



# GOVERNMENT OF ANDHRA PRADESH



## WELCOME TO

**Sri N. Chandrababu Naidu Garu**  
**Hon'ble Chief Minister of Andhra Pradesh**

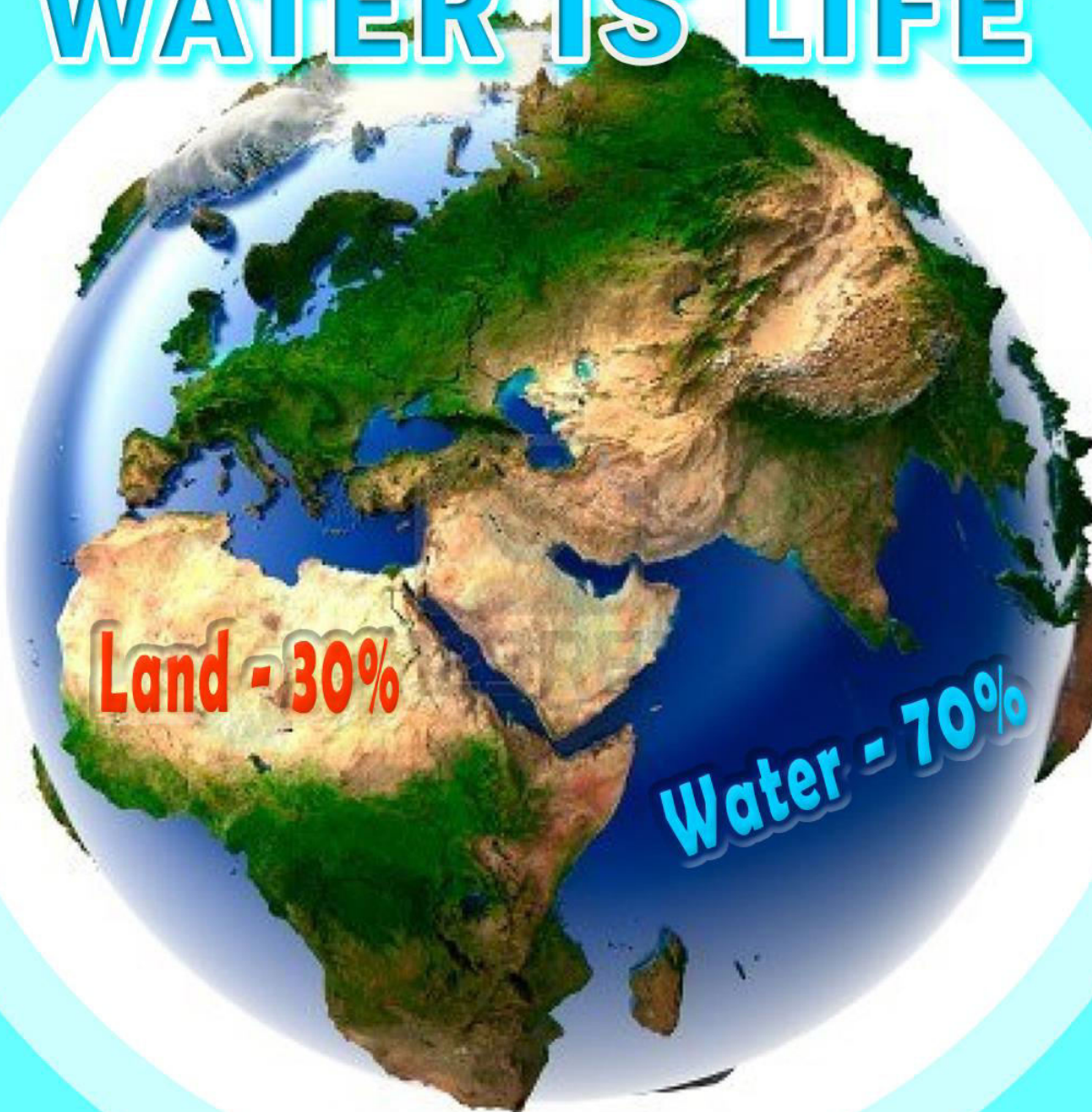
**&**

**Council of Ministers**

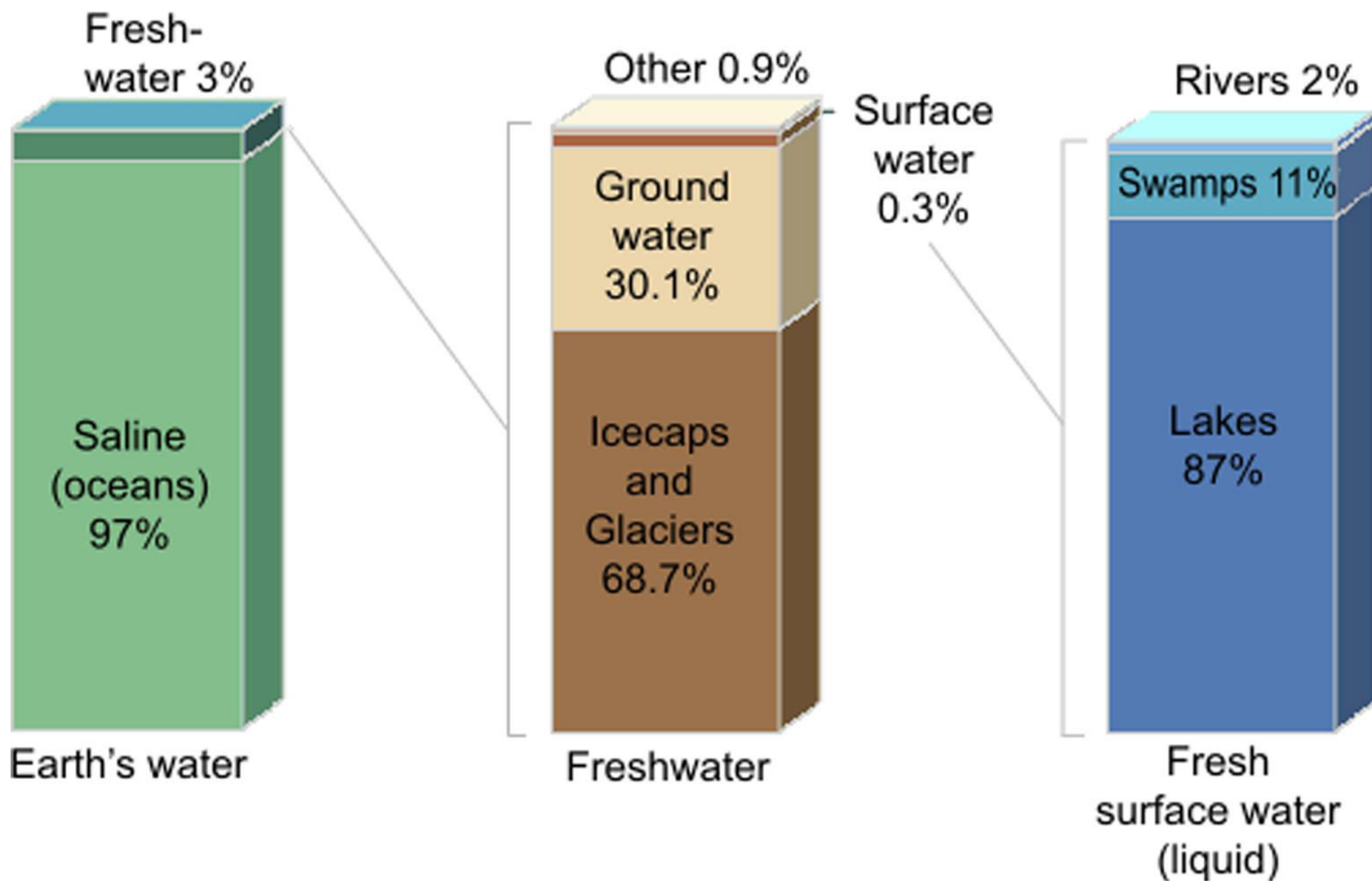
**RURAL WATER SUPPLY & SANITATION DEPARTMENT**

**WATER MISSION**

# **WATER IS LIFE**



# Distribution of Earth's Water



## A TIMELINE OF HUMAN WATER USE

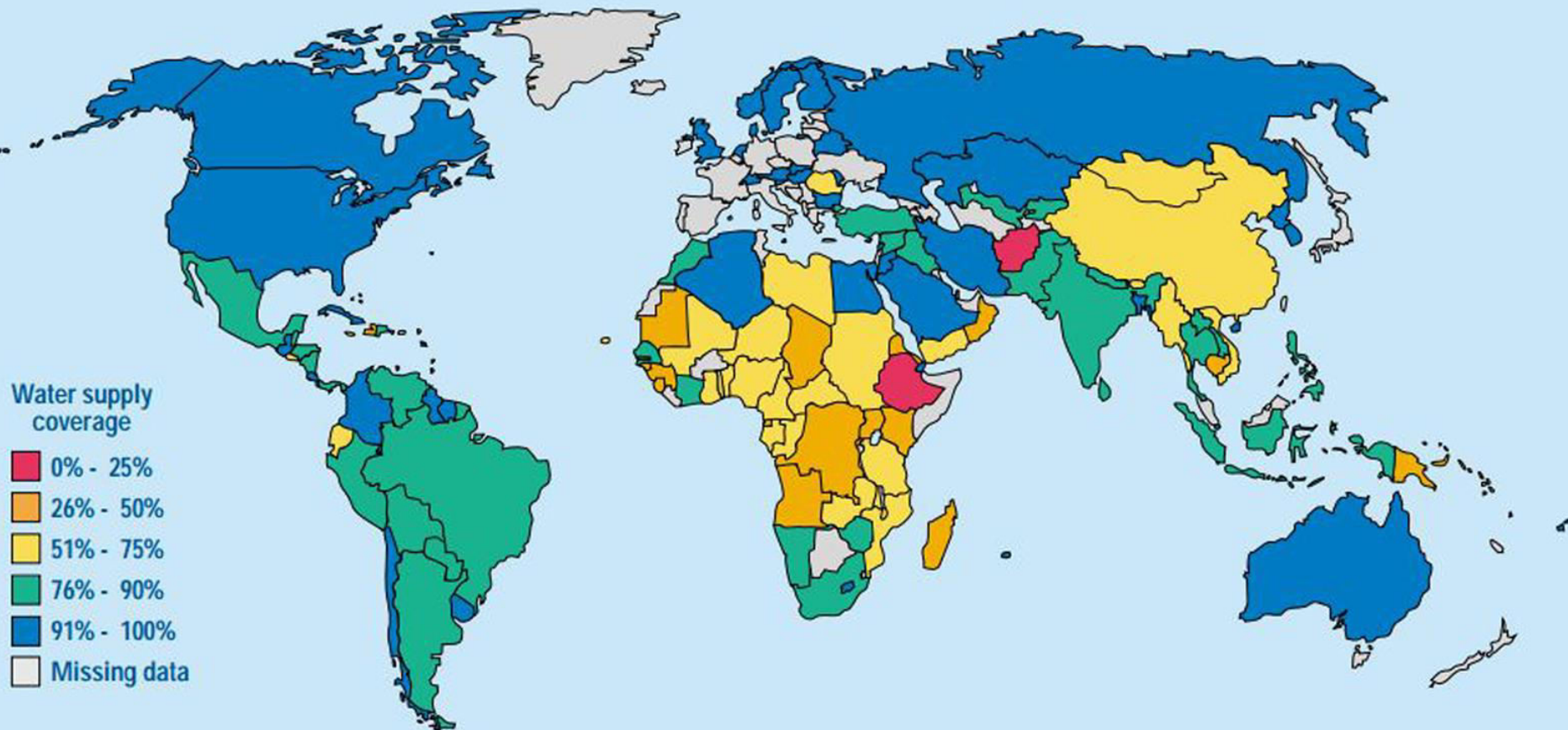
- 12,000 yrs. ago: hunter-gatherers continually return to fertile river valleys
- 7,000 yrs. ago: water shortages spur humans to invent irrigation
- Mid 1800's: faecal contamination of surface water causes severe health problems (typhoid, cholera) in some major North American cities, notably Chicago
