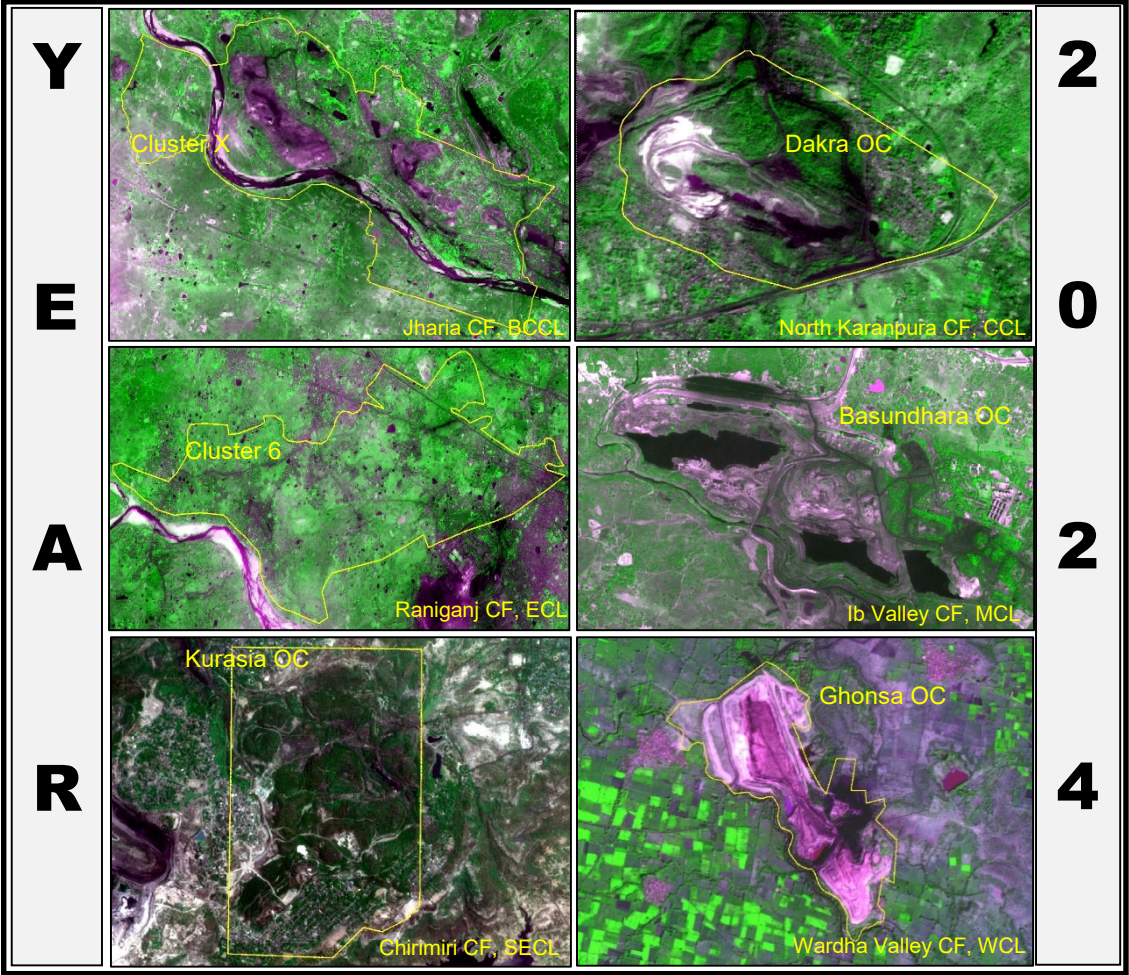


Land Restoration/Reclamation Monitoring of 39 (OC/UG and Cluster) Mine Projects of CIL producing less than 5 mcm (Coal+OB) annually based on Satellite Data for the Year 2024



कोल इंडिया लिमिटेड के ५ मिलियन घन मीटर(कोल+ अधिभार) से कम
उत्पादन क्षमता वाले ३९ (खुली/भूमिगत एवं क्लस्टर) खदानों के भूमि पुनरुद्धार हेतु वर्ष
२०२४ के उपग्रह डाटा के आधार पर निगरानी का वार्षिक प्रतिवेदन

**Land Restoration / Reclamation Monitoring of 39 (OC/UG and Cluster) Mine
Projects of CIL producing less than 5 mcm (Coal+OB) annually
based on Satellite Data for the Year 2024**

March- 2025



**Remote Sensing Cell
Geomatics Division
CMPDI, Ranchi**

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कार्यकारी सारांश

१.० प्रोजेक्ट

कोल इंडिया लिमिटेड के विभिन्न सहायक कंपनियों से संबंधित ५ मिलियन घन मीटर (कोल+ अधिभार) से **कम** उत्पादन क्षमता वाले ३९ क्लस्टर एवं खुली/भूमिगत खदानों के भूमि पुनरुद्धार हेतु वर्ष २०२४ के उपग्रह डाटा के आधार पर वार्षिक निगरानी।

२.० उद्देश्य

भूमि पुनरुद्धार (लैंड रिक्लेमेशन) का उद्देश्य पट्टाक्षेत्र में बैकफील, वृक्षारोपण, सामाजिक वानिकी, सक्रिय उत्खनन क्षेत्र, जल निकाय (वाटर ड्रेनेज) बंजर भूमि, कृषि भूमि और जंगल के विभिन्न प्रकार के वितरण प्रणाली के क्षेत्र का आकलन करने के लिए है। यह अध्ययन न केवल उपरोक्त सभी खुली खदानों के भूमि पुनरुद्धार (लैंड रिक्लेमेशन) का निगरानी के प्रगति का आकलन में मदद करेगा बल्कि पर्यावरण संरक्षण के लिए आवश्यक उपचारात्मक उपायों को क्रियान्वित करने में भी सहायता करेगा।

३.० मुख्य निष्कर्ष

- कोल इंडिया द्वारा चयनित विभिन्न खदानों के निगरानी हेतु वर्ष २०२४ में कुल ३९ परियोजनाओं को कोल इंडिया लिमिटेड के कार्यदेश के अनुसार उपग्रह डाटा के आधार पर भूमि पुनरुद्धार की निगरानी हेतु चुना गया।
- ३९ क्लस्टर एवं खुली/भूमिगत खदानें जिनका वर्ष २०२४ के उपग्रह डाटा के आधार पर भूमि पुनरुद्धार की निगरानी हेतु चयनित किया गया है उनका कुल पट्टा क्षेत्र ४२५८०.१७ हैक्टर है तथा उत्खनन क्षेत्र ३७३७.२५ हैक्टर है। जिसमें ७८६.०४ हैक्टर (२१.०३%) क्षेत्र में जैविक पुनरुद्धार किया गया है, १६५९.४५ हैक्टर (४४.४०%) क्षेत्र में तकनीकी पुनरुद्धार कार्य प्रगति पर है तथा शेष १२९१.७६ हैक्टर (३४.५६%) क्षेत्र सक्रिय खनन के अंतर्गत आता है। उपग्रह डाटा के विश्लेषण से स्पष्ट है कि ३९ क्लस्टर एवं खुली/भूमिगत खदानों के कुल उत्खनन क्षेत्र ३७३७.२५ हैक्टर के २४४५.४९ (६५.४४%) क्षेत्र में कुल भूमि पुनरुद्धार का कार्य किया गया है। परियोजनानुसार विवरण तालिका-१.१ और लेखा -१.१ में प्रदर्शित किया गया है।
- वर्ष २०२४-२५ में विभिन्न कोयला कंपनियों के चयनित ३९ क्लस्टर एवं खुली/भूमिगत खदानों का भूमि पुनरुद्धार के तुलनात्मक विश्लेषण वर्ष २०१९/२०/२१/२२/२३ के सापेक्ष में करने पर पता चलता कि भूमि पुनरुद्धार का क्षेत्र वर्ष २०१९/२०/२१/२२/२३ के २०९५.२६ हैक्टर की तुलना में वर्ष २०२४-२५ में बढ़कर २४४५.४९ हैक्टर हो गया है। कुल भूमि पुनरुद्धार में जैविक और तकनीकी पुनरुद्धार दोनों ही शामिल है। वर्ष २०२४-२५ में कुल भूमि पुनरुद्धार में ३५०.२३ हैक्टर की यह वृद्धि पर्यावरण संरक्षण की दिशा में कोल इंडिया के विभिन्न सहायक कम्पनियों द्वारा पर्यावरण संरक्षण की

दिशा में किए गए सतत प्रयास का परिणाम है। जिनका परियोजनानुसार विवरण लेखा -१.२ में दर्शाया गया है।

