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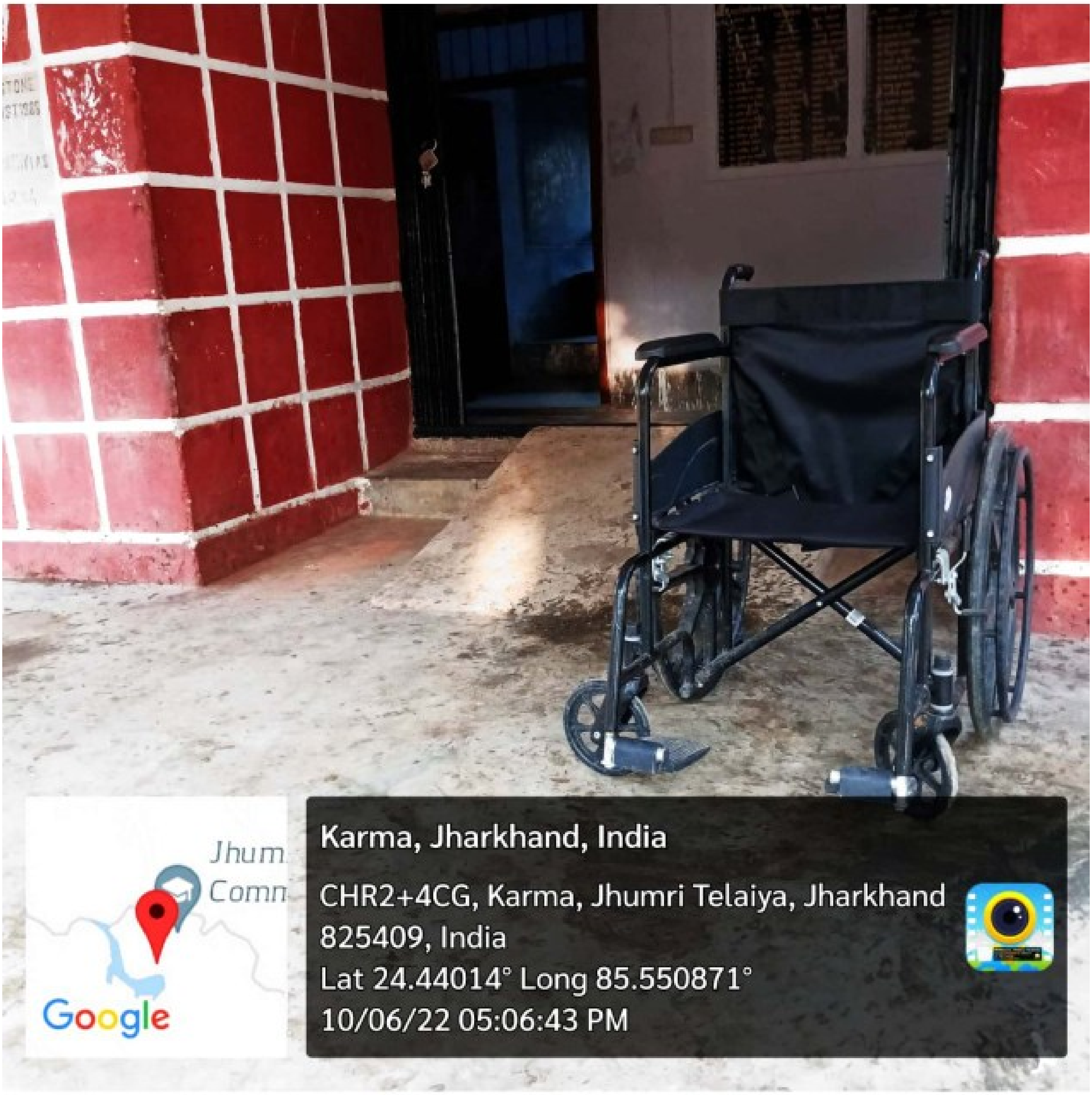

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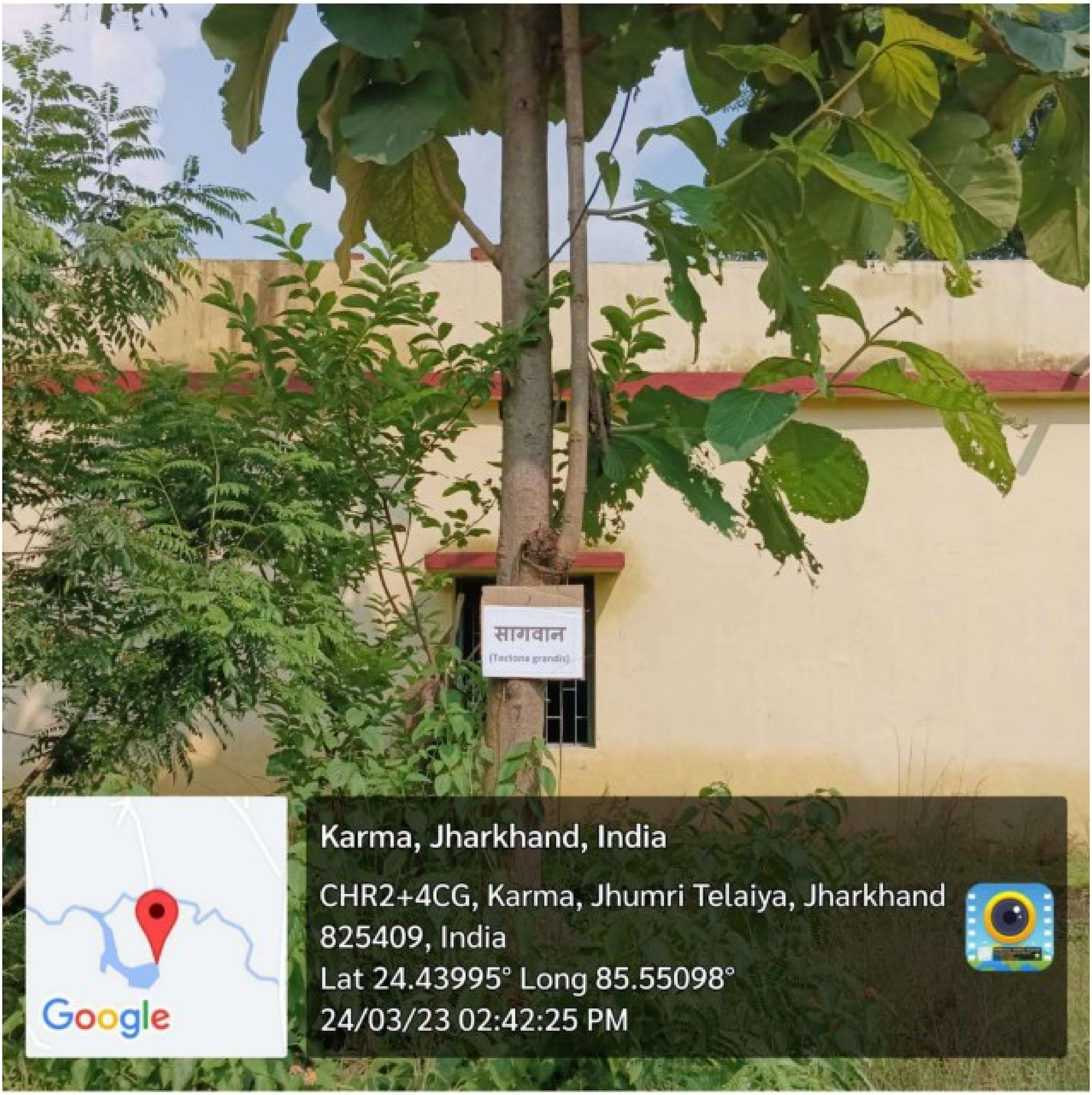

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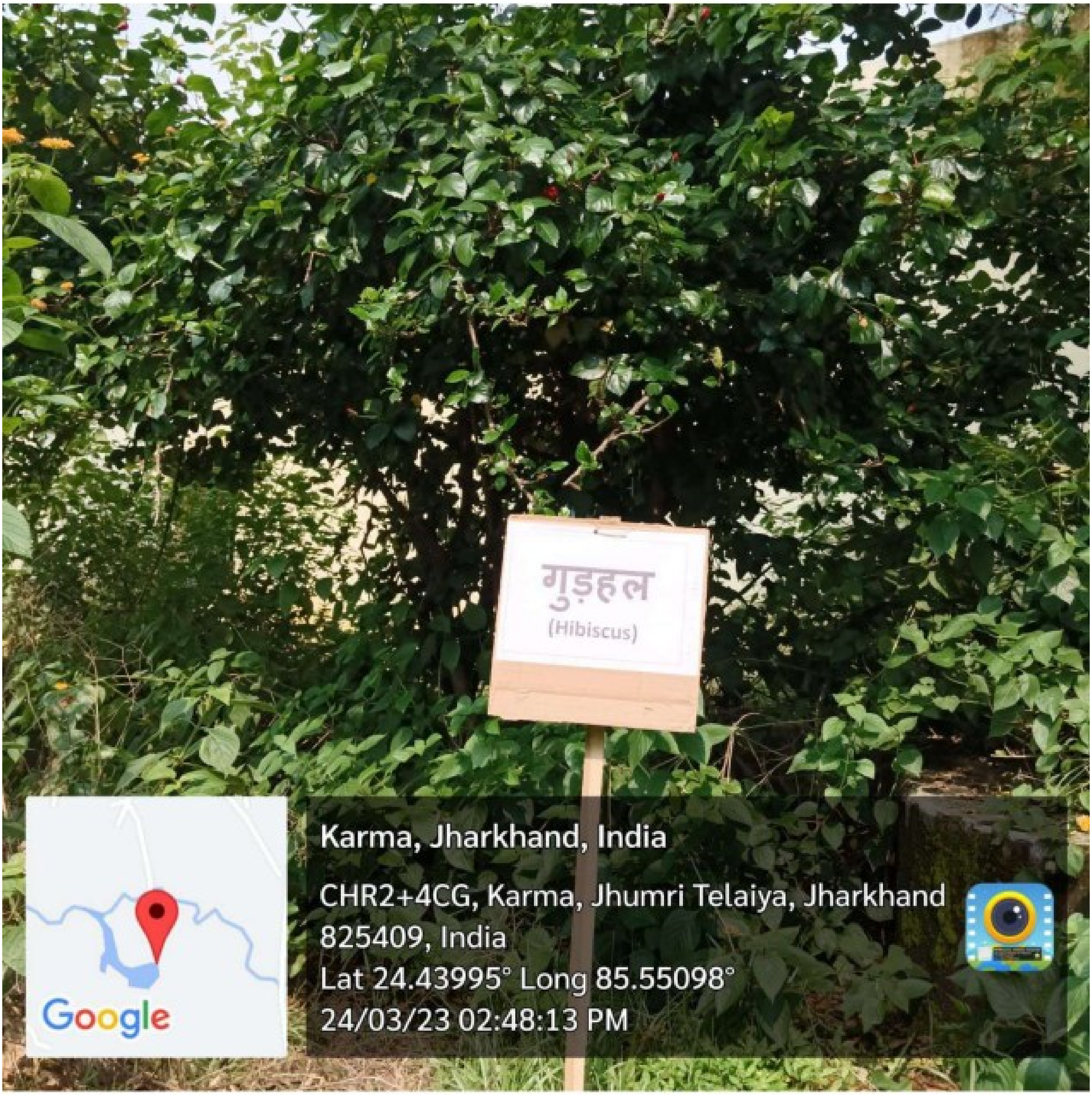