- 1858: "Year of the Great Stink" in London, due to sewage and wastes in Thames

(Contd.,)

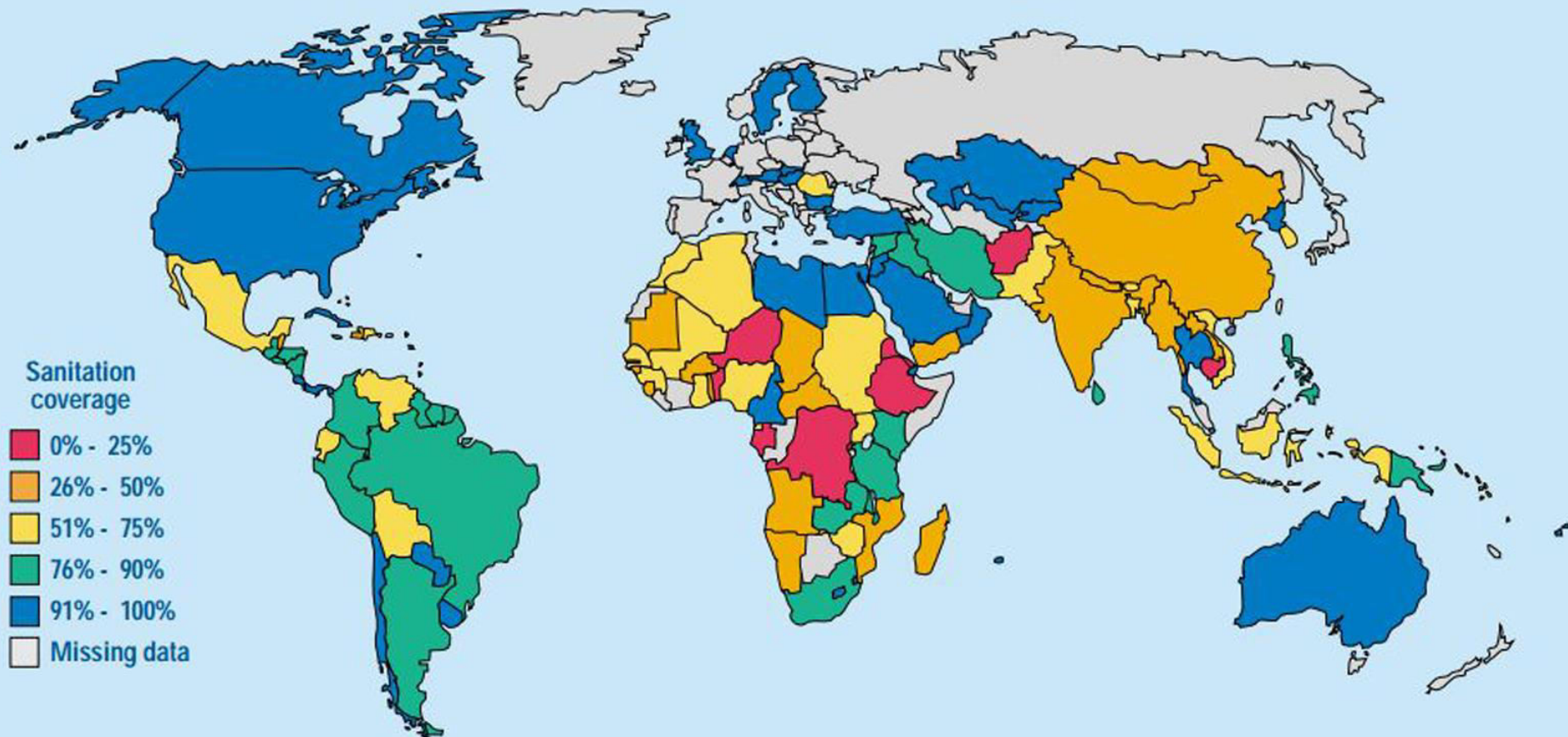


- Late 1800s-early 1900: Dams became popular as a water management tool
- 1900s: The green revolution strengthens human dependency on irrigation for agriculture
- World War II: water quality impacted by industrial and agricultural chemicals
- 1972: Clean Water Act passed; humans recognize need to protect water
- 1981 - 90 – International Drinking Water decade by UN
- 2000 – UN Announces Millennium Development Goals (MDG)
  - 7 – C deals with Water & Sanitation
  - Global assessment of Water & Sanitation
- 2005 –15 – International decade for action “Water for Life”.