- यह देखा गया है कि कोल इंडिया के प्रायः सभी सहायक कंपनियों के उत्खनन क्षेत्र में तकनीकी पुनरुद्धार के बढ़ते हुए रुझान का पता चलता है। वर्ष २०२४ के उपग्रह डाटा के पूर्ववर्ष (२०१९/२०/२१/२२/२३) तुलनात्मक विश्लेषण से यह पता चलता है कि वर्ष २०२४ में तकनीकी पुनरुद्धार के क्षेत्र में कुल समग्र वृद्धि २५४.४९ हैक्टर का आकलन किया गया है।
- पूर्ववर्ष (२०१९/२०/२१/२२/२३) से वर्ष २०२४ के उपग्रह डाटा के तुलनात्मक विश्लेषण से यह पता चलता है कि वर्ष २०२४-२५ में एसईसीएल, बीसीसीएल और सीसीएल, में जैविक पुनरुद्धार के अंतर्गत क्षेत्र में वृद्धि पाई गई। जैविक पुनरुद्धार के अंतर्गत क्षेत्र तालिका-१.१ से पूर्णतः स्पष्ट हो जाता है।
- यह भी पाया गया है कि कोल इंडिया की सहायक कंपनियाँ डब्लूसीएल, एसईसीएल और सीसीएल के पट्टाक्षेत्र में कुल वृक्षारोपण (हरित क्षेत्र) जिसमें बैकफील, अधिभार डंपिंग क्षेत्र में वृक्षारोपण तथा सामाजिक वानिकी के अंतर्गत वृक्षारोपण सम्महित है इनमें वृद्धि दर्ज किया गया है। जबकि एमसीएल, बीसीसीएल और ईसीएल के कुल हरित क्षेत्र में थोड़ी कमी का मुख्य कारण अधिभार का हरित क्षेत्र पर डालना या डम्पिंग, नए रोड बनना इत्यादि हो सकता है। विश्लेषण के अनुसार २०२४-२५ में कोल इंडिया के सभी सहायक कोयला कंपनियों के तहत आनेवाले परियोजनाओं के कुल पट्टाक्षेत्र में ८.०३ प्रतिशत हरित क्षेत्र (कुल वृक्षारोपण) के अंतर्गत पाया गया है।
- वर्ष २०२४ के उपग्रह डाटा के विश्लेषण से यह पता चलता है कि कोल इंडिया के प्रायः सभी सहायक कंपनियों के भूमि पुनरुद्धार में बढ़ोतरी हुई है। वर्ष २०२४-२५ में विभिन्न कोयला कंपनियों के चयनित ३९ क्लस्टर एवं खुली/भूमिगत खदानों का भूमि पुनरुद्धार के तुलनात्मक विश्लेषण वर्ष २०१९/२०/२१/२२/२३ से करने पर पता चलता है कि भूमि पुनरुद्धार का क्षेत्र वर्ष २०१९/२०/२१/२२/२३ के २०९५.२६ हैक्टर (६४.७८%) की तुलना में वर्ष २०२४ में बढ़कर २४४५.४९ हैक्टर (६५.४४%) वर्ग किलोमीटर हो गया।

वर्ष २०२४ के उपग्रह डाटा के आधार पर चयनित क्लस्टर एवं खुली/भूमिगत खदानों के वार्षिक निगरानी से संबंधित विश्लेषण, पाई चार्ट के माध्यम से चार्ट - १.१ में दर्शाया गया है। २०२४ में कोल इंडिया की सहायक कंपनियों में भूमि पुनरुद्धार की स्थिति बार चार्ट के द्वारा चार्ट - १.२ में दर्शाया गया है। भूमि पुनरुद्धार और हरित क्षेत्र की स्थिति को बार चार्ट के द्वारा क्रमशः चार्ट - १.३ और चार्ट - १.४ में दर्शाया गया है।

Executive Summary

1.0 Project

Land restoration / reclamation monitoring of 39 Cluster and OC/UG coal mines in different subsidiaries of Coal India Ltd. (CIL) producing less than 5 million cu.m. (Coal+OB) per annum based on satellite data on triennial basis.

2.0 Objective

Objective of the land restoration / reclamation monitoring is to assess the area under backfilling, plantation, social forestry, active mining area, water bodies, distribution of wasteland, agricultural land and forest in the leasehold area of the projects. This will help in assessing the progressive status of mined land reclamation and to take up remedial measures, if any, required for environmental protection.

3.0 Salient Findings

- In the year 2024, amongst projects of different subsidiaries of Coal India Ltd. taken up 39 (Clusters and OC/UG) mines for monitoring.
- Out of the total mine leasehold area of 42580.17 Ha of the 39(Clusters and OC/UG) projects considered for monitoring during 2024-25; total excavated area is 3737.25 Ha; out of which 1659.45 Ha area (44.40%) is under backfilling (Technical Reclamation), 786.04 area (21.03%) has been planted (Biologically Reclaimed) and 1291.76 Ha area (34.56%) is under active mining. It is evident from the analysis that 2445.49 Ha (65.44%) area out of the total excavated area of 3737.25 Ha of the 39(Clusters and OC/UG) projects is already under reclamation and balance 1291.76 Ha (34.56%) area is under active mining. Company wise details are given in Table – 1.1& Chart-1.2.
- On comparing the status of land reclamation carried out in previous year (2019/20/21/22/23) with respect to year 2024-25 in the 39(Clusters and OC/UG) projects of different CIL subsidiaries, it is evident from the analysis that area under land reclamation has increased from 2095.26 Ha (2019/20/21/22/23) to 2445.49 Ha (Yr. 2024-25), which includes both area under plantation (Biological Reclamation) and areas under backfilling (Technical Reclamation). This increase of 350.23 Ha area of land reclamation is the result of the efforts made by CIL's subsidiary companies towards land reclamation. Year wise comparison in land reclamation in different subsidiaries is given in Chart 1.3.

- It has been observed that in all the subsidiaries of Coal India Limited (CIL), technical reclamation has shown an increasing trend. As compared to the analysis done in the year 2019/20/21/22/23, it has been found that there has been an overall increase of 254.49 Ha in area under technical reclamation commutatively in the year 2024.
- It has been observed that in WCL, SECL, BCCL, MCL, CCL&ECL area under biological reclamation has increased in comparison to previous study. In CCL biological reclamation has marginally reduced. (Refer Table-1.1).
- In has been also observed that in subsidiaries like WCL, SECL&CCL, total area under plantation (Green Cover) which includes plantation over backfill, plantation over overburden dumps and plantation done under social forestry etc. has increased as compared to previous years of study.

However, in MCL, BCCL& ECL, there has been marginal decrease in area under green cover due to fresh dumping activities, construction of roads and mine advancement in some projects. All these factors have contributed for decrease in Green Cover.

Overall, 8.03% of the total leasehold area of all the subsidiaries of CIL commutatively is under Green Cover as per the analysis of satellite data of the year 2024.

- Analysis of the results based on satellite data of the year 2024 also indicate that all subsidiaries of CIL, whose projects were under monitoring indicate an increasing trend for area under reclamation. It has been observed that total area under reclamation has increased from 2095.26 Ha (64.78%) in 2019/20/21/22/23 to 2445.49 Ha (65.44%) in the year 2024.

Commutative Status of Land Reclamation monitoring based on satellite data of the year 2024 is indicated in the Pie Chart in Chart-1.1. Subsidiary wise status of Land Reclamation Monitoring of the projects monitored based on satellite data of the year 2024 is shown in form of Bar Chart at Chart-1.2. Comparison of Area under Reclamation and Green Cover in different subsidiaries of Coal India Limited between the years 2019/20/21/22/23 to 2024 has been shown in form of Bar- Chart in Chart-1.3& 1.4. The composite land reclamation status in remaining mines of every listed subsidiaries (<5 MCM Coal+OB) as per clause 2(ii) of the received work order from CIL has been incorporated under sub table of their respective Table1.

Table 1.1: Status of Land Reclamation in different Subsidiary

Subsidiary wise Land Reclamation Status in OC/UG and Clusters Projects <5 million Cu.m. (Coal + OB) based on Satellite Data of the Year 2024