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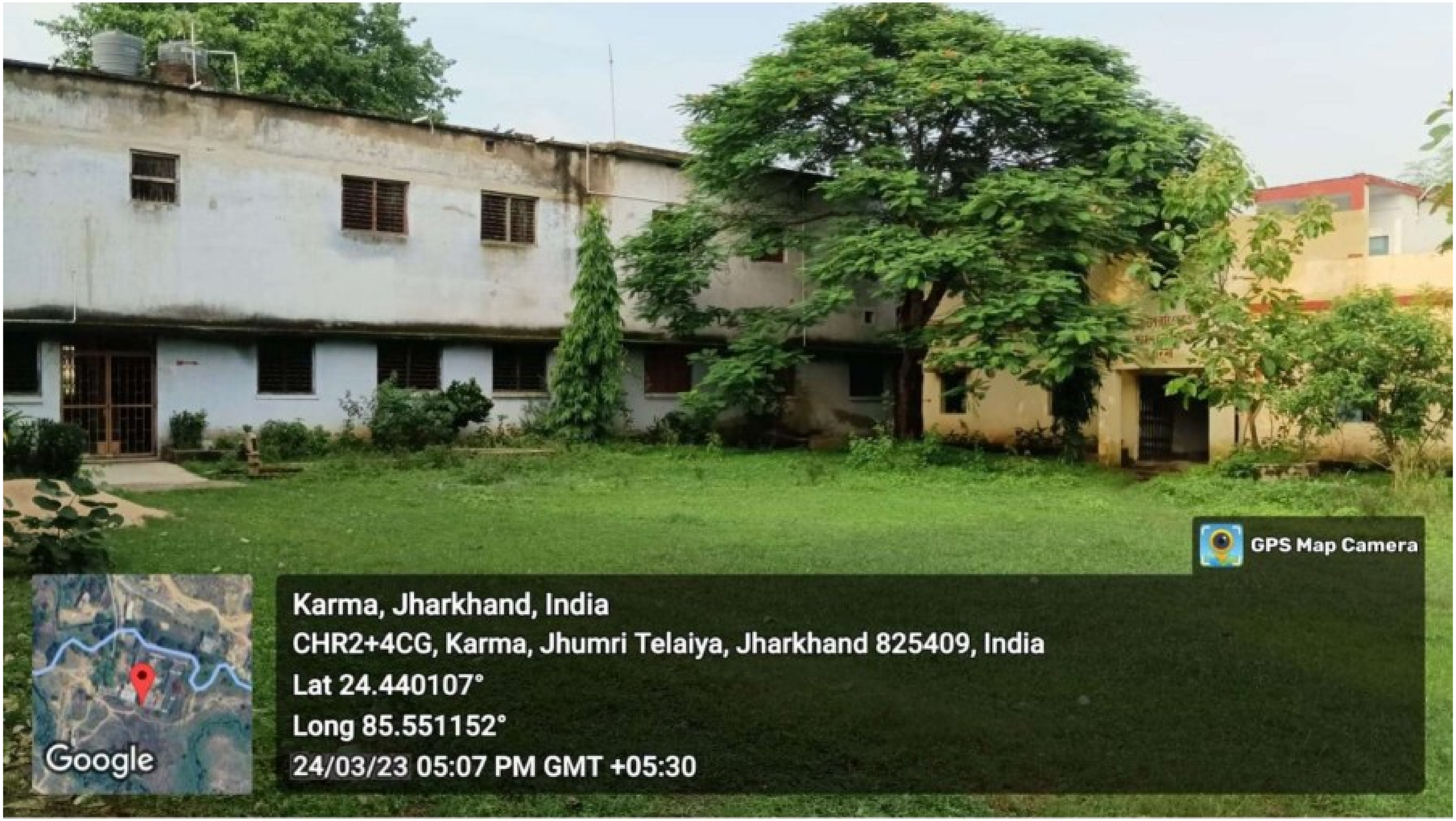

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GDCL/EA/01/032024

GREEN DONE CONSULTANTS

Striving to make the globe greener

ENERGY AUDIT CERTIFICATE

CERTIFICATE FOR ENERGY AUDIT

This Certificate is presented to

JHUMRI TELAIYA COMMERCE COLLEGE
Karma, Jhumri Telaiya, Dist- Koderma, Jharkhand 825409

For completing the **ENERGY AUDIT** of Their Campus on the 21st of April 2023.

This certificate will remain valid for 3 years from the date of issuance.

ATUL JOSHI

Accredited Energy Auditor - 0037
By Bureau of Energy Efficiency (MoP, GoI)
Director - Green Done Consultants LLP

ALKESH RAJDEV

Accredited Professional
Indian Green Building Council
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4/21/2023

REPORT ON GREEN AUDIT, ENERGY AUDIT & ENVIRONMENTAL AUDIT

Jhumri Telaiya Commerce College

Karma, Jhumri Telaiya, Dist-Koderma 825409, Jharkhand

Service Request No.: GDCL/GA/03/0624

GREEN DONE CONSULTANTS

Striving to make the globe greener

Prepared By:

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1. Executive Summary:

Eco campus is a concept implemented in many educational institutions, all over the world to make them sustainable because of their mass resource utilization and waste discharge into the environment.

Waste minimization plans for the educational institute are now mandatory to maintain the cleanliness of the campus. To find out the environmental performance of the educational institutions and to analyze the possible solutions for converting the educational campus into an eco-campus, the conducting Green Audit of institution is essential.

The green auditing of '**Jhumri Telaiya Commerce College, Karma, Jharkhand**', enables us to assess the practices, action and its impact on the environment. This audit was mainly focused on **Green Indicators** like consumption of energy in terms of electricity and fossil fuel, quality & utilization of water, vegetation, waste management practices and carbon footprint of the campus etc.

The premises were evaluated against the various criteria laid down by the National Assessment and Accreditation Council (NAAC). The major observations are provided below.

Renewable Energy

- The college have installed 10kWp Roof-top Solar Photovoltaic System for self-use.
- The quantity of plant waste (organic waste with higher starch contents) is not very substantial, consequently, when the plants grow enough, college may explore the potential for biogas generation.

Green Campus Initiative

- There are pedestrian friendly pathways for in-campus movement.
- **College is a 'Plastic Free' campus.**
- The campus is surrounded by greenery, trees, and proper landscaping.
- The bicycles are allowed for in-campus movement as required. Cycle stands should be provided inside the campus.
- Around 70% of staff and students use public transport for daily commuting.
- The movement of vehicles inside the campus is not restricted.

Environment & Energy Initiative

- The Institute has planted more than 18 varieties of more than 70 trees on its campus.
- Institute may go for replacement of existing fans with energy efficient BLDC fans.

Air Quality & Ventilation

- The classrooms and other areas are well ventilated to ensure proper air quality.
- The fans are appropriately installed to ensure proper air circulation
- The indoor as well as outdoor plants have also been provided to improve the environment.

Lighting System

- The usage of natural light is optimized through well designed structures and windows.
- College may initiate replacement of lighting fixtures with energy efficient LEDs.
- Institute may install sensor-based systems (motion sensors/ day-light sensors) to control operations of lights to save energy. It is recommended to install sensor-based devices to increase energy conservation.

Water Quality & Conservation

- The water is supplied through the bore well.
- The water quality reports are not available. Water analysis is recommended.
- Water purifiers are installed for water purification.
- The rainwater harvesting system is available and in use.
- The distribution network and piping were found satisfactory and adequate.

Waste Management

- The effluent water is discharged in the common drainage system, however there is no Sewage Treatment plant.
- The waste is segregated into two types solid and liquid waste.
- E-waste is to be collected & disposed of separately.
- For plant waste and dry leaves vermi-composting can be maintained.

Green IT culture

- Electronic communication is encouraged to minimize usage of papers.
- Most of the papers are reused for double sided printing to further minimize usage of paper.

Infrastructure usage

- Ramps and wheelchairs are provided for ease of movements for disabled persons.
- The on-campus movement is distributed with multiple entrances as well as staircases.
- Fire extinguishers have been installed in key areas.
- The draining system for washrooms is efficient and effective.
- No seepages were observed in the building premises.

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Bureau of Energy Efficiency (BEE, MoP)
Director – Green Done Consultant LLP.

Mr. Alkesh Rajdev
Accredited Professional
Indian Green Building Council
Director – Green Done Consultant LLP

2. Acknowledgment:

We wish to express our gratitude towards the Management of **Jhumri Telaiya Commerce College, Karma, Jharkhand** for having given us the opportunity for conducting the study and the support provided during the study.

We are also thankful to the **PRINCIPAL Mr. SOHAR YADAV** and **NAAC Coordinator Mr. SURESH PRASAD YADAV** for extending the necessary help and co-operation from their side.

3. Audit Team:

From **Green Done Consultants LLP, Mumbai**

1. Mr. Atul Joshi – Accredited Energy Auditor & Director.
2. Mr. Alkesh Rajdev – Accredited Sustainability Consultant, IGBC AP & Director.

From **Jhumri Telaiya Commerce College, Karma, Jharkhand.**

1. Principal - **Mr. SOHAR YADAV** and
2. IQAC/ NAAC Coordinator – **Mr. SURESH PRASAD YADAV**

4. Introduction:

4.1. About Institute:

Jhumri Telaiya Commerce College Karma was established in 1984 due to the tireless efforts of the intellectuals of Jhumri Tilaiya Commerce College Karma. The college was established with the efforts of Shri Rajendra Prasad alias RP Gandhi, but the real founder of the college was the then Sub-Divisional Officer of Koderma, Shri Sudhir Tripathi, who was an IAS officer. Also, the dedication of the local people of Karma in the establishment and development of this educational institution is worth mentioning in golden letters. The only affiliated college in this area was Jagannath Jain College, whereas Koderma is a densely populated area, and the students were facing a lot of inconvenience from the only college here, keeping this in mind, this institute was established with the utmost efforts of the local and village people.

