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Geological Survey of India (GSI)

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Geological Survey of India (GSI)

Practice MCQs

At a glance

GSI is India’s national geology agency. It began in 1851 to find coal and now maps rocks, hazards and critical minerals.

01 **1851** GSI was set up, mainly to find coal for the railways.
02 **4.3 lakh sq km** Area covered by GSI landslide susceptibility maps.
03 **230** Critical mineral projects GSI took up in 2025-26.
04 **54th** Varsha Ashok Aglawe is the first woman Director General.

- GSI is an attached office of the Ministry of Mines, based in Kolkata.
- It is the nodal agency for landslide studies in India.
- CDS-II 2021 asked which town sits in the highest seismic zone.

Source: PIB, Ministry of Mines on the NGDR portal, 18 Dec 2023.

Source: PIB, Parliament question on landslide-prone areas, 20 Aug 2025.

Attached officeA body that does a ministry's field work but sits outside its core secretariat.
Nodal agency The one body that leads a task for the whole country.
Field season The working year in which GSI teams go out to the field.
Inferred resourceA mineral estimate built on limited evidence, not yet a proven reserve.
The Geological Survey of India (GSI) is the country's national geology agency. It maps rocks, finds minerals and studies hazards such as landslides. This lesson shows why GSI was set up and what it does today. It then covers critical minerals and how UPSC tested it.

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2. What it does today
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What is the Geological Survey of India?

GSI is the government's own geology survey. It began in 1851 and still works under the Ministry of Mines.

1. Who runs GSI, and where is it based?

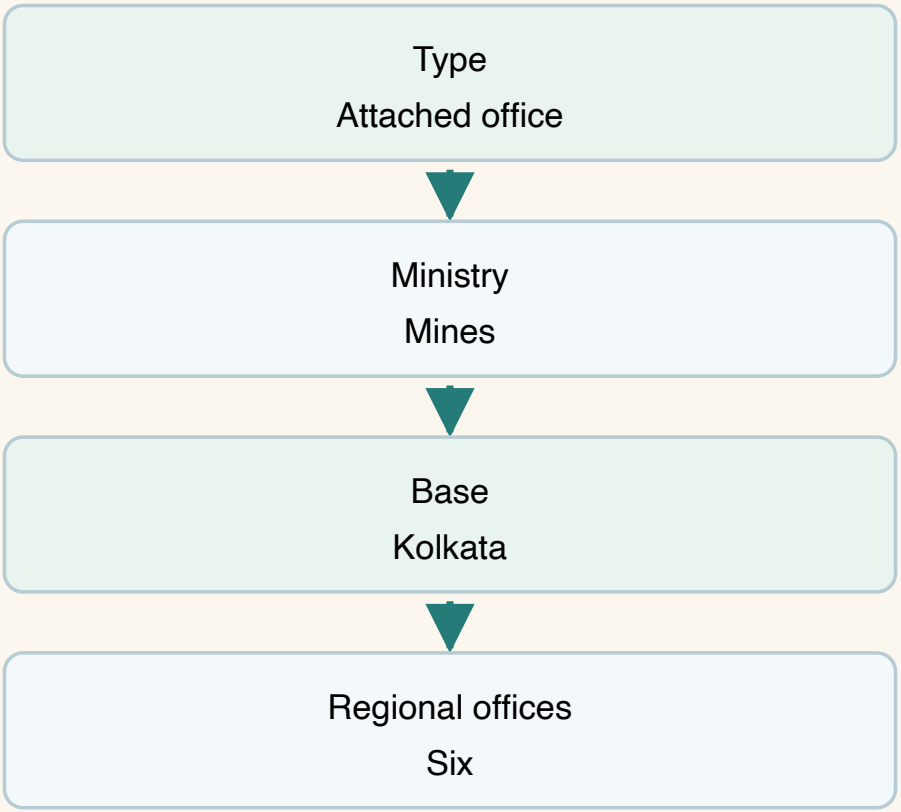
GSI is an attached office of the Ministry of Mines, and its headquarters are in Kolkata. An attached office carries out the work of a ministry but is not a part of its core secretariat.

GSI has six regional offices. They are in Lucknow, Jaipur, Nagpur, Hyderabad, Shillong and Kolkata. It also has state unit offices in almost every state.

PIB describes GSI as a geoscience organisation of international repute. It also acts as a repository of geoscience information.


GOVERNMENT OF INDIA
OFFICE OF THE DIRECTOR GENERAL
GEOLOGICAL SURVEY OF INDIA
CENTRAL HEADQUARTERS
27, JAWAHARLAL NEHRU ROAD
KOLKATA 700016
Website http://www.gsi.gov.in

GSI's central headquarters on the Indian Museum campus in Kolkata. Photo: Biswarup Ganguly. File page. Licence: CC BY 3.0.



GSI is an attached office of the Ministry of Mines.

Source: PIB, Ministry of Mines on the NGDR portal, 18 Dec 2023, item 1

2. Why was GSI set up in 1851?

GSI was set up in 1851 mainly to find coal for the railways. Steam trains and steamships needed coal, and India’s coal was poorly known.

The first head was Sir Thomas Oldham, who joined in 1851. His title was Superintendent. Work began in Calcutta, now Kolkata, and the first years went into hunting for coal.

The date matters for exams. Remember the year 1851 and the purpose, which was coal for the railways.



GSI began as a hunt for coal.

