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Groundwater Resources and Water Stress in India

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Groundwater Resources and Water Stress in India

Practice: 8 MCQs

At a glance

The hidden water under India, and how fast it is used

01 **Where it goes**Farming takes 87% of the groundwater pumped out.
02 **The 2025 picture**India extracts 60.63% of the water it can safely extract.
03 **Hot spots**Punjab, Rajasthan and Haryana take out more than nature refills.
04 **The response**Rules for stressed areas, recharge plans and community schemes.

- India runs 43,228 groundwater monitoring stations.
- Between 2017 and 2025, safe units grew from 62.6% to 73.14% of all units.
- Over the same years, over-exploited units fell from 17.2% to 10.80%.
- Atal Bhujal Yojana ran until 15 October 2025.
- Every figure here is a dated snapshot from the cited pages.

RechargeWater that soaks down and refills the groundwater.
BCMA billion cubic metres of water.
Stage of Extraction The share of the extractable resource that is pumped out.
CGWBThe Central Ground Water Board, which assesses groundwater with the states.

Groundwater is India's biggest hidden water source. This lesson covers the 2025 national assessment, state patterns, and why stress differs by region. It then covers traditional harvesting, regulation, schemes and

past exam questions. Figures are dated snapshots. Where sources differ, both numbers are shown with dates.

Contents

1. Where the water comes from
2. The national assessment
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Where does India's water come from?

Groundwater is the hidden half of the water story. Most of it is used for farming.

1. How much of the Earth's liquid freshwater is groundwater?

Groundwater is **about 99%** of the Earth’s liquid freshwater.

The same point was tested in UPSC Prelims 2021 (see item 24).

Source: PIB backgrounder, 22 Jan 2026, item 1

Source: UNESCO, World Water Development Report 2022, item 1

2. How much water does India have, and how many people share it?

India has 17.5% of the world’s population. It also has 11.6% of the world’s livestock.

Precipitation is about 3,880 BCM a year. Average annual water available is 1,999.20 BCM (CWC study, 2019).

Per-capita availability was 1,573.19 cubic metres in 2021 (CWC, 2024 assessment).

Share of world	Water a year
Population 17.5%	Rain: 3,880 BCM
Livestock 11.6%	Available: 1,999.2 BCM
	Per head, 2021: 1,573 cu m

Per-capita availability is from the CWC 2024 assessment.

Source: PIB backgrounder, 27 May 2026, item 2

Source: PIB, Rajya Sabha reply, 10 Aug 2026, item 2

3. How much of India's water use depends on groundwater?

Groundwater meets about **62% of irrigation needs**. It also meets 85% of rural and 50% of urban water needs.

Cheap drilling and pumping encourage uncontrolled abstraction. India has 43,228 groundwater monitoring stations.



Groundwater matters most for villages.



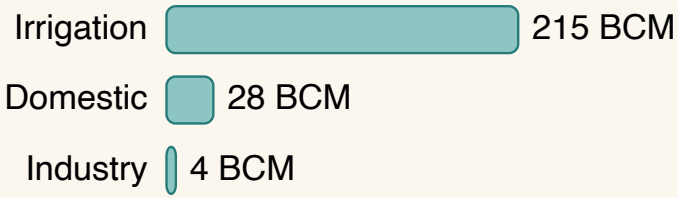
Groundwater from a tubewell used for crop irrigation, powered by electricity, in Gujarat, India (2015). Photo: TeshTesh, CC BY-SA 4.0, via Wikimedia Commons. File page. Licence: CC BY-SA 4.0.

True or False: Groundwater meets about 62% of India's irrigation needs.
Source: PIB backgrounder, 22 Jan 2026, item 3

4. Who uses the groundwater that India draws?

The 2025 assessment splits extraction by sector. Irrigation takes **215 BCM**, or 87%.

Domestic use takes 28 BCM (11%). Industry takes 4 BCM (2%).



Irrigation takes 87% of the total.

Source: PIB, Rajya Sabha reply, 10 Aug 2026, item 4

What does the latest national assessment say?

The Central Ground Water Board (CGWB) assesses dynamic groundwater with the states. The latest edition is 2025.

5. What are the headline numbers of the 2025 assessment?

Annual recharge is **448.52 BCM**. Annually extractable resource is 407.75 BCM.

Extraction is 247.22 BCM. The national **Stage of Extraction (SoE)** is **60.63%**.

The 2024 edition showed recharge of 446.90 BCM, extraction of 245.64 BCM and SoE of 60.47%.

2025 edition	2024 edition
Recharge 448.52	Recharge 446.90
Extractable 407.75	Extraction 245.64
Extraction 247.22	SoE 60.47%
SoE 60.63%	

All volumes are in BCM.

