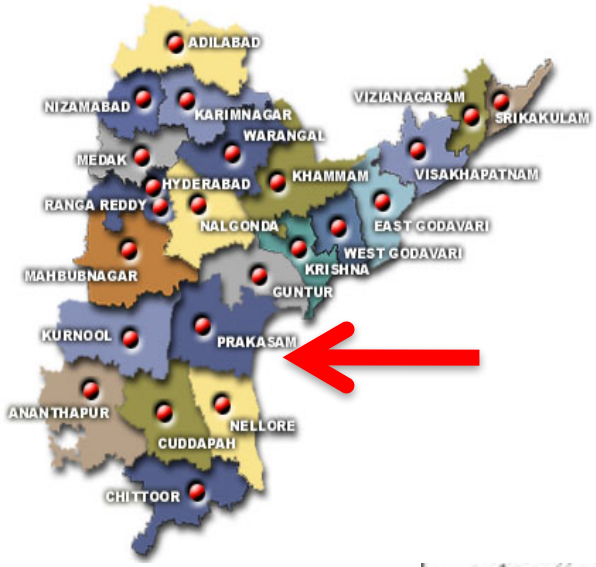
Village records high rate of kidney diseases due to water consumption

Special Correspondent

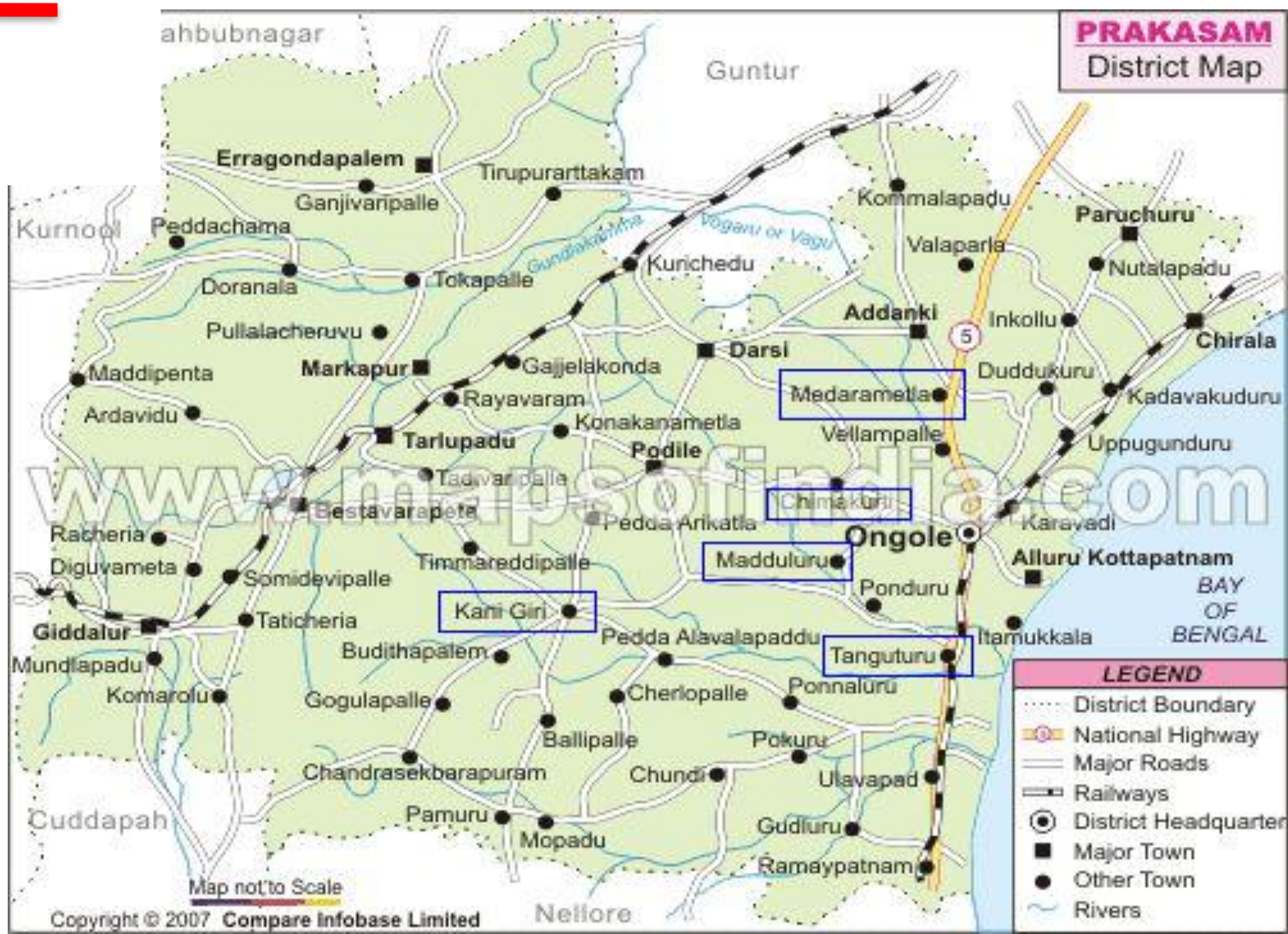
NIMS research project reveals alarming situation

Consumption of borewell water is the cause

Villagers advised to stop using bore water


ADILABAD
NIZAMABAD
KARIMNAGAR
VIZIANAGARAM
SRIKAKULAM
WARANGAL
MEDAK
HYDERABAD
KHAMMAM
VISAKHAPATNAM
RANGA REDDY
NALGONDA
EAST GODAVARI
WEST GODAVARI
MAHBUBNAGAR
KRISHNA
GUNTUR
KURNOOL
PRAKASAM
ANANTHAPUR
NELLORE
CUDDAPAH
CHITTOOR

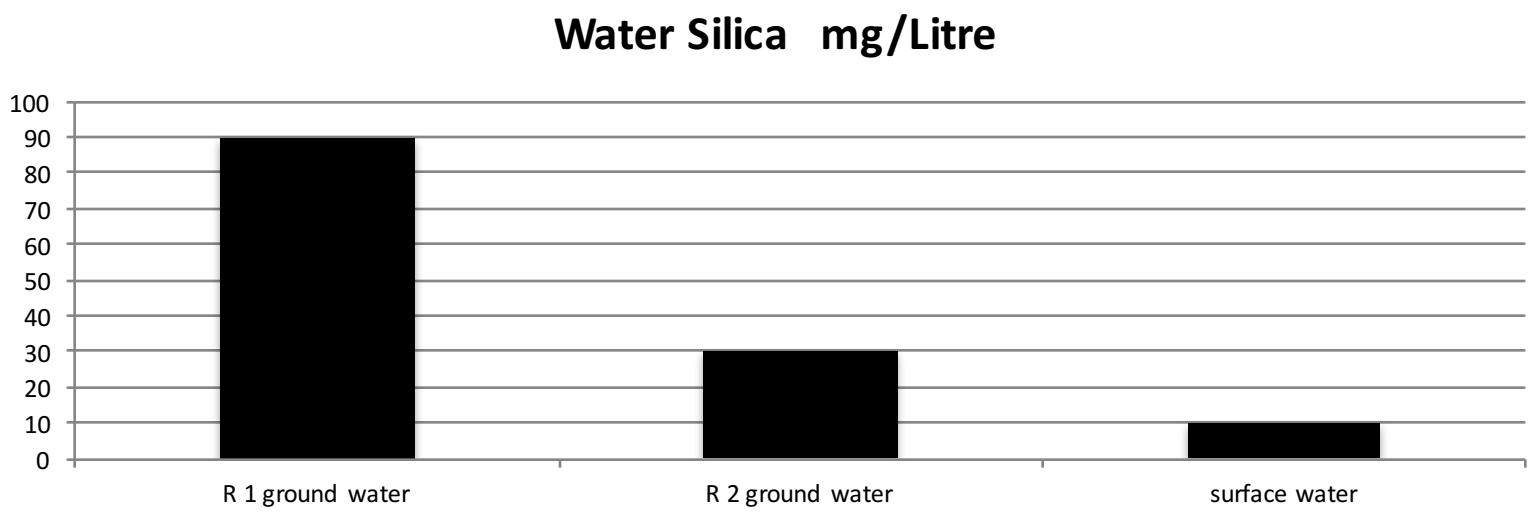
Prakasham


PRAKASAM
District Map
ahbubnagar
Guntur
Kurnool
Cuddapah
Nellore
Erragondapalem
Tirupurarttakam
Ganjivaripalle
Peddachama
Doranala
Tokapalle
Kurichedu
Pullalacheruvu
Markapur
Gajjelakonda
Maddipenta
Rayavaram
Ardavidu
Tarlupadu
Konakanametla
Podile
Racheria
Diguvameta
Somidevipalle
Giddalur
Taticheria
Mundlapadu
Komarolu
Budithapalem
Gogulapalle
Ballipalle
Chandrasekharapuram
Pamuru
Mopadu
Kommalapadu
Valaparla
Paruchuru
Nutalapadu
Addanki
Inkollu
Chirala
Darsi
Medarametla
Dudduguru
Kadavakuduru
Vellampalle
Uppugunduru
Chimakurti
Pedda Arikatla
Ongole
Karavadi
Alluru Kottapatnam
Timmareddipalle
Maddulurupalle
Ponduru
Kanigiri
Pedda Alavalapaddu
Itamukkala
Tanguturu
Cherlopalle
Ponnaluru
Pokuru
Chundi
Ulavapad
Gudluru
Ramayapatnam
BAY
OF
BENGAL
Map not to Scale
Copyright © 2007 Compare Infobase Limited
LEGEND
District Boundary
National Highway
Major Roads
Railways
District Headquarter
Major Town
Other Town
Rivers

Prakasham - district

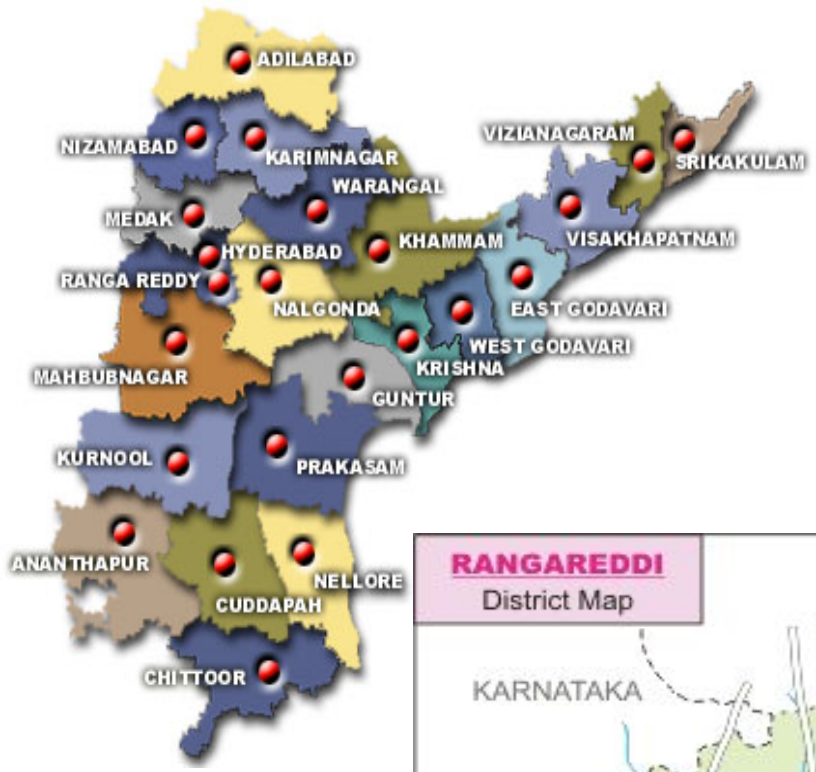
Sl.No.	Village	Population Screened	Scr > 1.5 mg/dl	%
1	Laxmipuram	114	12	10.52632
2	Elurivaripalem	112	8	7.142857
3	Chilakapadu	143	30	20.97902
4	Thallamalla	98	18	18.36735
5	Machikalapadu	118	23	19.49153
6	Rudravaram	91	45	49.45055
7	Chandrapadu	126	15	11.90476
8	Vengalayapuram	57	20	35.08772
9	Diwakarapally	112	33	29.46429
10	Neredupally	74	36	48.64865
11	Chimalamarri	224	31	13.83929
12	Kanduluru	395	81	20.50633
13	Torragudipadu	195	39	20
14	Bandlamudi	153	18	11.76471
15	Yerragudipadu	88	13	14.77273
16	Mallavarappadu	162	10	6.17284
17	Madduluru	274	23	8.394161
18	B Machavaram	112	15	13.39286
19	Ramachandrapuram	156	18	11.53846
	Total population	**2804**	**488**	**17.40371**