True or False: GSI was set up in 1851 mainly to find coal for the railways.
Source: PIB, Ministry of Mines on the NGDR portal, 18 Dec 2023, item 2

Source: Maps of India, GSI founding, item 2

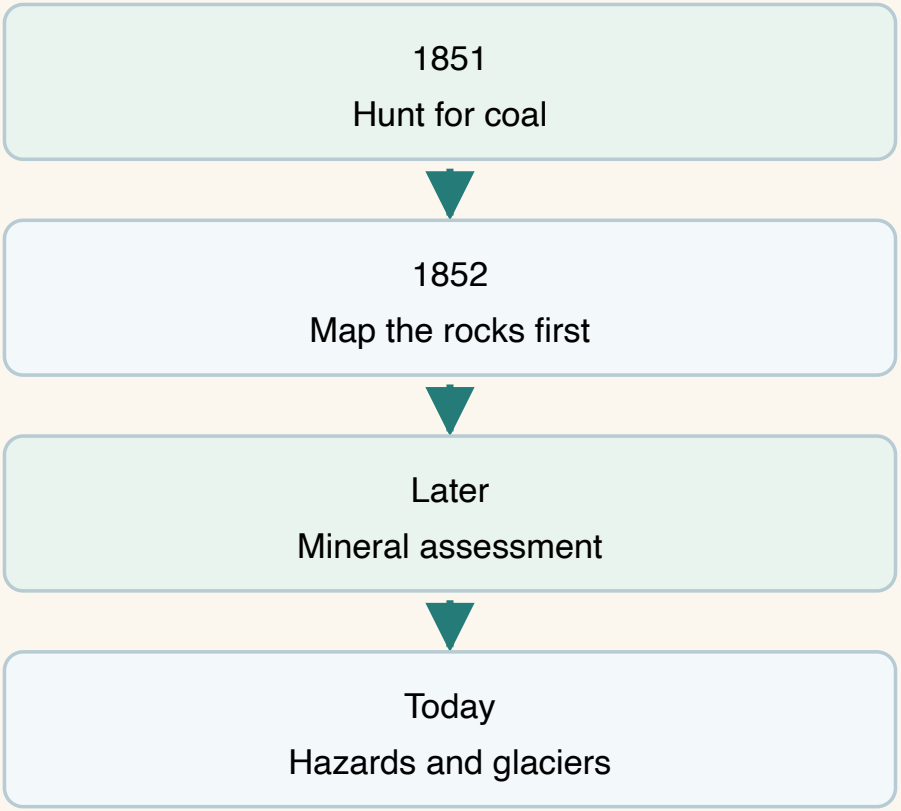
Source: Banglapedia, Thomas Oldham, item 2

3. How did GSI's job grow beyond coal?

GSI’s job grew because coal cannot be found without a map of the rocks. In 1852 Oldham argued this to the government. He said India’s geological structure had to be mapped first. He then drew up a plan to widen the department’s area of work.

That argument widened the work from coal-hunting to geological mapping. Today GSI creates and updates India’s national geoscience information. It also assesses mineral resources.

The tools now include ground surveys, airborne surveys and marine surveys. GSI also studies glaciers, natural hazards and earthquake zones.



Mapping the rocks came before finding coal.

Source: Maps of India, GSI founding, item 3

Source: Banglapedia, Thomas Oldham, item 3

Source: PIB, Ministry of Mines on the NGDR portal, 18 Dec 2023, item 3

What does GSI do for the country today?

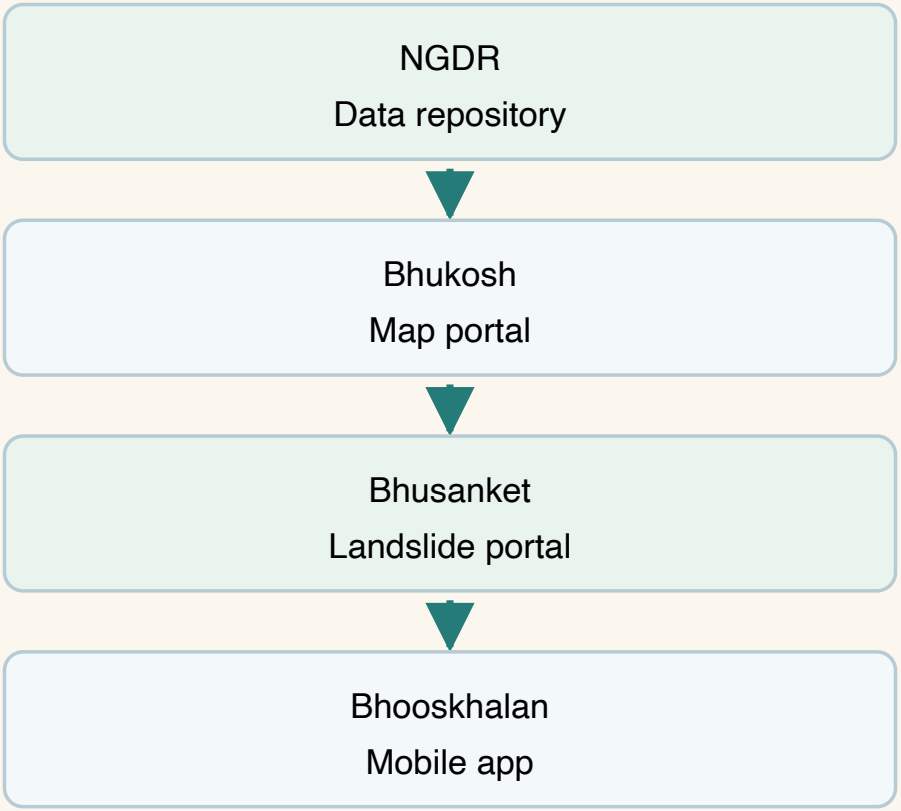
GSI keeps the national map data and studies hazards. Two jobs stand out: sharing data and handling landslides.

4. How does GSI share its maps and data?

GSI shares its data through online portals. The National Geoscience Data Repository (NGDR) is the main one. It is an online platform for finding, sharing and studying geospatial information.

The Ministry of Mines launched the NGDR on 19 December 2023. GSI and the Bhaskaracharya National Institute for Space Applications and Geo-informatics (BISAG-N) built it.

GSI maps are also on its Bhukosh map portal, and landslide maps are on the Bhusanket portal. The Bhooskhalan mobile app shows landslide data too. Free download is open to all users.



These portals let users see GSI data.