# WATER SUPPLY, GLOBAL COVERAGE, 2000



# SANITATION, GLOBAL COVERAGE, 2000

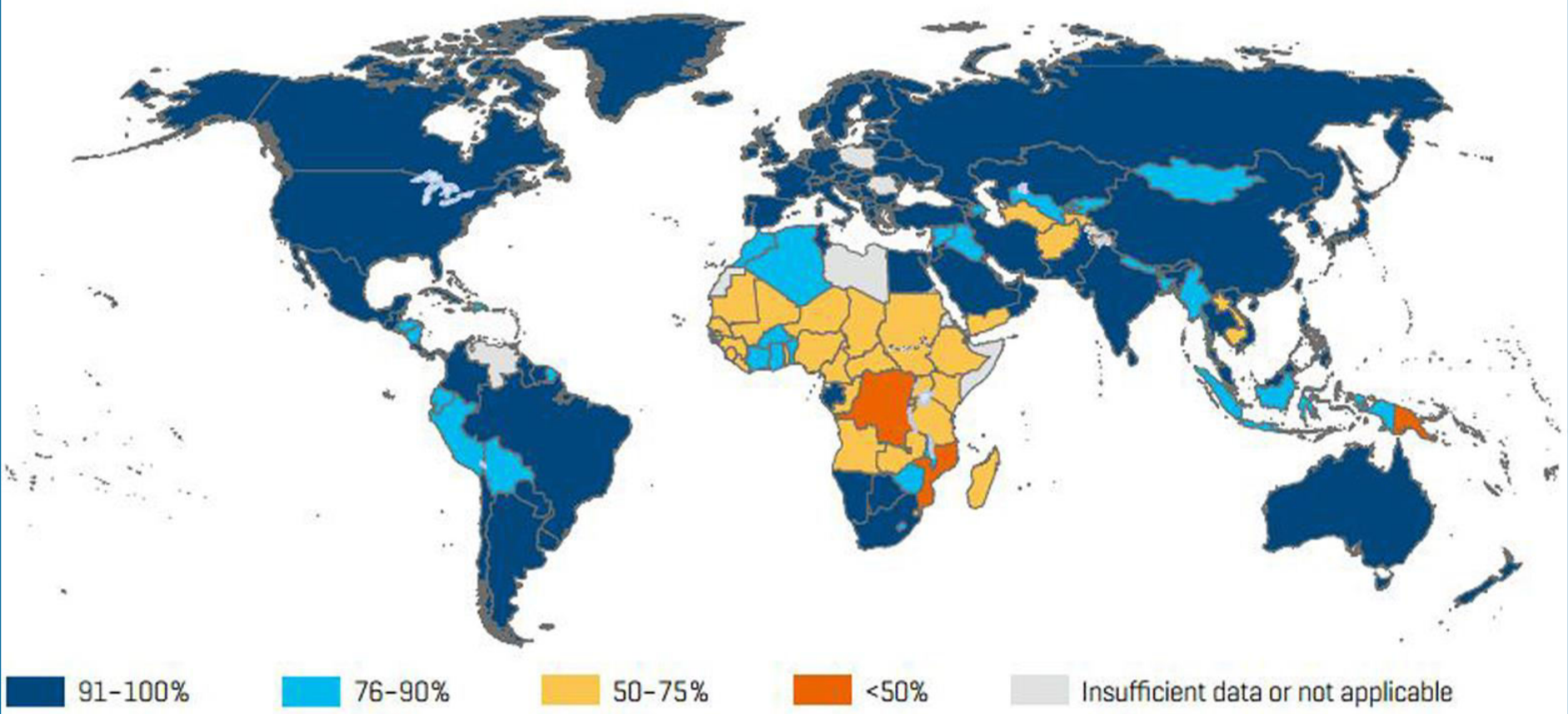


# JOINT MONITORING PROGRAMME OF WHO & UNICEF

- JMP conducts assessment of progress with regard to water supply and sanitation of each country towards millennium development goals. It publishes annual reports.
- 2014 report shows
  - India achieving target with regard to water.
  - With regard to sanitation, India is off the track.