Praksham district - observation



		pH	TDS	Fl (mg/l)	Silica (mg/l)	V(ppb)	Mn(ppb)	Fe(ppb)	Co(ppb)	Ni(ppb)	Cu(ppb)	Zn(ppb)	As(ppb)	Rb(ppb)	Sr(ppb)	Ag(ppb)	Cd(ppb)	Cs(ppb)	Ba(ppb)	Pb(ppb)	U(ppb)
R2		7.44	1505.6	0.84	69	10.21	88.88	109.18	0.87	5.85	9.67	209.23	2.31	12.83	1967.05	11.61	0.11	1.02	191.63	4.16	13.15
R1		7.33	904.09	1.38	130.9	95.1	4.8	134.5	0.13	1.75	3.68	102.39	2.33	2.84	1337.53	3.52	0.05	0.03	273.34	1.41	3.65
	Ttest	0.6	0.11	0.04	0.05	0.0003	0.23	#DIV/0!	0.09	0.06	0.09	0.36	0.93	0.36	0.22	0.28	0.22	0.37	0.31	0.00001	0.03
WHO		**6.5 - 8.2**		**1.5mg/l**	**1-30mg/l**	**? Ppm**	**0.5ppm**	**3ppm**	**?**	**20ppb**	**2ppm**	**5ppm**	**10ppb**	**?**	**7ppm**	**?**	**10ppm**	**?**	**2ppm**	**50ppm**	**30ppb**

Pesticides and other pollutatants were NOT analyzed

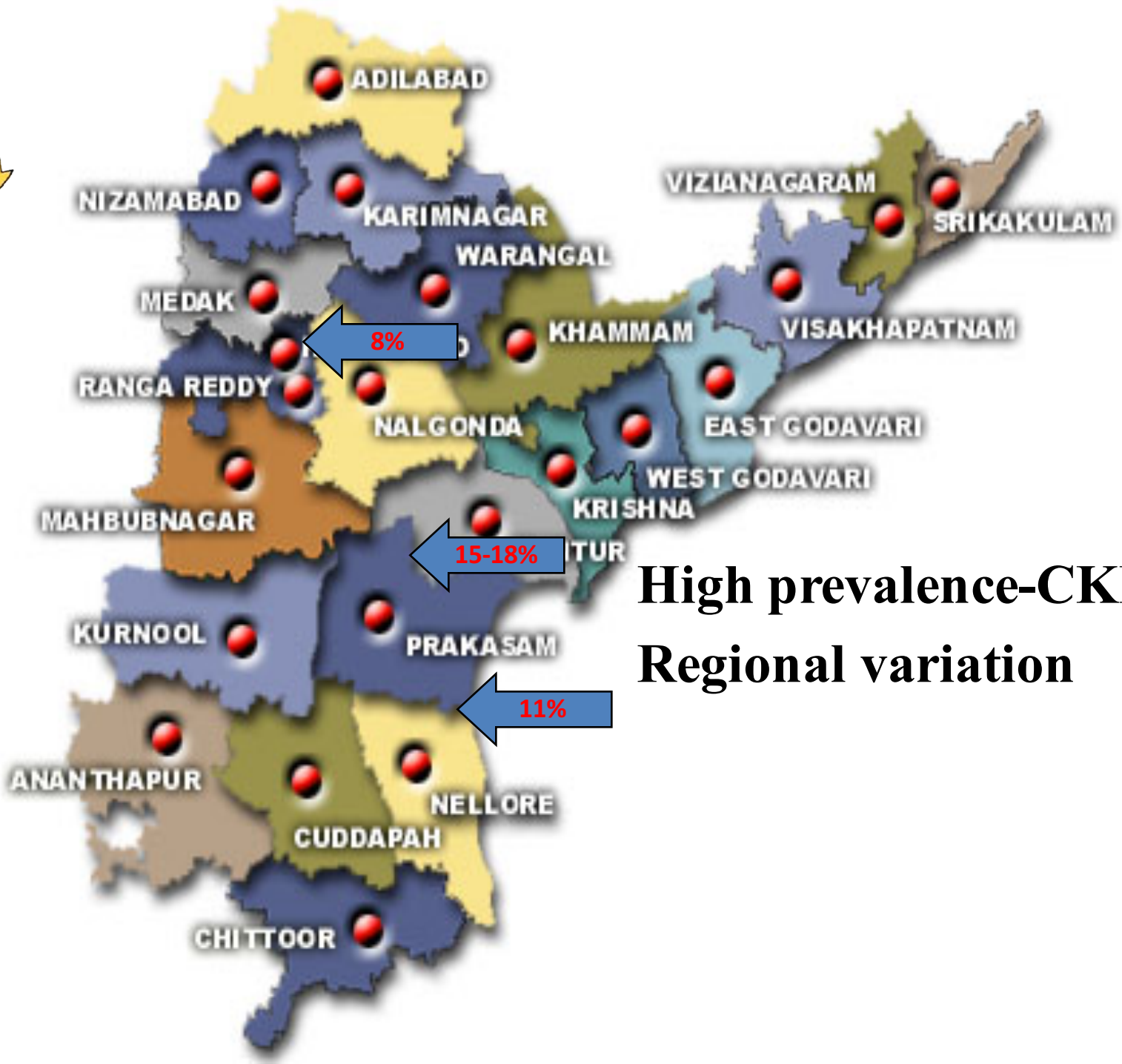


RangaReddy

www.mapsofindia.com

RangaReddy

	Total population screened	Patients with Scr>1.5mg%	Prevalence of disease %
Azeez nagar	151	11	7.28
Kanukunta	285	9	3.15
	436	**20**	**4.5**