As an affiliated unit of Vinoba Bhave University (VBU), Hazaribag, we uphold the university's commitment to academic excellence and holistic development. Our comprehensive range of courses includes the prestigious Bachelor of Arts (BA) and Bachelor of Commerce (B. Com) programs, designed to equip students with the knowledge, skills, and insights needed to thrive in today's competitive world.

What sets us apart is our dedicated faculty, who are experts in their respective fields and are committed to nurturing the talents of our students. Through innovative teaching methods, personalized guidance, and a focus on practical learning, we ensure that every student receives a well-rounded education that prepares them for future challenges.

Jhumri Telaiya Commerce College, we believe in fostering a culture of creativity, critical thinking, and ethical leadership. Our state-of-the-art facilities, including well-equipped classrooms, libraries, and laboratories, provide a conducive environment for academic exploration and growth.

Vision

To be a leading institution committed to academic excellence, innovation, and ethical leadership.
Creating a conducive environment for higher education and enhancing it with efficient infrastructure resources.
Providing students with a high-quality education.
Developing and refining the necessary learning skills, knowledge, and perspective.
To provide quality teacher education to students of the district as well as state.
Be a leader in educational services to the people of the district.

To provide innovative learning experience to enable the students to realize their potential and mold their personality.
To make available equal opportunities to all irrespective of gender, class, caste, religion, and economic condition.
To provide state of art teaching facilities and empower society with educational reforms.
These are conveyed through the provision of education through lectures, experiments, minor and major research programs, all with the objective of advancing higher education in the underprivileged and tribal regions in which the institution is located.

Mission:

Empowering students with quality education and holistic development to excel in their chosen fields.

To impart quality higher education and skill among the students in order to create a quality human resource for the country along with inculcating human, social, democratic, environmental and nationalistic values in them.

To improve their personality by developing the attributes of determination, initiatives skills, positive approach, optimism, scientific temper and human values.

To make students academically and psychologically confident to be at par with any other promising students of the institution of excellence.

Updating their knowledge in different fields of specialization, familiar with the new technologies and develop their understanding towards the emerging areas and the requirements of society and thus enhancing the scope of employment.

The college is situated in Karma and is about 10 kms. from Koderma, which is one of the district headquarter of the State. The surroundings of the college are spread with well-maintained gardens, buildings, hostels, a computer centre and playground. Believing in the holistic development of the students, the college is keen to make available its best facilities.

The student and faculty strength of the college is listed below:

Physical Structure:

Physical Structure	
Total Campus Area	7.3 acre
Built-up Area	4522 sq. mtr.
No. of Departments	11
Conference/seminar Halls	1
Classrooms	10
Office Rooms	3
Libraries	1
Auditorium	0
Canteen	0
Other Girls Common Room	1
Other Boys common Room	0
N.S.S.	0
IQAC	0
Geography lab/Home science lab	2
Smart Classroom	1
ICT Lab	1

Total Strength of Students, Teachers & Non-teaching Staff:

Staff Details	Male	Female	Total
No. of Students	693	509	1202
No. of Teaching Staff	17	1	18
No. of Non-Teaching Staff	10	2	12

1. Objectives of Green Audit:

The main aim objectives of this green audit are to assess the environmental quality and the management practice, and strategies being implemented in Jhumri Telaiya Commerce College, Karma, Jharkhand.

The specific objectives are:

1. To monitor the energy consumption pattern of the college.
2. To assess the quality of the water in the campus.
3. To quantify the liquid and solid waste generation and management plans in the campus.
4. To assess the carbon footprint of the college.
5. To assess whether the measures implemented by the College have helped to reduce the Carbon Footprint.
6. To impart environment management plans of the college.
7. Providing a database for corrective actions and future plans.
8. To assess whether extracurricular activities of the Institution support the collection, recovery, reuse and recycling of waste generated within the campus.
9. To identify the gap areas and suggest recommendations to improve the Green Campus status of the Jhumri Telaiya Commerce College, Karma, Jharkhand.

2. Target Areas of Green Audit:

Green audit forms part of a resource management process. Although they are individual events, the real value of green audit is the fact that they are carried out, at defined intervals, and their results can illustrate improvement or change over time. Eco-campus concept mainly focuses on the efficient use of energy and water, Minimize waste generation or pollution and efficiency in resource utilization. All these indicators are assessed in the process of "Green Auditing of this educational institute".

Eco-campus focuses on the reduction of contribution to emissions, procure a cost effective and secure supply of energy, encourage and enhance energy use conservation, promotes personal action, reduce the institute's energy and water consumption, reduce wastes to landfill, and integrate environmental considerations into all contracts and services considered to have significant environmental impacts. **Target areas included in this green auditing are water, energy, waste, green campus and carbon footprint.**

2.1. Auditing for Water Management

Water is a natural resource. All living organisms depend on water. While freely available in many natural environments, in human settlements potable (drinkable) water is less readily available. Groundwater depletion and water contamination are taking place at an alarming rate. Hence it is essential to examine the quality and usage of water in the college. Water auditing is conducted for the evaluation of facilities of raw water intake and determining the facilities for water treatment and reuse. The concerned auditor investigates the relevant method that can be adopted and implemented to balance the demand and supply of water.

2.2. Auditing for Energy Management

Energy conservation is an important aspect of campus sustainability which is also linked with carbon footprint of the campus. Energy auditing deals with the conservation and methods to reduce its consumption related to environmental degradation. It is therefore essential that any environmentally responsible institution examine its energy use practices.

2.3. Auditing for Waste Management:

Human activities create waste, and it is the way these wastes are handled, stored, collected and disposed of, which can pose risks to the environment and to public health. Solid waste can be divided into three categories: bio-degradable, non-biodegradable & hazardous waste.

1. Bio-degradable wastes include food wastes, canteen waste, wastes from toilets etc.
2. Non-biodegradable wastes include what is usually thrown away in homes and schools such as plastic, tins and glass bottles etc.

3. Hazardous waste is waste that is likely to be a threat to health or the environment like cleaning chemicals, acids and petrol.

Unscientific management of these wastes such as dumping in pits or burning them may cause harmful discharge of contaminants into soil and water supplies and produce greenhouse gases contributing to global climate change respectively. Special attention should be given to the handling and management of hazardous waste generated in the college.

Bio-degradable waste can be effectively utilized for energy generation purposes through anaerobic digestion or can be converted to fertilizer by composting technology. Non-biodegradable waste can be utilized through recycling and reuse. Thus, the minimization of solid waste is essential to a sustainable college. The auditor diagnoses the prevailing waste disposal policies and suggests the best way to combat the problems.

2.4. Auditing for Green Campus Management:

Trees play an important ecological role within the urban environment, as well as supporting improved public health and providing aesthetic benefits to cities. In one year, a single mature tree will absorb up to 48 pounds of carbon dioxide from the atmosphere and release it as oxygen. The amount of oxygen released by the trees of the campus is good for the people in the campus. So while you are busy studying and working on earning those good grades, all the trees in campus are also working hard to make the air cleaner for you.

2.5. Auditing for Carbon Footprint:

Burning of fossil fuels (such as petrol) has an impact on the environment through the emission of greenhouse gases into the atmosphere. The most common greenhouse gases are carbon dioxide, water vapour, methane, nitrous oxide and ozone. Of all the greenhouse gases, carbon dioxide is the most prominent greenhouse gas, comprising 402 ppm of the Earth's atmosphere. The release of carbon dioxide gas into the Earth's atmosphere through human activities is commonly known as carbon emissions. Vehicular emission is the main source of carbon emission in the campus, hence, to assess the method of transportation that is practiced in the college is important.

3. METHODOLOGY ADOPTED:

The methodology adopted to conduct the Green Audit of the Institution had the following components.

Onsite Data Collection:
A virtual tour of the college campus was organized by the Green Audit Team. The data samples and relevant photographs were collected through geo-tagged photographs. The key focus of the audit was on assessing the status of the green cover of the Institution, their waste management practices and energy conservation strategies etc.

Focus Group Discussion:
The Focus Group discussions were held with the staff members and the management focusing on various aspects of Green Audit. The discussion was focused on identifying the attitudes and awareness towards environmental issues at the institutional and local level.

Energy, Waste Management and Carbon Footprint Analysis Survey:
With the help of teachers and staff, the audit team has assessed the energy consumption pattern and waste generation, disposal and treatment facilities of the college. The monitoring was conducted with a detailed questionnaire survey method.

4. AUDIT STAGE:

Green auditing in **Jhumri Telaiya Commerce College, Jharkhand** began with the assessment of the status of the green cover of the Institution followed by waste management practices and energy conservation strategies etc. The team monitored different facilities at the college, determined different types of appliances and utilities (lights, taps, toilets, air conditioners, etc.) as well as measuring the usage per item (Watts indicated on the appliance, etc.) and identifying the relevant consumption patterns (such as how often an appliance is used) and their impacts. The staff and learners were interviewed to get details of usage, frequency or general characteristics of certain appliances. Data collection was done in the sectors such as Energy, Waste, Greening, Carbon footprint and Water use. College records and documents were verified several times to clarify the data received through survey and discussions.

5. GREEN AUDIT REPORT

5.1. Water Quality Assessment:

Water is provided through one borewell and one well. Institute has installed R.O. system for drinking water. The bore well water is being used for flushing and gardening. Institute has not carried out lab testing of bore well water sample. Hence the current water analysis report was not available at the time of audit. The Institute has installed water coolers to provide cold water to the staff and students.

5.2. Water Management:

The source for the water used in the College is bore-well water. Institute has installed three overhead tanks with a capacity of 1 KL.

- Water availability is good throughout the year & the institute does not need tanker water to meet its demand during peak summer.
- A water meter is not installed on the bore-well and hence, no record is maintained for daily water consumption.
- There were no leaking taps or water wastage reported during the audit phase.
- There is no formal water management plan available with the institute.
- College has displayed signboards for spreading awareness of its water saving initiatives.
- The institute is harvesting the Rainwater.
- There is no **Sewage Water Treatment** plant on the campus to recycle the wastewater for the use of flushing and gardening. The wastewater is being drained into the soak pit.
- The effluent generation from the laboratory is being discharged into the common.

5.3. Energy Audit Report:

5.3.1. Electrical Bill Analysis:

Electricity is supplied by JHARKHAND BIJLI VIRTARAN NIGAM LIMITED (JBVNL). The institute falls under the NDS (II) tariff category.

NDS (II) tariff is applicable for all consumers, using electrical energy for light, fan and power loads for non-domestic purposes like shops, hospitals (govt. or private), nursing homes, clinics, dispensaries, restaurants, hotels, clubs, guest houses, marriage houses, public halls, show rooms, workshops, central air-conditioning units, offices (govt. or private), commercial establishments, cinemas, X-ray plants, MRI Centers, CAT Scan Centers, Pathologies Telephone Booths / PCO (STD / ISD), Fax Communication Centers, Photo Copiers, Cyber Café, **schools and colleges (govt. or private)**, boarding/ lodging houses, libraries (govt. or private), research institutes (govt. or private), railway stations, fuel-oil stations, service stations (including vehicle service stations), All India Radio/ T.V. installations, printing presses, commercial trusts/ societies, Museums, poultry farms, Duckery, Horticulture, Tissue culture Floriculture, Herbal-Medicinal-Bio Diesel Plant Farming, Food Processing Unit, Mushroom and Farming units, Banks, Theatres, Common facilities in multi-storied Commercial office/buildings, Dharmshala and such other installations not covered under any other tariff schedule.