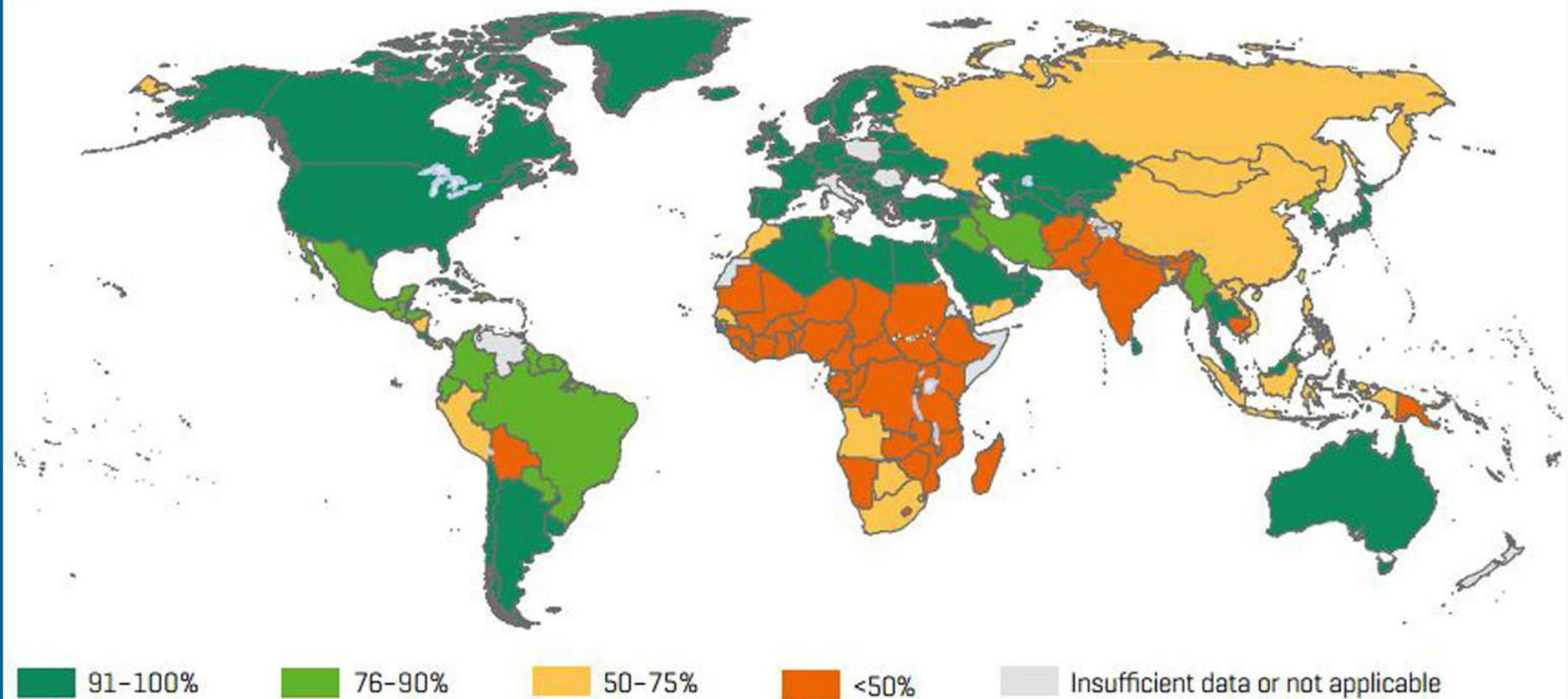


**The lowest levels of drinking water coverage are in sub-Saharan Africa**



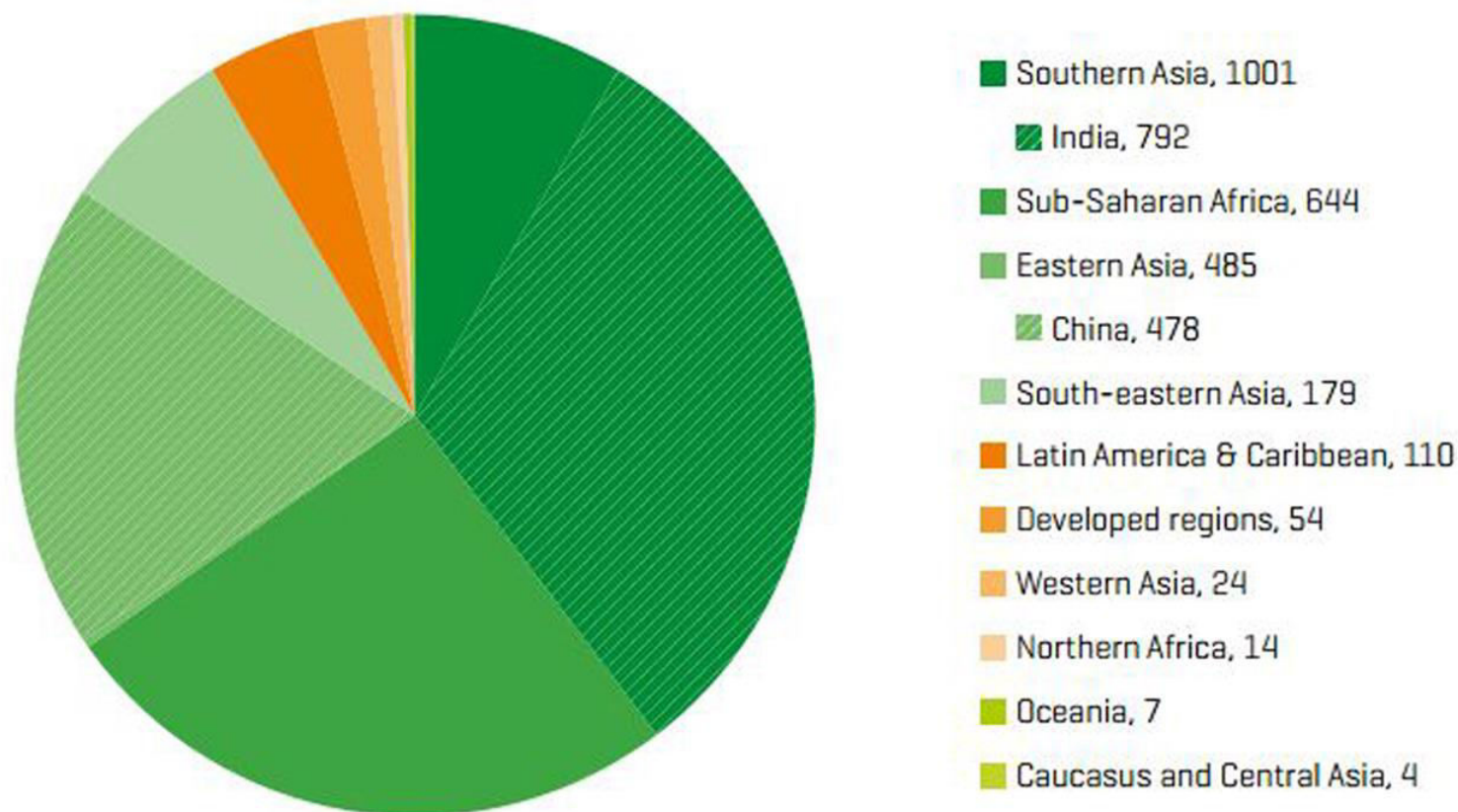
**Fig. 3.** Proportion of the population using improved drinking water sources in 2012

**There are 46 countries where less than half the population has access to an improved sanitation facility**



**Fig. 9.** Proportion of the population using improved sanitation in 2012

## Globally, 2.5 billion people do not have access to an improved sanitation facility



**Fig. 12.** Number of people [in millions] without access to an improved sanitation facility in 2012, by MDG region

# SAFE WATER & GLOBAL HEALTH

- Safe water supply and hygienic sanitation are fundamental to global health
- Access to safe drinking water, improving sanitation and hygiene can prevent 1/10<sup>th</sup> of global disease burden
- Safe water can prevent 1.4 million child deaths from diarrhea
- 0.5 million child deaths from Malaria
- 8.6 lakh child deaths from malnutrition



# INDIAN SCENARIO

- India has 16% of World Population
- 4% of World freshwater resources
- Per capita water availability in Cubic Meters
  - 1958 - 5300
  - 1996 - 2200
  - 2020 - 1600
- India will be water stressed country by year 2020

## **WATER COVERAGE STATUS**

- 94% Rural Population have access to Safe Drinking Water
- 91% Urban Population have access to Safe Drinking Water

## **SANITATION**

### **% of households without Toilets:**

	India	Andhra Pradesh
2001	78.1	81.9
2011	69.2	67.8

# **WATER QUALITY**

- While access to Drinking Water is challenge, water quality issue are becoming bigger challenge
- Quality problems are caused by Pollution, Over exploitation, Industrialization, Run of from agricultural fields

## **HEALTH BURDEN OF POOR WATER QUALITY IN INDIA**

- 37.7 million Indians are affected by waterborne diseases annually
- 63 million working days are lost annually
- Resultant economic burden is \$ 600 million per annum

## OVER EXPLOITATION

- 85% Drinking Water sources are ground water dependent
- Arsenic contamination – West Bengal
- Fluoride concentration – A.P., Gujarat, Karnataka, Madhya Pradesh, Rajasthan, Assam
- Arsenic – 6 million are at risk
- Fluoride – 6.6 Million are at risk



## **SOLUTION**

- To prefer surface water like Rivers, Reservoirs, Tanks, Check Dam Storages for PWS/CPWS Schemes to Rural area and not tapping Ground Water
- Planning for state wide water supply grid (long term)
- To introduce community water treatment systems

# NTR Sujala Pathakam

To address the issue of quality of drinking water, the Government has taken a policy decision to implement “**NTR Sujala Pathakam**” to provide Safe Potable Water of 20 litres for Rs. 2.00 to each household.

# Need For NTR Sujala Pathakam

- To address the issue of quality of water where there is a problem.
- To address the water quality problems associated with water supply and distribution networks.
- To also address the issue of hygiene and handling of water at the house hold level.

# Cabinet Sub-Committee

- The Government has formulated a Cabinet Sub-Committee with the following Hon'ble Ministers for successful implementation of the programme:
  - 1) Hon'ble Minister for Panchayat Raj & RWS.
  - 2) Hon'ble Minister for I&CAD.
  - 3) Hon'ble Minister for MA&UD, Urban water supply & Urban Planning.
- Two meetings of the Cabinet Sub-committee held on 20.06.2014 and 19.07.2014.
- The Cabinet Sub Committee during 1<sup>st</sup> meeting, decided to constitute a Technical Experts Committee to go into various aspects for supply of safe potable water of 20 litres for Rs. 2.00. to each household.



# Technical Experts Committee

➤ The Government vide GO. Rt. No. 740, dated: 25.06.2014 of PR&RD (RWS-II) Dept., constituted a Technical Experts Committee with the following members:

1. Sri. R. Kondal Rao, ENC (Rtd), Panchayat Raj – Chairman
2. Chief Engineer, RWS&S, Hyd – Convener.
3. The Deputy Advisor, Dept. Of Drinking Water & Sanitation, Delhi.
4. Engineer-in-Chief, I&CAD, AP., Hyd.
5. Engineer-in-Chief, PHMED, AP, Hyd.
6. The Director, Institute of Preventive Medicine, AP, Hyderabad.
7. Representative from NEERI, Nagpur.
8. Representative from UNICEF dealing with drinking water from Hyderabad.

# Work Shop

- A workshop on “Selection of suitable water treatment technologies for implementation of NTR Sujala Pathakam in Rural areas of Andhra Pradesh” was held on 30.06.2014 with the committee members and manufacturers/ NGOs.
- 22 Firms/ NGOs have participated in the workshop and shared their expertise in technology and views pertaining to implementation of the programme.

# List of Firms participated

Sl. No	Name of the Organization
1	M/s ION Exchange India Ltd., Hyderabad
2	Sri Sai Water Treatment Pvt Ltd., Hindupur
3	M/s Adisha Water Solutions, Bangalore
4	M/s Shresht Industries Pvt Ltd., Hyderabad
5	M/s Abhra Water Tech Ltd, Chennai
6	Tata Projects Ltd., Hyderabad
7	M/s SWISS Tech India Pvt Ltd., Hyderabad
8	Venture Motive Consulting., Hyderabad
9	Sri Shivoham Sales Corporation., Secunderabad
10	Sun Packing Industries., Hyderabad
11	CPW India Pvt Ltd., Hyderabad
12	M/s ATM Water Systems, Hyderabad
13	M/s Sony Hydro Tech., Secunderabad
14	Iswarya Aqua Tech Pvt Ltd., Vijayawada
15	M/s Sawyer Inc

# List of NGOs participated

Sl. No	Name of the Organization
1	Dhatri Foundation., Hyderabad
2	Satya Sai Seva Organization
3	NTR Memorial Trust., Hyderabad
4	Naandi Foundation., Hyderabad
5	Nandi Group., Nandyal
6	Mahila Seva Samiti., Vizianagaram
7	St. John Welfair association., West Godavari

# Views of NGOs/ Firms

- Under BOOT system, minimum lease period is 10 Years.
- 50% Capital cost to be borne by Government.
- Power cost to be borne by Government.
- To fix the rate for 20 lits taking into account increase in power tariff
- Involvement of DWACRA, SHGs, NGOs, etc., for maintenance.

# Technical Experts Committee

- 3 Meetings were held with the members of the Committee on 30.06.2014, 04.07.2014 & 14.07.2014.
- Final Recommendations:
  1. To follow IS standards of Potable water i.e., IS 10500: 2012.
  2. Types of treatment technologies based on water quality parameters:
    - a) RO (Reverse Osmosis) Technology:

If TDS > 500 mg/l, Fluoride > 1 mg/l, Nitrate > 45 mg/l.
    - b) EDF (Electrolytic Defluoridation) Technology:

If Fluoride > 1 mg/l and all other parameters are within IS Standards.