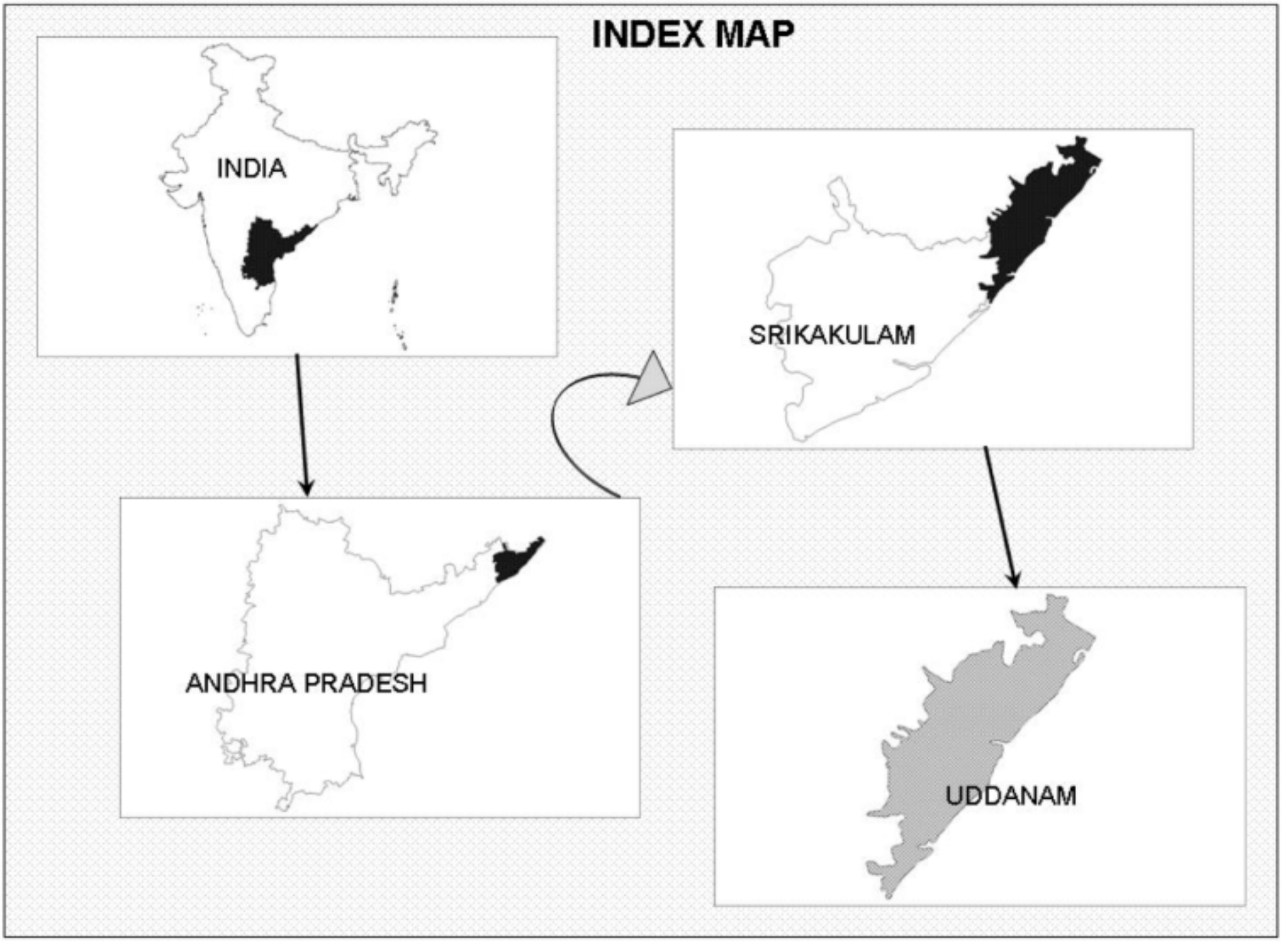


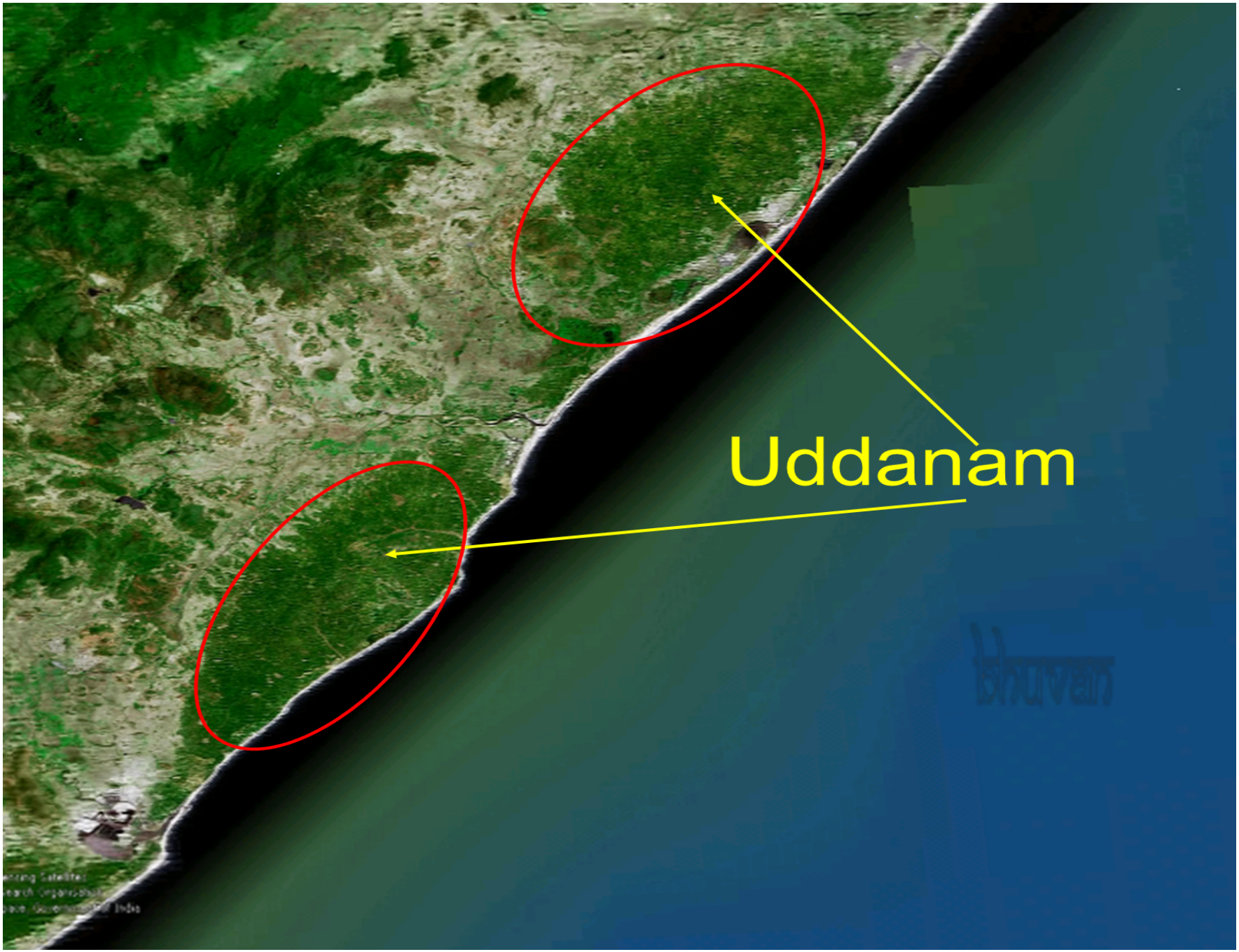
High prevalence-CKD

Regional variation

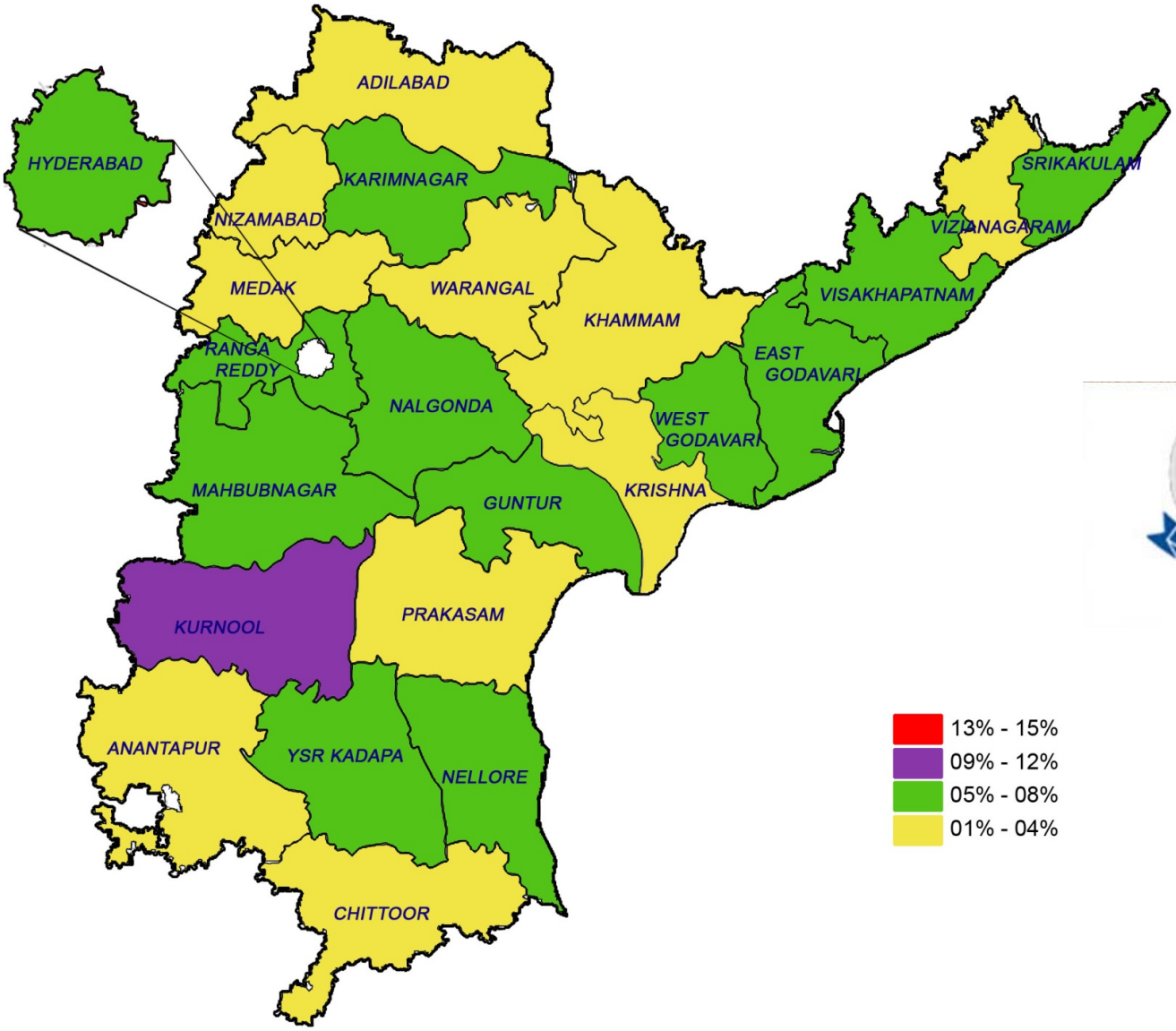
2012

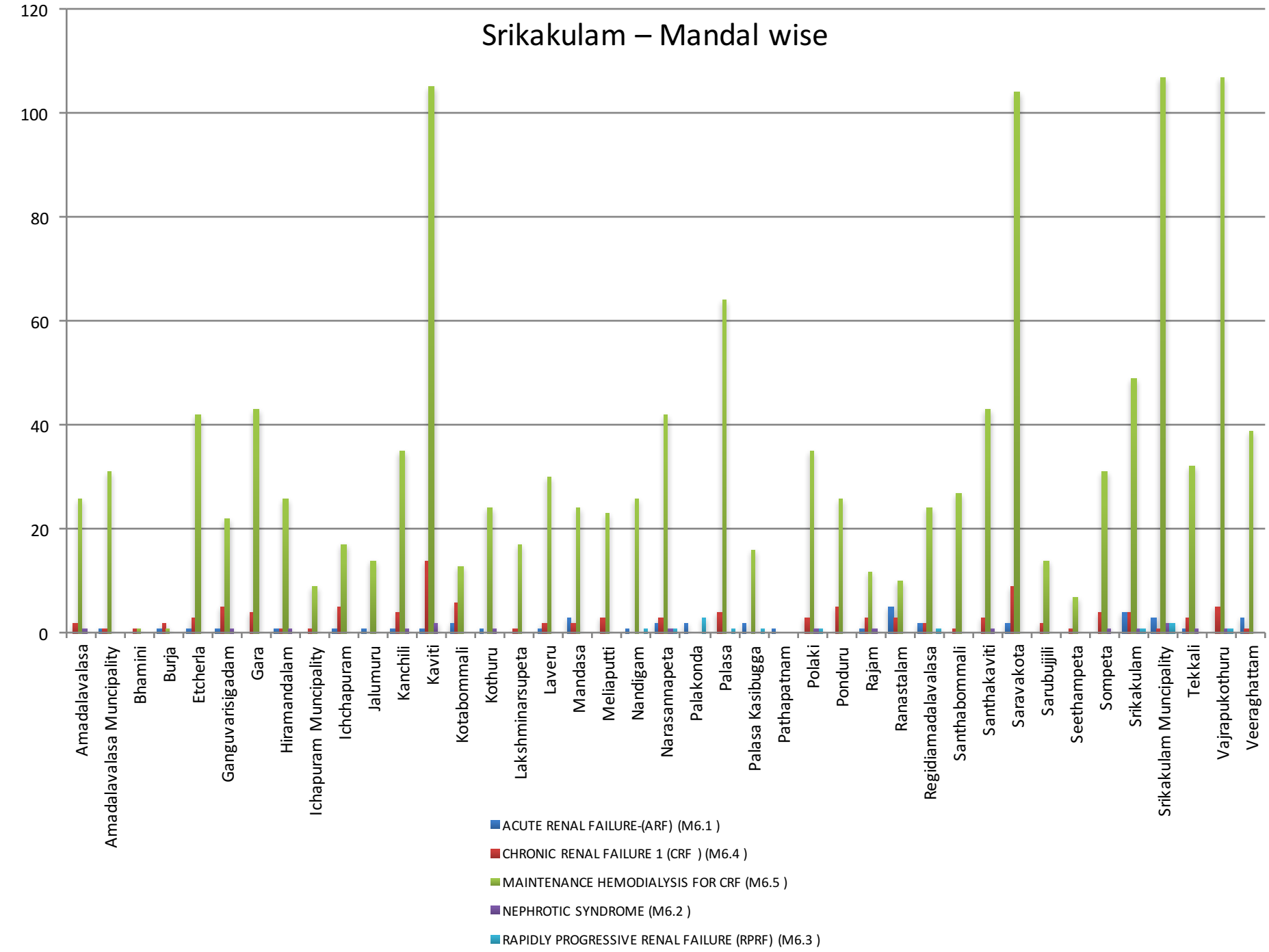
INDEX MAP



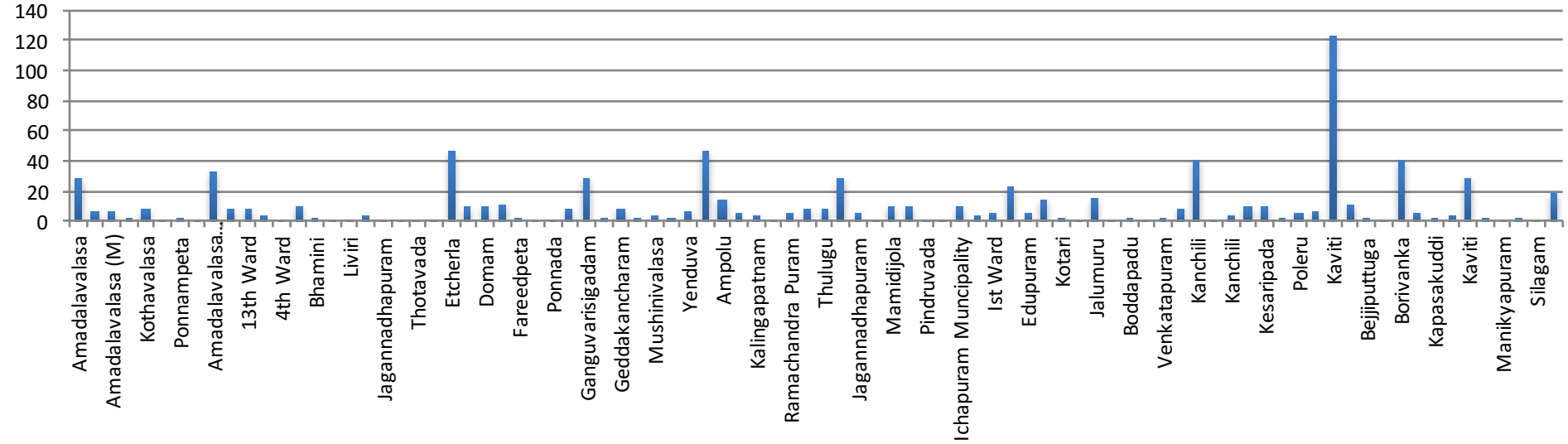

Uddanam

Mapping of Chronic Renal Failure (CRF) cases according to the percentage of disease burden

