



STUDY OF SUSTAINABILITY OF DRINKING WATER SOURCES

OBSERVATIONS AND
RECOMMENDATIONS

JJM Aims

- To improve the **“EASE of LIVING”** of rural population
- To provide a functional household tap connection (FHTC) to every rural household by 2024.
- Providing **drinking water of prescribed quality** (BIS 10500 water quality standards), in **adequate quantity (55 lpcd)**, on long-term and regular basis.
- **GPs/ rural communities to plan, implement, manage, own, operate and maintain their own in-village water supply systems**

Sustainability Challenges

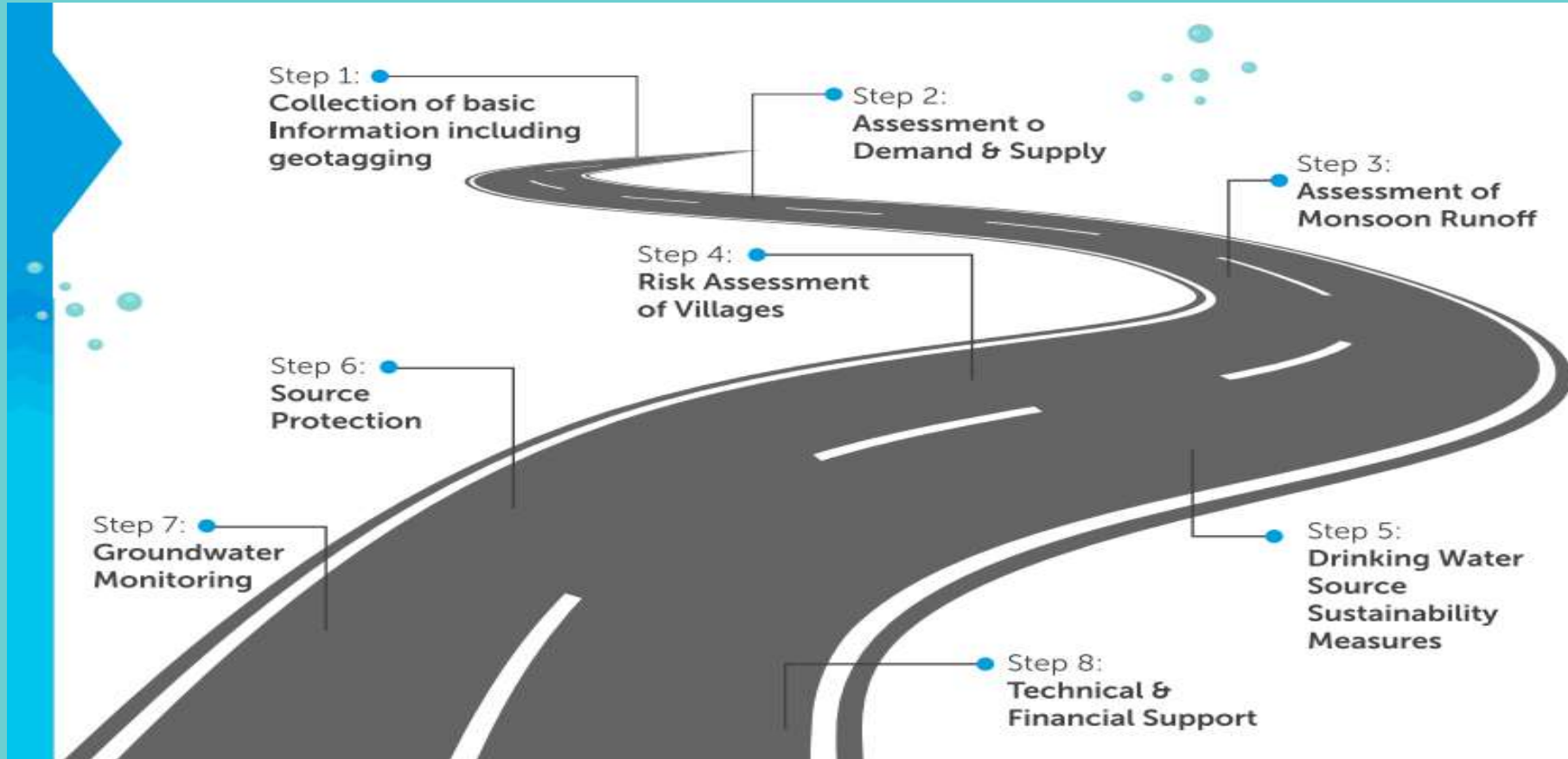
- Wide spatial and temporal variation of rainfall in the country
- Increasing population leading to falling per capita water availability
- Increased food demand
- Impact of climate change