# Technical Experts Committee contd..

## c) Terafil Technology:

If Iron  $> 0.3$  mg/l and all other parameters are within IS Standards.

## d) Ultra Filtration Technology (Generally for Surface Water):

If Turbidity  $> 2$  NTU and all other parameters are within IS Standards.

## e) Disinfection shall be integral part in all the above identified treatment units.

## Technical Experts Committee contd..

- f) The SEs shall examine the quality parameters of water source to finalize the treatment technology
- g) The capacity of treatment plants will be 50 LPH, 250 LPH, 500 LPH, 1000 LPH and 1500 LPH. For habitations requiring above 1500 lph, multiples of such units shall be proposed at different locations of the habitations to bring down walking distance.
- h) For thandas of population upto 150, plants of capacity 50 lph shall be proposed. If source is not available in such habitations, a treatment plant in the main village/suitable convenient place shall be proposed and water shall be transported to thandas.

# Technical Experts Committee contd..

- Generally in RO plants reject water will be around 40% to 60%. The reject water of RO plant shall be treated before disposal.
- However, it is decided to study the treatment of reject water of RO plant in detail and will be finalized based on the findings.
- Purified water shall be supplied in two sizes of 10 litres or 20 litres cans.

# Reverse Osmosis Plant

## PRETREATMENT

Using a **Multi Media Filter Tank** large contaminants, odour, colour, chlorine etc. are removed from raw water.

## MICROFILTRATION

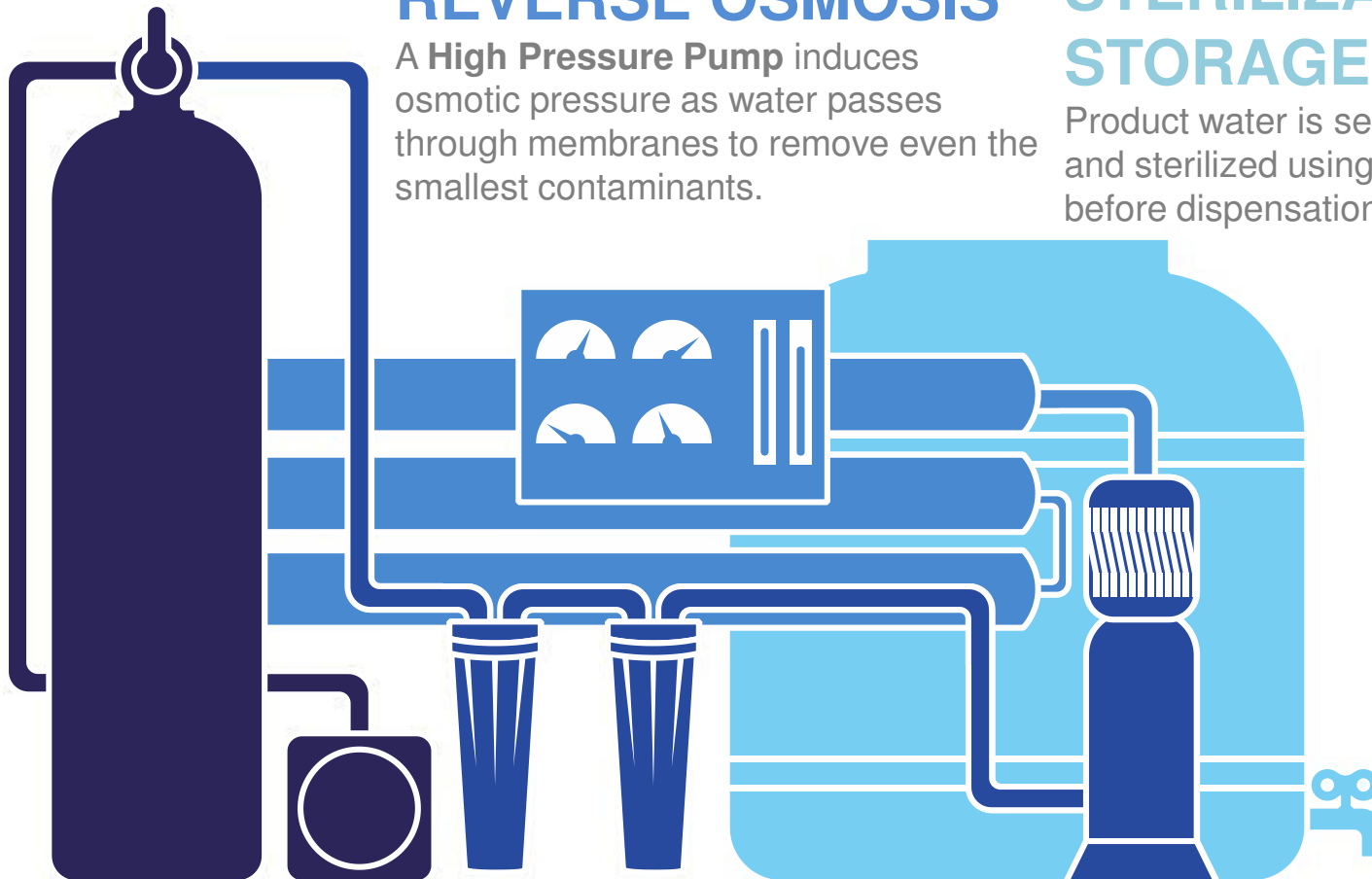
**Micron Filters** remove medium sized contaminants before water reaches membranes.

## REVERSE OSMOSIS

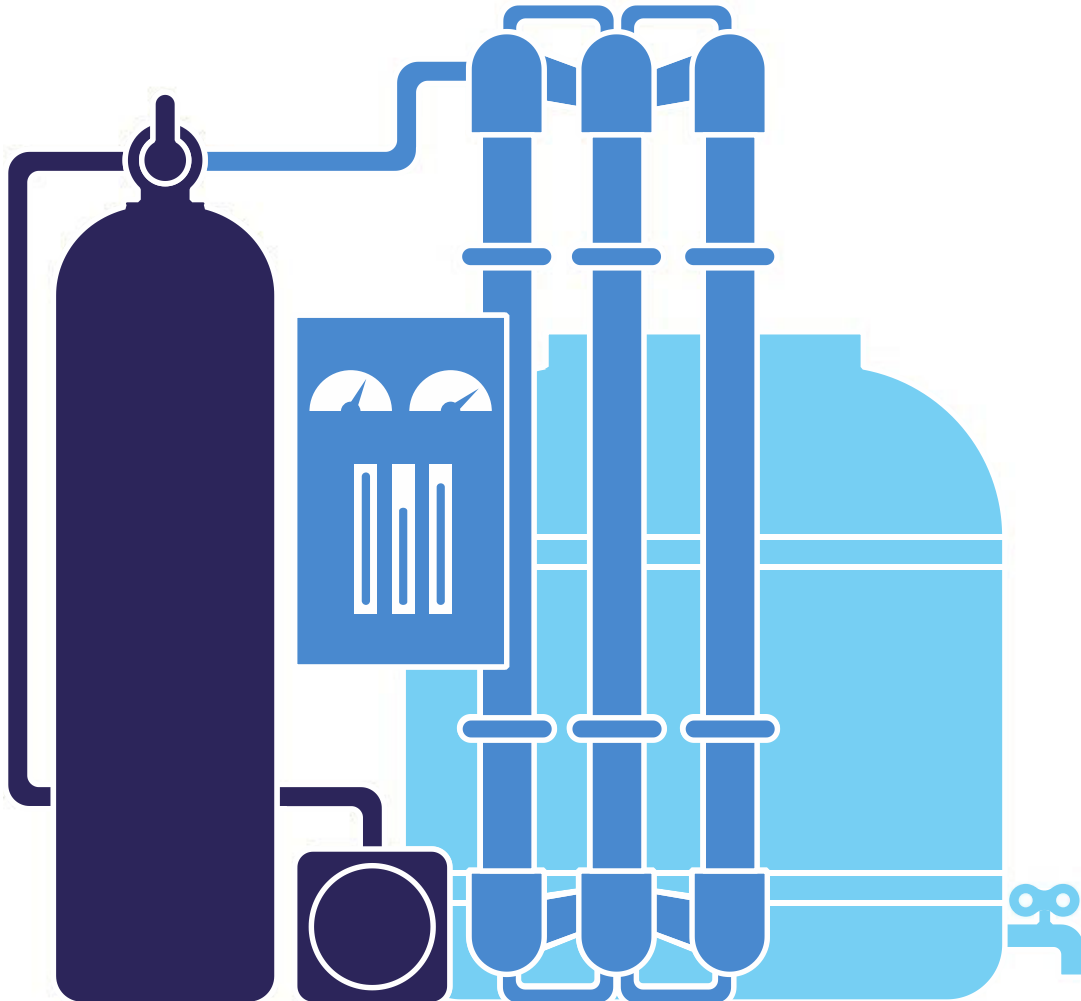
A **High Pressure Pump** induces osmotic pressure as water passes through membranes to remove even the smallest contaminants.