Sl. No.	Coal Company (No. of OC/UG Projects and Cluster of mines)		Area in Hectare (% calculated in respect of total excavated area)																	
			Leasehold Boundary	Technical Reclamation		Plantation						Area under Active Mining	Total Excavated Area		Total Area under Plantation (% Green Cover generated in Leasehold)		Total Area under Reclamation			
						Biological Reclamation		Other Plantation												
				Area under Backfilling	Area under Plantation on backfill	Plantation on External OB Dumps		Social Forestry, Avenue Plantation etc.												
1	2		3		4		5		6		7		8		9 (=4+5+8)		10 (=5+6+7)		11 (=4+5)	
	2019/20/21/22/23	2024	2019/20/21/22/23	2024	2019/20/21/22/23	2024	2019/20/21/22/23	2024	2019/20/21/22/23	2024	2019/20/21/22/23	2024	2019/20/21/22/23	2024	2019/20/21/22/23	2024	2019/20/21/22/23	2024	2019/20/21/22/23	2024
(A)	PROJECT WISE (OC)																			
1	WCL (05)	WCL (05)	1436.98	1436.98	16.29 5.31%	25.67 6.85%	0.00 0.00%	0.00 0.00%	119.22	155.92	51.97	66.73	290.67 94.69%	349.31 93.15%	306.96	374.98	171.19 11.91%	222.65 15.49%	16.29 5.31%	25.67 6.85%
2	SECL (15)	SECL (15)	10180.17	10239.95	332.60 34.79%	275.26 28.91%	498.45 52.14%	570.68 59.94%	5.10	4.61	329.84	424.70	124.95 13.07%	106.20 11.15%	956.00	952.14	833.39 8.19%	999.99 9.77%	831.05 86.93%	845.94 88.85%
4	MCL (01)	MCL (01)	437.10	437.10	143.13 71.13%	147.36 72.83%	0.00 0.00%	0.00 0.00%	8.53	6.32	10.13	10.13	58.10 28.87%	54.98 27.17%	201.23	202.34	18.66 4.27%	16.45 3.76%	143.13 0.00%	147.36 0.00%
5	CCL (5)	CCL (8)	1446.20	2115.60	176.04 35.22%	256.68 37.91%	129.93 26.00%	134.30 19.84%	54.78	76.14	50.16	75.29	193.84 38.78%	286.04 42.25%	499.81	677.02	234.87 16.24%	285.73 13.51%	305.97 61.22%	390.98 57.75%
6	ECL(0)	ECL (1)	-	600.00	-	5.00	-	0.00	-	0.00	-	13.00	-	12.00	-	17.00	-	13.00	-	5.00
TOTAL (A) (26)		TOTAL (A) (30)	13500.45	14829.63	668.06 34.02%	709.97 31.93%	628.38 31.99%	704.98 31.71%	187.63	242.99	442.10	589.85	667.56 33.99%	808.53 36.36%	1964.00	2223.48	1258.11 9.32%	1537.82 10.37%	1296.44 66.01%	1414.95 63.64%
(B)	CLUSTERS WISE																			
1	BCCL (05)	BCCL (05)	9411.54	9411.54	712.90 58.52%	923.48 63.18%	61.92 5.08%	81.06 5.55%	149.84	98.69	757.18	752.62	443.36 36.40%	457.23 31.28%	1218.18	1461.77	968.94 10.30%	932.37 9.91%	774.82 63.60%	1004.54 68.72%
2	ECL (04)	ECL (04)	18339.00	18339.00	24.00 46.15%	26.00 50.00%	0.00 0.00%	0.00 0.00%	0.00	0.00	988.00	948.00	28.00 53.85%	26.00 50.00%	52.00	52.00	988.00 5.39%	948.00 5.17%	24.00 46.15%	26.00 50.00%
TOTAL (B) (09)		TOTAL (B) (09)	27750.54	27750.54	736.90 58.02%	949.48 62.72%	61.92 4.87%	81.06 5.35%	149.84	98.69	1745.18	1700.62	471.36 37.11%	483.23 31.92%	1270.18	1513.77	1956.94 7.05%	1880.37 6.78%	798.82 62.89%	1030.54 68.08%
TOTAL CIL (A+B) (35) Less than 5 MCM		TOTAL CIL (A+B) (39) Less than 5 MCM	41250.99	42580.17	1404.96 43.44%	1659.45 44.40%	690.30 12.29%	786.04 21.03%	337.47	341.68	2187.28	2290.47	1138.92 35.22%	1291.76 34.56%	3234.18	3737.25	3215.05 7.79%	3418.19 8.03%	2095.26 64.78%	2445.49 65.44%

Note: In reference of the above Table, different parameters are classified as follows:

- Area under Biological Reclamation includes areas under plantation done on backfilled area only.
- Area under Technical Reclamation includes area under barren backfilled only
- Area under Active mining includes coal quarry site, quarry filled with water etc.
- Social Forestry and Plantation on external OB dump are not included in Biological Reclamation and are put under separate categories as shown in the table.
- (%) calculated in the above table is in respect of total excavated area except for "Total area under plantation" where (%) is calculated in terms of leasehold area.

STATUS OF LAND RECLAMATION WITHIN THE LEASEHOLD OF 30 OC/UG MINES & 09 CLUSTERS OF MINES FOR MONITORING IN THE YEAR 2024-25

(For projects producing Less than 5 MCM Coal+OB)
(Pie chart indicated distribution of Total Excavated Area Only)