The rates are given in the following table.

Tariff- Existing FY 2020-21				Proposed Tariff FY 23-24	
Category/ Sub-Category	Slabs	EC	FC	EC	FC
NDS	NDS-I (Rural) (0-400)	5.75 / kWh	50.00 / kW / Month	7.25 / kWh	200.00 / kW / Month
	NDS -I (Rural) (401 and above)			8.25 / kWh	200.00 / kW / Month
	NDS-II (Urban) (0-400)	6.00 / kWh	100.00 / kW / Month	8.00 / kWh	250.00 / kW / Month
	NDS-II (Urban) (401 and above)			9.00 / kWh	250.00 / kW / Month

The college is consuming an average of 2100 kWh/ month of electrical energy.

5.3.2. Electrical Consumers:

Institute does not have air conditioners. The list of common electrical consumers along with its typical electricity consumption is provided in the table below.

Sl. No.	Room No. / Name	Type of Electrical Device	Quantity	Power	Operation	
			Nos.	Watt	Hrs/Day	Days/Month
1	1	5 Fan4 LED	9	780x72	8/6	26/12
2	2	6 Fan5LED	11	780x72	8/6	26/12
3	3	6 Fan4 LED	10	520x36	8/6	26/12
4	4	6 Fan4 LED	10	520x36	8/6	26/12
5	5	5 Fan4 LED	9	520x36	8/6	26/12
6	6	5 Fan4 LED	9	520x37	8/6	26/12
7	7	5 Fan4 LED	9			26/12
8	8	6 Fan6 LED	12			26/12
9	9	7 Fan6 LED	13			26/12
10	10	6 Fan6 LED	12			26/12
11	Principal Chamber	2 Fan 3 LED	5		8/6	26/12
12	Head Clerk	1 Fan 2 LED	3		8/6	26/12
13	Seminar Hall	8 Fan 11 LED	19		8/6	26/12
14	ICT Lab	1 Fan 1 LED	2		8/6	26/12
15	HOME SC LAB	2 Fan 1 LED	3			

16	Geography Lab	1 FAN 2 LED	3			
17	CSC Common centre	1 fan 1 LED	2			
18	Library cum study Room	3 Fan 5 LED	8		8/6	26/12
19	C.C.T.V. L.E.D Screen	-	1	18"	8/6	25/12

Office space equipment

Sl. No.	Room No. / Name	Type	Quantity	Power	Operation		Star Rating
			Nos.	Watt	Hrs/Day	Days/Month	
1	Examination		4 fan 2Led		8/6	26/12	
2	Accountant		1fan 2 led		8/7	26/13	
3	IQAC				8/8	26/14	
4	Cash Counter & Marks Distribute, Inquiry counter		2 FAN 3 LED		8/9	26/15	
5	NSS				8/10	26/16	
6	Corridor		5 LED		8/11	26/17	
7	Corridor		1 LED		8/12	26/18	
8	Boys common room		1 Fan 1 Led		8/13	26/19	
9	Girls common room		1 Fan 2 Led		8/14	26/20	
10	Male toilet		4 LED		8/15	26/21	
11	Female toilet		5 LED		8/16	26/22	

5.4. Alternate Sources of Energy and Energy Conservation Measures

- The Institute is have install a Solar PV Rooftop system of 10kWp.
- Since the biodegradable waste generation is very low, there is no Bio-gas plant.
- Institute is using electricity from grid, Solar and DG.
- Institute has not installed any sensor-based energy conservation system yet.
- Institute have been replacing existing lighting fixtures with LEDs and energy efficient lighting.
- The Institute has air conditioners and most of the air conditioners are 3 star rated.

- Institute is utilizing the natural light to its maximum. The classroom and offices are designed in such a way that it allows maximum sunlight and reduces the requirement of artificial lights.

5.5. Waste Management:

Following data provide the details of the waste generated & the disposal method adopted by the college.

Waste Management Practices Adopted by the College:
The following table shows the quantum of waste generation from office, labs & canteen.

Approximate quantity of waste generated per day (in kg)				
Office	**Type of Waste**			
Quantity	**Biodegradable**	**Non-Biodegradable**	**Hazardous**	**Others**
< 1kg	0.5	0.2	0	0.2
2 - 10 kg				
> 10 kg				
Labs	**Type of Waste**			
Quantity	**Biodegradable**	**Non-Biodegradable**	**Hazardous**	**Others**
< 1kg	0.2	0	0	0
2 - 10 kg				
> 10 kg	√	2'5Kgs	Nil	

How the waste generated in the college is managed?		
Options	**Yes/No**	**Remark**
Composting / Vermicomposting	Yes	
Recycling	NO	
Reusing	NO	
Other Ways	NO	Dumped into Municipalities Garbage Bin

Waste generated in college	
Type	**Separate Collection**
E-waste	Yes Computer, LED, Wire
Hazardous Waste	NO
Solid waste	Yes 5 Septic Tanks
Dry Leaves	YES Vegetarian
Canteen Waste	Yes
Liquid Waste	YES Bathroom + Canteen
Glass	NO
Unused Equipment /Scrap	Yes
Napkins	YES
Others (Specify)	NO

- The waste generated is collected and disposed of by Local Authorities.
- There is no biomedical waste, hazardous chemicals and radioactive waste getting generated.
- The institute is segregating the waste into solid & liquid waste.

5.6. Green Campus:

The Institute has planted more than 70 no. of trees on the campus.

Table 6. List of plants in the campus

Si. No	Species	No. of Plants
1	Sagwan	4
2	Sisam	20
3	Jamun	1
4	Kranj	4
5	Amrud	3
6	Acassia	3
7	rose	1
8	Alovera	1
9	Kadi patta	1
10	Awala	1
11	udhul	1
12	Palm	1
13	Kadam	3
14	Ashok	4
15	Babul	8
16	kaner	3
17	Gular	5
18	Khajur	10
	TOTAL	74

5.6.1. Green Campus Initiatives:

The following are a few activities under green campus initiatives.

- Automobile entry is restricted to the campus.
- Institute is yet to adopt battery-powered vehicles for transportation. However, cycles are being used for internal transport.
- The pathways inside the campus are pedestrian friendly. The campus areas have been designed with the concept of open spaces including roads and lawns.
- The natural landscape has been preserved. There is a clear pedestrian connection through all campus roads and adequate parking facilities
- The Institute is segregating waste in to 'Dry Waste' and 'Wet Waste' before sending it for disposal.
- **Institute is a 'Plastic free' campus.**
- Awareness programmers, recycling plastics into reusable materials that do not harm the planet, alternatives to go plastic free, etc. are all afoot in college campuses.
- The college campus is landscaped with various trees & plants.
- Tree plantation is the major focus of the management to maintain the pristine purity and beauty of the institute to provide a congenial atmosphere for academic and non-academic pursuits.

5.6.2. Quality audits on Environment and Energy:

Institutes have initiated carrying out the following audit on regular basis.

1. Green Audit
2. Environmental Audit
3. Energy Audit

This is the first audit, and the institute plans to have such audits at regular frequency. Institute is carrying out many environmental promotion activities on the campus throughout the year. These activities include

- ✓ Cleanliness Drive
- ✓ Plantation Drive

The institute not only organizes such programs inside the campus but is also actively doing it outside the campus as well.

5.6.3. Disabled-Friendly Environment:

Institute has provided a ramp for easy access to classrooms for disabled students and staff. Wheelchairs are available for disabled students/ staff for movement in the campus.

5.6.4. Air Quality & Ventilation:

The classrooms and offices on the premises are well ventilated. The fans are operational and adequately placed to affect sufficient air changes. Fans installed are not star-rated.

5.6.5. Infrastructure Usage:

- College premises have multiple entrances and have broad passageways.
- The campus has a drainage system and there were no leakages/ seepages from the roof.
- The premises are equipped with fire extinguishers at required locations which are regularly checked and maintained.

5.6.6. Green IT Culture:

The institute is following a green IT culture.

- Email/ electronic communication mode is preferred to save papers.
- Both side printing is being adopted to save paper and trees.
- E-waste is not collected separately.

6. Carbon Footprint Analysis:

6.1. CO2e Calculation:

Scope	Source	Quantity	Emission Factor (kg CO_2/unit)	Emissions (kg CO_2/day)	Source of Emission Factor
Scope 1	Fuel used by four-wheelers	30 liters	2.68 kg CO_2/liter	80.4 kg CO_2	IPCC Guidelines
Scope 1	LPG cylinders	83.496 liters	1.51 kg CO_2/liter	126.08 kg CO_2	IPCC
Scope 1	Fuel used by generators	10 liters	2.68 kg CO_2/liter	26.8 kg CO_2	IPCC Guidelines
Scope 2	Grid Electricity	25200 kWh	0.716 kg Co2/kWh	18043 kg CO2	IPCC CEA Data

6.2. CO2 Reductions Measures

Source	Quantity	Avoided Emissions (kg CO_2/year)	Assumptions/Factors Used
10 kWp Solar Installation	45 kWh/day	13,468.5 kg CO_2/year	0.82 kg CO_2/kWh for grid electricity (India)
70 Trees Planted	70 trees	1,400 kg CO_2/year	20 kg CO_2/year/tree (India)
Total Annual Avoided Emissions		**14,868.5 kg CO_2/year**	

Sr. No	Description	Remark
1	Direct Emissions	Based on GHG Protocol
2	Indirect Emissions	No Data available
3	Reductions	Institute may install more Solar PV rooftop to offset the emission with cleaner & greener energy sources. Or Plant more trees to offset the emission.

7. SUGGESTIONS AND RECOMMENDATIONS:

7.1. Water Management:

- There should be a proper monitoring of water consumption pattern in the campus. The bore well should be installed with a water meter to monitor the consumption. The water meter readings to be recorded every day or every week at a fixed time.
- It is recommended to check water quality from bore well and R.O. water quality for dissolved oxygen, acidity, alkalinity, chloride, hardness, pH, and conductivity, total dissolved solids and E-coli/ coliform.
- The wash basin taps may be equipped with water saving fixtures.
- The flush tanks of the toilets may be fitted with a dual volume system.
- Institute may install drip irrigation system to water the garden and plants in the campus.