Government of India
Ministry of Jal Shakti
Department of Water Resources,
River Development & Ganga Rejuvenation

SUSTAINABILITY OF GROUNDWATER SOURCES

Standard Operating Procedure



1. Basic Information (**Mobile app used during JSA may be used**)

Name of habitation:	
Location	Dist./ Block/ GP Lat Long
Population	
Aquifer Type	Soft Rock/ Hard Rock
Type of Structure	Dug Well Tube Well Bore Well
Sustainable throughout the year?	Yes/ No
Average pumping hours/day	
Water Quality Issue	Saline/F/Fe/NO ₃ /As



2. Demand and Supply Assessment

Demand Assessment			
Population	Per capita water supply (minimum 55 LPCD)	Nos of days	Annual Demand (cubic metre/year)
1	2	3	$4 = (1 \times 2 \times 3) / 1000 = (a)$
Supply Assessment			
Scheme	Discharge Cubic m/hr	Nos of Running Hours/ day	Annual Extraction (cubic metre/year)
1	2	3	$4 = 2 \times 3 \times 365 = (b)$
Source 1			
Source 2			(c) = Loss @ 15% of (b)
			Total (d) = (b) + (c)
Gap Assessment			(a) – (d)

3. Assessment of Monsoon Runoff

Land use	Runoff Co-efficient (Fraction)	Area (Sq m)	Rainfall (m)	Runoff (Cubic metre)
1	2	3	4	5=2X3X4
Agriculture	0.20			
Habitation	0.50			
Others	0.15			
Total				

Source: CPWD RWH Manual - 2002

4. RISK ASSESSMENT OF VILLAGES

Parameter	Safe	At Risk	High Risk
Normal Annual Rainfall (mm)	> 750	<750 but >500	<500
Tube / Bore well Discharge (lps)	> 3	1 to 3	< 1
Whether Discharge is available throughout the year	Yes	No	No
Gap between Demand and Supply	No gap	Some Gap	> 50% Gap
Geomorphology	Plain/Valleys	Plain/Valleys	Hills/ High Slopes
Depth to Water Level (m bgl)	<10	10 - 20	> 40
Quality			
Iron (ppm)	< 1	> 1	> 1
Fluoride (ppm)	< 1.5	> 1.5	> 1.5
Arsenic (ppb)	< 10	> 10	> 10
Salinity (TDS)	< 500	500- 2000	>2000

A) Rainfall



B) Terrain

Slope > 20%

High Risk

Slope < 20%

Discharge (lps)

C) Aquifer Potential

> 3

< 3

High Risk

D) Sustainability

Whether Water is available throughout the year

Yes

No

E) Aquifer Health

Depth to Water Level (mbgl)

High Risk

< 10

10-20

> 20

F) Risk Assessment

Safe

At Risk

High Risk

JJM Sources

G) Water Quality

Drinking Water Standard according to IS 10500 : 2012

Yes

No

Follow Row F & Above

High Risk

A) Rainfall



B) Terrain

Slope > 20%

High Risk

Slope < 20%

Discharge (lps)