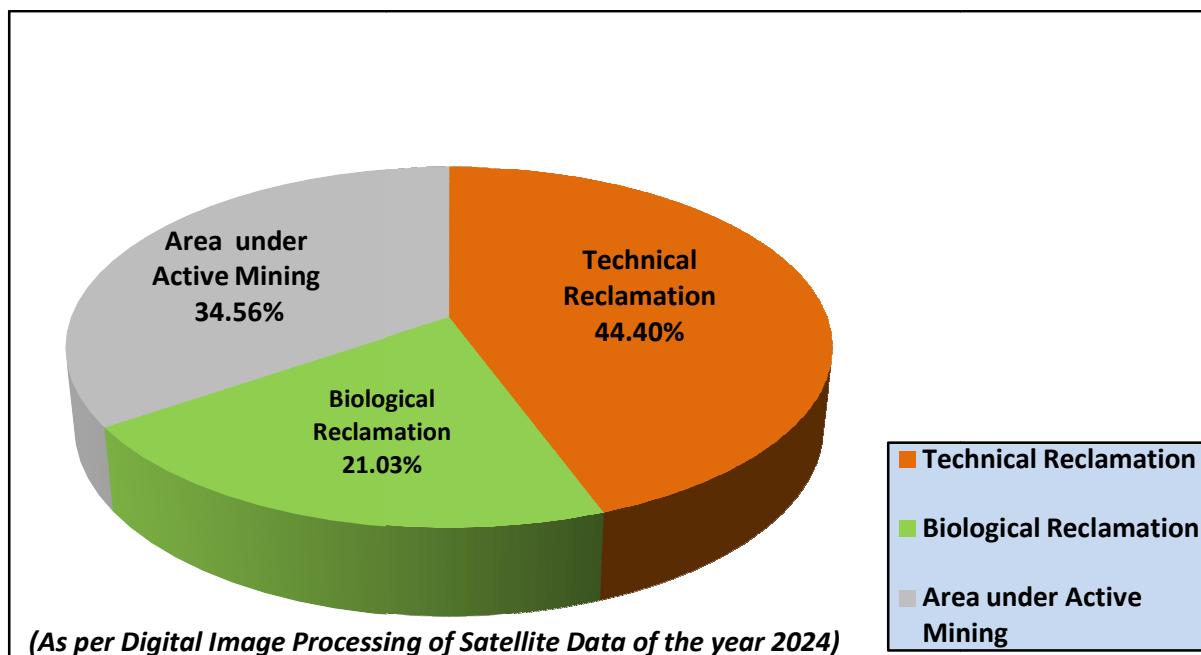


Chart 1.1: Pie Chart Showing Status of Land Reclamation

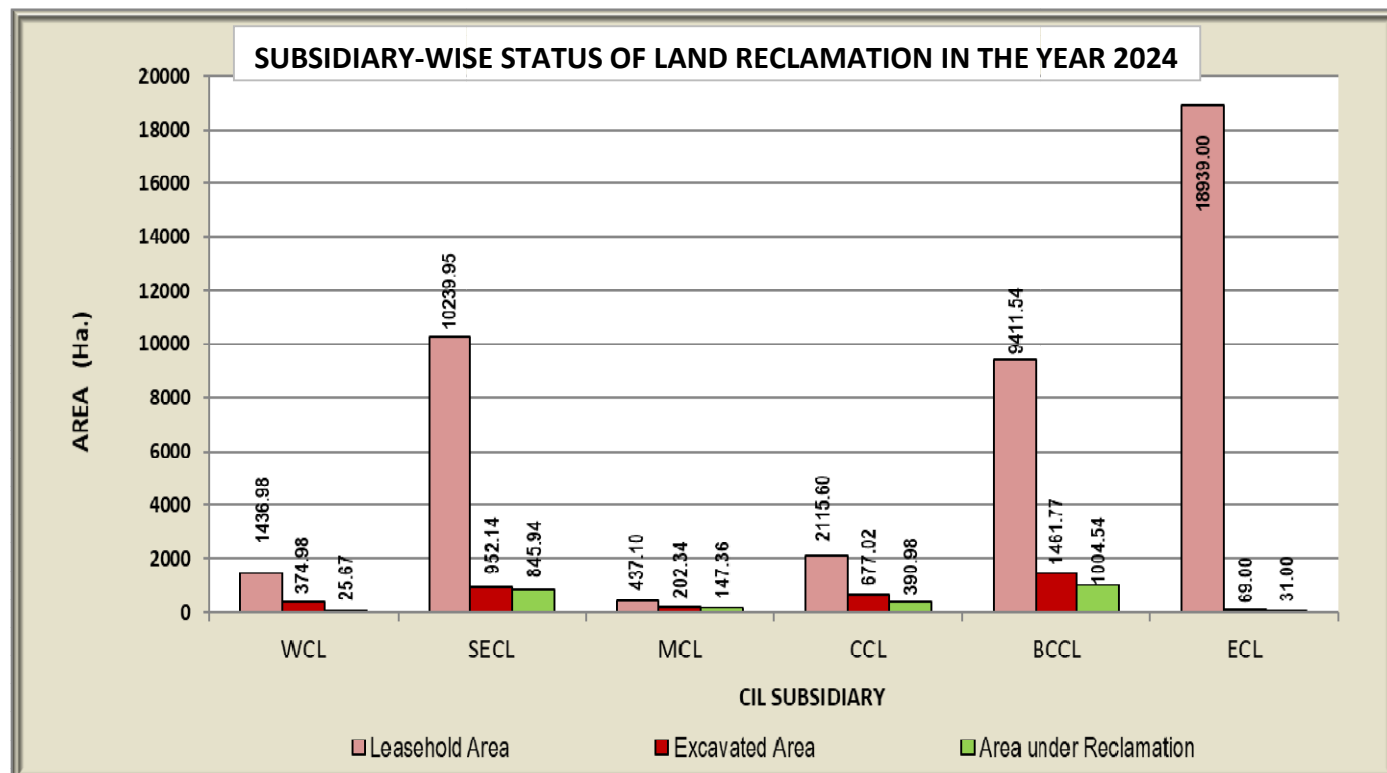


Chart 1.2: Subsidiary Wise Land Reclamation Status in the Year 2024

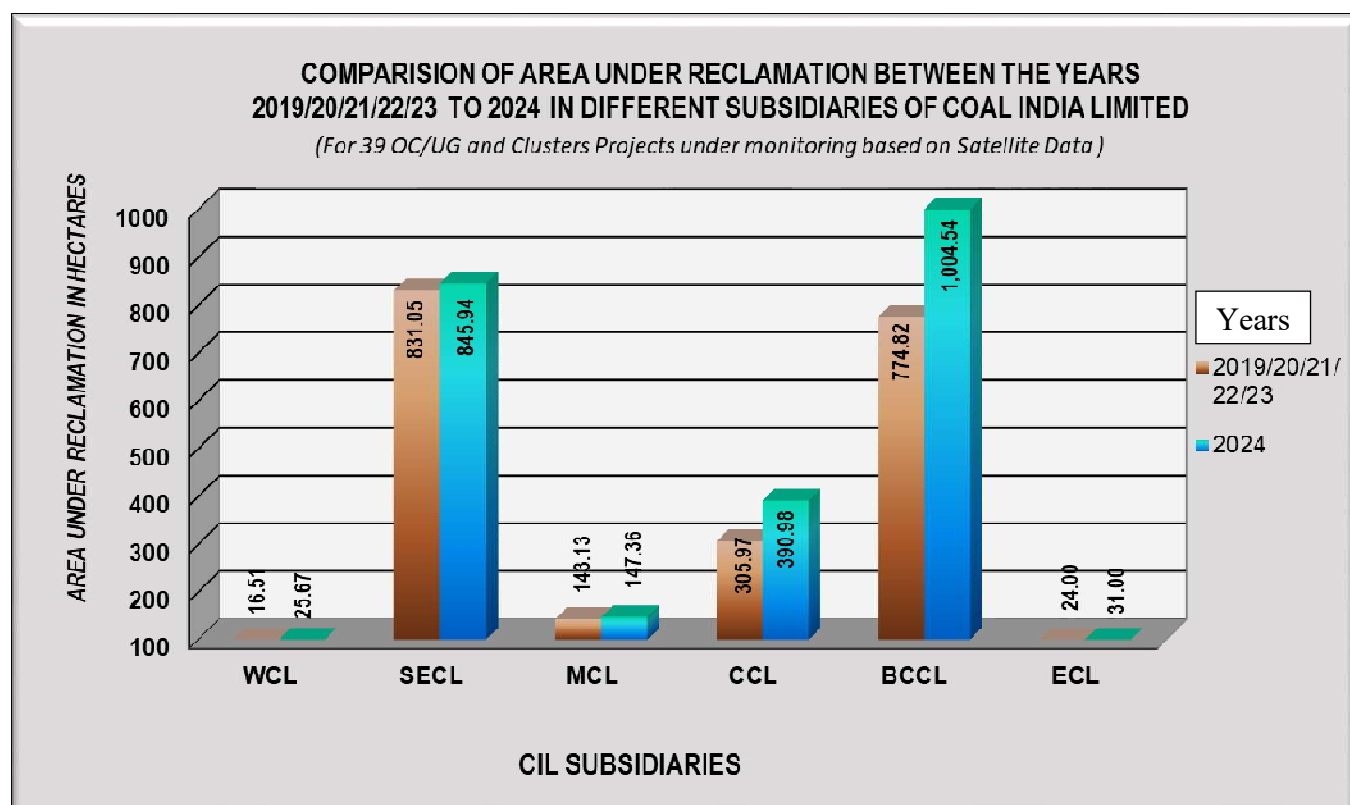


Chart 1.3: Comparison for Area under Land Reclamation in between 2019/20/21/22/23 to 2024

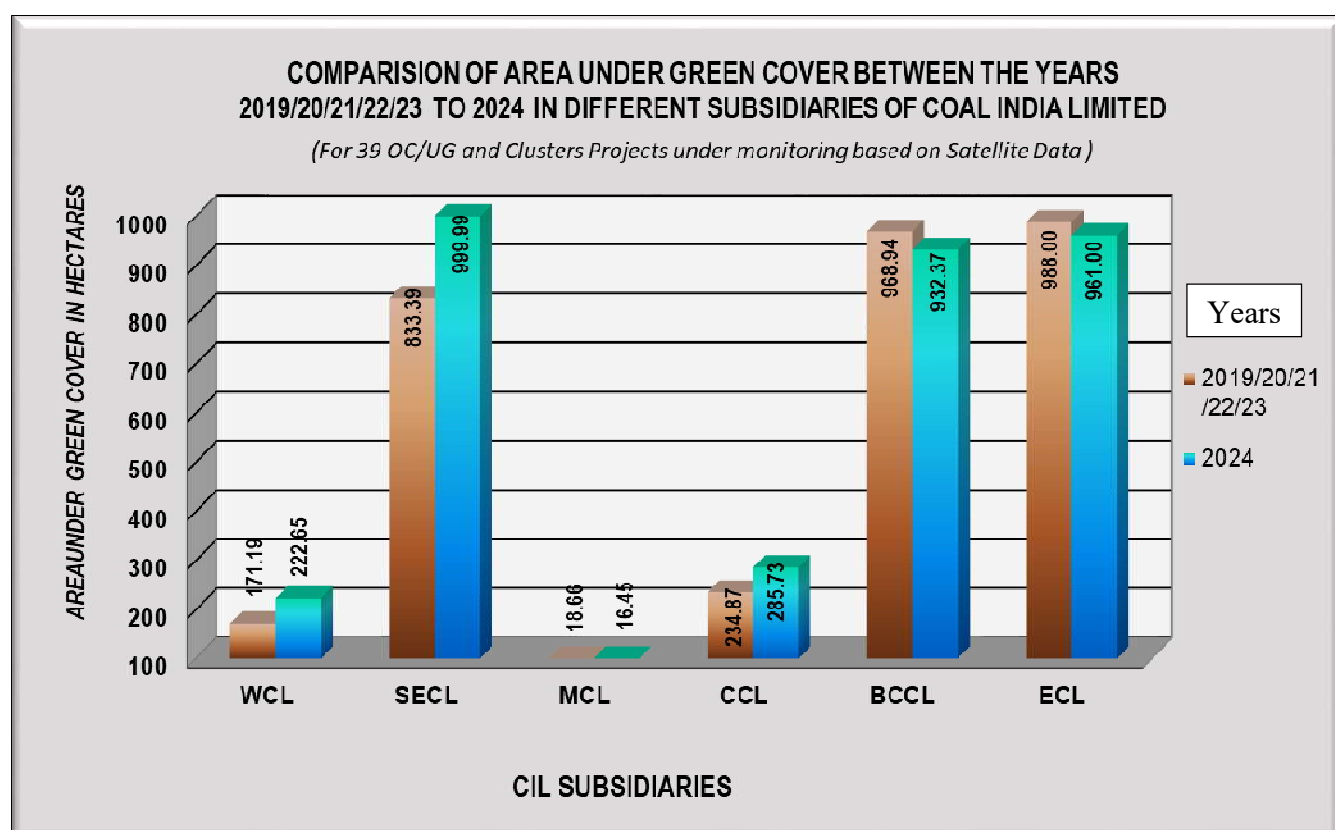


Chart 1.4: Comparison for Area under Green Cover in subsidiaries between 2019/20/21/22/23 to 2024

1. Background

1.1 Land is the most important natural resource which embodies soil, water, flora, fauna and total ecosystem. All human activities are based on the land which is the scarcest natural resource in our country. Mining is a site-specific industry and it could not be shifted anywhere else from the location where mineral occurs. It is a fact that surface mining activities do affect the land environment due to ground breaking. Therefore, there is an urgent need to reclaim and restore the mined out land for its productive use for sustainable development of mining. This will not only mitigate environmental degradation, but would also help in creating a more congenial environment for land acquisition by coal companies in future.