7.2. Energy Management:

1. Ceiling fans have a very good scope for reducing power consumed using a technology called Brushless DC Motor or simply BLDC motor. BLDC technology, in general, has been in the market for a couple of decades. The traditional fan uses an induction motor and typically consumes 70-90 watts. But BLDC fan, on the other hand, can reduce power consumption up to 65%.
2. Prominent advantages of BLDC motor over induction motor are Lower Electricity Consumption, Longer backup on Inverters (even on Solar), improved reliability, Noise reduction, longer lifetime.
3. Institute may consider replacing existing fan with BLDC fans which

Sr. No.	Parameters	Unit	Value
1	Total No. of Fans	Nos.	85
2	Power Drawn by Regular Fans	Watts	80
3	Power Drawn by BLDC Fans	Watts	35
4	Energy Saving per Fan	Watts	45
5	Operating Hours Per Day	Hrs/Day	8
6	Annual Operating Days	Days/Yr	312
7	Annual Energy Savings Per Fan	kWh	112.32
8	Annual Energy Savings – For 85 Fans	kWh	9547.20
9	Energy Cost	Rs. /kWh	6.5
10	Annual Cost Savings	Lacs Rs.	0.62
11	Estimated Investment	Lacs Rs.	2.56
12	Simple Payback	Years	4.1

4. The college may adopt sensor-based (occupancy sensors) energy conservation approach for offices, classrooms and washrooms as well.
5. No action is required to offset carbon emissions in the present scenario.

7.3. Green Campus:

Battery powered vehicles may be adopted in future to reduce emissions inside campus.

7.4. Waste Management:

College may undertake feasibility study to install sewage water treatment in the campus to recycle wastewater and use it in flush or for gardening purposes.

Efforts to be made to ban the use of plastic on the campus, and to encourage the use of biodegradable materials as alternatives. Try to achieve the goal of plastic free campus.

ac Single Phase Two Wire
Static Intelligent Energy Meter

0632

kW

Scroll

OLMS, Category C3 as per IS : 15939 Part 1

240V, 50 Hz,
Class : 1.0
Type : MCPL-12
Ref. Temp. 27°C
Warranty : 1 year

3200
imp/kWh

5-30A

Sr. No.: 798257

Optical Port

Mfg.: 01/2024

MAHASHAKTI ENERGY LTD.
Bathinda, Punjab(India)

GPS Map Camera

Karma, Jharkhand, India
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GPS Map Camera
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Google

जैविक (गीला) कचड़ा
BIODEGRADABLE WASTE
अजैविक (सूखा)
NON BIODEGRADABLE WASTE
Google
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रुम न.-D-6.D-7

J.T.C. COLLEGE

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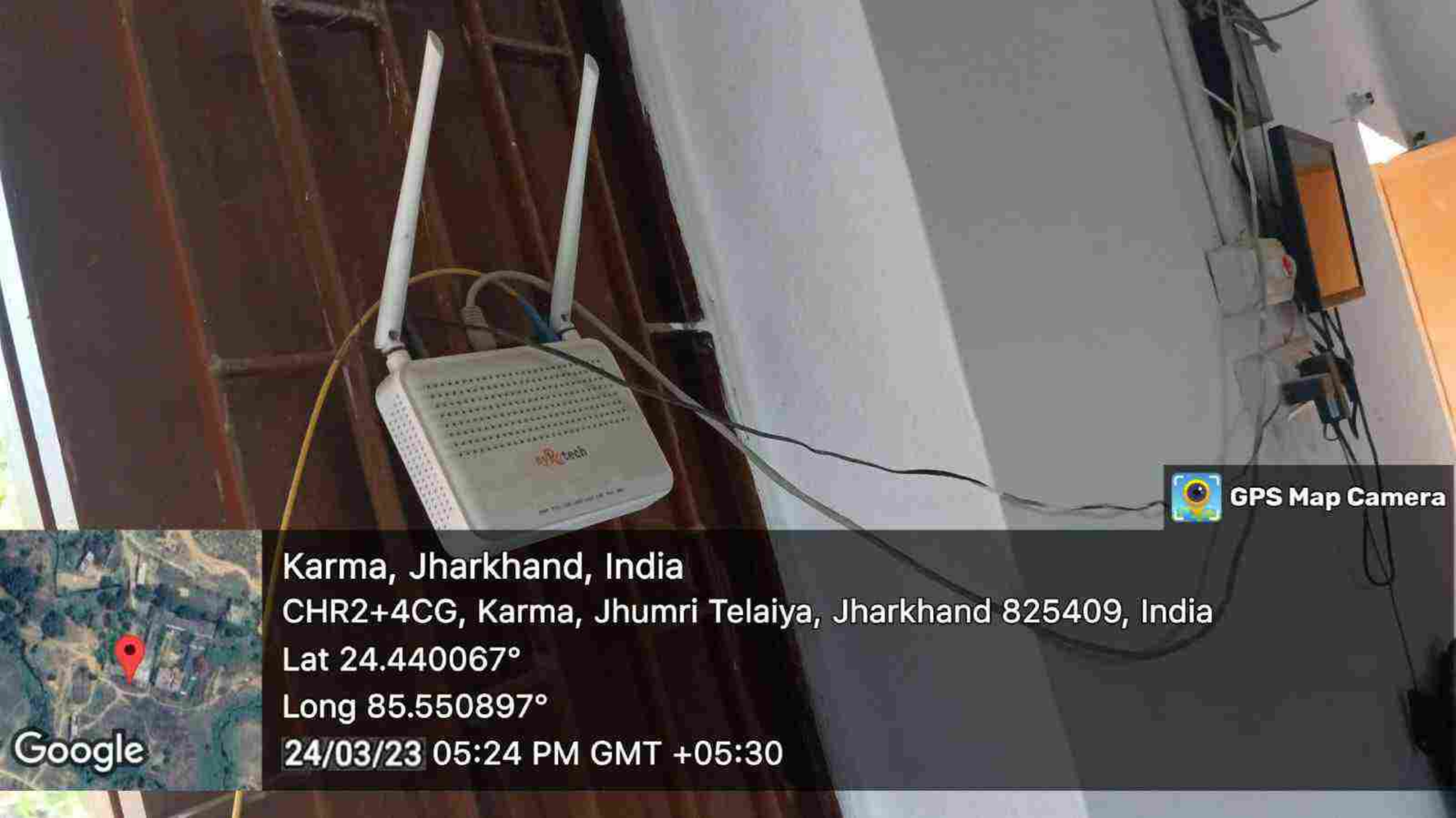
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GPS Map Camera

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D-3

CLASS ROOM 2

GPS Map Camera

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ACCOUNTANT OFFICE
GPS Map Camera
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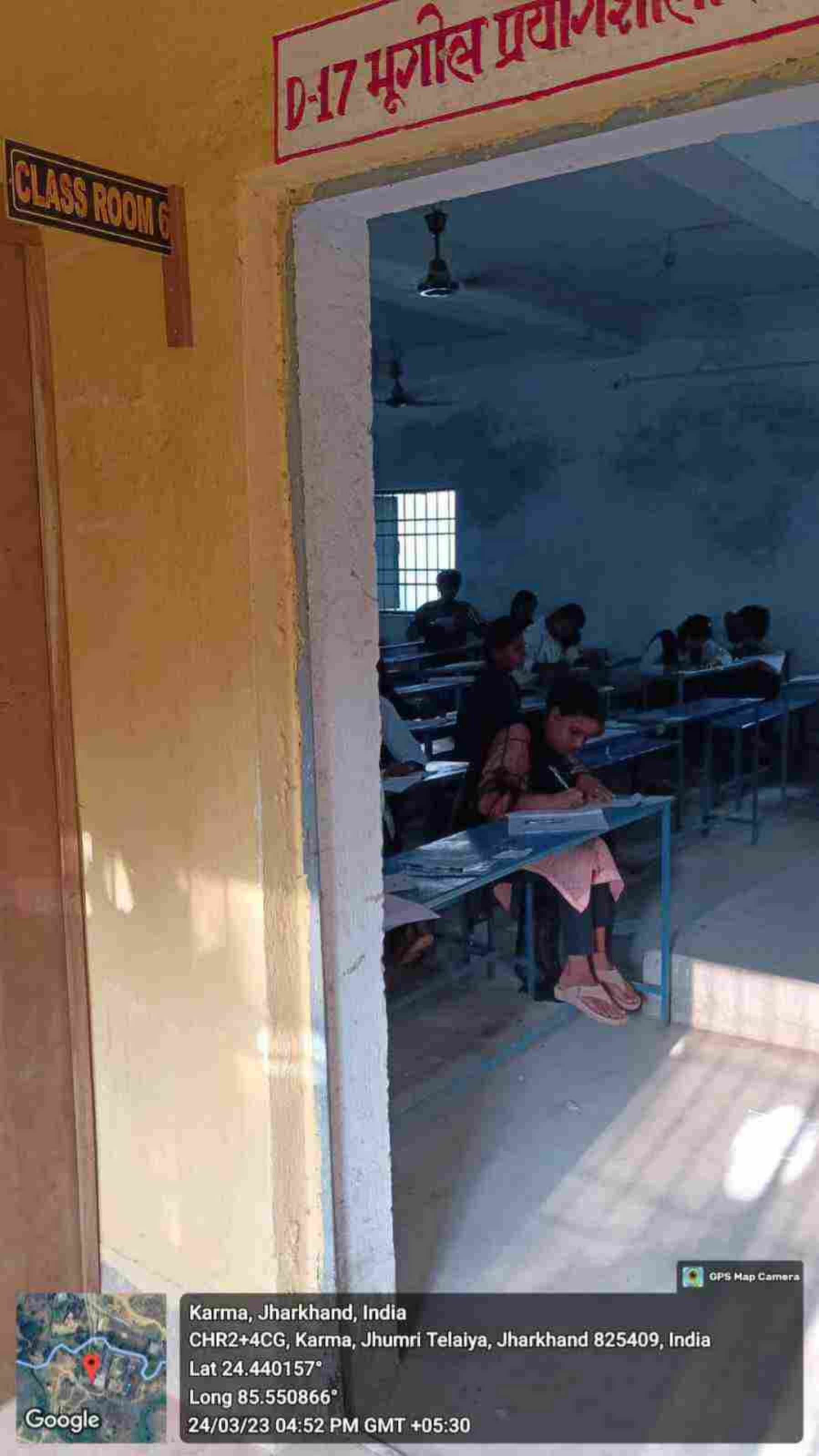
D-17 भूगोल प्रयोगशाला
CLASS ROOM 6
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D-2

CLASS ROOM 1

GPS Map Camera

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D-9

CLASS ROOM 5

GPS Map Camera

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D-6

CLASS ROOM 3

GPS Map Camera

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D-7

CLASS ROOM 4

GPS Map Camera

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GIRLS COMMON ROOM

GPS Map Camera

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EXAMINATION SECTION

D-22 CONTROL ROOM

LIBRARY CUM. READING ROOM
TEACHER
COMMON ROOM
GPS Map Camera
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Google