## STERILIZATION & STORAGE

Product water is sent to permeate storage tank and sterilized using an **Ultraviolet System** before dispensation.



# Ultra Filtration Plant



## PRETREATMENT

Using a **Multi Media Filter Tank** large contaminants, odour, colour, chlorine etc. are removed from raw water.

## ULTRAFILTRATION

Water passes through **Membrane Filters** which remove remaining turbidity, bacteria and pathogens.

## STERILIZATION & STORAGE

Product water is sent to permeate storage tank and sterilized using an **Ultraviolet System** before dispensation.

# Electrolytic Defluoridation Plant



Reaction Chamber



Treated Water Tank

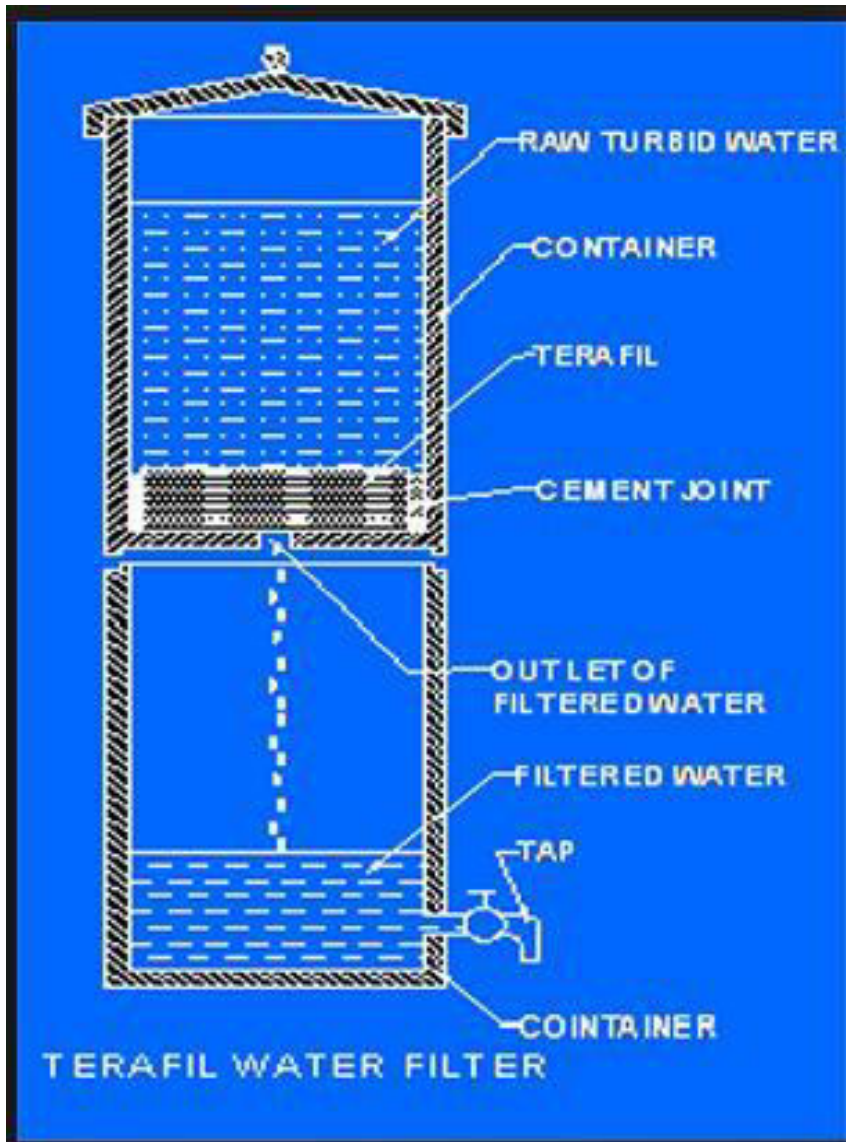


Treated Water Taps





# Terafil Treatment



# Cost Analysis (Tentative)

Rs in Lakhs

Type of Treatment Unit	250 LPH	500 LPH	1000 LPH	1500 LPH
RO	1.30	2.25	3.20	3.50
EDF	1.00	1.90	3.00	3.25
Terrafil	0.36	0.36	0.63	0.70
UF/ Gravity Filters	1.20	1.30	1.40	1.50

## Cost Analysis (Tentative) contd..

Bore Well/ Room

Rs in Lakhs

Item	Cost
Bore Well	1.00
Pump set and accessories	0.75
Room	1.50
<b>Total</b>	<b>3.25</b>

# Capital and Recurring Cost Analysis

## ➤ 1000 LPH RO Plant:

1. Capital Cost = Rs. 3.20 lakhs

2. O&M Cost per Month:

Power = Rs. 8,400

Materials = Rs. 3,000

Man Power = Rs. 3,000

Total = Rs. 14,400

3. Monthly Income = Rs. 24,000

(8000 lit/ day \* 30 days \* Rs. 2.00 per 20 Lits)

Monthly Net Income = Rs. 9,600

## Capital and Recurring Cost Analysis contd..

4. Monthly Net savings = Rs. 6,720 (considering 70% purchase)

Per Annum Net savings = Rs. 80,640

5. Interest = Rs. 83,200 (for 4 years)

6. No. of years for Reimbursement = 5 years for capital and interest.

7. Taking a practical view of purchase by locals and for his efforts to undertake the project, administration charges & profit , allow additional 5 years.

8. Hence, total lease period of plant– 10 Years.

## Breakup of Water Treatments as Planned initially

Sl. No	Description	No of Plants
1	RO Plants	4258
2	EDF (Electrolytic Defluoridation) Plants	160
3	Terafil Plants	178
4	Ultra Filtration/ Gravity Filtration Plants	806
	<b>Total</b>	<b>5402</b>

# Issues

- Action Plan for 4 Years.

Year	No. of Habitations proposed
2014-15	5,000
2015-16	10,000
2016-17	15,000
2017-18	15,000

- About 3459 habitations were already covered through existing plants installed by Govt./NGOs/Private agencies.



# Issues contd...

## ➤ Action Plan for 2014-15

- ❖ Selection of 5000 habitations in 1<sup>st</sup> Phase where
  - Water Quality is an issue.
  - Building and water source is conveniently available.
  - To cover only one location per Gram Panchayat.
  - Preference for uncovered Gram Panchayats.

District	No. of Habitations proposed
Srikakulam	350
Vizianagaram	350
Visakhapatnam	350
East Godavari	350
West Godavari	500
Krishna	350
Guntur	350

District	No. of Habitations proposed
Prakasam	350
Nellore	350
Chittoor	350
Kadapa	350
Anantapur	650
Kurnool	350

# Issues contd...

- Government Support –Water, building and assistance in getting power connection.
- Can sizes – 10 or 20 liters.
- Source of Fund :

## 1. GOI

- GOI has newly introduced a Programme from 2014-15 for installation of Community water treatment systems for Quality Affected habitations
- The GOI tentative allocation for this year Rs.54.24 Crores

# Issues **contd...**

## 2. BOOT (Build – Own – Operate & Transfer) System.

- Shall sell @ Rs. 2.00 per 20 litres can.
- Plant cost and all other equipment including maintenance till lease period shall be borne by the agency.
- Maintenance through SHGs, DWACRA, NGOs, etc.,
- Ensure water quality as per BIS standards (IS 10500 : 2012)
- Plant shall be up and running round the clock.

## 3. Corporate Social Responsibility (CSR).

## 4. NGOs.

## 5. Self employment scheme through SHGs.

- Finalization of Logo for the scheme.
- Decision on the date of launching.