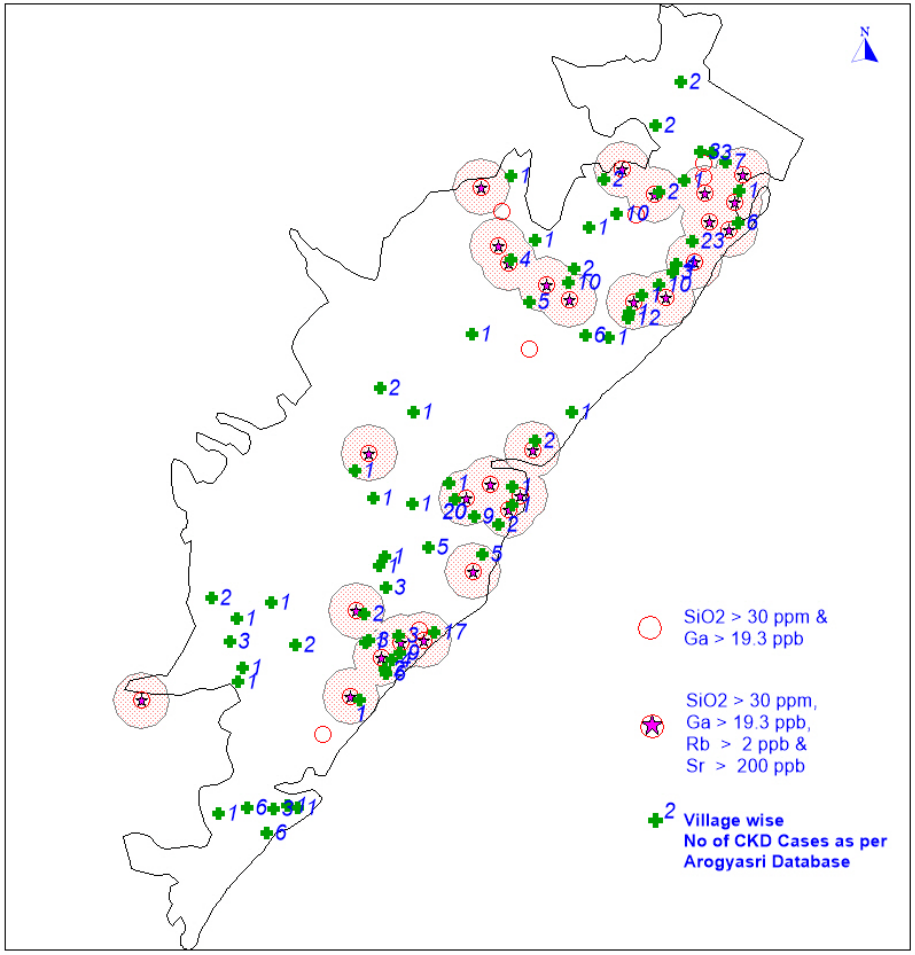



Srikakulam – Mandal wise
120
100
80
60
40
20
0
Amadalavalasa
Amadalavalasa Muncipality
Bhamini
Burja
Etcherla
Ganguvarisigadam
Gara
Hiramandalam
Ichapuram Muncipality
Ichchapuram
Jalumuru
Kanchili
Kaviti
Kotabommali
Kothuru
Lakshminarsupeta
Laveru
Mandasa
Meliaputti
Nandigam
Narasannapeta
Palakonda
Palasa
Palasa Kasibugga
Pathapatnam
Polaki
Ponduru
Rajam
Ranastalam
Regidiamadalavalasa
Santhabommali
Santhakaviti
Saravakota
Sarubujjili
Seethampeta
Sompeta
Srikakulam
Srikakulam Muncipality
Tekkali
Vajrapukothuru
Veeraghattam
ACUTE RENAL FAILURE-(ARF) (M6.1)
CHRONIC RENAL FAILURE 1 (CRF) (M6.4)
MAINTENANCE HEMODIALYSIS FOR CRF (M6.5)
NEPHROTIC SYNDROME (M6.2)
RAPIDLY PROGRESSIVE RENAL FAILURE (RPRF) (M6.3)

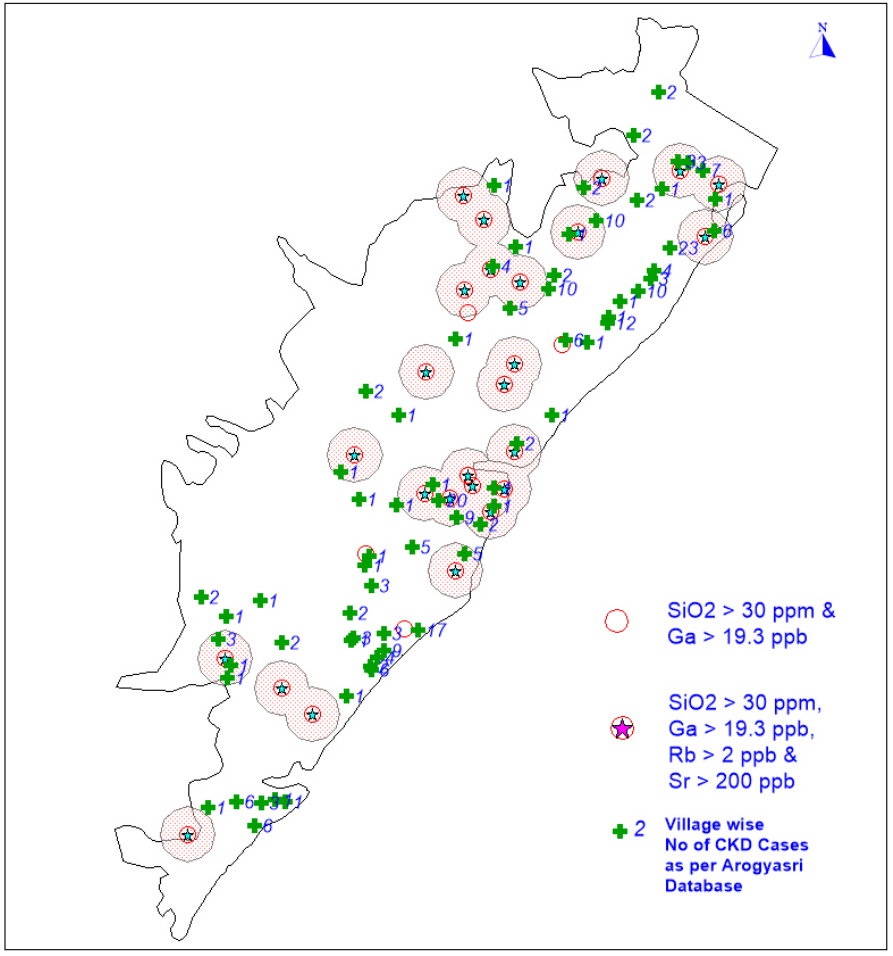
Village wise



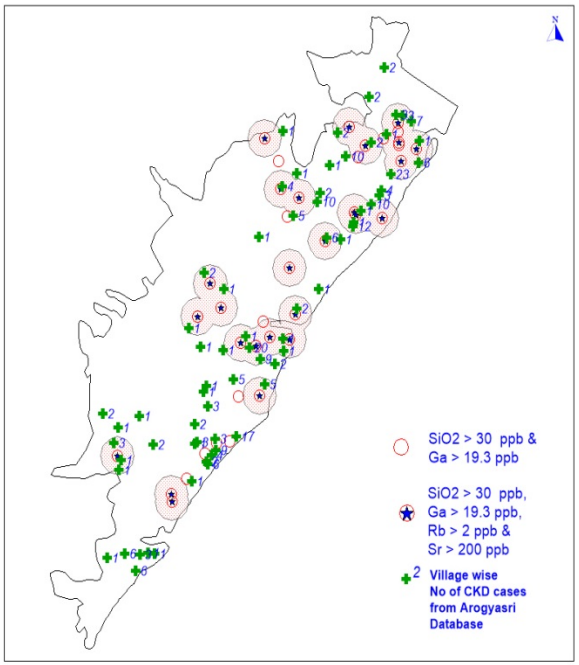
MAP SHOWING HIGH CONCENTRATION CLUSTERS OF SiO2, Ga, Rb & Sr IN GROUNDWATER SAMPLED VILLAGES IN UDDANAM AREA DURING APRIL 2013



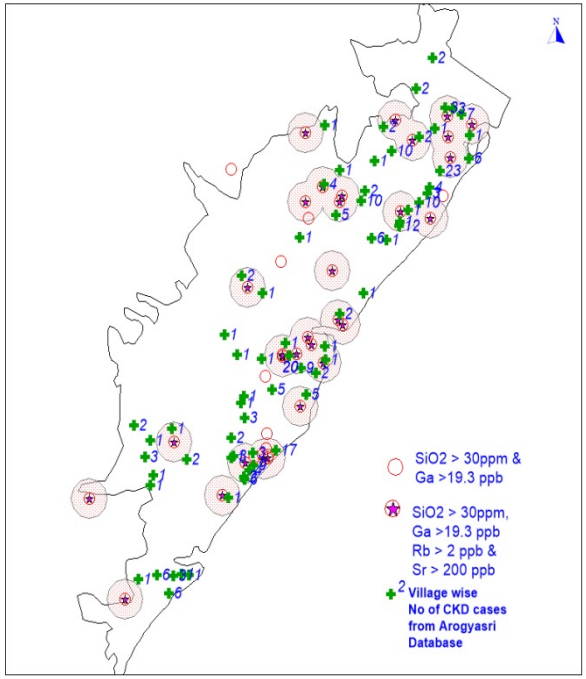
MAP SHOWING HIGH CONCENTRATION CLUSTERS OF SiO2, Ga, Rb & Sr IN GROUNDWATER SAMPLED VILLAGES IN UDDANAM AREA DURING SEPTEMBER 2013



MAP SHOWING HIGH CONCENTRATION CLUSTERS OF
SiO2, Ga, Rb & Sr IN GROUNDWATER SAMPLED VILLAGES
IN UDDANAM AREA DURING DECEMBER 2013



MAP SHOWING HIGH CONCENTRATION CLUSTERS OF
SiO2, Ga, Rb AND Sr IN GROUNDWATER SAMPLED VILLAGES
IN UDDANAM AREA DURING APRIL 2014



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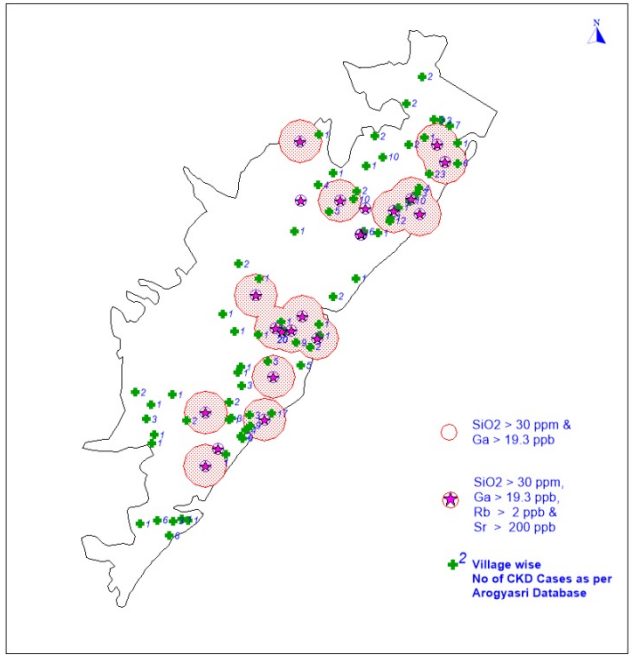
SiO2, Ga, Rb & Sr IN GROUNDWATER SAMPLED VILLAGES
IN UDDANAM AREA DURING SEPTEMBER 2014



Srikakulam – CKD - Demography

					AGE (years)				BMI (kg/m^2)			
S NO	VILLAGE	TOTAL POP	SCREENED	S C > 1.5	20 to 30	30 to 40	40 to 50	> 50	< 18.5	18.5 to 24.9	25 to 29.9	≥ 30
1	Rangoi	1500	157	21	2	6	7	6	4	8	6	3
2	Ambugam	1400	197	18	2	8	4	4	3	9	5	1
3	Limbugam	1000	133	52	12	12	18	10	12	31	8	1
4	Loharibanda	1500	192	22	4	6	8	4	6	11	3	2
5	Bethalapuram	2000	195	16	Nil	2	9	5	3	9	4	Nil
6	Narayanapuram	3000	454	62	12	24	18	8	8	36	12	6
7	PSRP	3000	794	102	11	15	28	48	25	59	16	2
8	Makarampuram	2500	346	48	8	22	12	6	7	28	8	5
9	Burjapadu	2000	354	35		9	13	13	3	20	8	4
10	Amalapadu	1300	207	22	2	2	10	8	4	14	4	Nil
11	Gunapalli	1200	120	31	Nil	7	12	12	2	16	11	2
12	Narthaputuga	2000	341	42	8	20	10	4	6	24	8	4
13	Silagam	1300	120	17	2	5	5	5	3	9	5	Nil
		23700	**3610**	**488**	**63**	**138**	**154**	**133**	**86**	**274**	**98**	**30**