True or False: India's national Stage of Extraction in 2025 was above 100%.
Source: PIB, 18 Dec 2025, item 5

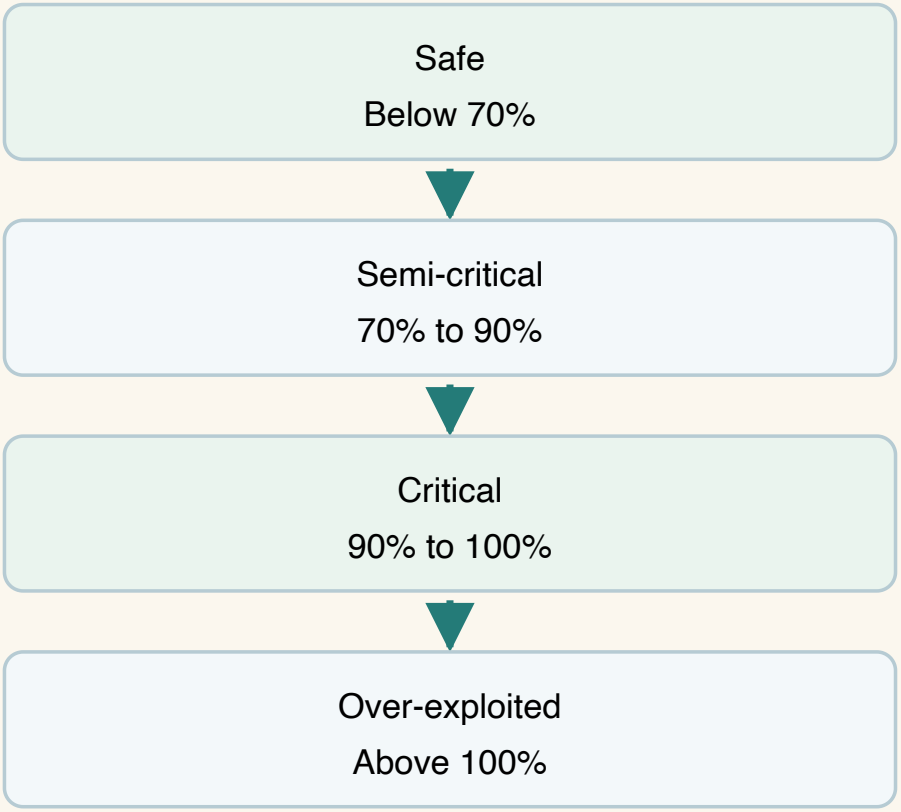
Source: PIB, 31 Dec 2024, item 5

6. What is Stage of Extraction, and how are units classified?

SoE is extraction as a share of the extractable resource. The unit of assessment is a block, taluk or mandal.

- Safe: below 70%.
- Semi-critical: 70% to 90%.

- Critical: 90% to 100%.
- Over-exploited: above 100%.
- Saline units are listed separately.



Saline units sit outside these four classes.

Source: PIB, 29 Jan 2026, item 6

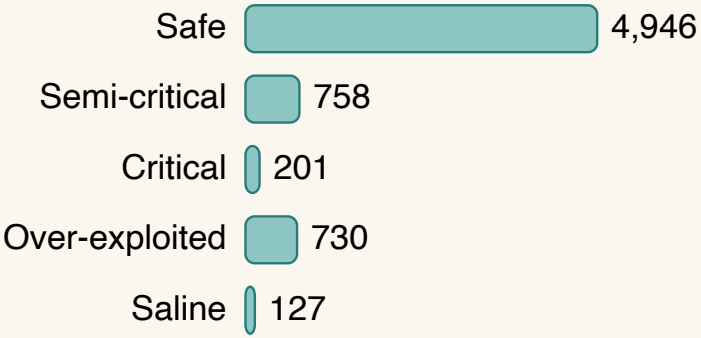
Source: PIB, 18 Dec 2025, item 6

7. How many assessment units fall in each category?

The 2025 assessment covers 6,762 units. Of these, **4,946 (73.14%)** are safe.

Semi-critical units number 758 (11.21%). Critical units number 201 (2.97%).

Over-exploited units number **730 (10.80%)**. Saline units number 127 (1.88%).



Together the five groups make 6,762 units.

True or False: Most assessment units in 2025 were rated safe.
Source: PIB, 18 Dec 2025, item 7

8. Is the situation getting better or worse?

Between 2017 and 2025, recharge rose from 432 to 448.52 BCM. **Safe units rose from 62.6% to 73.14%**.

Over-exploited units fell from 17.2% to 10.8%. So the national picture has improved on paper.

In 54.4% of analysed wells, post-monsoon 2024 levels were higher than the 2019-23 mean.

2017	2025
Recharge 432 BCM	Recharge 448.52 BCM
Safe units 62.6%	Safe units 73.14%
Over-exploited 17.2%	Over-exploited 10.8%

On paper, the national picture has improved.

Source: PIB, 29 Jan 2026, item 8

Source: PIB, 18 Dec 2025, item 8

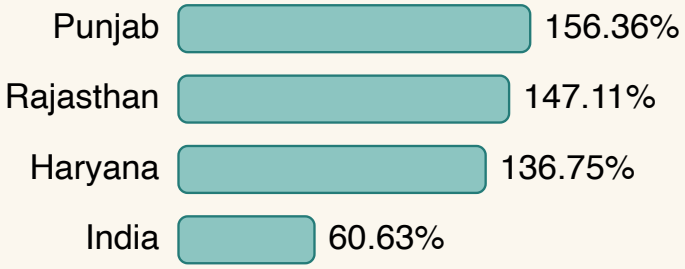
Why does groundwater stress differ so much across India?

The national average hides sharp regional gaps. Some states take out more than they recharge.