True or False: GSI maps can be downloaded only from its Kolkata office.
Source: PIB, Ministry of Mines on the NGDR portal, 18 Dec 2023, item 4

Source: PIB, Parliament question on landslide-prone areas, 20 Aug 2025, item 4

5. What is GSI's role in landslide mapping?

GSI is the nodal agency for landslide studies. A nodal agency is the one body that leads a task for the whole country.

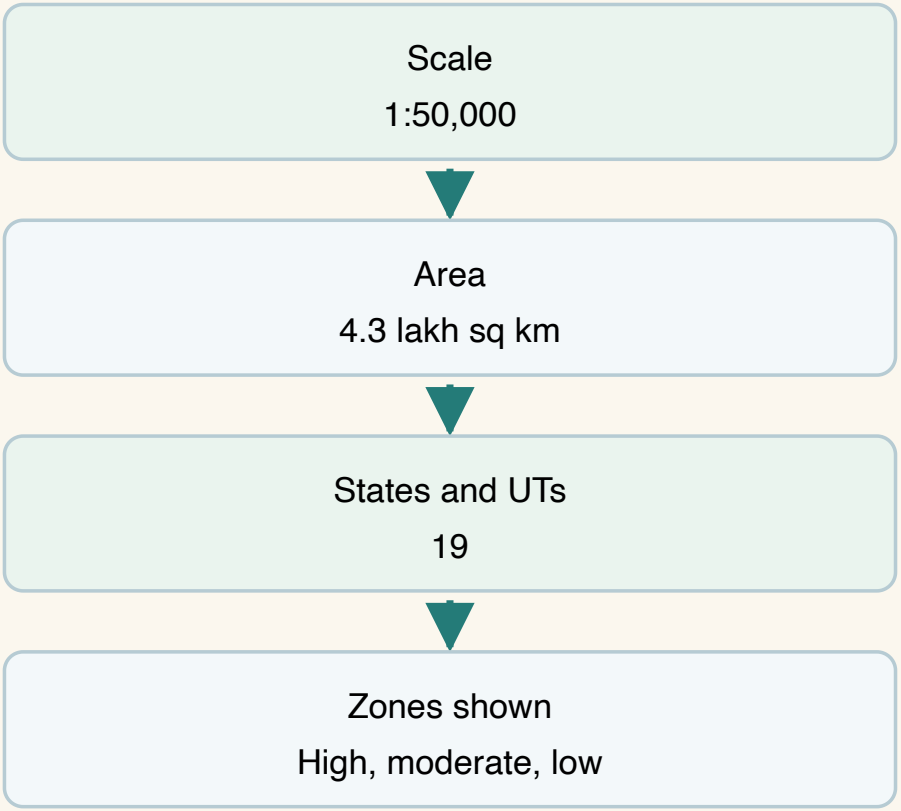
Under the National Landslide Susceptibility Mapping (NLSM) programme, GSI has mapped about 4.3 lakh square kilometres. The maps are at a scale of 1:50,000. They cover hilly parts of 19 states and Union Territories. These include the Himalaya, the Tertiary Belt of the North-East and the Western Ghats.

The maps split land into high, moderate and low zones. Planners use them to decide where to build.

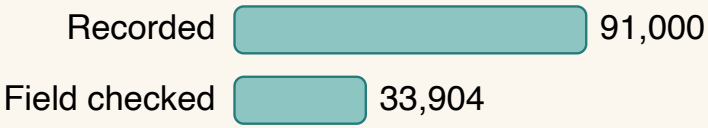
GSI also holds records of 91,000 past landslides. Field teams have checked 33,904 of them.



Landslide debris covers a road in Tharali, Uttarakhand. GSI's susceptibility maps help plan around such slopes. Photo: Nitin Maletha. File page. Licence: CC BY-SA 4.0.



The maps sort slopes into three zones.



About a third of the records are field checked.

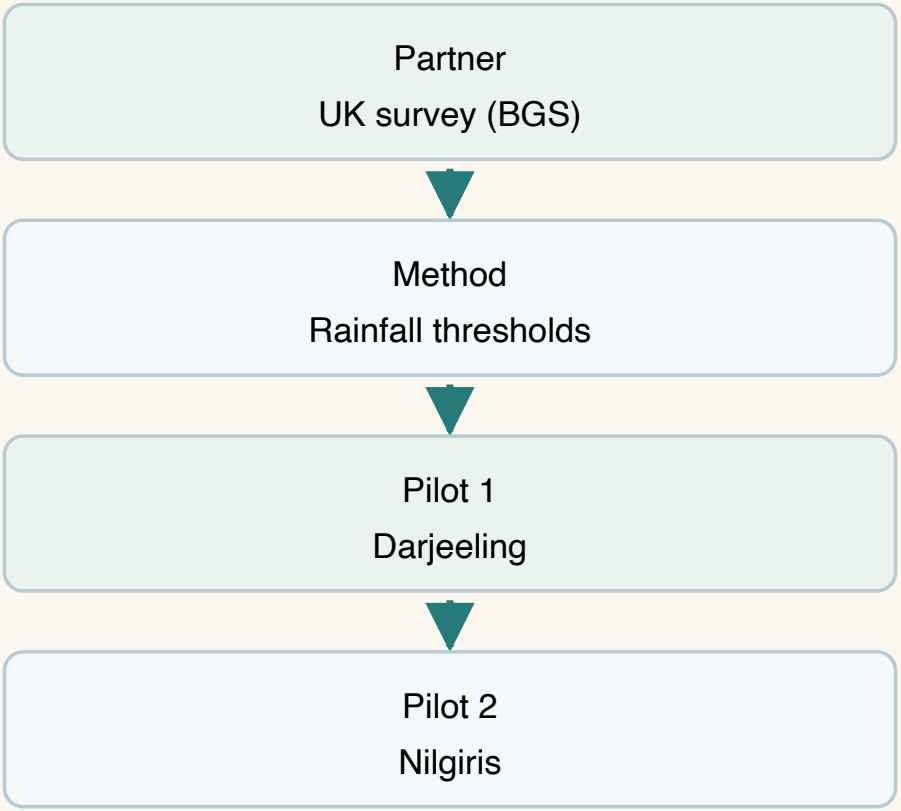
True or False: GSI's landslide susceptibility maps cover about 4.3 lakh square kilometres.
Source: PIB, Parliament question on landslide-prone areas, 20 Aug 2025, item 5

6. How is landslide warning improving?

GSI is moving from broad maps to close-up maps. It now makes meso-scale maps at 1:10,000 and 1:5,000. The target is 200 critical sectors by 2028. By the end of field season 2024-25, 160 were done.