THANKS

# Status of Existing Water Treatment Plants

Sl. No	District	No. Of Plants functioning		
		Department	Private	Total
1	Srikakulam	0	29	29
2	Vizianagaram	5	18	23
3	Visakhapatnam	0	54	54
4	East Godavari	26	109	135
5	West Godavari	77	367	444
6	Krishna	63	174	237
7	Guntur	40	1105	1145
8	Prakasam	93	60	153
9	Nellore	0	247	247
10	Chittoor	13	124	137
11	Kadapa	106	185	291
12	Anantapur	25	177	202
13	Kurnool	283	79	362
	<b>Total</b>	<b>731</b>	<b>2728</b>	<b>3459</b>

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# BIS Water Quality Standards

	IS: 10500 : 2012 (Potable Water)	IS: 14543: 2004 (Packaged Drinking Water)
pH	6.5-8.5	6.5-8.5
Colour Co-pt	5	2
Fluoride mg/l	1	1
Chlorides	250	200
E.Coli no/100MI	Nil	Nil
TDS mg/l	500	Max 500
Nitrate mg/l	45	45
Iron (Fe)	0.30	0.10
Calcium(ca+)	75	75
Magnesium (mg+) mg/l	30	30
Sulphate mg/l	200	200
Alkalinity mg/l	200	200
Turbidity NTU	1	1
Manganese(mg/l)	0.30	0.10

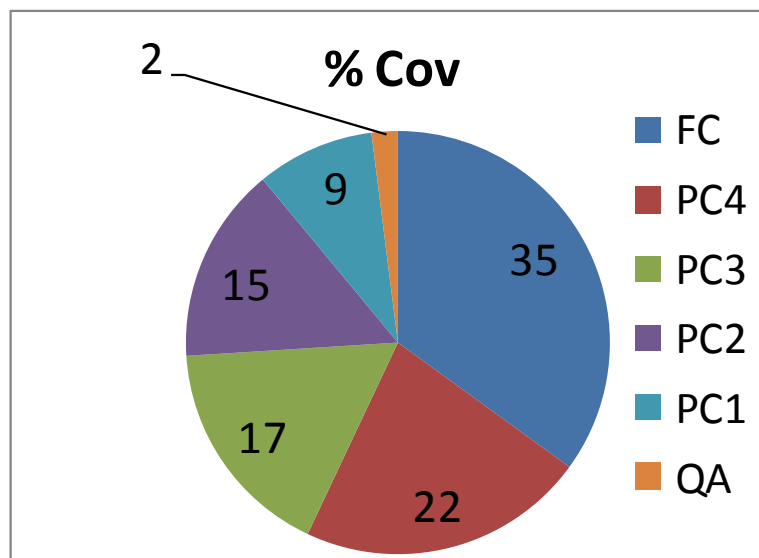
# IS: 10500 : 2012 Potable Water Quality

	Requirement (Desirable Limit)	Permissible limit in the absence of alternative source
pH	6.5-8.5	No Relaxation
Colour Co-pt	5	15
Fluoride mg/l	1	1.5
Chlorides	250	1000
E.Coli no/100MI	Nil	Nil
TDS mg/l	500	2000
Nitrate mg/l	45	45
Iron (Fe)	0.30	0.30
Calcium(ca+)	75	200
Sulphate mg/l	200	400
Alkalinity mg/l	200	600
Turbidity NTU	1	5
Manganese(mg/l)	0.30	0.30



# Habitation Status

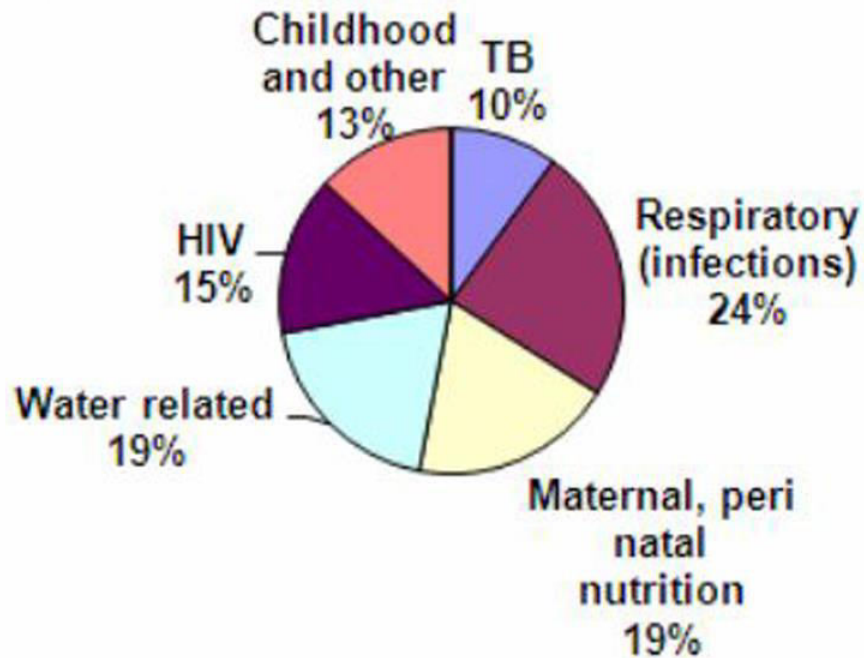
Status	As per 55 LPCD	
	Habs	%
Fully Covered (=>100% Pop Cov)	16742	35
PC4 (75-100% Pop Cov) (42 – 55lpcd)	10213	22
PC3 (50-75% Pop Cov) (28 – 42 lpcd)	8138	17
PC2 (25-50% Pop Cov) (14 – 28lpcd)	6904	15
PC1 (0-25% Pop Cov) (0 – 14lpcd)	4049	9
<b>Partially Covered (0-100% Pop Cov)</b>	<b>29304</b>	<b>63</b>
Quality Affected (NSS)	1144	2
<b>Total</b>	<b>47190</b>	



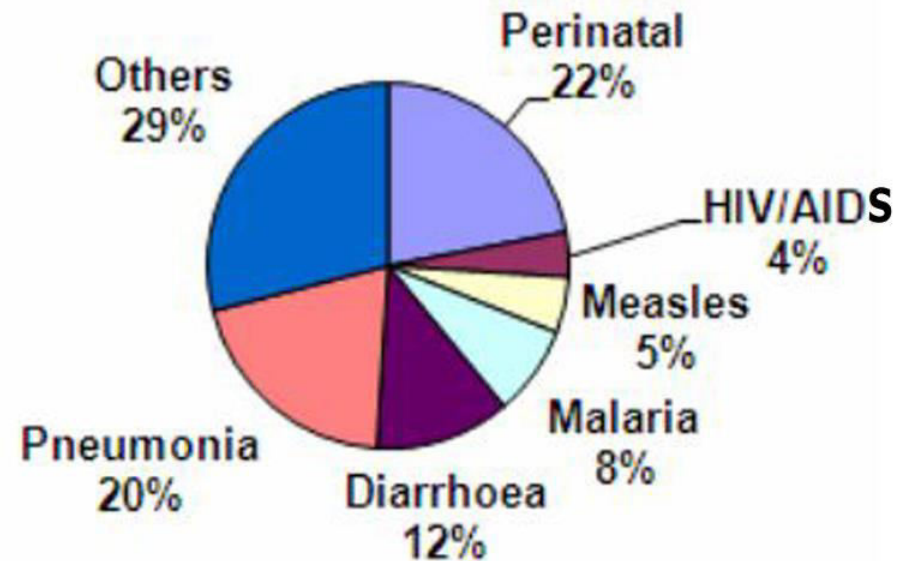
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## Major causes of death world wide 2000.

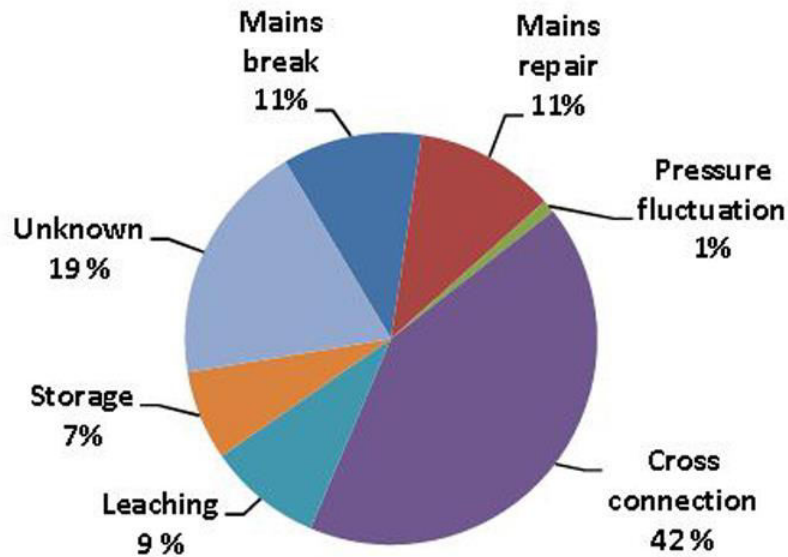
### All deaths infectious disease



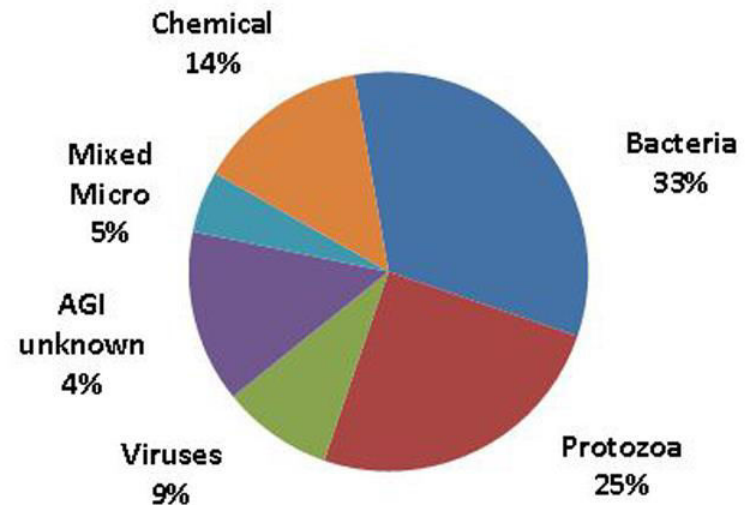
### Under 5, deaths



## Waterborne outbreaks associated with distribution systems in the USA, 1981-2010, by (a) System fault and (b) Causative agent