9. Which states extract more groundwater than nature recharges?

Three states have SoE above 100%. These are **Punjab (156.36%)**, **Rajasthan (147.11%)** and **Haryana (136.75%)**.

Rajasthan is the second most over-extracted state. Punjab extracts 26.27 BCM against an extractable 16.80 BCM.



Three states extract more than they recharge.

True or False: Rajasthan is the most over-extracted state in the 2025 assessment.
Source: PIB, 18 Dec 2025, Annexure-I, item 9

10. Which states are above the national average?

Nine states and UTs are above the national SoE. They are Punjab, Rajasthan, Haryana, Delhi, Puducherry, Tamil Nadu, Uttar Pradesh, Chandigarh and Karnataka.

Delhi is at 92.10%. Tamil Nadu is at 73.50% and Uttar Pradesh at 70.00%. Also, 281 districts are above the national average.



Nine states and UTs are above the national figure.

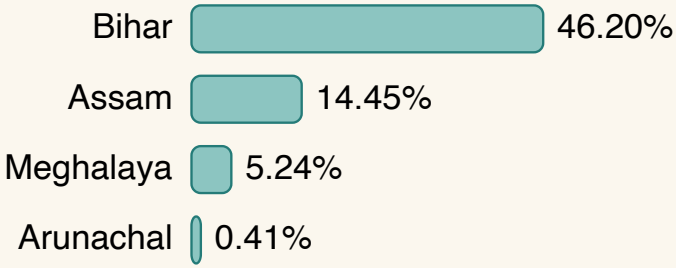
Source: PIB, Rajya Sabha reply, 10 Aug 2026, item 10

Source: PIB, 18 Dec 2025, Annexure-I, item 10

11. Why are the eastern and north-eastern states far below the average?

Recharge is large and use is small. Bihar recharges 34.51 BCM and extracts 14.47 BCM, an SoE of 46.20%.

Assam is at 14.45% and Meghalaya at 5.24%. Arunachal Pradesh is at 0.41%.



Large recharge and small use keep the stage low.

Source: PIB, 18 Dec 2025, Annexure-I, item 11

12. What is the pattern of use across the states?

NCERT groups states by how much of their replenishable groundwater they use. Use is very high in Punjab, Haryana, Rajasthan and Tamil Nadu.

Use is low in Chhattisgarh, Odisha and Kerala. It is moderate in Gujarat, Uttar Pradesh, Bihar, Tripura and Maharashtra.

Source: NCERT Class 12, India: People and Economy, chapter 4, item 12

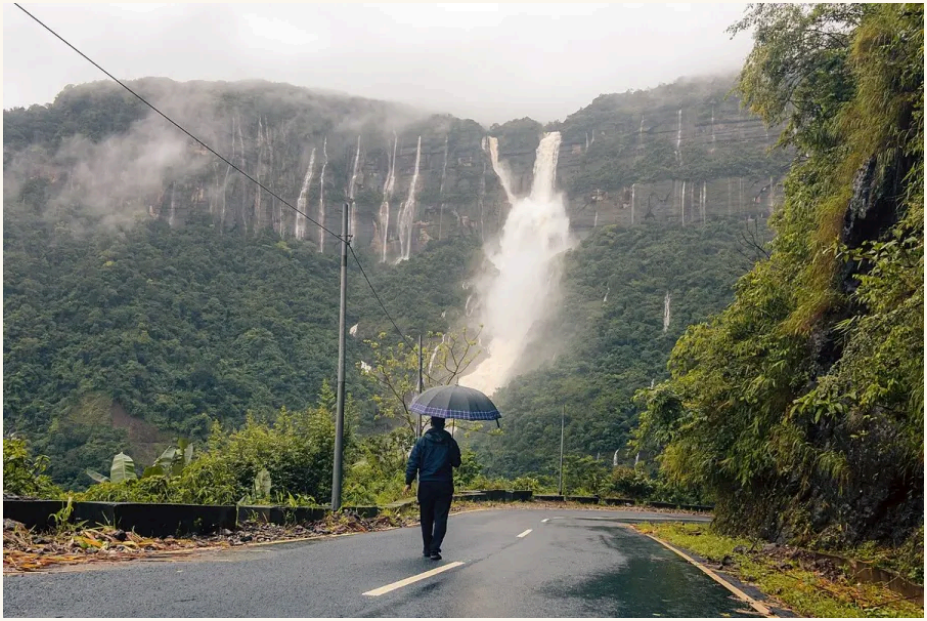
13. Can a place be water-short even when the rain is heavy?

Yes. **Cherrapunji and Mawsynram** get the highest rainfall in the world.

Yet Shillong faces an acute shortage of water. There, rooftop harvesting gives 15% to 25% of household water.

Heavy rain	Still short
Cherrapunji	Shillong
Mawsynram	Acute shortage
	Rooftop gives 15% to 25%

Shillong still faces an acute shortage of water.



Kynrem Falls in the monsoon in Sohra, East Khasi Hills, Meghalaya. Photo: Wann Majaw, CC0, via Wikimedia Commons. File page. Licence: CC0.