GIRLS TOILET

D-24 GIRLS TOILET

GPS Map Camera

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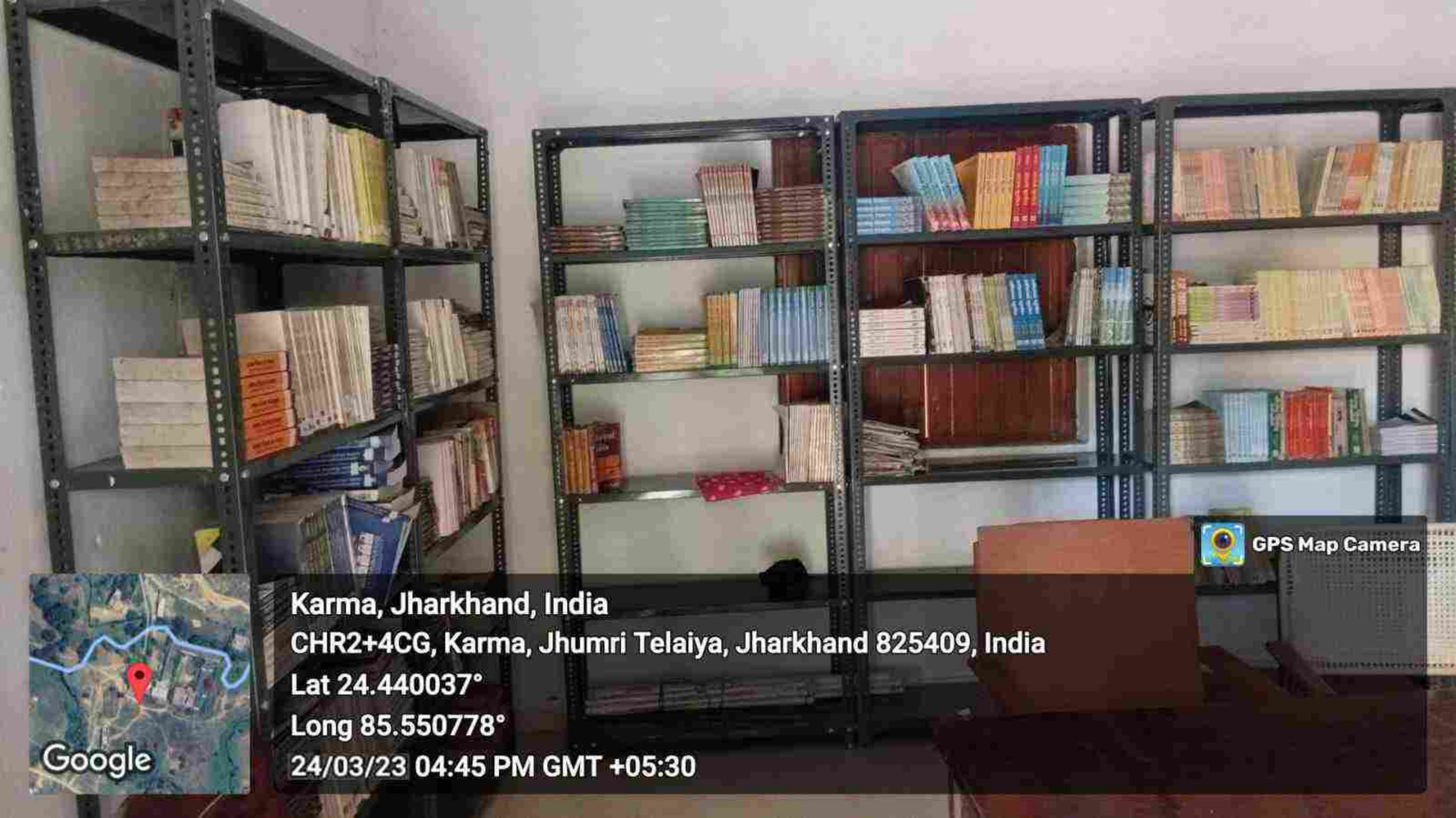
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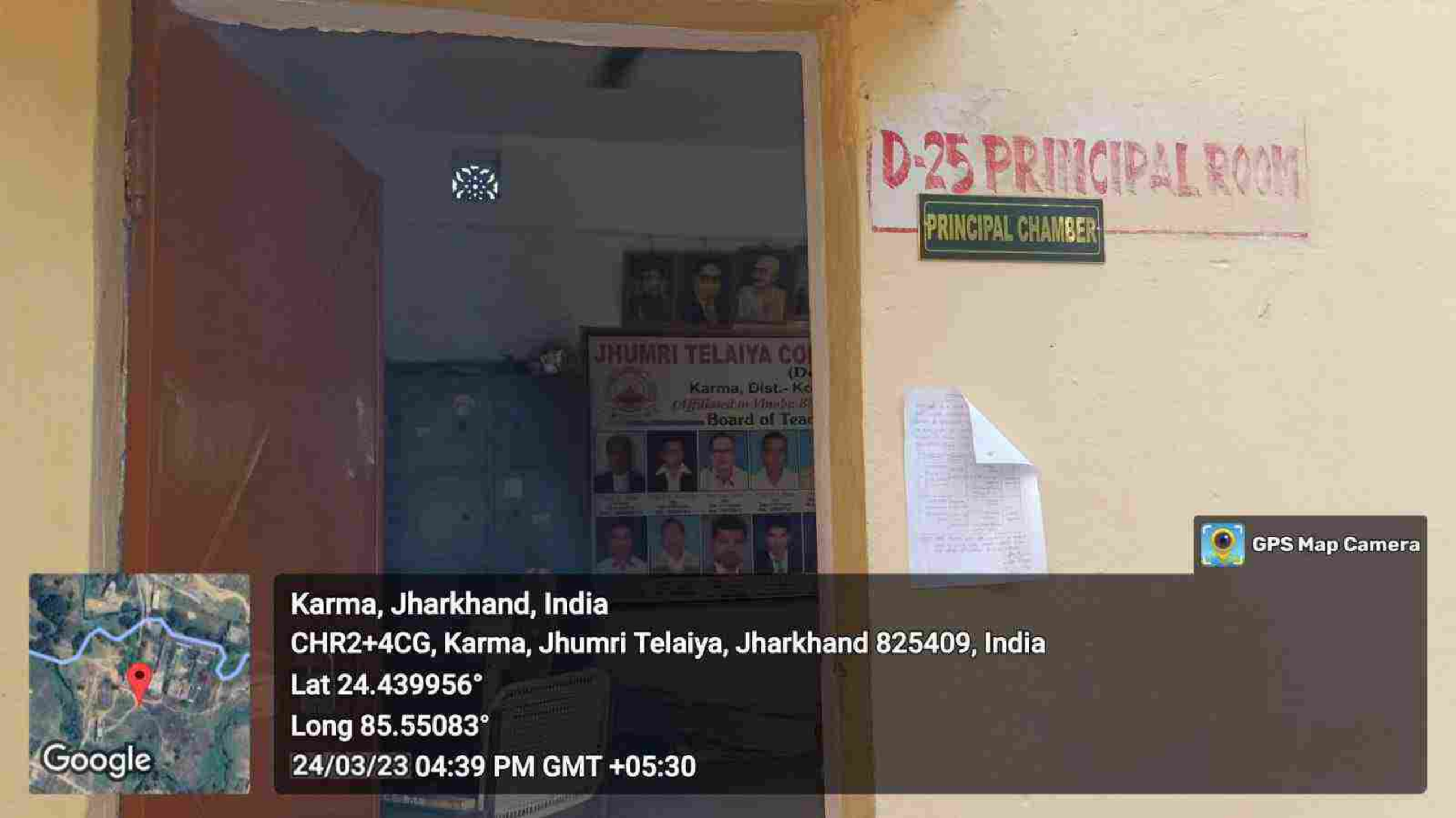
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PRINCIPAL CHAMBER
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Karma, Dist.- Ko
Board of Tea
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SEMINAR HALL

GPS Map Camera

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GEOGRAPHY LAB
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D-20 व्याख्यान कक्ष