Srikakulam – CKD – Blood pressure

					Systolic BP mm Hg			Diastolic BP mm Hg		
S NO	VILLAGE	TOTAL POP	SCREENED	S C > 1.5	≥ 130	≥ 140	≥ 150	> 80-86	>86-90	90
1	Rangoi	1500	157	21	4	2	1	3	2	1
2	Ambugam	1400	197	18	2	3	Nil	1	3	Nil
3	Limbugam	1000	133	52	3	8	2	2	1	1
4	Loharibanda	1500	192	22	9	3	Nil	Nil	2	1
5	Bethalapuram	2000	195	16	4	1	2	Nil	1	1
6	Narayanapuram	3000	454	62	8	6	Nil	18	4	6
7	PSRP	3000	794	102	19	4	6	Nil	1	11
8	Makarampuram	2500	346	48	2	4	Nil	2	3	3
9	Burjapadu	2000	354	35	6	Nil	1	Nil	2	1
10	Amalapadu	1300	207	22	2	1	Nil	4	1	Nil
11	Gunapalli	1200	120	31	1	3	4	Nil	5	5
12	Narthaputuga	2000	341	42	4	3	Nil	2	4	1
13	Silagam	1300	120	17	Nil	2	2	2	1	2
		23700	**3610**	**488**	**64**	**40**	**18**	**34**	**30**	**33**

Srikakulam- CKD – evaluation

					Serum Creatinine > 1.5							
S NO	VILLAGE	TOTAL POP	SCREENED	S C > 1.5	>1.5 to 2	2 to 3	3 to 4	> 4	RBS > 180	TC > 200	Urinary Protein	NSAID
1	Rangoi	1500	157	21	2	3	4	4	Nil	2	6	8
2	Ambugam	1400	197	18	4	8	4	2	Nil	1	8	10
3	Limbugam	1000	133	52	16	20	9	7	Nil	7	28	32
4	Loharibanda	1500	192	22	6	9	2	5	Nil	2	7	16
5	Bethalapuram	2000	195	16	5	9	1	1	1	4	4	14
6	Narayanapuram	3000	454	62	24	18	14	6	3	18	27	32
7	PSRP	3000	794	102	41	39	11	11	Nil	18	46	59
8	Makarampuram	2500	346	48	18	16	8	4	1	6	18	22
9	Burjapadu	2000	354	35	12	15	8		2	Nil	27	Nil
10	Amalapadu	1300	207	22	9	10	1	2	1	2	16	6
11	Gunapalli	1200	120	31	10	11	6	4	4	7	23	4
12	Narthaputuga	2000	341	42	12	16	9	5	1	4	18	26
13	Silagam	1300	120	17	5	9	2	1	3	1	11	7
		23700	**3610**	**488**	**164**	**183**	**79**	**52**	**16**	**72**	**239**	**236**

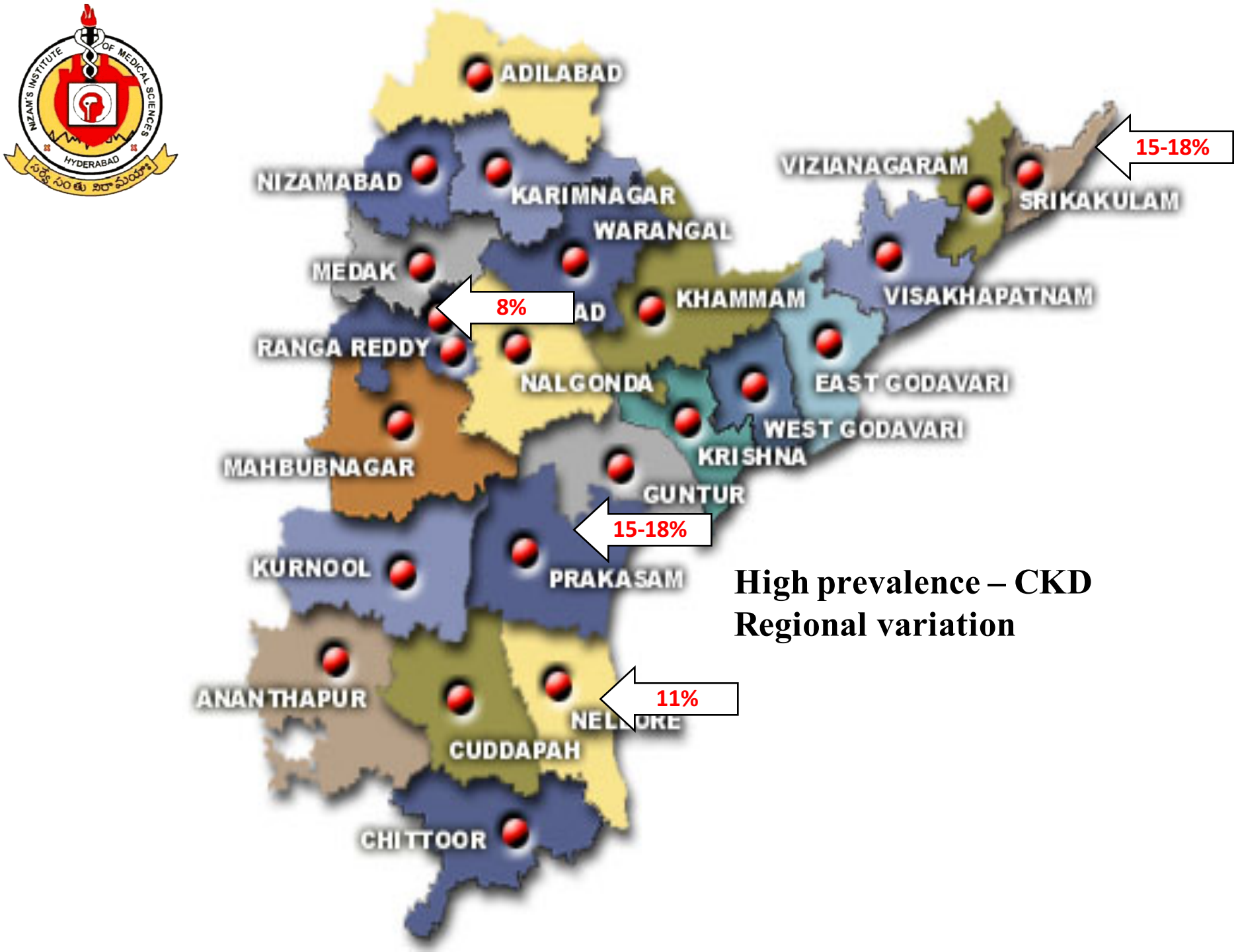
Srikakulam- CKD

CONTROL REGION

MANDAL	VILLAGE	POPULATION	SCREEND	Creat > 1.5 mg/dL
	Jellunda	600	108	0
	RD puram	1100	165	2
	Ampuram	600	150	0
	Saripalli	4500	664	2
	Bhyripuram	1100	186	3
	Bhoganeni	800	122	1
	Bellupatia	1300	159	2
	TOTAL	**10000**	**1554**	**10**

Srikakulam – CKD summary

	Total Pop	Screened	S C > 1.5	DM	HTN	U PROTEIN
UDHANAM	23700	3610	488	16	56	239
CONTROL	10000	1554	10	Nil	Nil	18


ADILABAD
NIZAMABAD
KARIMNAGAR
WARANGAL
MEDAK
8%
KHAMMAM
RANGA REDDY
NALGONDA
MAHBUBNAGAR
GUNTUR
15-18%
KURNOOL
PRAKASAM
ANANTHAPUR
11%
CUDDAPAH
CHITTOOR
VIZIANAGARAM
SRIKAKULAM
15-18%
VISAKHAPATNAM
EAST GODAVARI
WEST GODAVARI
KRISHNA
High prevalence – CKD
Regional variation

Observations

- A. Kidney disease prevalence – High
- B. High -Presumed chronic interstitial nephritis
- C. Regional variation

Table 2 Patient demographics, socioeconomic status, and CKD etiology and severity in different geographic zones

	East	North	South	West	Total
Number of cases	**5,768**	**14,588**	**18,555**	**13,362**	**52,273**
Age (Years)	51.8 ± 14.9	49.1 ± 15.0	50.3 ± 14.0	50.2 ± 14.9	50.1 ± 14.6
Number of females	1,690 (29.3)	4,610 (31.6)	5,073 (27.3)	4,155 (31.1)	15,528 (29.7)
Monthly family Income (n = 50,250)					
< Rs 5,000	1,968 (35.2)	6,198 (44.0)	7,873 (44.4)	5,430 (42.3)	21,469 (42.7)
Rs 5,001-20,000	2,471 (44.3)	6,367 (45.2)	7,597 (42.9)	5,866 (45.7)	22,301 (44.4)
> Rs 20,000	1,144 (20.5)	1,530 (10.9)	2,259 (12.7)	1,547 (12.0)	6,480 (12.9)
Causes of CKD					
Diabetic nephropathy	1,804 (31.3)	4,554 (31.2)	6,110 (32.9)	3,903 (29.2)	16,371 (31.3)
Undetermined	574 (10.0)	1,967 (13.5)	3,751 (20.2)	2,093 (15.7)	8,385 (16.0)
Chronic glomerulonephritis	885 (15.3)	2,133 (14.6)	2,302 (12.4)	1,897 (14.2)	7,217 (13.8)
Hypertensive nephrosclerosis	840 (14.6)	1782 (12.2)	2,190 (11.8)	1,929 (14.4)	6,741 (12.9)
Chronic interstitial nephritis	476 (8.3)	1,085 (7.4)	1,177 (6.3)	943 (7.1)	3,681 (7.0)
Obstructive uropathy	201 (3.5)	537 (3.7)	505 (2.7)	533 (4.0)	1,776 (3.4)
ADPKD	116 (2.0)	499 (3.4)	367 (2.0)	384 (2.9)	1,366 (2.6)
Miscellaneous	808 (14.0)	1,846 (12.7)	1,996 (10.8)	1,489 (11.1)	6,139 (11.7)
Renovascular disease	56 (1.0)	121 (0.8)	108 (0.6)	146 (1.1)	431 (0.8)
Graft failure	8 (0.1)	64 (0.4)	49 (0.3)	45 (0.3)	166 (0.3)

CKD: chronic kidney disease, ADPKD: autosomal dominant polycystic kidney disease

Figures in parentheses are percentages

Causes for high prevalence & regional variation

?

Local factors ?

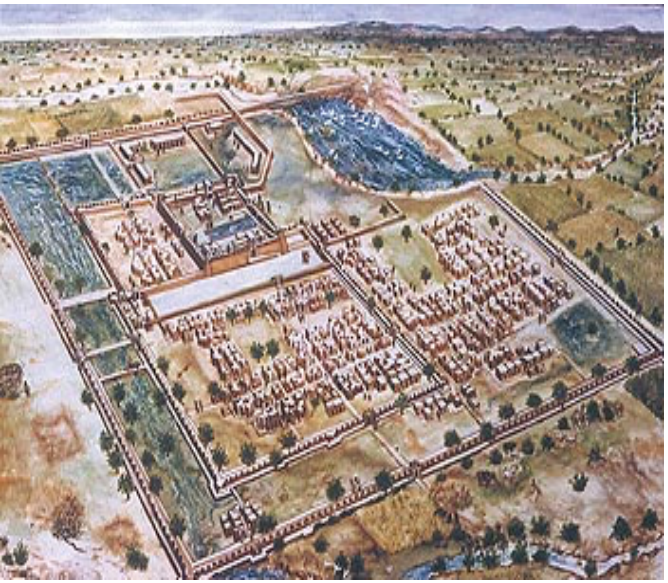
Environmental?