True or False: A place that gets very heavy rain cannot face a water shortage.
Source: NCERT Class 10, Contemporary India II, chapter 3, item 13

14. What does the NITI Aayog water index show about states?

The Composite Water Management Index (CWMI) has a foreword dated 12 June 2018. It uses 9 themes and 28 indicators.

For 2016-17, **Gujarat scored highest (76)**. Meghalaya scored lowest (26).

Fourteen of 24 states scored below 50. NITI said 54% of groundwater wells were declining.

The index	2016-17 scores
Foreword 12 June 2018	Gujarat 76 (top)
9 themes	Meghalaya 26 (low)
28 indicators	14 of 24 states below 50

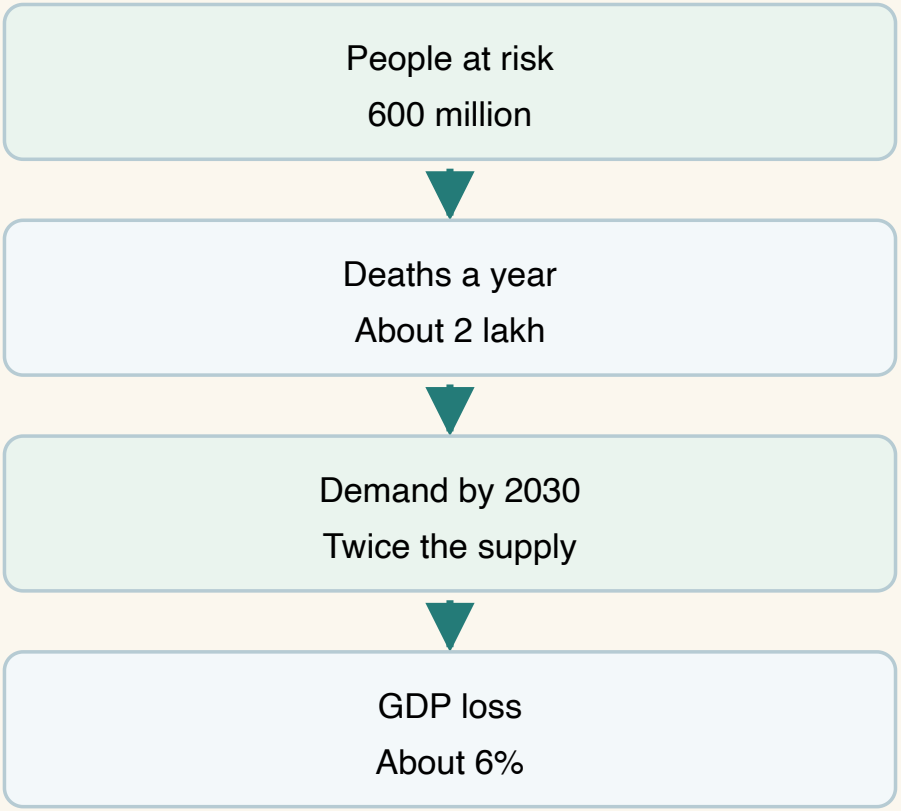
NITI also said 54% of wells were declining.

Source: NITI Aayog, Composite Water Management Index, 2018, item 14

15. How bad could water stress get, according to NITI Aayog?

The 2018 report said **600 million Indians** face high to extreme water stress. It linked poor water access to about **2 lakh deaths a year**.

It projected demand at twice the supply by 2030. It estimated a loss of about 6% of GDP.



These are the report's own projections.

Source: NITI Aayog, Composite Water Management Index, 2018, item 15

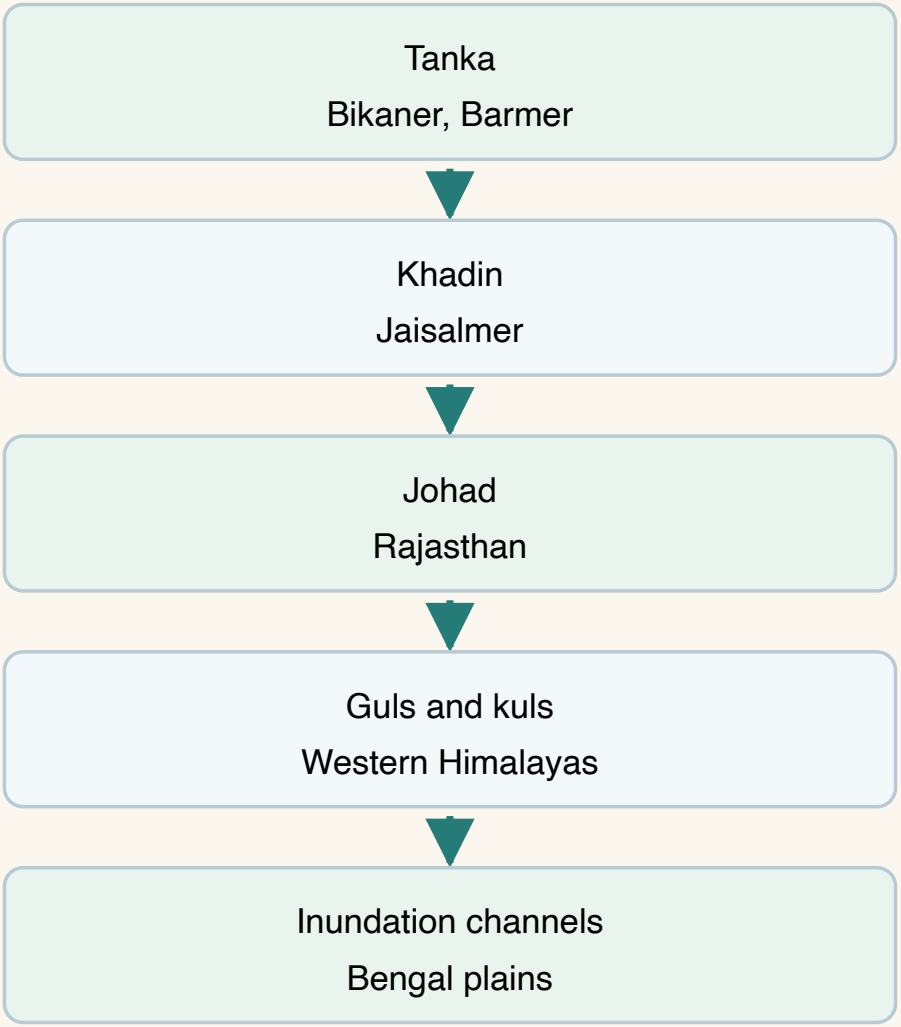
How do traditional and urban methods recharge groundwater?