Keeping above in view, Coal India Ltd. (CIL) issued a work order vide letter no. CIL/WBP/Env/2009/2428 dated 29.12.2009 to Central Mine Planning & Design Institute (CMPDI), Ranchi, for monitoring land reclamation. status of the opencast/underground and clusters of coal mines having production of less than 5 million m³ per annum (coal + OB taken together per annum) based on remote sensing satellite data, regularly on triennial basis for sustainable development of mining. Further, a revised work order was issued vide letter no. CIL/WBP/Env/2011/4706 dated 12.10.2012 from Coal India Limited for the period 2012-13 to 2016-17 which was subsequently followed by another work order vide letter no. CIL/WBP/Env/2017/DP/8477 dated 21.09.2017 from Coal India Limited for the period 2017-18 to 2021-22. Continuation to this work order from CIL vide CIL/ENV/2022-23/W.O./10899 dated 06.07.2022 is for land reclamation monitoring of 109 opencast projects and vegetation cover monitoring of 13 major coalfields for the period 2023-2024. CIL issued a latest work order vide letter no. vide their letter No CIL/ENV/2024/11463 dated 03.07.2024 from Coal India Limited for the period 2024-25, 2025-26 & 2026-27 for land reclamation monitoring of opencast projects and vegetation cover monitoring of 19 major coalfields. According to this work order, all mines in CIL with output capacity of 5 million cu. m (coal +OB) shall be monitored every year and all mines below this capacity shall be monitored at an interval of 3 years. All coalfields in CIL shall also be monitored at an interval of 3 years as per a

defined plan. The result of land reclamation status of all such mines to be put on the website of CIL (www.coalindia.in), CMPDI (www.cmpdi.co.in) and the concerned coal companies in public domain. Detail report to be submitted to Coal India and respective subsidiaries.

- 1.2 Land reclamation monitoring of all opencast coal mining projects would also comply the statutory requirements of Ministry of Environment, Forest & Climate Change (MoEF & CC), GoI (Government of India). Such monitoring would not only facilitate in taking timely mitigation measures against environmental degradation but would also enable coal companies to utilize the reclaimed land for larger socio-economic benefits in a planned way.
- 1.3 CMPDI undertook the above study and the present report is embodying the findings in nutshell carrying out for the 39 opencast/underground and clusters projects of different subsidiaries producing less than 5 million cubic m. Coal +OB in the year 2024-25.

2. Objective

Objective of the land reclamation/restoration monitoring is to assess the area of backfilled, plantation, OB dumps, social forestry, active mining area, settlements, water bodies, distribution of wasteland, agricultural land and forest land in the leasehold area of the project. This is an important step taken up for assessing the progressive status of mined land reclamation and for taking up remedial measures, if any, required for environmental protection.

3. Methodology

There are number of steps involved between raw satellite data procurement and preparation of final map. National Remote Sensing Centre (NRSC) Hyderabad, being the nodal agency for satellite data supply in India, provides only raw digital satellite data, which needs further digital image processing for extracting the information and map preparation before uploading the same in the website. Methodology for land

reclamation monitoring is given in Fig 1. Following steps are involved in land reclamation /restoration monitoring:

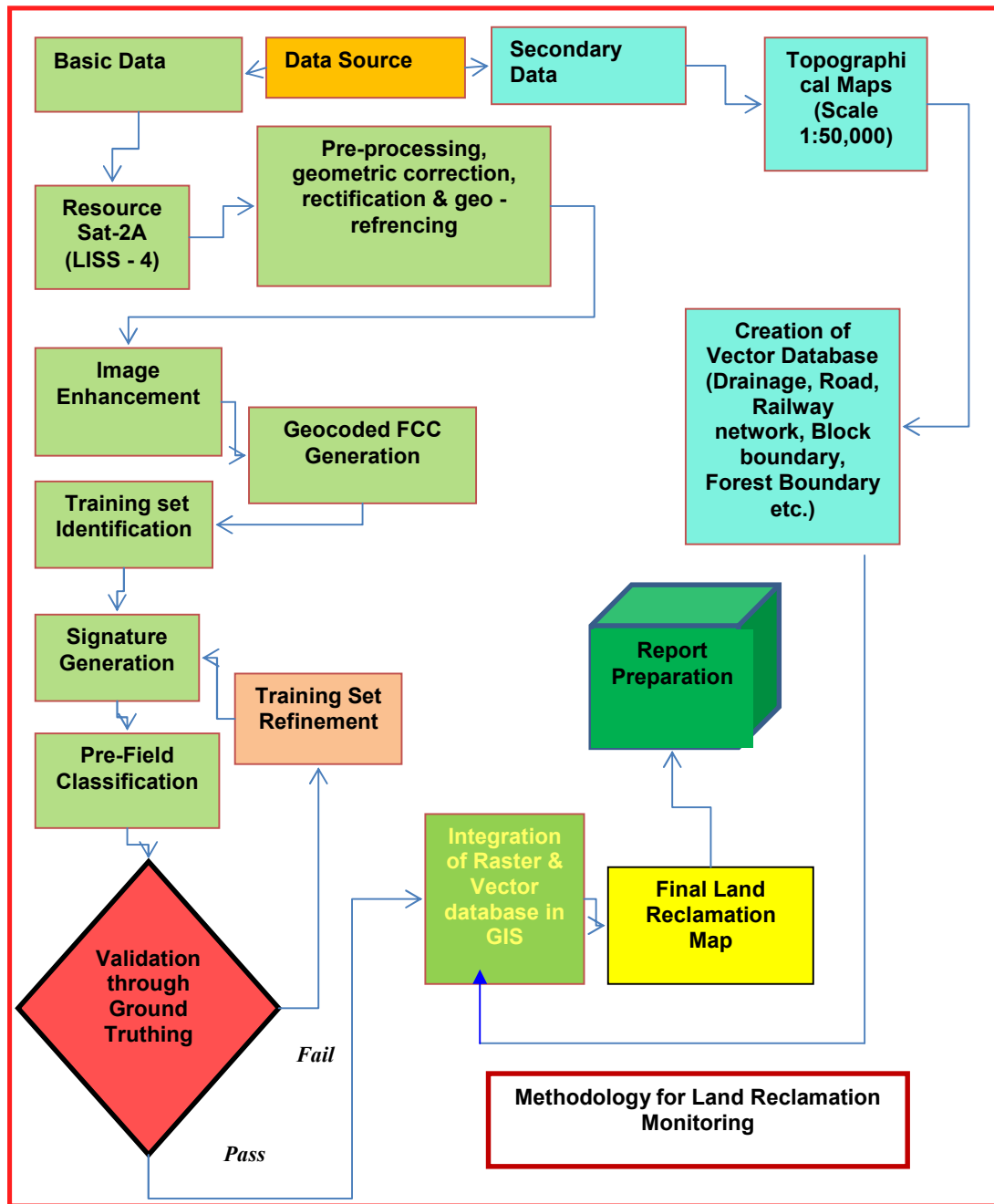


Fig 3.1: Methodology for Land Reclamation Monitoring

3.1 Data Procurement

After browsing the data quality and date of pass on internet, supply order for data is placed to NRSC. Secondary data like leasehold boundary, topo sheets are procured for creation of vector database.

3.2 Satellite Data Processing

Satellite data are processed using ERDAS IMAGINE v 2022 digital image processing s/w. Methodology involves the following major steps:

- **Rectification & Geo-referencing:** Inaccuracies in digital imagery may occur due to 'systematic errors' attributed to earth curvature and rotation as well as 'non-systematic errors' attributed to satellite receiving station itself. Raw digital images contain geometric distortions, which make them unusable as maps. Therefore, geo-referencing is required for correction of image data using ground control points (GCP) to make it compatible to Sol (Survey of India) Topo-sheet.
- **Image enhancement:**
To improve the interpretability of the raw data, image enhancement is necessary. Local operations modify the value of each pixel based on brightness value of neighbouring pixels using ERDAS IMAGINE v 2022 digital image processing s/w and enhance the image quality for proper interpretation.
- **Training set selection**
Training set requires to be selected, so that software can classify the image data accurately. The image data are analysed based on the interpretation keys. These keys are evolved from certain fundamental image-elements such as tone/colour, size, shape, texture, pattern, location, association and shadow. Based on the image-elements and other geo-technical elements like land form, drainage pattern and physiography; training sets were selected/identified for each land use/cover class. Field survey was carried out by taking selective traverses in order to collect the ground information (or reference data) so that training sets are selected accurately in the image. This was intended to serve as an aid for classification.
- **Classification and Accuracy assessment**
Image classification is carried out using the maximum likelihood algorithm. The classification proceeds through the following steps: (a) calculation of statistics [i.e. signature generation] for the identified training areas, and (b) the decision boundary of maximum probability based on the mean vector, variance, covariance and correlation

matrix of the pixels. After evaluating the statistical parameters of the training sets, reliability test of training sets is conducted by measuring the statistical separation between the classes that resulted from computing divergence matrix. The overall accuracy of the classification was finally assessed with reference to ground truth data.