C) Aquifer Potential

> 3

1 - 3

< 1

High Risk

D) Sustainability

Whether Water is available throughout the year

Yes

No

E) Aquifer Health

Depth to Water Level (mbgl)

High Risk

< 10

10-20

> 20

F) Risk Assessment

Safe

At Risk

High Risk

JJM Sources

G) Water Quality

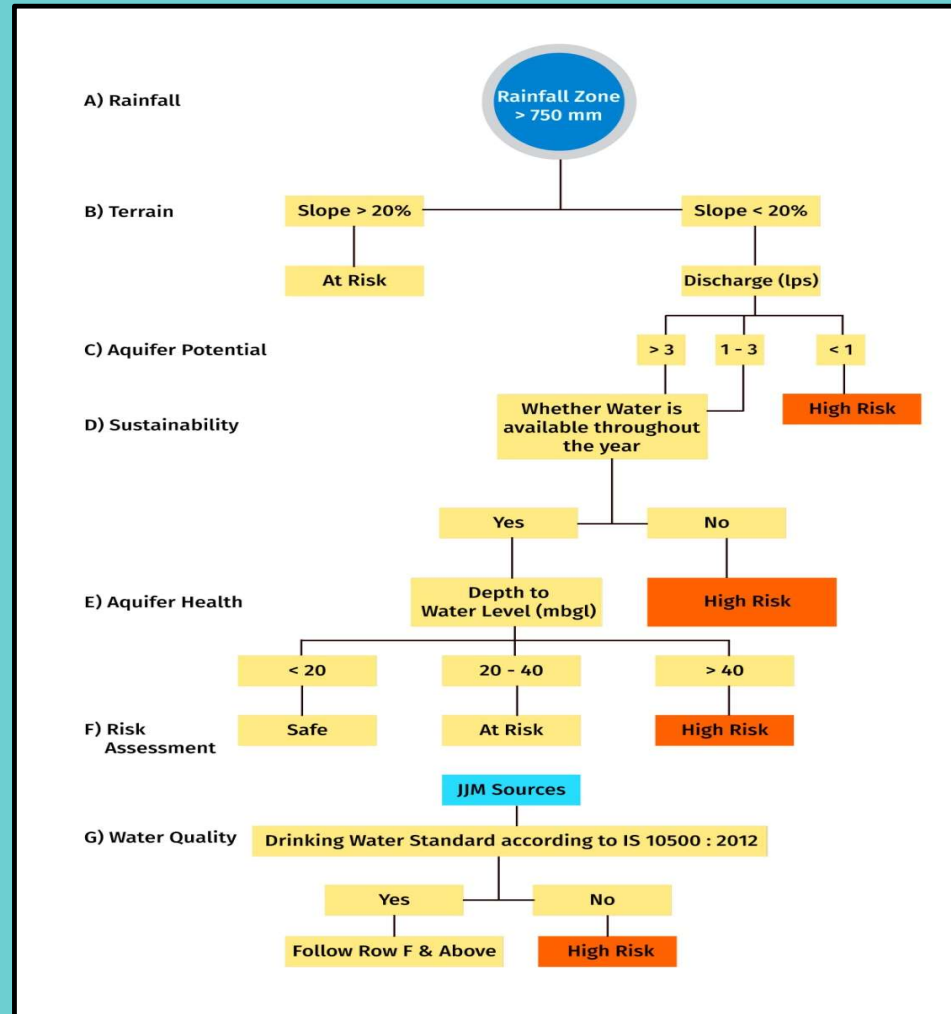
Drinking Water Standard according to IS 10500 : 2012