Harvesting rain locally is the oldest answer to scarcity. NCERT lists regional methods.

16. What are the traditional rainwater-harvesting methods?

- **Tanka**: an underground tank in Bikaner, Phalodi and Barmer.
- **Khadin**: a harvesting system in Jaisalmer.
- Johad: used in other parts of Rajasthan.
- Guls and kuls: channels in the Western Himalayas.
- Inundation channels: used in the Bengal plains.

NCERT describes one household’s tank in Phalodi as 6.1 m deep, 4.27 m long and 2.44 m wide.



These five methods suit different regions.



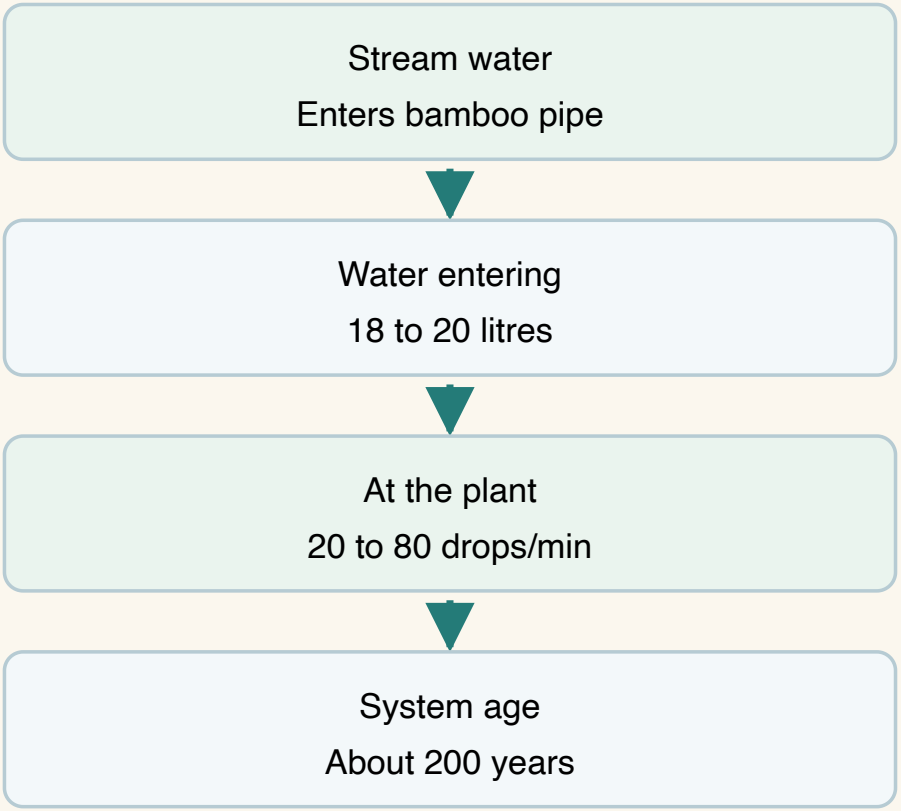
A nadi, a small johad, in village Laporiya, Rajasthan. A nadi is usually built on clay patches where water cannot seep into the ground. Photo: Amar singh kangarot, CC BY-SA 4.0, via Wikimedia Commons. File page. Licence: CC BY-SA 4.0.

Source: NCERT Class 10, Contemporary India II, chapter 3, item 16

17. How does bamboo drip irrigation work?

It is a 200-year-old system in Meghalaya. Bamboo pipes carry stream water to the plants.

About 18 to 20 litres enter the pipe. At the plant, 20 to 80 drops fall a minute.



Water reaches each plant drop by drop.

Source: NCERT Class 10, Contemporary India II, chapter 3, item 17

18. Why did the Indira Gandhi Canal change tanka use?

The canal brings plenty of water to western Rajasthan. As a result, people there use tankas less.