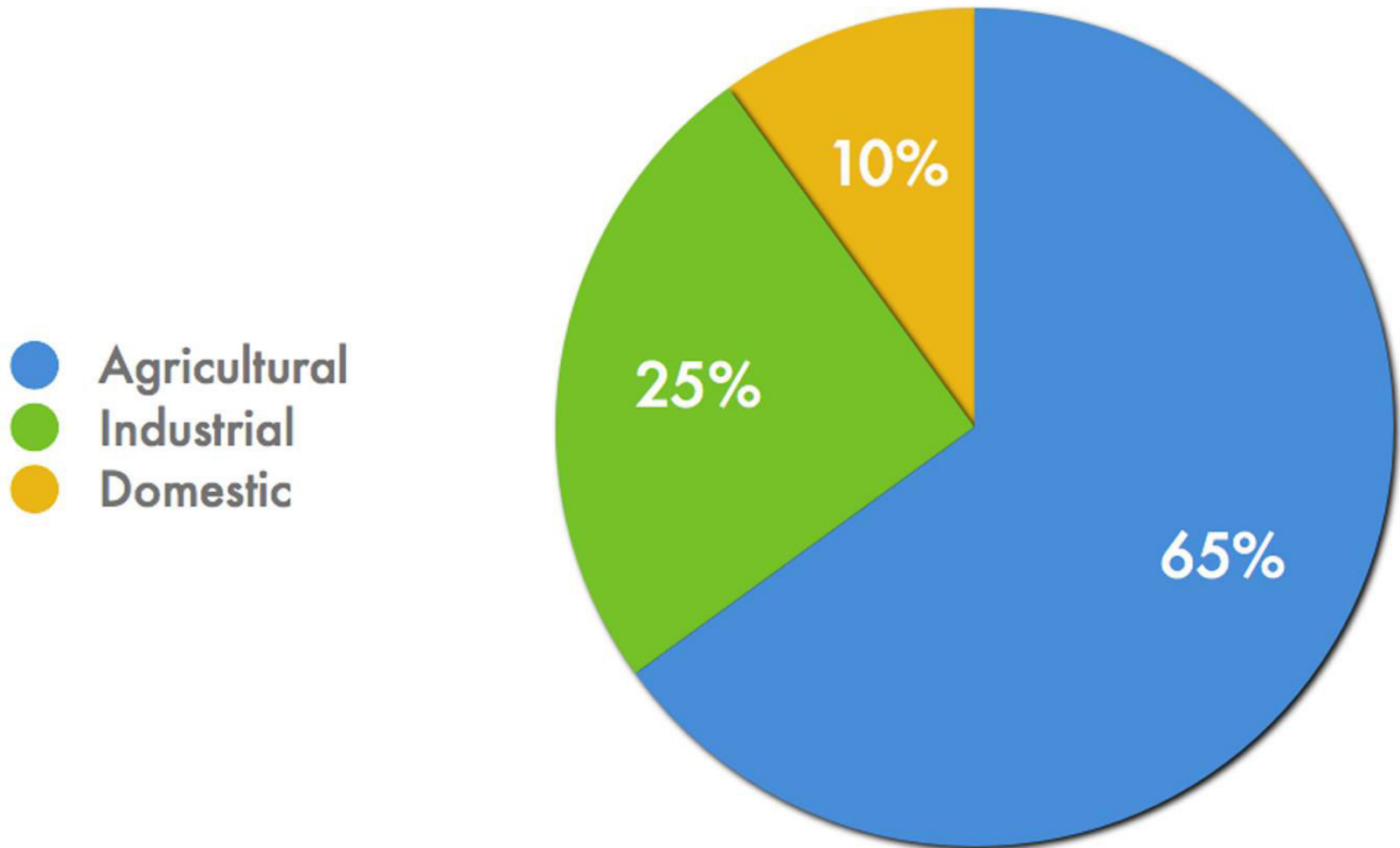


**A**



**B**

# GLOBAL FRESHWATER USE



# Millennium Development Goals adopted in 2000 by United Nations

- Goal – 7: Ensure Environmental Sustainability
- 7-C: Halve, by 2015, the proportion of the population without suitable access to safe Drinking Water and basic Sanitation

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# Types of 20 Lts Capacity Cans





## Status of Habitations as on 1.4.2014 (55 LPCD)

S.No.	District	FC	PC4	PC3	PC2	PC1	NSS	Total
1	SRIKAKULAM	615	896	977	819	640	40	3987
2	VIZIANAGARAM	1068	723	403	365	285	81	2925
3	VISAKHAPATNAM	1641	1060	1137	1127	513	19	5497
4	EAST GODAVARI	820	708	577	396	313	105	2919
5	WEST GODAVARI	984	436	324	227	130	84	2185
6	KRISHNA	1049	555	257	165	80	363	2469
7	GUNTUR	465	404	355	263	162	50	1699
8	PRAKASAM	724	341	392	520	316	52	2345
9	NELLORE	1137	639	568	466	150	5	2965
10	CHITTOOR	5011	2807	1482	1024	654	10	10988
11	KADAPA	942	707	1037	1118	594	1	4399
12	ANANTAPUR	1975	678	247	90	95	224	3309
13	KURNOOL	311	259	382	324	117	110	1503
	<b>Total</b>	<b>16742</b>	<b>10213</b>	<b>8138</b>	<b>6904</b>	<b>4049</b>	<b>1144</b>	<b>47190</b>

The updation of Habitation status as on 1.4.2014 is under process

## Status of Habitations as on 1.4.2014 (55 LPCD)

S.No.	District	FC	PC4	PC3	PC2	PC1	QA	Total	Status of PC1, PC2&QA	
									Habs	%
1	KADAPA	942	707	1037	1118	594	1	4399	1713	39
2	PRAKASAM	724	341	392	520	316	52	2345	888	38
3	SRIKAKULAM	615	896	977	819	640	40	3987	1499	38
4	KURNOOL	311	259	382	324	117	110	1503	551	37
5	VISAKHAPATNAM	1641	1060	1137	1127	513	19	5497	1659	30
6	GUNTUR	465	404	355	263	162	50	1699	475	28
7	EAST GODAVARI	820	708	577	396	313	105	2919	814	28
8	VIZIANAGARAM	1068	723	403	365	285	81	2925	731	25
9	KRISHNA	1049	555	257	165	80	363	2469	608	25
10	NELLORE	1137	639	568	466	150	5	2965	621	21
11	WEST GODAVARI	984	436	324	227	130	84	2185	441	20
12	CHITTOOR	5011	2807	1482	1024	654	10	10988	1688	15
13	ANANTAPUR	1975	678	247	90	95	224	3309	409	12
	<b>Total</b>	<b>16742</b>	<b>10213</b>	<b>8138</b>	<b>6904</b>	<b>4049</b>	<b>1144</b>	<b>47190</b>	<b>12097</b>	<b>26</b>

The updation of Habitation status as on 1.4.2014 is under process

# Assets as on 1.4.2014

Sl.No	District	CPWS	PWS/MPWS	HP/SHPs
1	SRIKAKULAM	25	777	13676
2	VIZIANAGARAM	22	1032	14982
3	VISAKHAPATNAM	33	2492	17231
4	EAST GODAVARI	40	1838	11181
5	WEST GODAVARI	21	1969	3456
6	KRISHNA	37	1320	9915
7	GUNTUR	60	1334	17899
8	PRAKASAM	37	1440	23731
9	NELLORE	32	2059	15489
10	CHITTOOR	5	5820	17386
11	KADAPA	23	2027	12143
12	ANANTAPUR	65	3846	12422
13	KURNOOL	63	2220	13487
<b>Total</b>		<b>463</b>	<b>28173</b>	<b>183000</b>