On warnings, GSI worked with the British Geological Survey on the LANDSLIP project. The team built a prototype Landslide Early Warning System (LEWS). It uses rainfall thresholds, which are rainfall levels beyond which slopes become dangerous.

Two pilot areas test it. They are Darjeeling in West Bengal and the Nilgiris in Tamil Nadu. Since the 2020 monsoon GSI has sent daily forecast bulletins there.



Daily bulletins began in the 2020 monsoon.



GSI has finished 160 of 200 critical sectors.

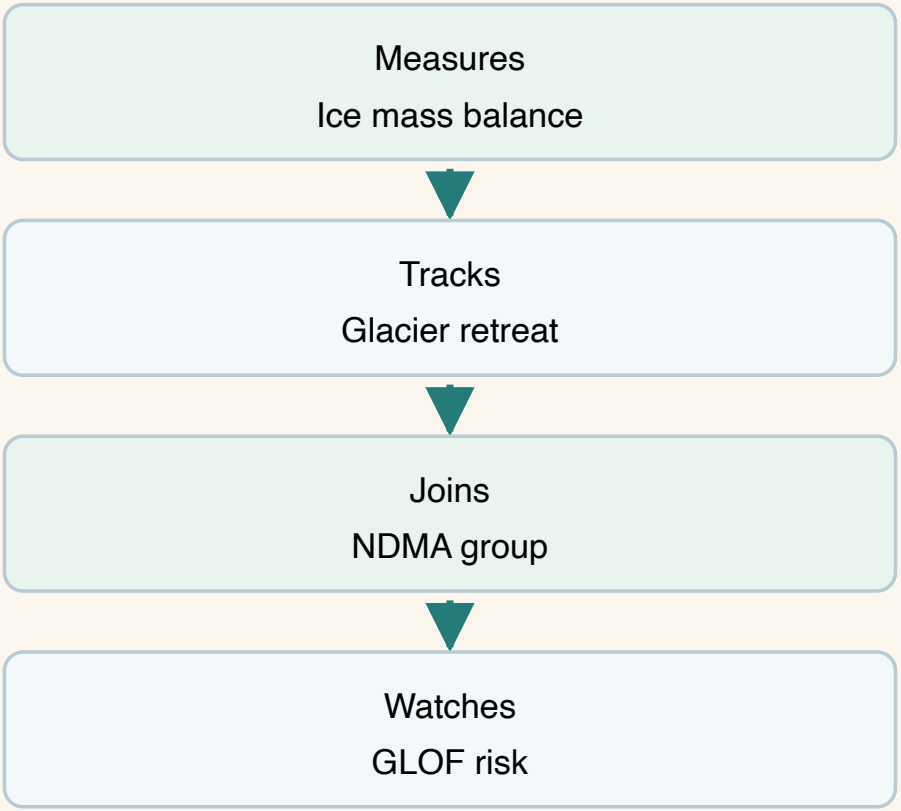
True or False: India's landslide early warning system already runs across the whole country.
Source: PIB, Parliament question on landslide-prone areas, 20 Aug 2025, item 6

Source: PIB, Early Warning System for Landslides, 2 Dec 2021, item 6

7. What does GSI do about glaciers?

GSI studies glaciers but does not run a glacier warning system. It measures mass balance, which is the yearly gain or loss of ice. It also tracks whether selected Himalayan glaciers are retreating or advancing.

For sudden floods, GSI sits in a group set up by the National Disaster Management Authority (NDMA). That group looks at methods to watch for avalanches and Glacial Lake Outburst Floods (GLOFs). A GLOF is a flood that bursts out when a glacier-fed lake breaks its banks.



GSI studies glaciers but runs no glacier alarm.

Source: PIB, Early Warning System for Landslides, 2 Dec 2021, item 7

How does GSI hunt for critical minerals?

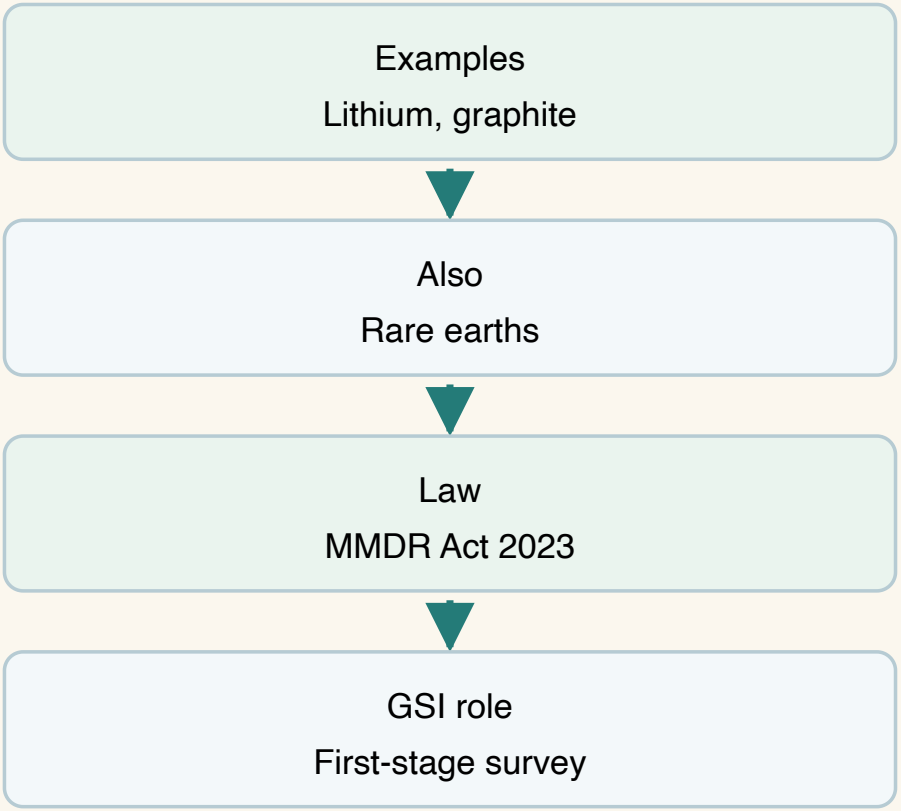
Critical minerals feed batteries, electronics and clean energy. GSI is the first stage of the hunt.