Source: NCERT Class 10, Contemporary India II, chapter 3, item 18

19. Which state first made rooftop harvesting compulsory?

Tamil Nadu was the first state to make rooftop rainwater harvesting compulsory in all houses.



A rooftop rainwater harvesting system at Ramakrishna Mission Ashrama, Sargachi, Murshidabad. Photo: Biswarup Ganguly, CC BY 3.0, via Wikimedia Commons. File page. Licence: CC BY 3.0.

True or False: Tamil Nadu was the first state to make rooftop rainwater harvesting compulsory in all houses.
Source: NCERT Class 10, Contemporary India II, chapter 3, item 19

20. What is the national plan for artificial recharge?

The Master Plan for Artificial Recharge to Groundwater (2020) proposes about **1.42 crore structures**. These could recharge about 185 BCM.

CGWB has also mapped about 25 lakh sq km under NAQUIM. It has prepared 654 district aquifer plans.

India has **14 principal and 42 major aquifers**.

Master plan	Mapping
About 1.42 crore structures	25 lakh sq km
About 185 BCM of recharge	654 district plans
	14 principal and 42 major aquifers

The master plan is from 2020.

Source: PIB, 18 Dec 2025, item 20

What have the government and the law done about it?

Schemes work on both supply and demand. Rules apply mostly to over-exploited areas.

21. What do the CGWA guidelines of 2020 say?

The Central Ground Water Authority (CGWA) issued guidelines on **24.09.2020**. They include heavy penalties and Environmental Compensation.

No new large-scale industries are allowed in over-exploited areas. Illegal borewells can be sealed.

The **Model Groundwater Bill** has been adopted by 21 states and UTs, including Bihar, Punjab, Haryana and Himachal Pradesh.

Source: PIB, 18 Dec 2025, item 21

Source: PIB backgrounder, 22 Jan 2026, item 21

22. What was Atal Bhujal Yojana, and what did it achieve?

Atal Bhujal Yojana was launched on **25 December 2019** with Rs 6,000 crore. It was a pilot for community-led groundwater management.

It covered **8,203 gram panchayats** in 229 blocks, 80 districts and 7 states. It ran from 1 April 2020 to **15 October 2025**.

Of the 229 blocks, **180 improved in 2023-2025**. Maharashtra saw 39 of 43 blocks improve.

More than 83,800 supply-side structures were built or renovated. Women's participation was set at a minimum of 33%.

The scheme has now ended.

Design	Results
Launched 25 Dec 2019	180 of 229 blocks improved, 2023-25
Rs 6,000 crore	Maharashtra: 39 of 43 blocks
8,203 panchayats	Ran to 15 Oct 2025

It was a pilot, and it has now ended.

True or False: Atal Bhujal Yojana is still running as a national scheme today.
Source: PIB, 30 Jul 2026, item 22

Source: PIB backgrounder, 22 Jan 2026, item 22

Source: PIB, 4 Dec 2025, item 22

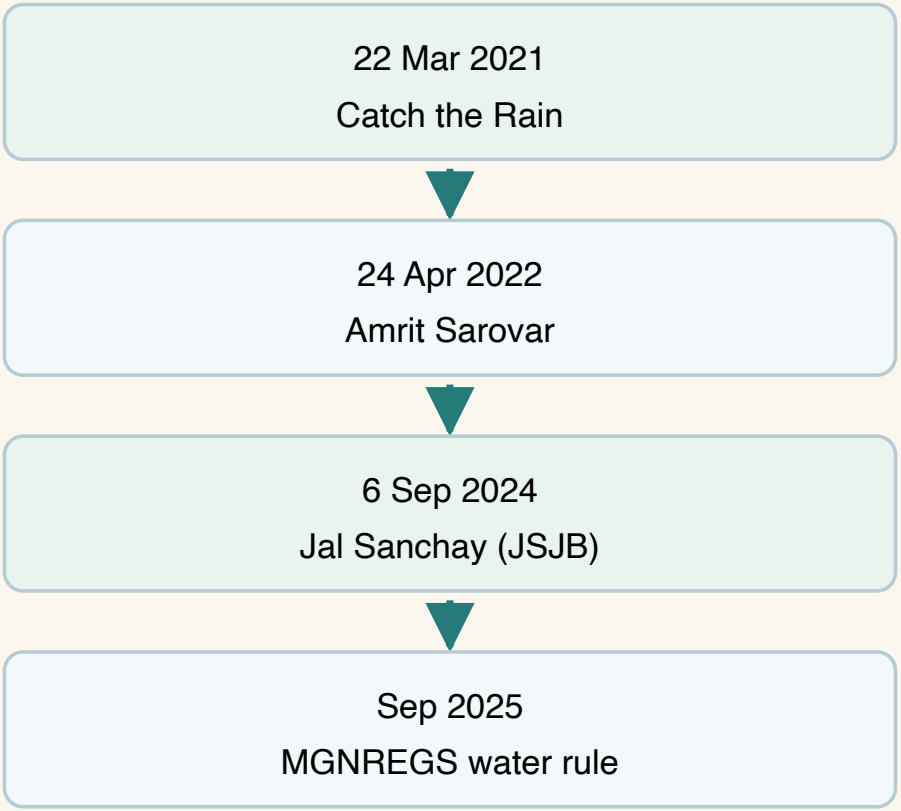
Source: PIB, 2 Apr 2026, item 22

23. What are Jal Shakti Abhiyan and its follow-ups?

Jal Shakti Abhiyan: Catch the Rain was launched on 22 March 2021. Jal Sanchay Jan Bhagidari followed on 6 September 2024.