- **Area calculation**

The area of each land use class in the leasehold is determined using ERDAS IMAGINE v 2022 digital image processing s/w.

- **Overlay of Vector data base**

Vector data base created based on secondary data. Vector layer like drainage, railway line, leasehold boundary, forest boundary etc. are superimposed on the image as vector layer in the Arc GIS database.

- **Pre-field map preparation**

Pre-field map is prepared for validation of the classification results.

3.3 Ground Truthing:

Selective ground verification of the land use classes are carried out in the field and necessary corrections if required, are incorporated before map finalization.

3.4 Land reclamation database on GIS:

Land reclamation database is created on GIS platform to identify the temporal changes identified from satellite data of different cut-off dates.

4. Work Plan

- 4.1** Total 30 opencast/underground and 9 clusters projects producing 5 million cubic m. less (Coal + OB together) during the year 2024-25 were taken up for the study. Based on the *RESOURCESAT-2* satellite data, land reclamation / mine closure monitoring was carried out using ERDAS IMAGINE digital image processing s/w and Arc-Info GIS.
- 4.2** The list of 30 opencast/underground project producing less than 5 mcm (Coal and OB together) annually of different CIL subsidiaries and 09 clusters of BCCL & ECL taken up for Land Reclamation monitoring based on satellite data of year 2024 is given in table below: The list of subsidiary wise 39 opencast/underground and cluster projects taken up for Land Reclamation Monitoring based on satellite data of year 2024 is given in table below:

Subsidiary (No. of Projects)	Opencast/Underground& Cluster Projects (5 million Cu.m. Coal +OB or less per annum)
WCL (5)	Kolgaon OC, Chhinda OC, Urdhan OC, Gouri OC and Ghonsa OC
SECL (15)	Kurasia OC, Kalyani UG, Shiwani UG, Gayatri UG, Ketki UG, Chirimiri UG, Rani Atari UG, Bijuri UG, Baherabandh UG, Rajnagar UG, Jhiria UG, West Jhagrakhand UG, Haldibari UG, Umaria UG, Vindhya UG and Singhali UG
MCL (1)	Basundhara OC
CCL (08)	Karama OC, Jarangdih OC, Sayal-D OC, Dakra OC, Giddi-A OC, Tetariakhar OC, Tapin South OC and Kabribad OC
BCCL (05)	Cluster X, Cluster VII, Cluster I, Cluster IV and Cluster XI
ECL (05)	Cluster 5, Cluster 6, Cluster 7, Cluster 8 and Kalidaspur OC
TOTAL (39)	

WESTERN COALFIELDS LIMITED

5. Land Reclamation Status in Western Coalfields Ltd.

5.1 Following 5 OC projects producing less than 5 million cubic m. (Coal + OB together) of Western Coalfields Ltd. have been taken up for land reclamation monitoring based on Satellite Data of the year 2024:

- | | |
|-----------|-----------|
| ▪ Kolgaon | ▪ Chhinda |
| ▪ Urdhan | ▪ Gouri |
| ▪ Ghonsa | |

5.2 Project wise Land Reclamation status in WCL for the year 2024 is given in Table 5.1 and also shown graphically in Chart- 5.1. Area statistics of different land use class present in the mine leasehold boundaries of the above projects for the year 2024 are shown in the Table - 5.2. Land use maps derived from satellite data are shown in Plate 5.1-5.5. Year wise changes in the different land use classes based on satellite data are depicted in Bar Charts in Chart- 5.2 - 5.6.

5.3 Study reveals that out of total mine leasehold area of 1436.98 Hectare of the 5 projects viz, Gauri Deep, Ghonsa, Kolegaon, Urdhan and Chhinda considered for monitoring during year 2024-25; total excavated area is 374.98 Ha, out of which 25.67 Ha (6.85%) area is under backfilling (Technically Reclaimed) and balance 349.31 Ha (93.15%) area is under active mining. It is evident from analysis that there is no biological reclamation i.e. plantation on backfill. Project wise details area given in Table 1.

5.4 From analysis it is revealed that total area under technical reclamation (area under backfilling) has also increased from 16.29 Ha (5.31%) in the year 2023 to 25.67 Ha (6.85%) area in the year 2024.

5.5 Study indicates that overall, the projects of WCL considered for this study indicate increase in technical reclamation i.e. area under backfilling.

5.6 After analyzing the satellite data of year 2023 vs. 2024 it is evident that total area under plantation (Green cover) carried out under social forestry in above OC mines of WCL

has increased from 171.82 Ha (Year 2023) to 223.43 Ha (Year 2024) in the span of one years. This increase of 51.61 Ha area under total plantation in one-year time is due to the sincere efforts made by WCL towards generation of green cover in leasehold area of the 5 opencast projects considered for land reclamation in the year 2024-25.

- 5.7** Out of 5 projects of WCL, maximum land reclamation has been carried out in Ghonsa OCP (13.41%) followed by Urdhan OCP (12.65%).

Table 5.1: Summarized Land Reclamation Status in WCL

(Area in Hectare)

Sl.No.	Project	Total Leasehold Area		Technical Reclamation		Plantation						Area under Active Mining		Total Excavated Area		Total Area under Plantation (% Green Cover Generated in Leasehold)		Total Area under Reclamation	
						Biological Reclamation		Other Plantations											
				Area under Backfilling		Plantation on Excavated / Backfilled Area		Plantation on External Over Burden Dumps		Social Forestry, Avenue Plantation Etc.									
1	2	3		4		5		6		7		8		9 (=4+5+8)		10 (=5+6+7)		11 (=4+5)	
		2023	2024	2023	2024	2023	2024	2023	2024	2023	2024	2023	2024	2023	2024	2023	2024	2023	2024
1	Gauri Deep	339.10	339.10	0.00	0.00	0.00	0.00	0.00	14.46	8.00	10.42	62.77	70.94	62.77	70.94	8.00	24.88	0.00	0.00
				0.00%	0.00%	0.00%	0.00%					100.00%	100.00%			2.36%	7.34%	0.00%	0.00%
2	Ghonsa	278.68	278.68	11.59	18.29	0.00	0.00	5.51	8.61	6.54	10.80	98.39	118.12	109.98	136.41	12.05	19.41	11.59	18.29
				10.54%	13.41%	0.00%	0.00%					89.46%	86.59%			4.32%	6.96%	10.54%	13.41%
3	Kolegaon	397.52	397.52	0.00	0.00	0.00	0.00	83.45	96.67	24.11	29.70	67.64	82.78	67.64	82.78	107.56	126.37	0.00	0.00
				0.00%	0.00%	0.00%	0.00%					100.00%	100.00%			27.06%	31.79%	0.00%	0.00%
4	Urdhan	315.00	315.00	4.70	7.38	0.00	0.00	10.15	15.44	9.02	11.13	38.06	50.96	42.76	58.34	19.17	26.57	4.70	7.38
				10.99%	12.65%	0.00%	0.00%					89.01%	87.35%			6.09%	8.43%	10.99%	12.65%
5	Chinda	106.68	106.68	0.00	0.00	0.00	0.00	20.11	20.74	4.30	4.68	23.81	26.51	23.81	26.51	24.41	25.42	0.00	0.00
				0.00%	0.00%	0.00%	0.00%					100.00%	100.00%			22.88%	23.83%	0.00%	0.00%
	Total (A)	1436.98	1436.98	16.29	25.67	0.00	0.00	119.22	155.92	51.97	66.73	290.67	349.31	306.96	374.98	171.82	223.43	16.51	25.93
	A			5.31%	6.85%	0.00%	0.00%					94.69%	93.15%			11.96%	15.55%	5.38%	6.92%

(%) calculated is in respect to Total Excavated Area as applicable

Note: In reference of the above Table, different parameters are classified as follows:

1. Area under Biological Reclamation includes Areas under Plantation done on Backfilled Area Only.
2. Area under Technical Reclamation includes Area under Barren Backfilling only.
3. Area under Active Mining Includes Coal Quarry, Advance Quarry Site and Quarry filled with water etc., if any.
4. Social Forestry and Plantation on External OB Dumps are not included in Biological Reclamation and are put under separate categories as shown in the above Table.
5. (%) calculated in the above Table is in respect to Total Excavated Area except for "Total Area under Plantation" where % is in terms of "Leasehold Area".