8. What are critical minerals, and why does GSI lead the search?

Critical minerals are minerals that a country needs but cannot easily source. Lithium, graphite and rare earth elements are examples. Rare earth elements (REEs) are a group of metals used in magnets and electronics.

The Mines and Minerals (Development and Regulation) Act was amended in 2023. It lists the critical and strategic minerals in Part D of its First Schedule. The Centre auctions them.

GSI leads the first stage. It surveys the rocks and finds where the minerals may lie. Auctions and mining follow later.



GSI leads the first stage of the hunt.

Source: PIB, Lithium and gold finds, 9 Feb 2023, item 8

Source: AICircle, GSI critical minerals push, 4 Dec 2025, item 8

9. How much exploration has GSI planned?

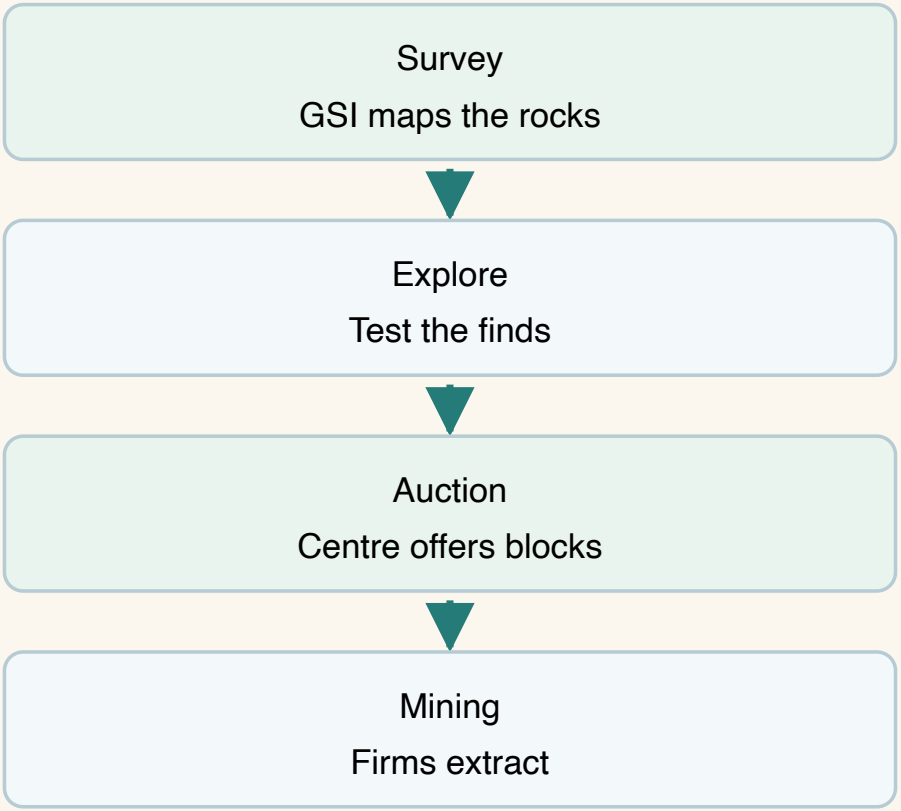
GSI's critical mineral work has grown each year. In field season 2023-24, it formulated 115 projects on strategic and critical minerals. Fertilizer minerals were part of that count.

A reply to Parliament in late 2025 gave newer numbers. GSI ran 195 critical mineral projects in 2024-25. It took up 230 in 2025-26.

A field season is the working year in which GSI teams go out to the field.



The 2023-24 count includes fertilizer minerals.



GSI works at the start of this chain.

True or False: GSI took up 230 critical mineral exploration projects in 2025-26.
Source: PIB, Lithium and gold finds, 9 Feb 2023, item 9

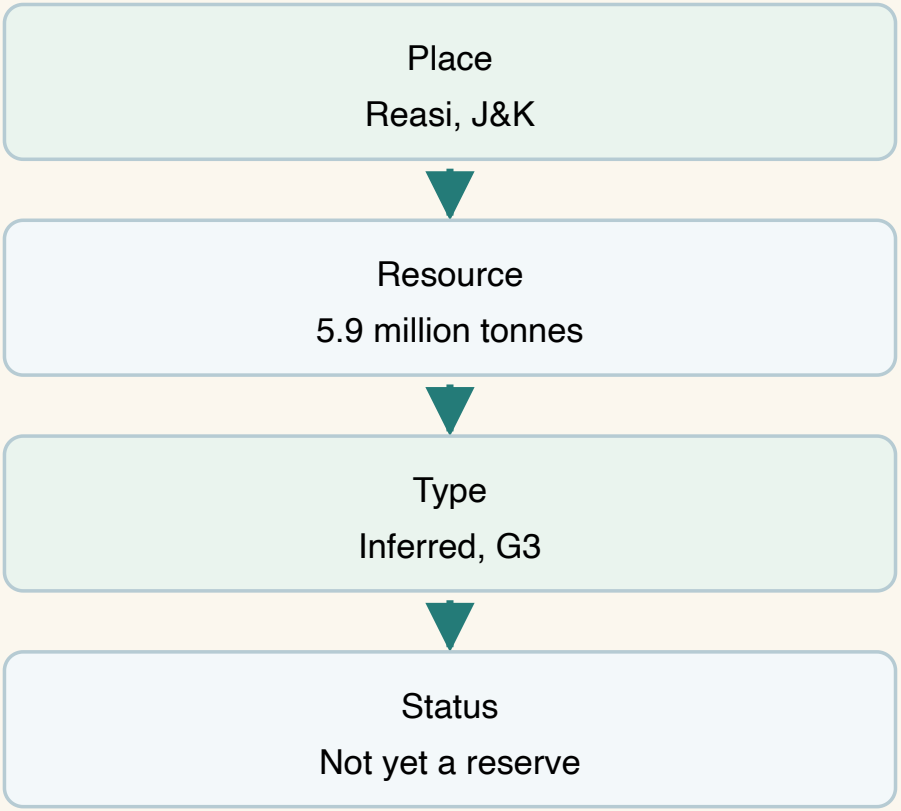
Source: AICircle, GSI critical minerals push, 4 Dec 2025, item 9