CLASS ROOM 9

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D-19 व्याख्यान कक्ष

CLASS ROOM 8

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BOYS TOILET

D-23 GENTS

GPS Map Camera

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कॉमर्स कॉलेज
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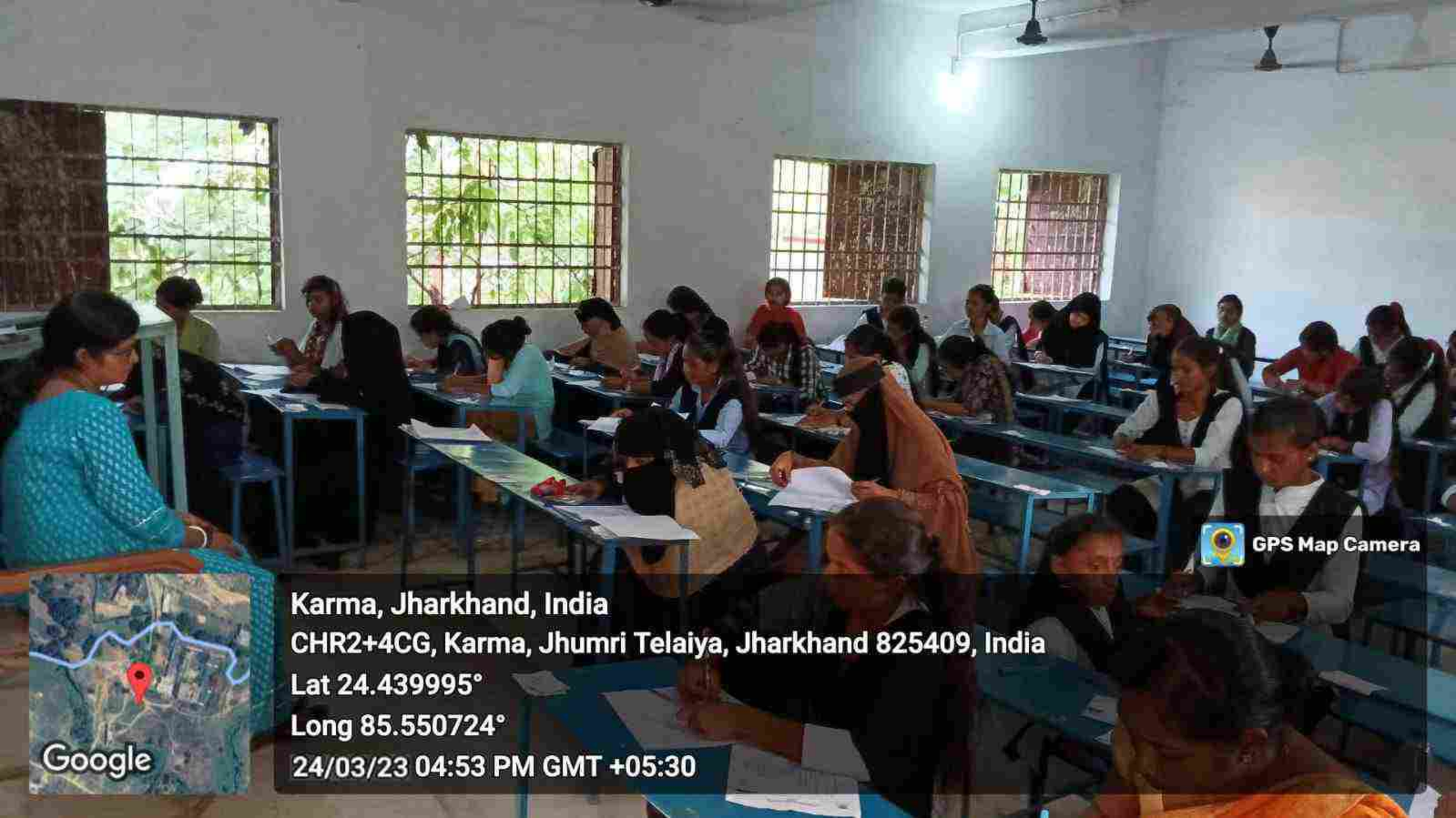
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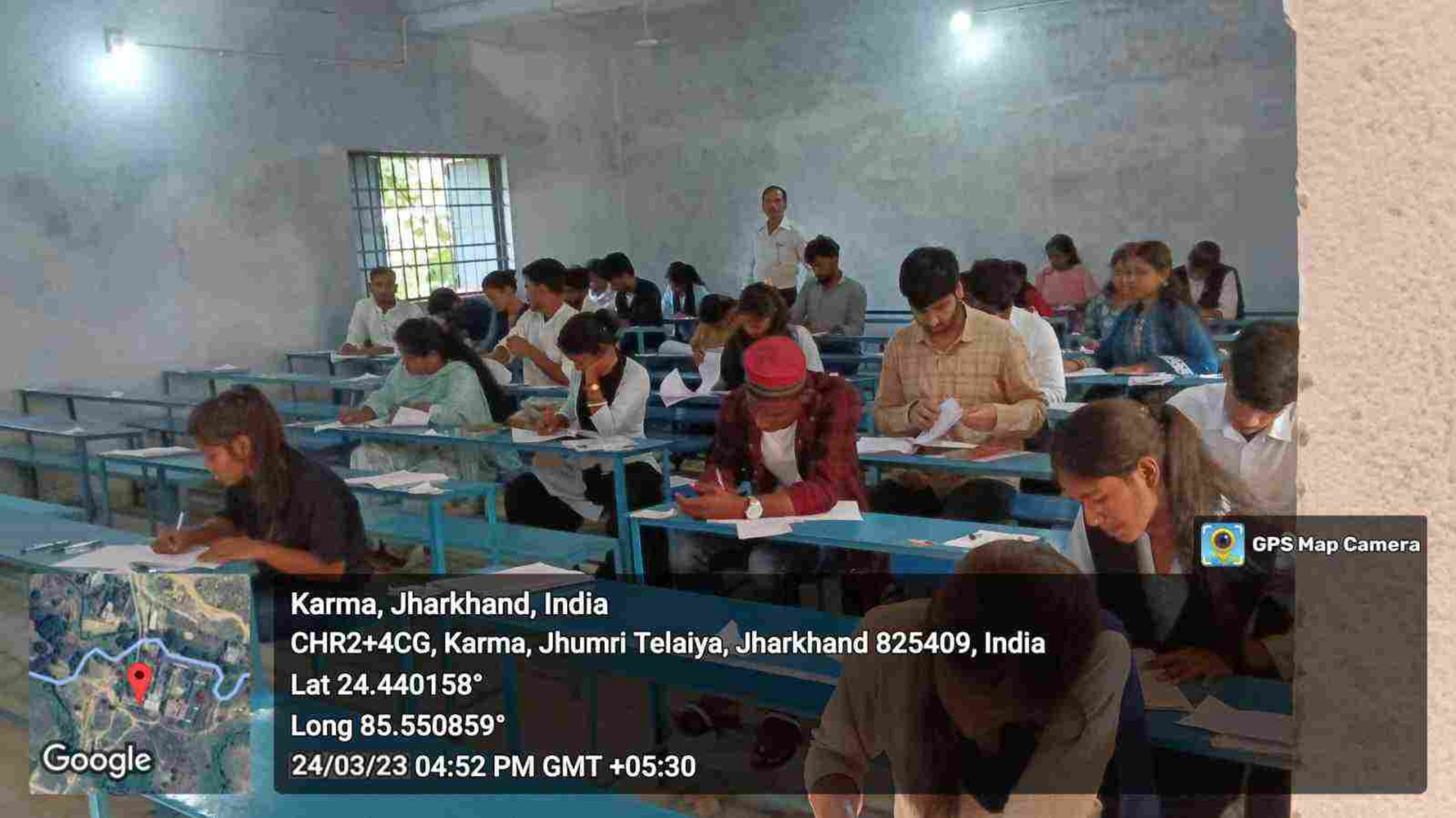
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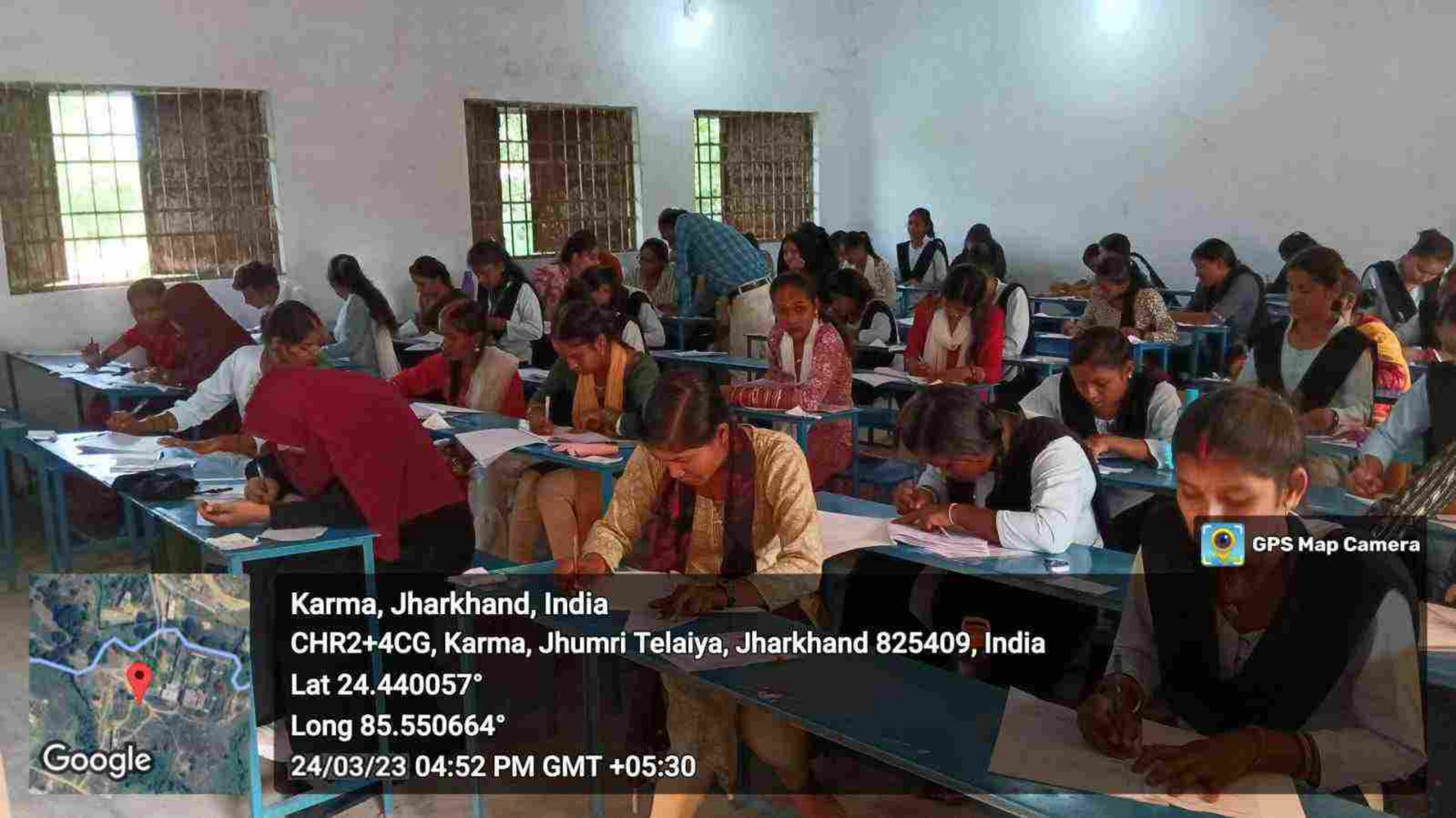
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नारियल
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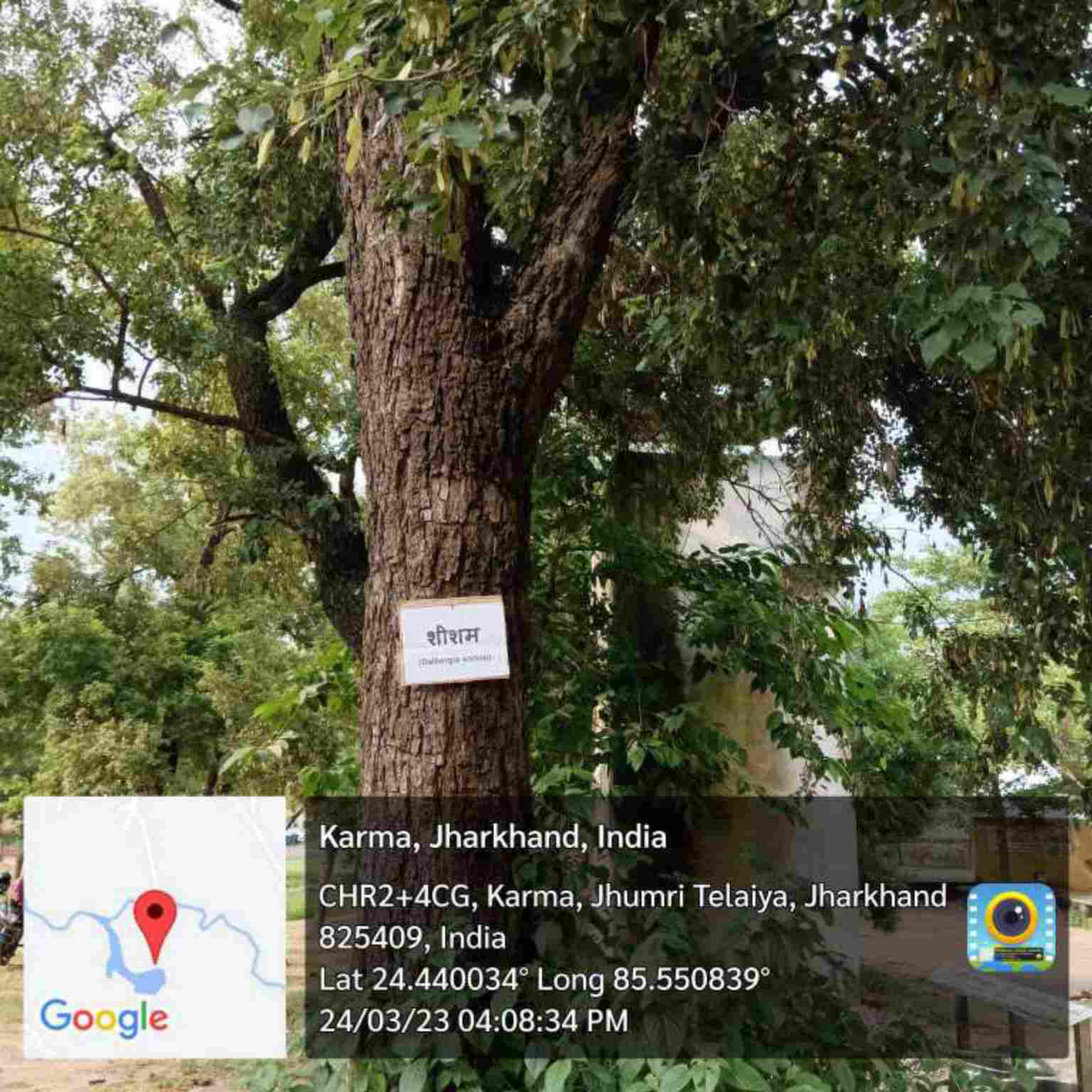
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सागवान