Table-5.1.1

Composite land reclamation status in remaining mines of WCL (<5 MCM Coal+OB) as per clause 2.(ii) of the received work order from CIL

(Area in Hectare)

Sl.No.	Cluster No.	Total Leasehold Area		Technical Reclamation		Plantation						Area under Active Mining		Total Excavated Area		Total Area under Plantation (% Green Cover Generated in Leasehold)		Total Area under Reclamation	
						Biological		Other Plantations											
				Area under Backfilling		Plantation on Excavated / Backfilled Area		Plantation on External OB Dumps		Social Forestry, Avaneue Plantation Etc.									
1	2	3		4		5		6		7		8		9 (=4+5+8)		10 (=5+6+7)		11(=4+5)	
		2022	2023	2022	2023	2022	2023	2022	2023	2022	2023	2022	2023	2022	2023	2022	2023	2022	2023
6	Padmapur OC **	829.00	829.00	59.00	65.00	28.00	28.00	214.00	221.00	83.00	83.00	118.00	112.00	205.00	205.00	325.00	332.00	87.00	93.00
				28.78%	31.71%	13.66%	13.66%					57.56%	54.63%			39.20%	40.05%	42.44%	45.37%
	TOTAL (B)	829.00	829.00	59.00	65.00	28.00	28.00	214.00	221.00	83.00	83.00	118.00	112.00	205.00	205.00	325.00	332.00	87.00	93.00
				28.78%	31.71%	13.66%	13.66%					57.56%	54.63%			39.20%	40.05%	42.44%	45.37%
		2019	2022	2019	2022	2019	2022	2019	2022	2019	2022	2019	2022	2019	2022	2019	2022	2019	2022
7	Singhori OC	425.04	425.04	0.00	0.00	0.00	0.00	0.00	0.00	4.59	7.63	26.82	50.56	26.82	50.56	4.59	7.63	0.00	0.00
				0.00%	0.00%	0.00%	0.00%					100.00%	100.00%			1.08%	1.80%	0.00%	0.00%
8	Makardhokra -II OC	258.23	258.23	44.61	57.75	2.90	0.00	58.76	47.14	2.57	2.57	6.91	0.00	54.42	57.75	64.23	49.71	47.51	57.75
				81.97%	100.00%	5.33%	0.00%					12.70%	0.00%			24.87%	19.25%	87.30%	100.00%
9	New Sethia OC	144.45	144.45	25.99	30.65	23.58	18.92	6.80	7.01	9.53	10.15	40.81	41.65	90.38	91.22	39.91	36.08	49.57	49.57
				28.76%	33.60%	26.09%	20.74%					45.15%	45.66%			27.63%	24.98%	54.85%	54.34%
10	Ghugus OC	1020.00	1020.00	267.70	258.74	55.38	73.22	135.00	136.64	84.91	125.20	35.77	26.89	358.85	358.85	275.29	335.06	323.08	331.96
				0.00%	72.10%	0.00%	20.40%					0.00%	7.49%			26.99%	32.85%	0.00%	92.51%
11	Pimpalgaon OC	451.87	451.87	13.33	13.34	0.00	0.00	136.11	149.76	80.32	79.62	46.25	54.23	59.58	67.57	216.43	229.38	13.33	13.34
				0.00%	19.74%	0.00%	0.00%					0.00%	80.26%			47.90%	50.76%	0.00%	19.74%
	TOTAL (C)	2299.59	2299.59	351.63	360.48	81.86	92.14	336.67	340.55	181.92	225.17	156.56	173.33	590.05	625.95	600.45	657.86	433.49	452.62
				59.59%	57.59%	13.87%	14.72%					26.53%	27.69%			26.11%	28.61%	73.47%	72.31%
		2018	2021	2018	2021	2018	2021	2018	2021	2018	2021	2018	2021	2018	2021	2018	2021	2018	2021
12	Shivpuri OC	336.29	336.29	17.98	44.97	6.06	10.15	20.41	20.93	16.53	23.91	47.31	35.14	71.35	90.26	43.00	54.99	24.04	55.12
				25.20%	49.82%	8.49%	11.25%					66.31%	38.93%			12.79%	16.35%	33.69%	61.07%
13	Ghorawar OC	1296.01	1296.01	32.06	42.76	8.92	16.24	27.60	27.68	14.43	14.84	23.07	38.10	64.05	97.10	50.95	58.76	40.98	59.00
				50.05%	44.04%	13.93%	16.73%					36.02%	39.24%			3.93%	4.53%	63.98%	60.76%
14	Barkuhi OC	237.51	237.51	13.84	15.64	0.00	0.00	0.00	0.00	8.73	8.81	18.69	18.01	32.53	33.65	8.73	8.81	13.84	15.64
				42.55%	46.48%	0.00%	0.00%					57.45%	53.52%			3.68%	3.71%	42.55%	46.48%
15	Ambara OC	162.15	162.15	45.34	45.67	13.51	13.84	0.00	0.00	10.55	10.91	21.50	26.55	80.35	86.06	24.06	24.75	58.85	59.51
				56.43%	53.07%	16.81%	16.08%					26.76%	30.85%			14.84%	15.26%	73.24%	69.15%
	TOTAL (D)	2031.96	2031.96	109.22	149.04	28.49	40.23	48.01	48.61	50.24	58.47	110.57	117.80	248.28	307.07	126.74	147.31	137.71	189.27
				43.99%	48.54%	11.47%	13.10%					44.53%	38.36%			6.24%	7.25%	55.47%	61.64%
	*GRAND TOTAL (A+B+C+D)	6597.53	6597.53	536.14	600.19	138.35	160.37	717.90	766.08	367.13	433.37	675.80	752.44	1350.29	1513.00	1224.01	1360.60	674.71	760.82
				39.71%	39.67%	10.25%	10.60%					50.05%	49.73%			18.55%	20.62%	49.97%	50.29%
*Grand Total (A+B+C+D) is the composite value of all 15 mines of WCL covered in 3 years cycle of Land Reclamation Monitoring														(% is calculated with respect to Excavated Area as applicable)					
** The Land Reclamation Monitoring for this mine was previously conducted under the category of more than 5 MTY capacity. For normalized calculations, the data from this mines has been converted from Sq.Kms to Ha.																			

*Grand Total (A+B+C+D) is the composite value of all 15 mines of WCL covered in 3 years cycle of Land Reclamation Monitoring (% is calculated with respect to Excavated Area as applicable)

** The Land Reclamation Monitoring for this mine was previously conducted under the category of more than 5 MTY capacity. For normalized calculations, the data from this mines has been converted from Sq.Kms to Ha.