Recent environmental changes
Health impact

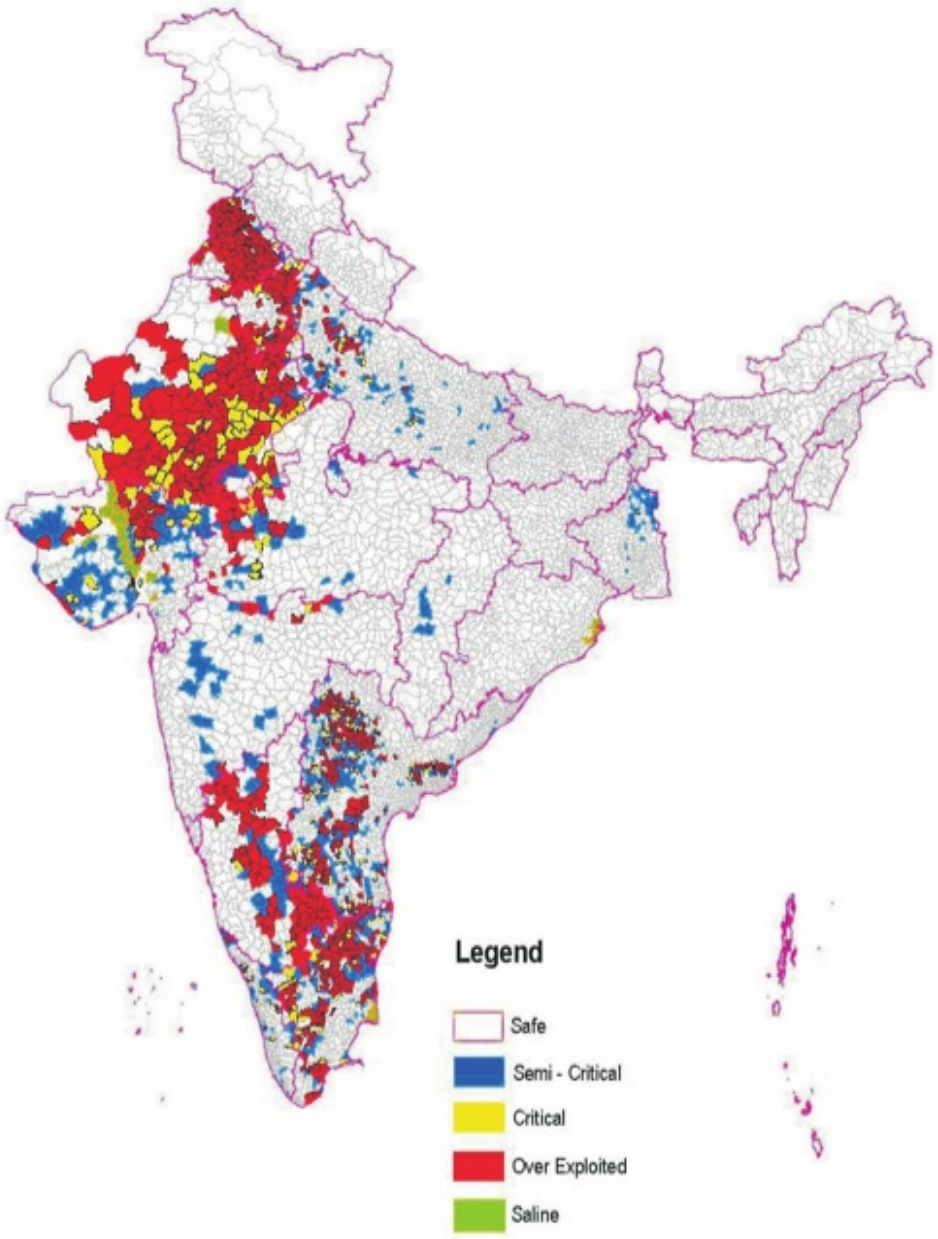
- Fluorosis

- Aresenicosis

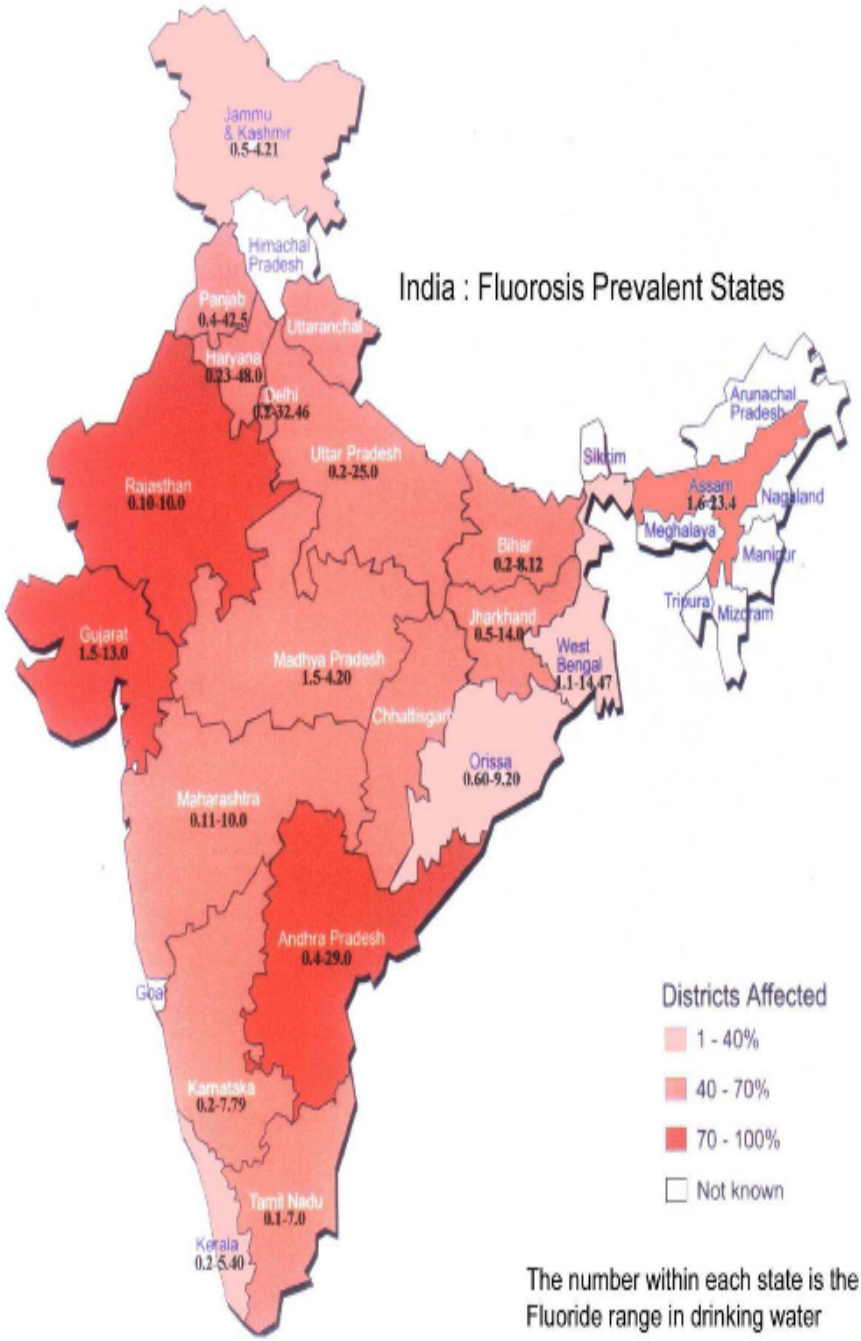
Changing drinking water systems



CATEGORIZATION OF BLOCKS/ MANDALS/ TALUKAS AS ON MARCH, 2004

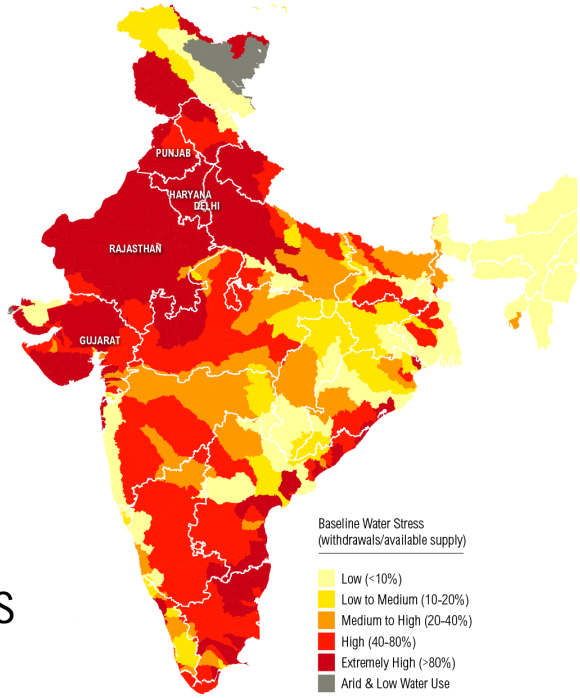


India : Fluorosis Prevalent States



Source of information: 1) UNICEF State of Art Report, 1999
2) FR & RDF data bank

54%
of India
Faces
High to
Extremely
High
Water Stress



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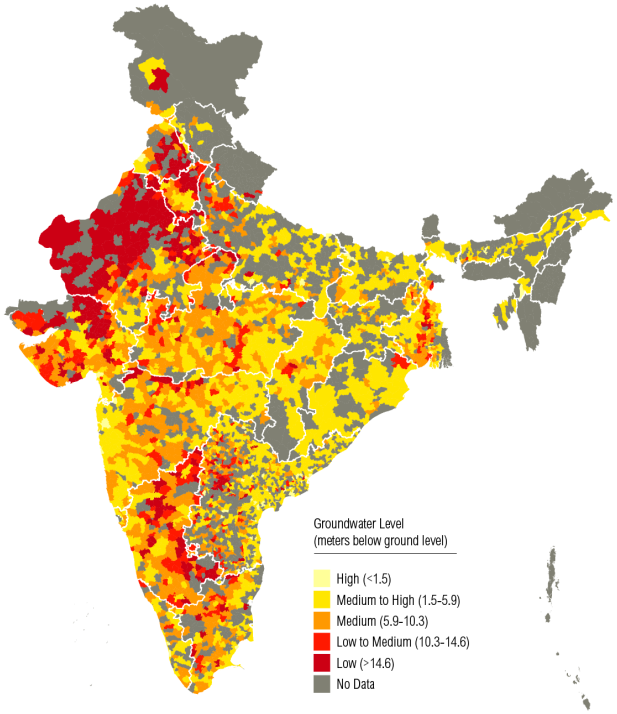
54%
of India's
Ground-
water
Wells Are
Decreasing



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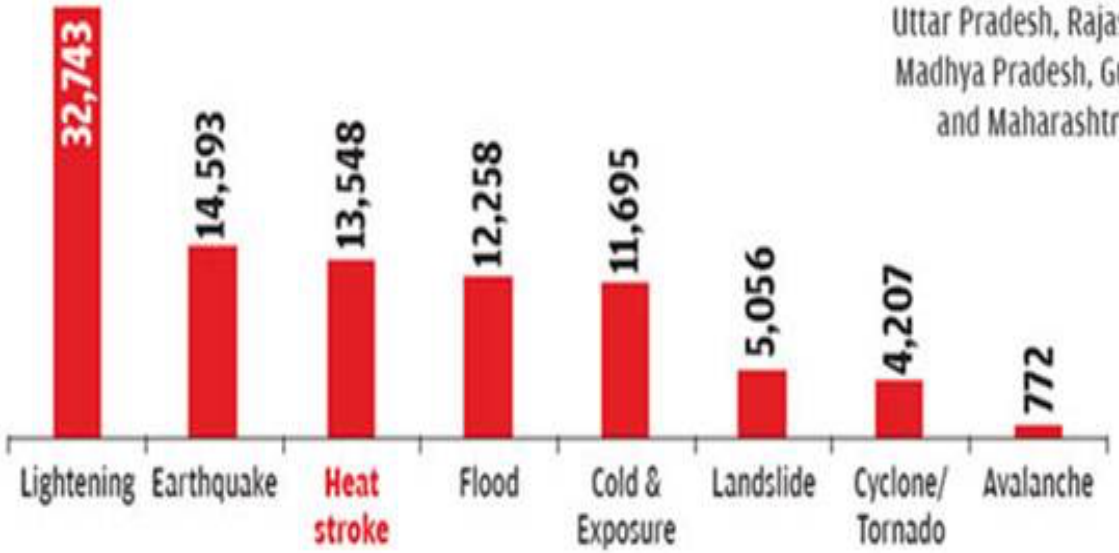
Changing temperatures