10. What did the Reasi lithium find actually show?

GSI found lithium in the Salal-Haimana area of Reasi district in Jammu and Kashmir. It was India's first such lithium estimate. The inferred resource is 5.9 million tonnes. PIB announced it on 9 February 2023.

Inferred means the estimate rests on limited evidence. The code G3 marks an early stage of exploration. So this is not a proven reserve that can be mined today.

GSI handed over this report to the state government. It came with 15 other resource reports and 35 geological memoranda. In all, 51 mineral blocks were handed over in 11 states and Union Territories.



Inferred means limited evidence.

True or False: The 5.9 million tonne lithium figure at Reasi is a proven reserve ready for mining.
Source: PIB, Lithium and gold finds, 9 Feb 2023, item 10

What is new at GSI in 2026?

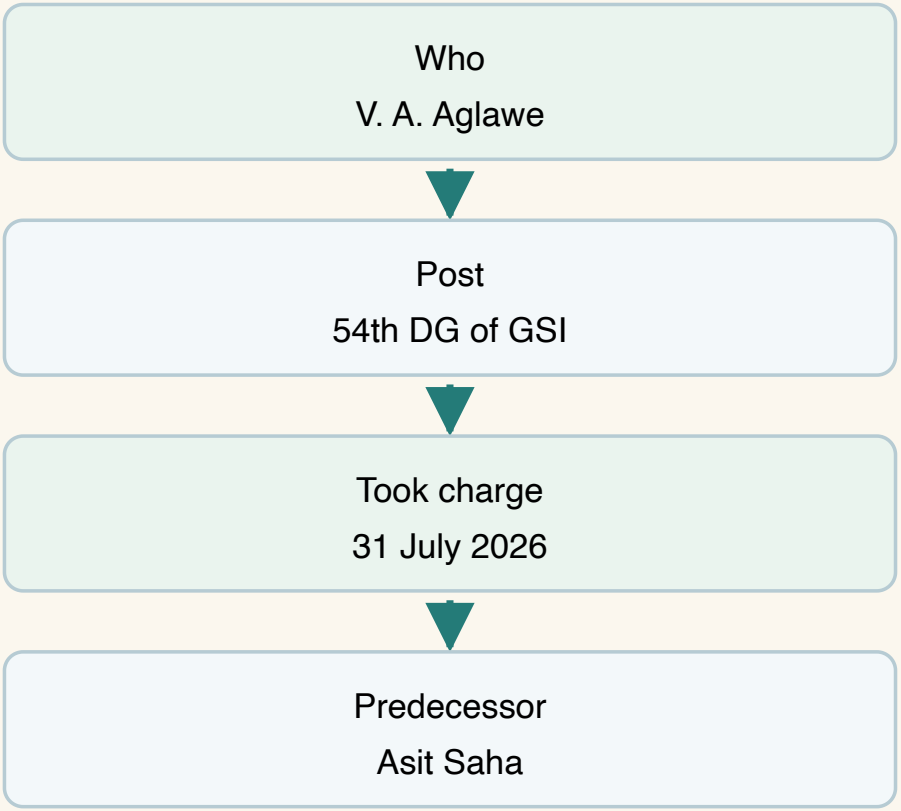
Two changes came within a week in mid-2026. GSI got its first woman leader, and it signed a technology pact.

11. Who is the new Director General?

Varsha Ashok Aglawe became the 54th Director General of GSI. She took charge on 31 July 2026. She is the first woman to lead the organisation. GSI is about 176 years old.

She joined GSI in 1992 after a short time at the Indian Bureau of Mines. Before this post she headed GSI's Eastern Region in Kolkata. She succeeds Asit Saha, who served from 27 July 2024 to 31 July 2026.

Her field is palaeontology, the study of fossils, and palynology, the study of pollen and spores. Her work covers the K-T boundary and the Gondwana basins of the Satpura region.



She is the first woman to lead GSI.

Source: Indian Bureaucracy, Aglawe assumes charge as DG, 2 Aug 2026, item 11

12. What does the C-DAC agreement do?

On 4 August 2026, the Centre for Development of Advanced Computing (C-DAC) and GSI signed an umbrella MoU. C-DAC works under the Ministry of Electronics and Information Technology. The signing took place in New Delhi.