Karma, Jharkhand, India

CHR2+4CG, Karma, Jhumri Telaiya, Jharkhand 825409, India

Lat 24.43995° Long 85.55098°

24/03/23 02:42:25 PM

पलाश
(Butea monosperma)
Google
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घृत कुमारी
(Aloe barbadensis)

Karma, Jharkhand, India

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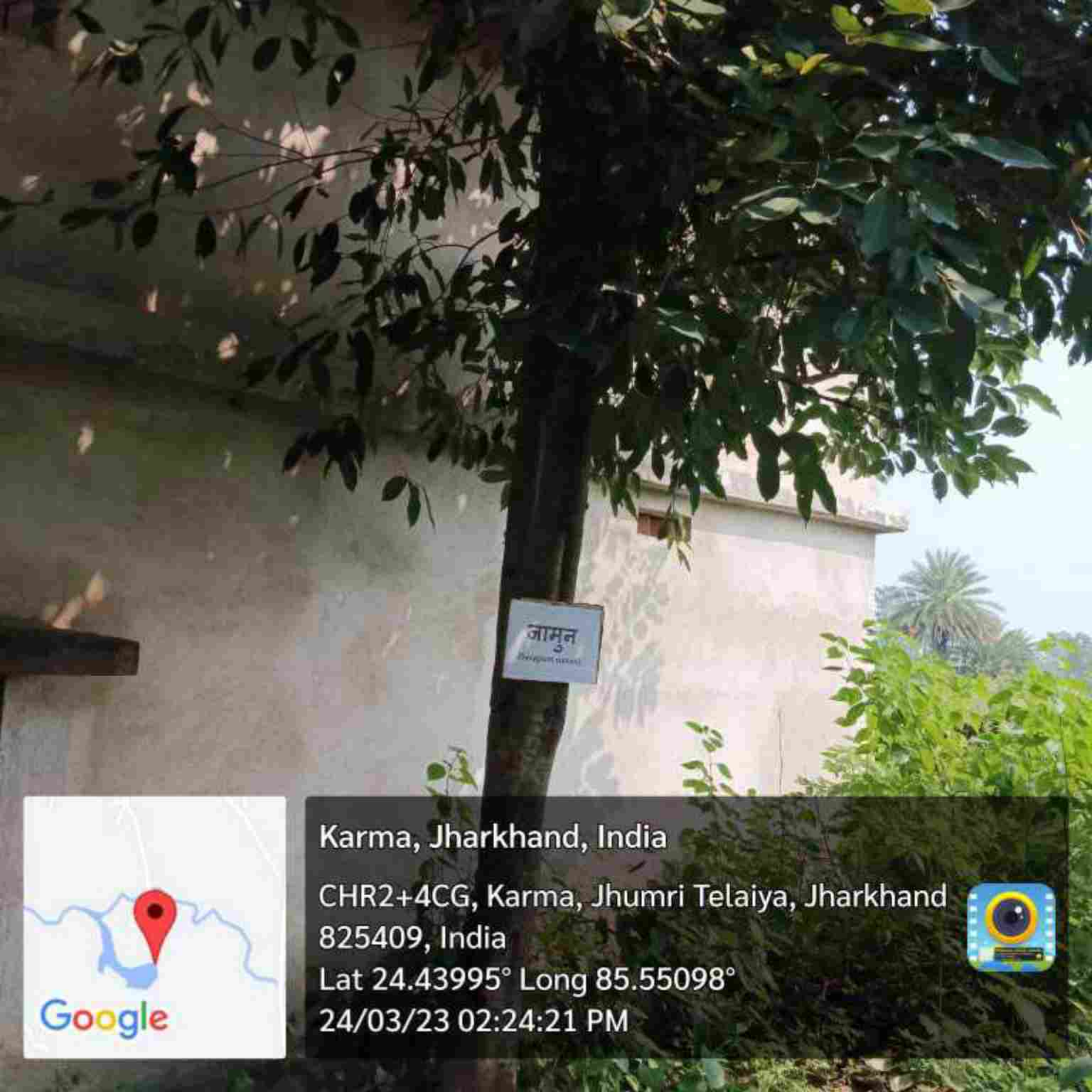
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गुड़हल
(Hibiscus)

Karma, Jharkhand, India

CHR2+4CG, Karma, Jhumri Telaiya, Jharkhand 825409, India

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करी पत्ता

(MURRAYA KOENIGII)

Karma, Jharkhand, India

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गम्हार
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अशोक
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नीम

(Azadirachta indica)

Karma, Jharkhand, India

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गुलाब
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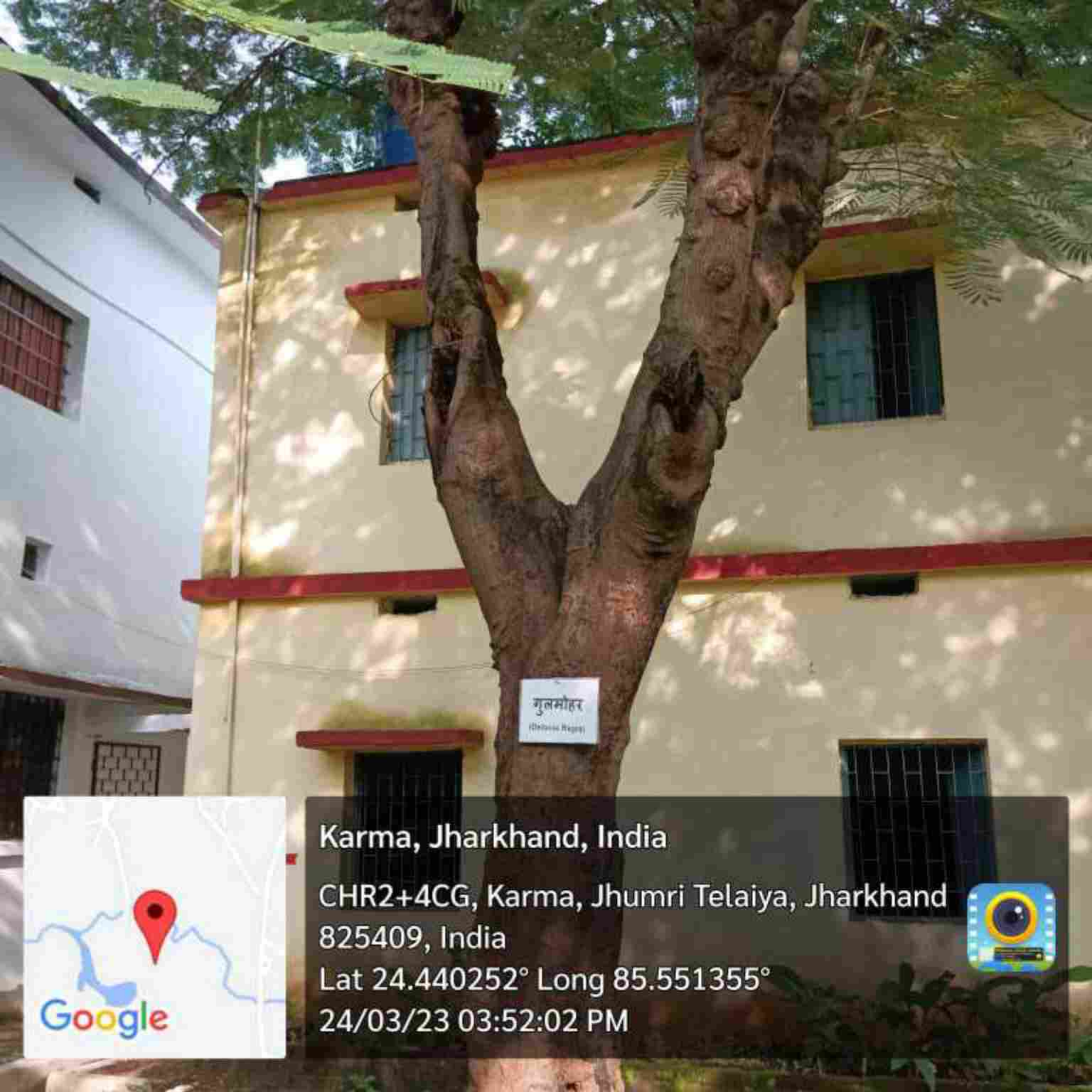
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Google
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नागेश्वर

(Mesua ferrea L)

Jhumri Telaiya, Jharkhand, India

CHQ2+H5, Jhumri Telaiya, Bhandarwa, Jharkhand 825409, India

Lat 24.439096° Long 85.550917°

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सागवान

Karma, Jharkhand, India

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Lat 24.43995° Long 85.55098°

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GPS Map Camera
Karma, Jharkhand, India
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Karma, Jharkhand, India

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Karma, Jharkhand, India

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