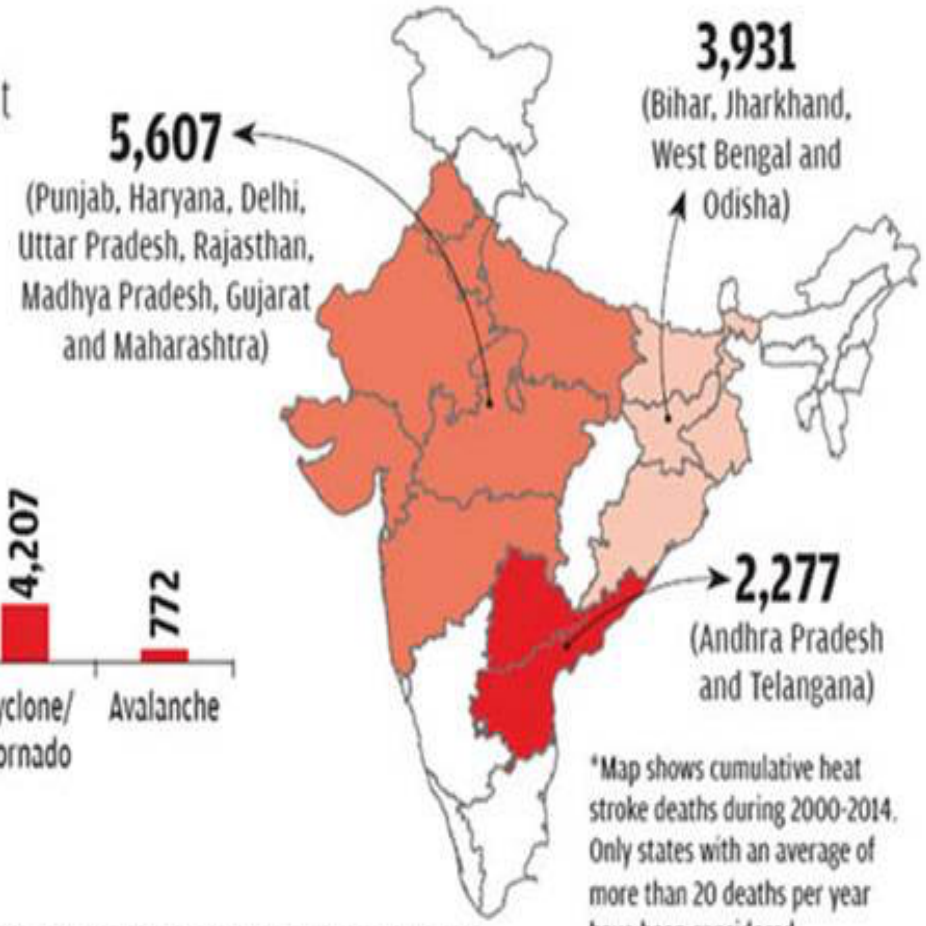
Natural killers

Despite being one of the top three killers in the country, heat waves are not considered a natural calamity by the government

Deaths according to causes (2000-2014)



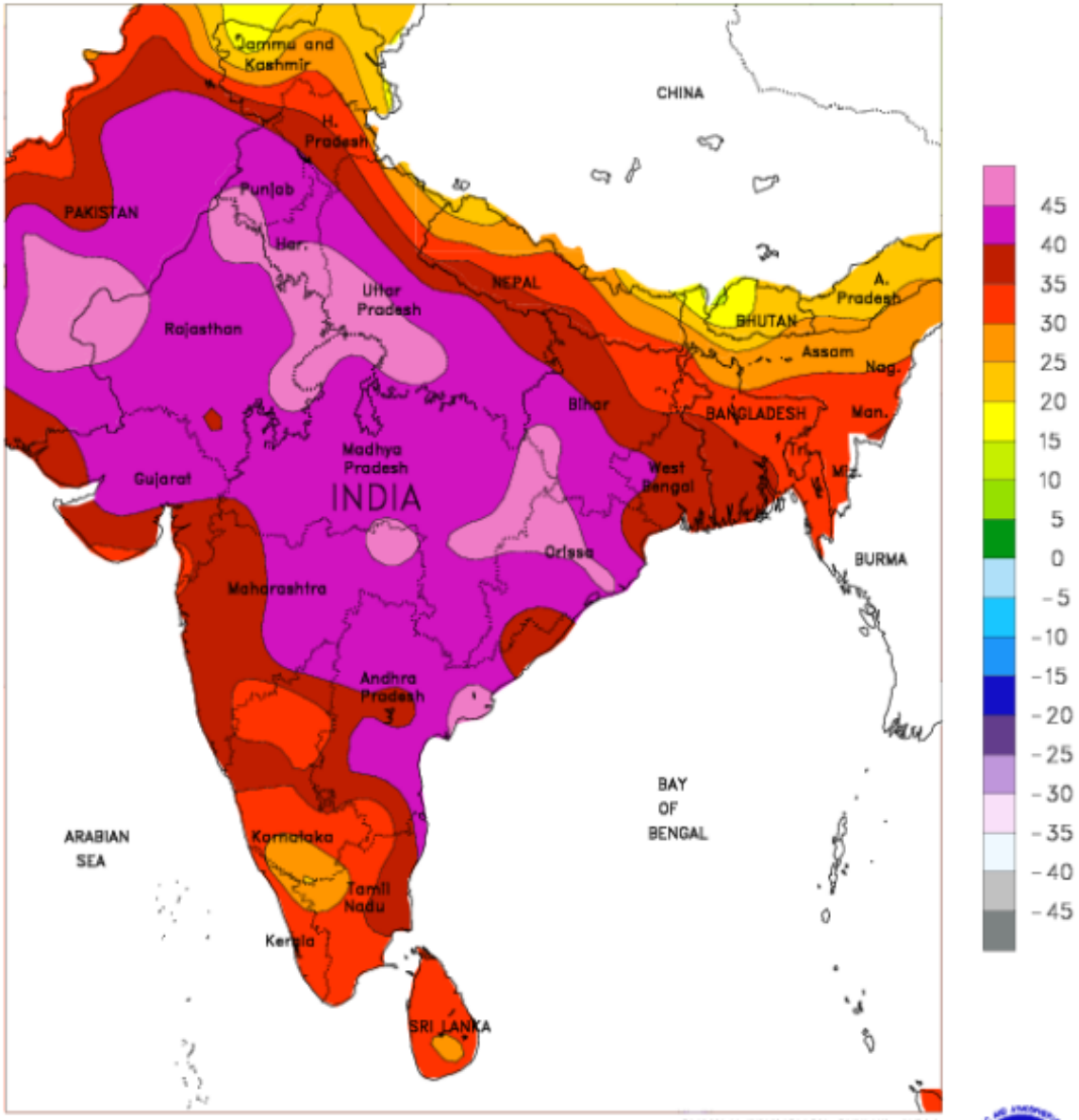
Heat hot spots*



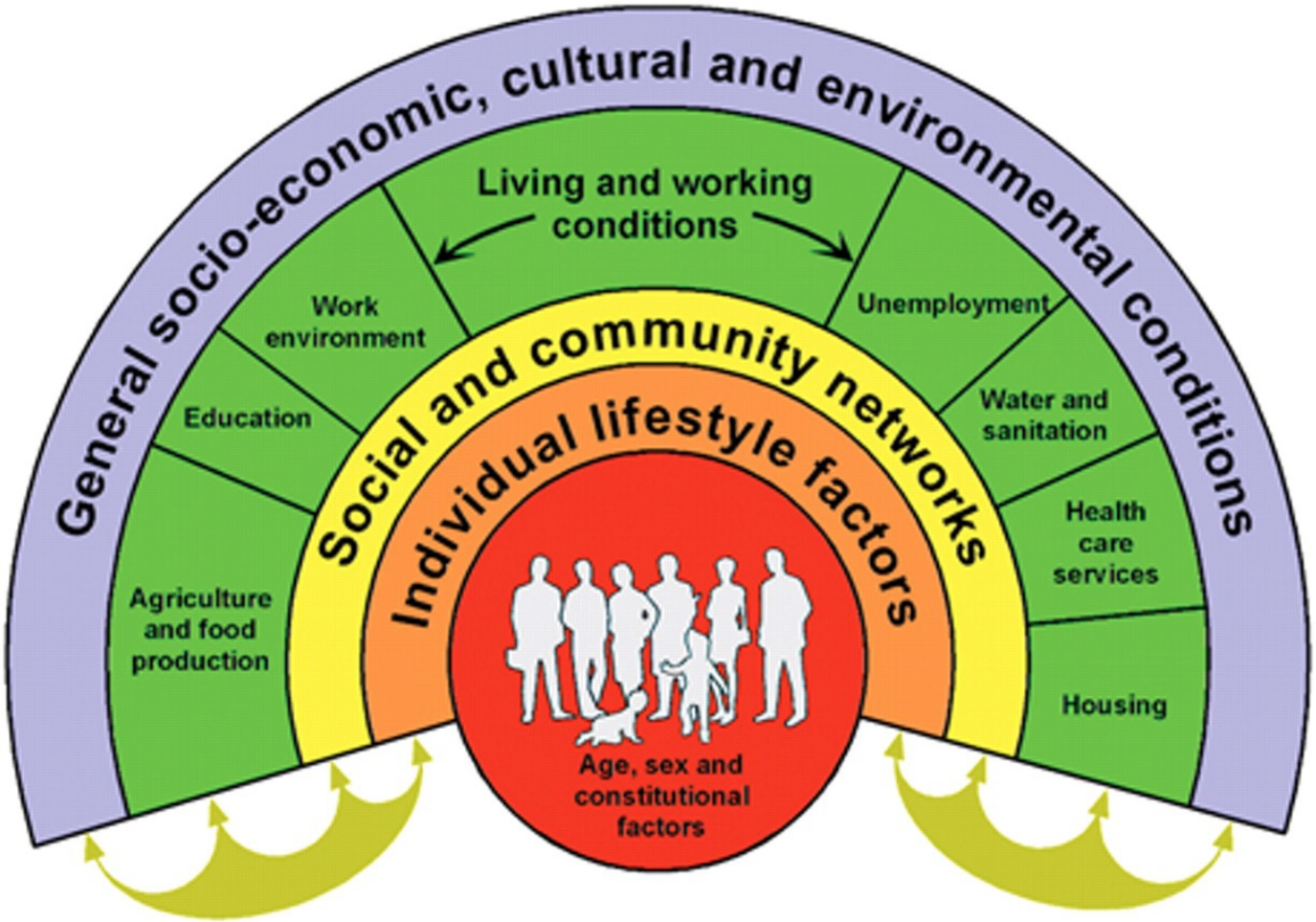
*Map shows cumulative heat stroke deaths during 2000-2014. Only states with an average of more than 20 deaths per year have been considered

Source: National Crime Records Bureau, Ministry of Home Affairs and Ministry of Statistics and Programme Implementation

SOUTH ASIA
Extreme Maximum Temperature (°C)
MAY 25, 2015



CLIMATE PREDICTION CENTER, NOAA
Computer generated contours
Based on preliminary data


General socio-economic, cultural and environmental conditions
Living and working conditions
Work environment
Unemployment
Education
Water and sanitation
Social and community networks
Individual lifestyle factors
Agriculture and food production
Health care services
Housing
Age, sex and constitutional factors

Kidney disease

Risk factors for CIN: Multi factorial

- ***Analgesic abuse***
- ***Ground water contamination with trace elements***
- ***Dehydration – Hot Climate / Less water intake***

Conclusion

CKDu / CKDnT :