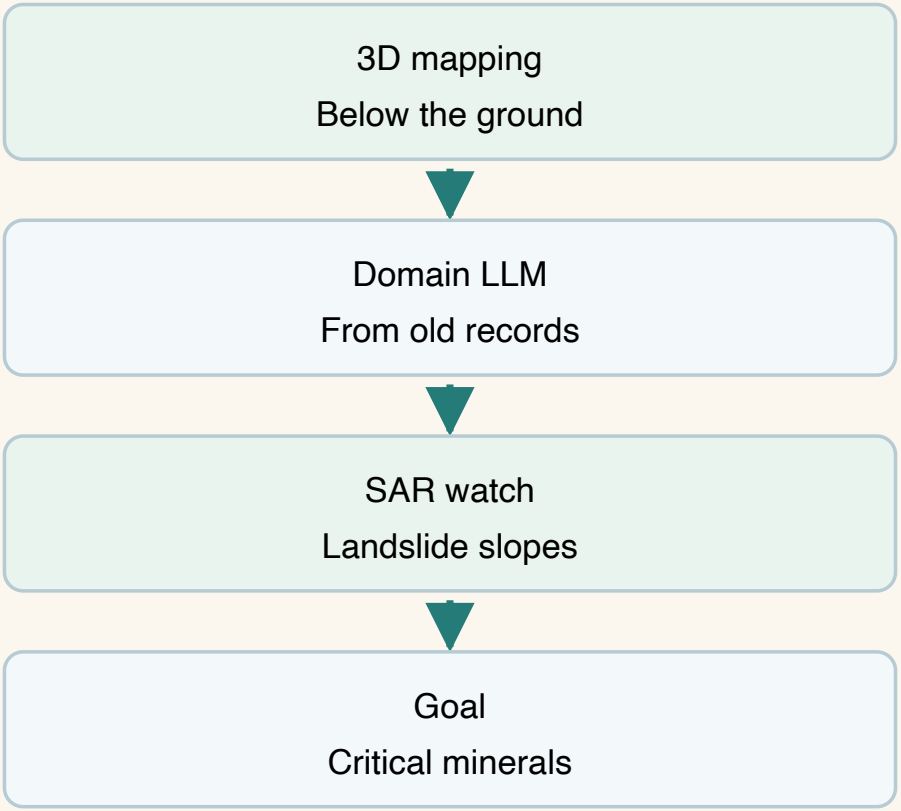
The deal joins C-DAC's High-Performance Computing (HPC) power with GSI's geological know-how. HPC means very fast computers that handle huge data sets.

Three uses are planned. One is 3D mapping of what lies underground. Another is a domain Large Language Model (LLM) built from decades of old geological records. The third is landslide watch with Synthetic Aperture Radar (SAR) and study of GLOFs.

The MoU also aims to speed up the discovery of critical minerals and rare earth elements.



Two bodies combine computing and geology.



The MoU aims at faster discovery.

Source: PIB, C-DAC and GSI sign Umbrella MoU, 4 Aug 2026, item 12

How did UPSC test GSI and seismic zones?

CDS 2021 linked GSI to earthquake risk. The question gave four towns and asked which one was riskiest.

13. What did CDS-II 2021 ask, and how do you answer it?

The question came in the Combined Defence Services (CDS) II 2021 General Knowledge paper as Q83.

Stem as printed on our CDS-II 2021 paper page. Who amongst the following will be at more risk with respect to the earthquake hazard zone specified by the Geological Survey of India?

The options were (a) Shahji at Secunderabad, (b) Ranbir at Indore, (c) Malti at Pithoragarh and (d) Maitri at Bhubaneswar. The answer is (c).

Pithoragarh lies in the Himalayan belt of Uttarakhand, which is Zone V. The other three towns sit in lower zones, II or III. Look for the Himalayan or Rann of Kutch town when you see such a question.

Paper

CDS-II 2021 GK

Question

Q83

Topic

Seismic risk

Answer

(c) Pithoragarh

The question asked which town is riskiest.

Zone V	Zones II-III
Pithoragarh	Secunderabad
Himalayan belt	Indore
Highest risk	Bhubaneswar

Pick the Himalayan town.

Source: CDS-II 2021 GK paper page, item 13

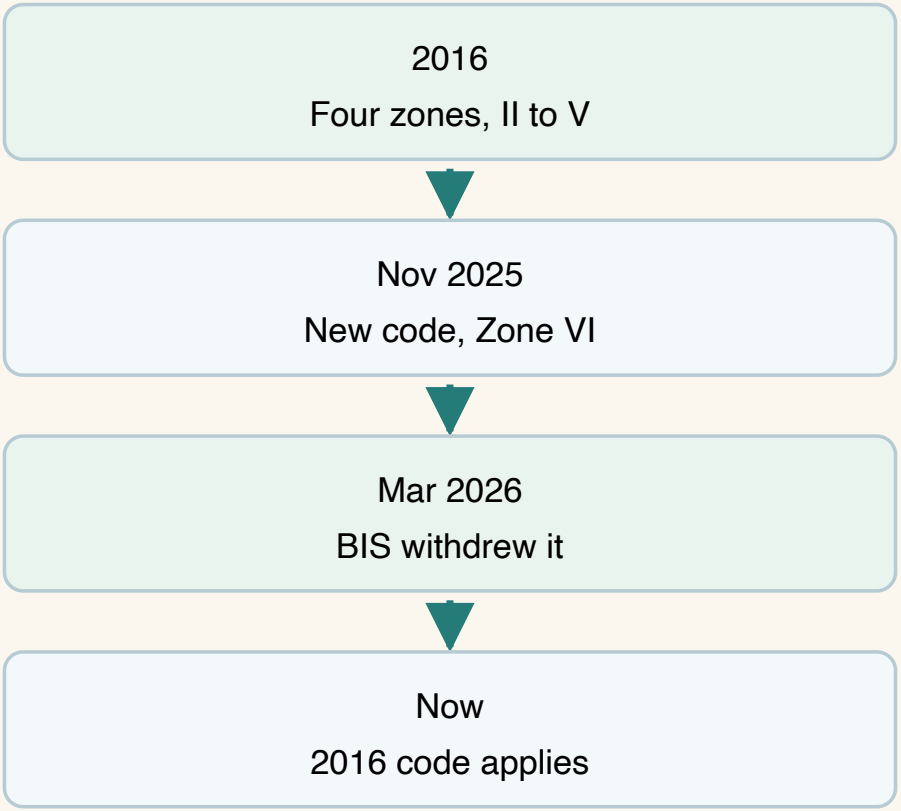
Source: PIB, Parliament question on landslide-prone areas, 20 Aug 2025, item 13

14. Did a sixth seismic zone ever become official?

No. In November 2025 BIS published a new seismic code with a new top Zone VI. It covered the whole Himalayan belt. In March 2026 BIS withdrew that code, after concerns raised by the housing ministry.