Mission Amrit Sarovar began on 24 April 2022. Each pond is at least 1 acre in area.

In September 2025, a National Initiative on Water Security set a MGNREGS rule. At least **65% of funds** in over-exploited and critical blocks go to water conservation. For semi-critical blocks it is 40%.



Each step adds a new tool.

Source: PIB backgrounder, 22 Jan 2026, item 23

Source: PIB, 29 Jan 2026, item 23

Source: PIB, Rajya Sabha reply, 10 Aug 2026, item 23

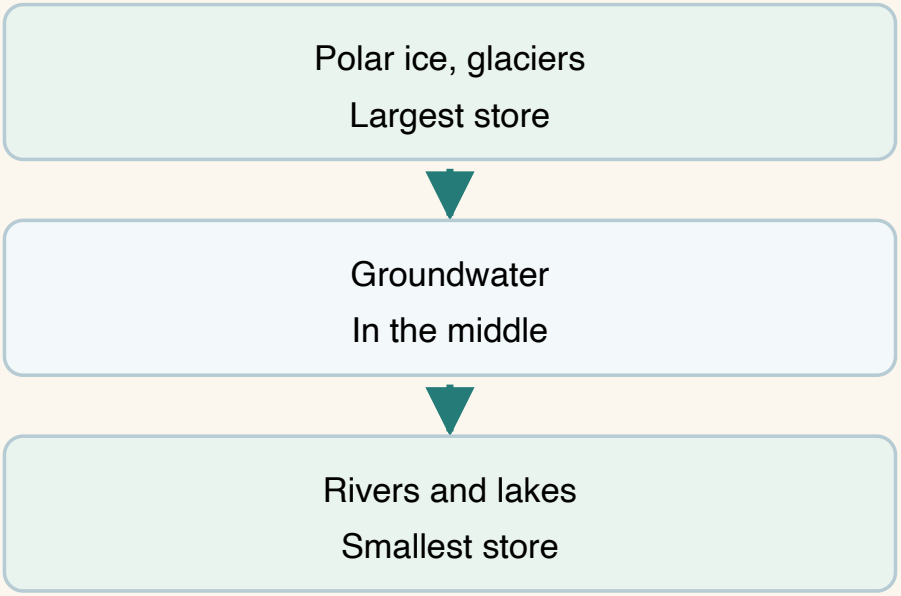
What has UPSC asked on this topic?

Prelims keys come from the official UPSC answer key. Mains has no official answer key to quote.

24. PYQ: UPSC Prelims 2021, GS Paper I, Series A, Q62

Official answer key: (b). Series A, Q62.

Groundwater is larger than rivers and lakes. Ice caps and glaciers are larger than groundwater.



This ordering gives the official key (b).

Source: UPSC question paper, CSP 2021 GS Paper I, item 24

Source: UPSC answer key, CSP 2021 GS-I, item 24

25. PYQ: UPSC Prelims 2023, GS Paper I, Series A, Q76

Official answer key: (c). Series A, Q76.

So UPSC treated Statement-I as correct and Statement-II as incorrect. Irrigation takes 87% of the groundwater extracted (item 4), a likely reason.

Source: UPSC question paper, CSP 2023, item 25

Source: UPSC answer key, CSP 2023 Paper I, item 25

26. PYQ: UPSC Mains 2025, GS Paper III, Q13 (15 marks, 250 words)

Question (verbatim): Examine the factors responsible for depleting groundwater in India. What are the steps taken by the government to mitigate such depletion of groundwater?

Items 3, 21, 22 and 23 above hold the facts for this answer.

Source: UPSC Mains 2025, GS Paper III, item 26

27. PYQ: UPSC Mains 2024, 2019 and 2018, GS Paper I, Q14 (15 marks each)

2024 (verbatim): The groundwater potential of the gangetic valley is on a serious decline. How may it affect the food security of India?

2019 (verbatim): What is water stress? How and why does it differ regionally in India?

2018 (verbatim): “The ideal solution of depleting ground water resources in India is water harvesting system.” How can it be made effective in urban areas?

Source: UPSC Mains 2024, GS Paper I, item 27

Source: UPSC Mains 2019, GS Paper I, item 27

Source: UPSC Mains 2018, GS Paper I, item 27

Four questions to think through

Why does farming decide India's groundwater story?

About 62% of irrigation needs are met by groundwater. Irrigation then takes 87% of all the groundwater extracted. So farm pumping moves the national total far more than city or factory use does. Cheap drilling and pumping make uncontrolled abstraction easy.

Why do Punjab and Bihar sit so far apart on Stage of Extraction?

Punjab pumps 26.27 BCM although only 16.80 BCM is extractable. Bihar recharges 34.51 BCM and extracts 14.47 BCM. So Punjab takes out more than it can refill. Bihar uses well under half of its recharge.

Does a better national picture mean the problem is solved?

Not fully. Safe units rose from 62.6% to 73.14% between 2017 and 2025. But 730 units are still over-exploited. Three states still extract more than they recharge.