Yes

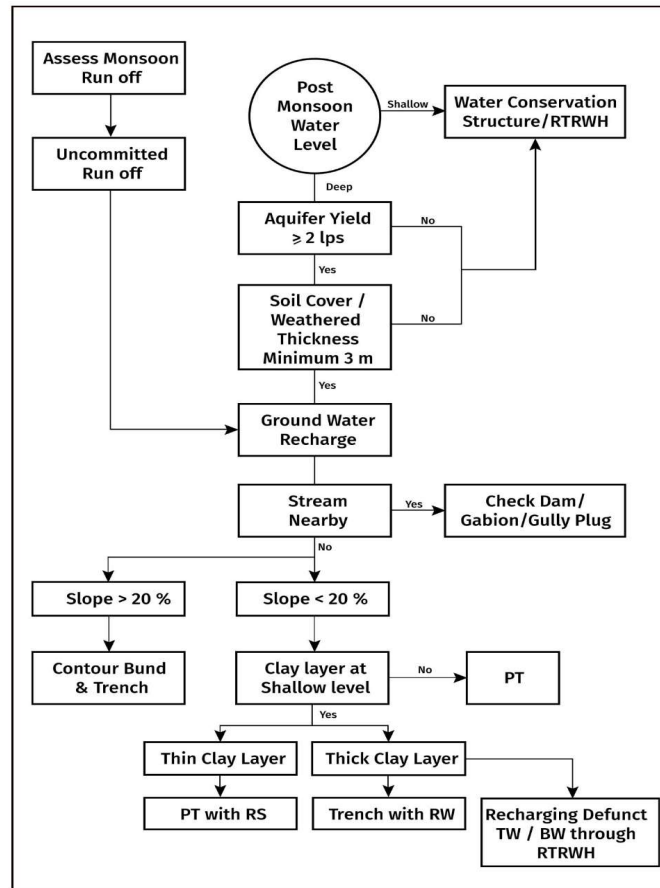
No

Follow Row F & Above

High Risk



5. Interventions to enhance sustainability of drinking water sources in Villages



Precaution to be taken for maintenance

- Recharge structures should be fitted with properly designed filter media to avoid contamination of aquifer.
- Maintenance/ rejuvenation of existing structures like desilting water bodies, clearing the inlet channels of encroachments/ jungle clearance, strengthening of bunds, repairs to regulatory control assets, etc may be taken up.
- Protective fencing around the pumping well and plantation of shrubs and small trees in the 50 m radius.

Other Measures

- District authorities should ensure regular risk assessment of villages.
- To stop wastage of precious groundwater sources, filling up of farm ponds/ tanks by pumping groundwater should be discouraged.
- Water bodies should be kept clean and dumping of garbage in water bodies should be banned

6. Well Head Protection

- Within of 50m radius of Tube well/ Bore well
 - No Land fill site
 - No disposal of toxic /polluting substance
 - No direct infiltration of wastewater/ greywater
 - *Afforestation of area*
 - No soak pit/ magic pit
- Avoid sinking of additional Tube well/ Bore well within a radius of 200m of existing groundwater scheme.

7. GW Monitoring

- Monthly monitoring of water level from at least one tube well
- Pre and Post monsoon Water quality monitoring for chemical and biological parameters.
- Maintain daily Pumping Hours record.
- Monitoring of extraction in 500 radius of the pumping well-constructed under JJM.
- Monitor tube well/ bore well extracting groundwater within 500m radius of existing JJM source.

8. Technical Support

Governments

NGOs

Civil Societies

Colleges with Geology Departments

Engineering colleges

Retired Officers from Groundwater Department/ Geology Department/ PHED/ DWS may be ensured. SAKSHAM and JALDOOT may be referred to resolve technical issues.



Interaction with Waterman, PDO and JJM officials at Jangamakote, Sidlaghatta Taluk



Govt. Model Higher Primary School, Working condition, Jangamakote (geotagged)



RO Plant, Jangamakote village



Failed BW near RO Plant, Jangamakote Village



Recharge Pit at Pre matric Boys' Hostel, Jagamakote village, Sidlaghatta Taluk



Damaged CD in Chintamani Taluk



THANK YOU