So the 2016 code applies again. It has four zones, II to V. Zone V is the highest.

For the exam, use the four-zone scale. If a question names Zone VI, read it closely.



Zone V is still the highest zone.

True or False: The seismic code of 2016 has five zones, and Zone VI is the highest.
Source: ETV Bharat, withdrawal of India's 2025 seismic code, 11 Mar 2026, item 14

Four questions to think through

Why did the survey begin with coal?

Railways and steamships ran on coal. India's coal was poorly known. So the government wanted a survey to find it. Later the work widened to all rocks and minerals.

Why must rocks be mapped before coal can be found?

Coal sits in particular rock layers. Without a map of the layers, a search is guesswork. Oldham made this point in 1852. A geological map shows where to look.

Why is the Reasi lithium figure only an estimate?

The figure is an inferred resource at the G3 stage. That means the evidence is limited. More drilling and tests must follow. Only then can it be called a proven reserve.

How could C-DAC's computers help GSI find minerals?

Fast computers can process huge sets of survey data. They can build 3D maps of the underground. AI can then point to likely mineral targets. A domain model can also read decades of old records.

Check your understanding

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

Continue to the practice MCQs

✅ Test Yourself

Try practice questions on GSI, landslide maps, critical minerals and the UPSC link.

Practice MCQs

1. Who was the first Superintendent of the Geological Survey of India, set up in 1851?

A. John McClelland

B. Asit Saha

C. Varsha Ashok Aglawe

D. Sir Thomas Oldham

See answer ↓

2. Why was the Geological Survey of India set up in 1851?

A. To map the Indian coastline

B. To count mineral workers

C. To study monsoon winds

D. Mainly to find coal for the railways

See answer ↓

3. Under which ministry does the Geological Survey of India work as an attached office?

A. Ministry of Mines

B. Ministry of Environment

C. Ministry of Earth Sciences

D. Ministry of Science and Technology

See answer ↓

4. About how much area has GSI covered with landslide susceptibility maps at the 1:50,000 scale?

A. About 1.2 lakh square kilometres

B. About 2.5 lakh square kilometres

C. About 4.3 lakh square kilometres

D. About 6.8 lakh square kilometres

See answer ↓

5. Which two areas are the pilot sites for GSI's landslide early warning system?

A. Wayanad and Idukki

B. Shimla and Kullu

C. Chamoli and Tehri

D. Darjeeling and the Nilgiris

See answer ↓

6. In 2023 GSI estimated a lithium resource of 5.9 million tonnes in Reasi. What kind of resource was this?

A. A proven reserve ready for mining

B. Inferred, at the G3 stage

C. An imported stock

D. A resource already auctioned

See answer ↓

7. Which field of geoscience is Varsha Ashok Aglawe, the first woman Director General of GSI, known for?

A. Palaeontology and palynology

B. Glaciology

C. Seismology

D. Marine geophysics

See answer ↓

8. Which technology will C-DAC and GSI use for slope-scale landslide monitoring under their August 2026 MoU?

A. Optical telescopes

B. Synthetic Aperture Radar (SAR)

C. Sonar buoys

D. Doppler weather radar

See answer ↓

Answer Key

1. **D.** Sir Thomas Oldham is the answer. He joined GSI in 1851 as its first head. His early title was Superintendent. In 1852 he argued that India's rocks had to be mapped before coal could be found. That idea widened GSI's work beyond coal. Asit Saha and Varsha Ashok Aglawe are recent heads of GSI. Memory hook: Oldham started it all. ↑ Q1
2. **D.** Finding coal for the railways is the answer. Steam trains and steamships needed coal. India's coal was poorly known. So the survey began as a coal hunt. Its job grew later to cover all rocks and minerals. The other tasks listed were never its founding aim. Memory hook: GSI began with coal. ↑ Q2
3. **A.** The Ministry of Mines is the answer. GSI is an attached office of that ministry. Its headquarters are in Kolkata. It also has six regional offices. The earth sciences ministry deals with weather and oceans, not GSI. Memory hook: GSI means Mines. ↑ Q3
4. **C.** About 4.3 lakh square kilometres is the answer. GSI mapped hilly parts of 19 states and Union Territories. These include the Himalaya, the North-East and the Western Ghats. The maps show high, moderate and low zones. Smaller figures do not match the PIB reply of August 2025. Memory hook: 4.3 lakh, 19 states. ↑ Q4
5. **D.** Darjeeling and the Nilgiris are the answer. GSI built a prototype with the British Geological Survey. It uses rainfall thresholds. Since the 2020 monsoon, GSI has sent daily forecast bulletins to both districts. The other pairs are landslide-prone but are not the pilot sites. Memory hook: Darjeeling and Nilgiris. ↑ Q5
6. **B.** An inferred resource at the G3 stage is the answer. The estimate rests on limited evidence. So it is not a proven reserve. GSI handed the report to the state government. The site is Salal-Haimana in Reasi, Jammu and Kashmir. Memory hook: inferred means not yet proven. ↑ Q6
7. **A.** Palaeontology and palynology is the answer. Palaeontology is the study of fossils. Palynology is the study of pollen and spores. She became the 54th Director General on 31 July 2026. Her work covers the K-T boundary and the Gondwana basins of the Satpura region. Memory hook: fossils and pollen. ↑ Q7

8. **B.** Synthetic Aperture Radar is the answer. The MoU also plans 3D mapping of the underground and a domain Large Language Model. It aims to speed up the discovery of critical minerals. It also covers Glacial Lake Outburst Flood studies. The other options are not named in the PIB release. Memory hook: radar from space watches slopes. ↑ Q8

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