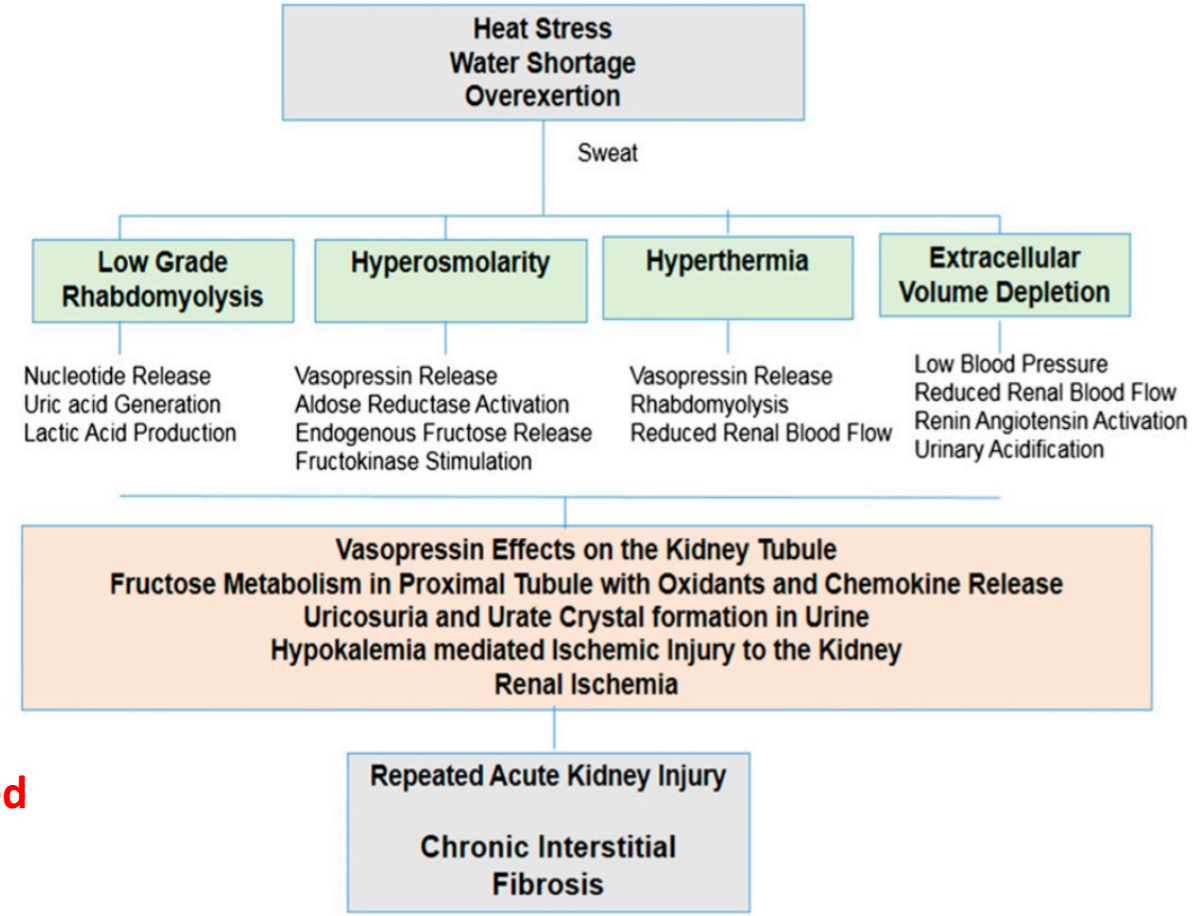
Kidney disease unknown etiology

Kidney disease of non Traditional causes

? Silica + Analgesic use

+ Dehydration + Heat stress

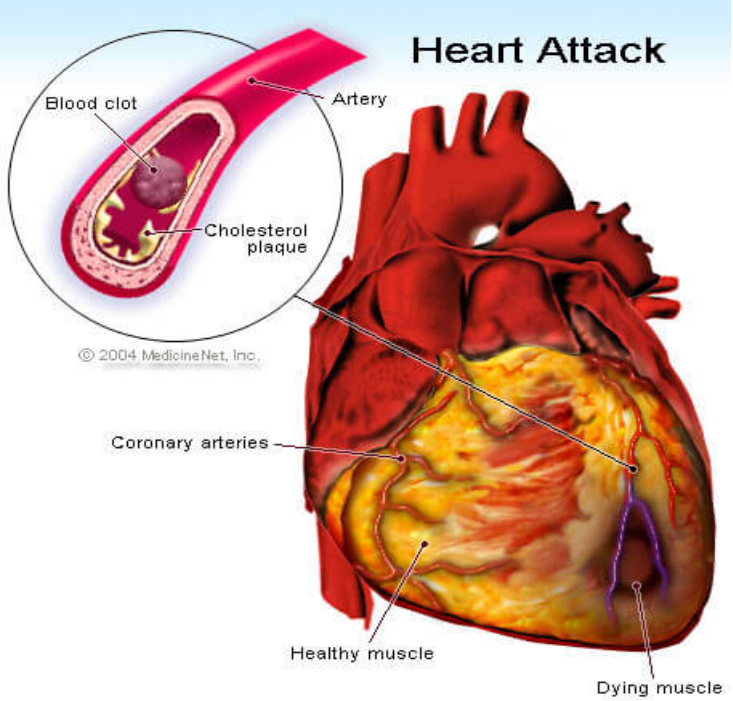
2016



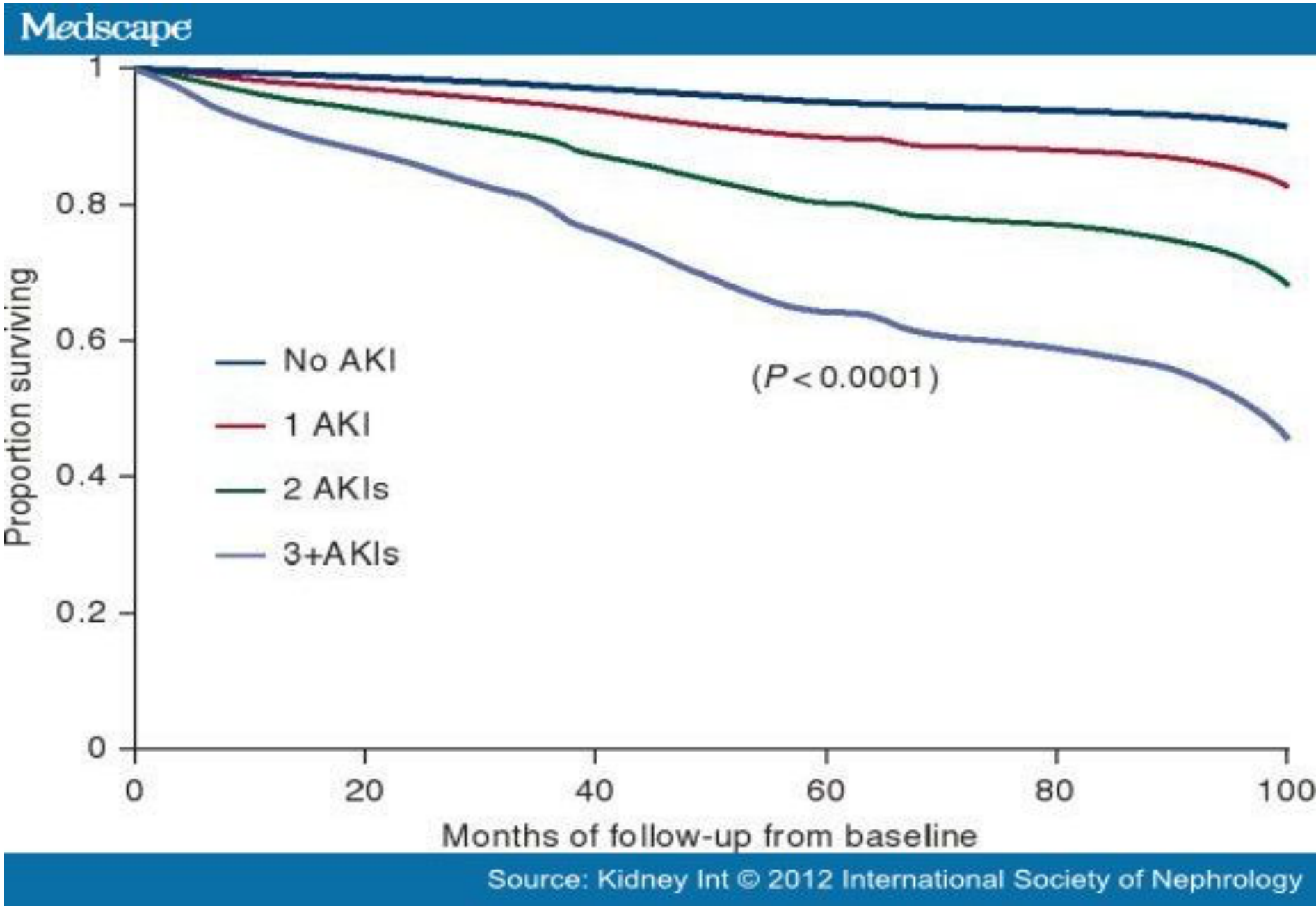
AKI – Infection related

NSAIDs

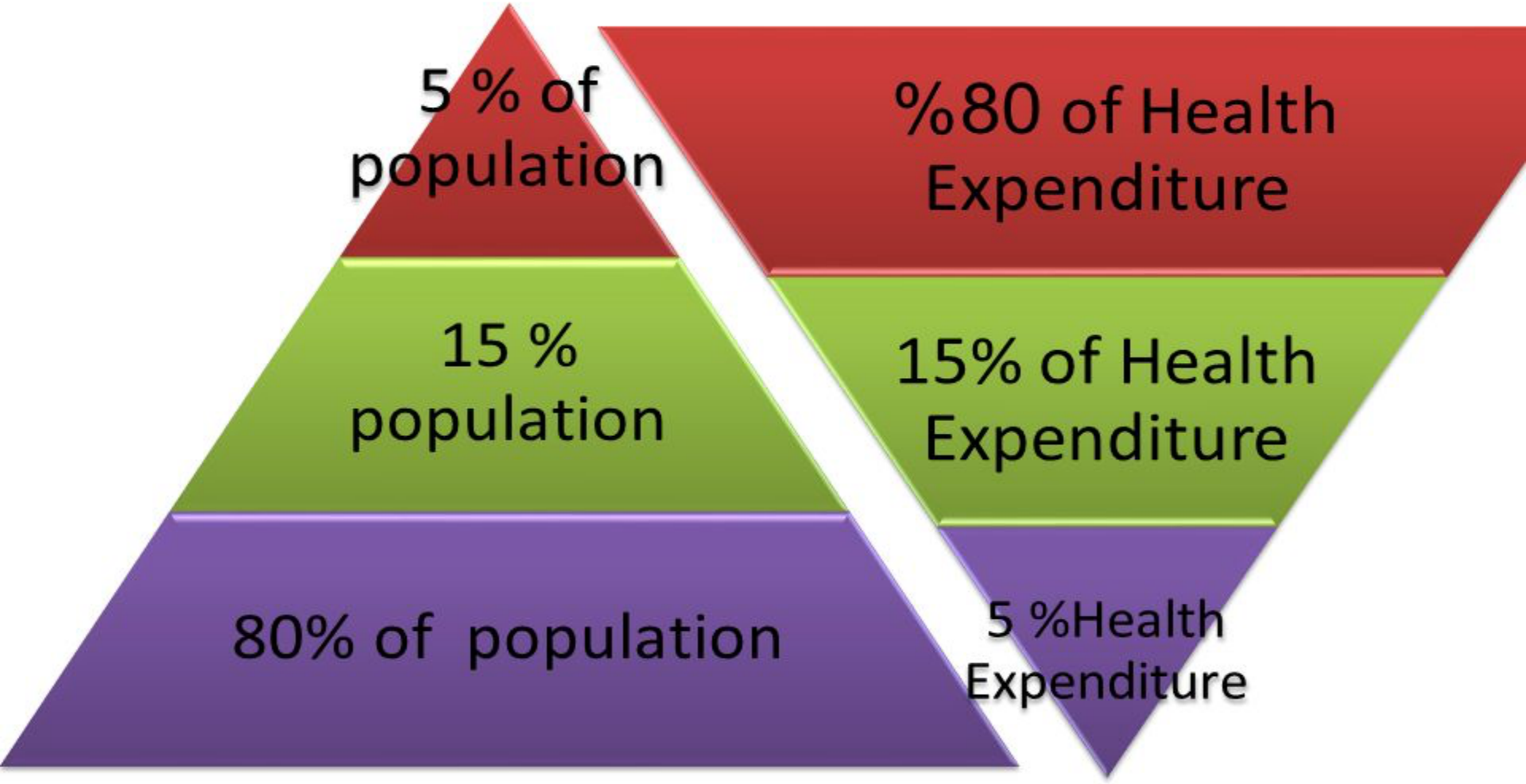
Figure 2. | **Mechanism for heat stress nephropathy**. Repeated heat stress and water shortage, especially when coupled with overexertion, can lead to several pathophysiologic processes, including low grade or overt rhabdomyolysis, hyperosmolarity, hyperthermia, and extracellular volume depletion. These processes can result in several mechanisms that can lead to AKI, including the acute effects of vasopressin on renal tubules, endogenous fructose metabolism in the proximal tubule *via* the fructokinase system, the development of uricosuria and urate crystal formation, hypokalemia-induced renal vasoconstriction and injury, and a generalized reduction in renal blood flow that may also cause ischemic damage. Repeated AKI, in turn, may lead to chronic tubulointerstitial disease.



AKI – Infections ; Heat stress ; NSAIDS


Medscape
1
0.8
0.6
0.4
0.2
0
Proportion surviving
No AKI
1 AKI
2 AKIs
3+AKIs
(P < 0.0001)
0
20
40
60
80
100
Months of follow-up from baseline
Source: Kidney Int © 2012 International Society of Nephrology

Population & Health Expenditure (Inverted Pyramid)



All are hereby ordered to

Be Happy,
Be Healthy,
See Good;

May you have no sorrow.

सर्वे भवन्तु सुखिनः सर्वे सन्तु निरामयाः ।
सर्वे भद्राणि पश्यन्तु मा कश्चिद्दुःखभाग्भवेत् ॥

sarvé bhavantu sukhinaḥ , sarvé santu nirāmayāḥ |
sarvé bhadrāṇi pashyantu , mā kashchid_duḥkha-bhāga-bhavet ||

Thank you