How can a very rainy place still run short of drinking water?

Heavy rain does not guarantee a water supply. Shillong faces an acute shortage of water despite the wet places nearby.

Check your understanding

Your 7 quick checks Answered 0 of · Correct
This score resets when the page reloads.

Continue to the 8 MCQs

✅ Test Yourself

Try 8 practice questions on groundwater and water stress.

Practice MCQs

1. What is 'water stress'?

A. A government tax on excess water use

B. A type of monsoon rainfall pattern

C. The process of desalinating seawater

D. When demand for water approaches or exceeds sustainably available supply

See answer ↓

2. What was India's national Stage of Extraction of groundwater in the 2025 assessment?

A. 60.47%

B. 73.14%

C. 100.00%

D. 60.63%

See answer ↓

3. In the 2025 assessment, a unit is classed as over-exploited when its Stage of Extraction is above what level?

A. 70%

B. 60.63%

C. 100%

D. 90%

See answer ↓

4. Which states had a Stage of Extraction above 100% in the 2025 assessment?

A. Punjab, Bihar and Rajasthan

B. Punjab, Rajasthan and Haryana

C. Rajasthan, Delhi and Tamil Nadu

D. Punjab, Haryana and Uttar Pradesh

See answer ↓

5. Between 2017 and 2025, the share of safe groundwater assessment units rose from 62.6% to what figure?

A. 54.4%

B. 73.14%

C. 10.80%

D. 60.63%

See answer ↓

6. Which statement about Atal Bhujal Yojana is supported by PIB?

A. It is a continuing national scheme that covers every state

B. It covered 8,203 districts in 7 states

C. It was launched in 2024 with an outlay of Rs 600 crore

D. It was a pilot for community-led management that ran from 1 April 2020 to 15 October 2025

See answer ↓

7. With reference to the water on the planet Earth, consider the following statements:

1. The amount of water in the rivers and lakes is more than the amount of groundwater.

2. The amount of water in polar ice caps and glaciers is more than the amount of groundwater.

Which of the statements given above is/are correct?

A. 1 only

B. 2 only

C. Both 1 and 2

D. Neither 1 nor 2

See answer ↓

8. Consider the following statements: Statement-I: According to the United Nations' 'World Water Development Report, 2022', India extracts more than a quarter of the world's groundwater withdrawal each year. Statement-II: India needs to extract more than a quarter of the world's groundwater each year to satisfy the drinking water and sanitation needs of almost 18% of world's population living in its territory.

Which one of the following is correct in respect of the above statements?

A. Both Statement-I and Statement-II are correct and Statement-II is the correct explanation for Statement-I

B. Both Statement-I and Statement-II are correct and Statement-II is not the correct explanation for Statement-I

C. Statement-I is correct but Statement-II is incorrect

D. Statement-I is incorrect but Statement-II is correct

See answer ↓

Answer Key

1. **D.** NITI Aayog's 2018 index report measures water stress as total annual water withdrawals as a percent of total annual available flow. Higher values mean more competition among users. The report said 600 million Indians face high to extreme water stress. It projected demand at twice the supply by 2030. UPSC asked what water stress is, and how it differs by region, in Mains 2019. ↑ Q1
2. **D.** The 2025 assessment puts the national Stage of Extraction at 60.63%. Annual recharge was 448.52 BCM and extraction was 247.22 BCM. The 2024 edition showed 60.47%. The figure of 73.14% is the share of units rated safe, not an extraction stage. ↑ Q2
3. **C.** A unit is over-exploited when extraction is above 100% of the extractable resource. Critical units lie between 90% and 100%. Semi-critical units lie between 70% and 90%. In 2025 there were 730 over-exploited units, or 10.80% of the 6,762 assessed. ↑ Q3
4. **B.** Punjab (156.36%), Rajasthan (147.11%) and Haryana (136.75%) were above 100%. Delhi was at 92.10%, below the line. Tamil Nadu was at 73.50% and Uttar Pradesh at 70.00%. Bihar was far lower, at 46.20%. ↑ Q4
5. **B.** Safe units rose from 62.6% in 2017 to 73.14% in 2025. Over the same years, over-exploited units fell from 17.2% to 10.8%. The figure of 54.4% is a different measure. It is the share of wells with higher post-monsoon 2024 levels than the 2019-23 mean. ↑ Q5
6. **D.** PIB describes Atal Bhujal Yojana as a pilot for community-led groundwater management. It ran from 1 April 2020 to 15 October 2025. It was launched on 25 December 2019 with Rs 6,000 crore. It covered 8,203 gram panchayats in 229 blocks of 7 states, and it has now ended. ↑ Q6
7. **B.** The official UPSC key for Series A, Question 62 is (b). Groundwater is larger than rivers and lakes, so statement 1 is wrong. Ice caps and glaciers hold more than groundwater, so statement 2 is right. PIB's January 2026 backgrounder says groundwater is about 99% of Earth's liquid freshwater. ↑ Q7
8. **C.** The official UPSC key for Series A, Question 76 is (c). So UPSC treated Statement-I as correct and Statement-II as incorrect. Irrigation takes 215 BCM or 87% of the groundwater extracted, a likely reason. ↑ Q8

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