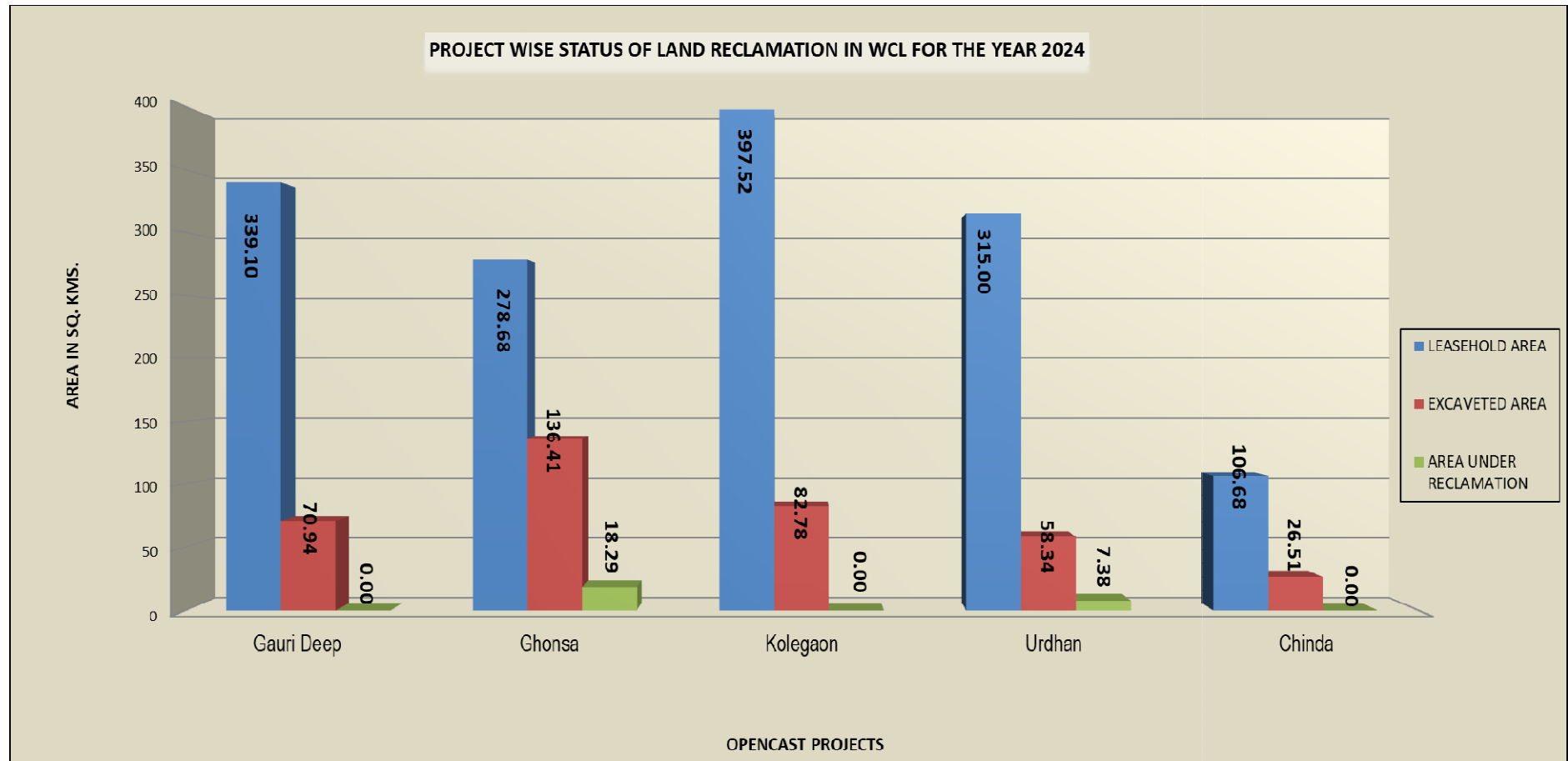


Chart 5.1: Bar Chart showing Land Reclamation Status in WCL

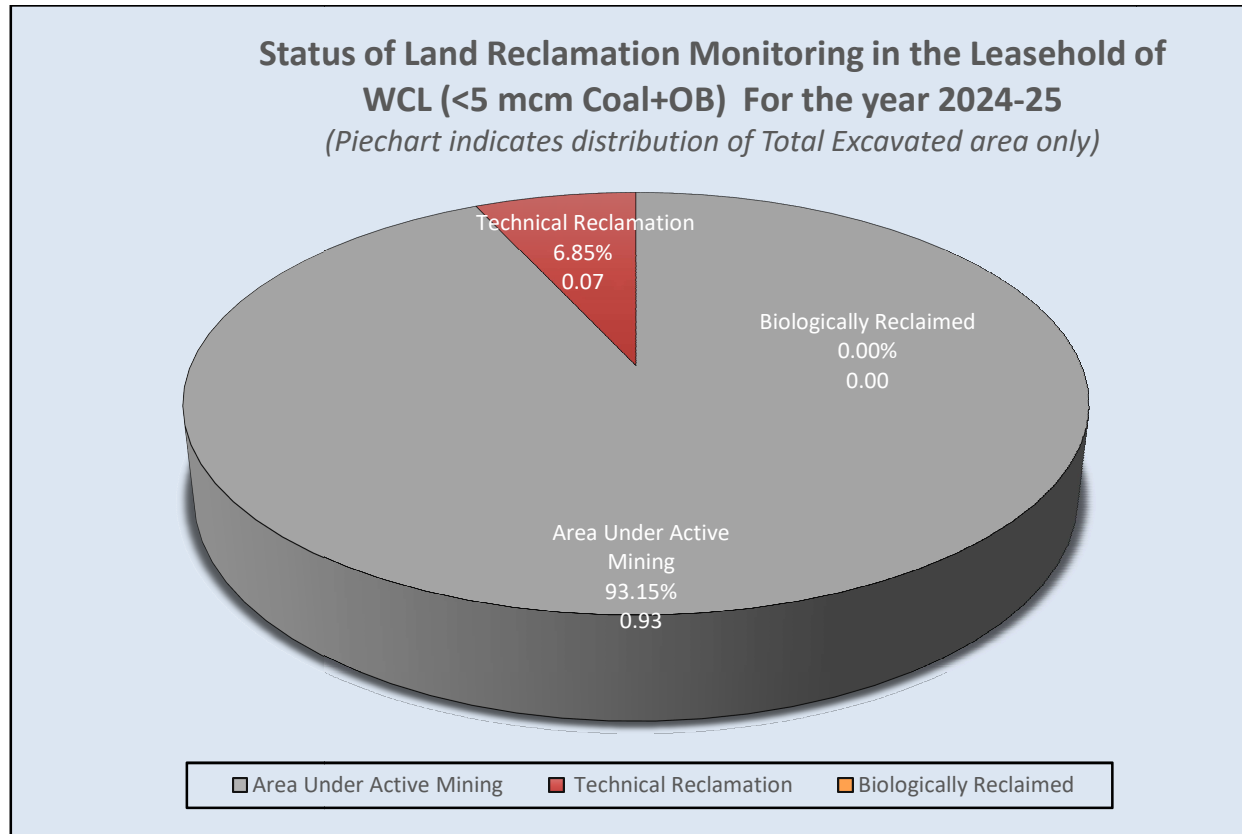


Fig.5.1: Land Reclamation Status of Total Excavated area in OC projects of WCL (<5 MCM Coal+OB) in the Year 2024

Table 5.2: Project-wise Land Reclamation Status in Opencast Projects of WCL (2024)

		(Area in Hatare)											
		Gauri Deep		Ghonsa		Kolegaon		Urdhan		Chhinda		Total	
		Area	%	Area	%	Area	%	Area	%	Area	%	Area	%
FORESTS	Dense Forest 	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Open Forest 	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Total Forest	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SCRUBS	Scrubs 	31.69	9.35	46.72	16.76	26.08	6.56	22.96	7.29	10.28	9.64	137.73	9.58
PLANTATION	Social Forestry 	10.42	3.07	10.80	3.88	29.70	7.47	11.13	3.53	4.68	4.39	62.05	4.32
	Plantation on OB Dump 	14.46	4.26	8.61	3.09	96.67	24.32	15.44	4.90	20.74	19.44	155.92	10.85
	Plantation on Backfill (Biological Reclamation) 	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Total Plantation	24.88	7.34	19.41	6.96	126.37	31.79	26.57	8.43	25.42	23.83	222.65	15.49
	Total Vegetation	56.57	16.68	66.13	23.73	152.45	38.35	49.53	15.72	35.70	33.46	360.38	25.08
ACTIVE MINING	Coal Quarry 	64.34	18.97	104.75	37.59	72.84	18.32	37.04	11.76	25.22	23.64	304.19	21.17
	Coal Dump 	6.60	1.95	7.32	2.63	4.71	1.18	12.79	4.06	0.83	0.78	32.25	2.24
	Advance Quarry Site 	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Quarry Filled With Water 	0.00	0.00	6.05	2.17	5.23	1.32	1.13	0.36	0.46	0.43	12.87	0.90
	Total Area under Active Mining	70.94	20.92	118.12	42.39	82.78	20.82	50.96	16.18	26.51	24.85	349.31	24.31
	Barren OB Dump 	92.93	27.40	20.52	7.36	71.49	17.98	76.81	24.38	15.96	14.96	277.71	19.33
	Barren Backfilled Area (Technical Reclamation) 	0.00	0.00	18.29	6.56	0.00	0.00	7.38	2.34	0.00	0.00	25.67	1.79
	Total Area	92.93	27.40	38.81	13.93	71.49	17.98	84.19	26.73	15.96	14.96	303.38	21.11
	Total Area Under Mine Operation	163.87	48.32	156.93	56.31	154.27	38.81	135.15	42.90	42.47	39.81	652.69	45.42
WASTELANDS	Waste Lands 	13.11	3.87	34.12	12.24	44.62	11.22	14.84	4.71	2.35	2.20	109.04	7.59
	Fly Ash Pond / Sand Body 	0.24	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.24	0.02
	Total Wasteland	13.35	3.94	34.12	12.24	44.62	11.22	14.84	4.71	2.35	2.20	109.28	7.60
WATERBODIES	Reservoir, nallah, ponds 	1.70	0.50	0.33	0.12	0.93	0.23	0.00	0.00	0.00	0.00	2.96	0.21
	Total Waterbodies	1.70	0.50	0.33	0.12	0.93	0.23	0.00	0.00	0.00	0.00	2.96	0.21
AGRICULTURE	Crop Lands 	2.94	0.87	0.00	0.00	0.00	0.00	25.00	7.94	1.56	1.46	29.50	2.05
	Fallow Lands 	99.48	29.34	20.39	7.32	42.50	10.69	87.34	27.73	23.54	22.07	273.25	19.02
	Total Agriculture	102.42	30.20	20.39	7.32	42.50	10.69	112.34	35.66	25.10	23.53	302.75	21.07
SETTLEMENTS	Urban Settlement 	0.53	0.16	0.08	0.03	0.98	0.25	0.92	0.29	1.06	0.99	3.57	0.25
	Rural Settlement 	0.00	0.00	0.00	0.00	0.00	0.00	1.67	0.53	0.00	0.00	1.67	0.12
	Industrial Settlement 	0.66	0.19	0.70	0.25	1.77	0.45	0.55	0.17	0.00	0.00	3.68	0.26
	Total Settlement	1.19	0.35	0.78	0.28	2.75	0.69	3.14	1.00	1.06	0.99	8.92	0.62
	Grand Total	339.10	100.00	278.68	100.00	397.52	100.00	315.00	100.00	106.68	100.00	1436.98	100.00

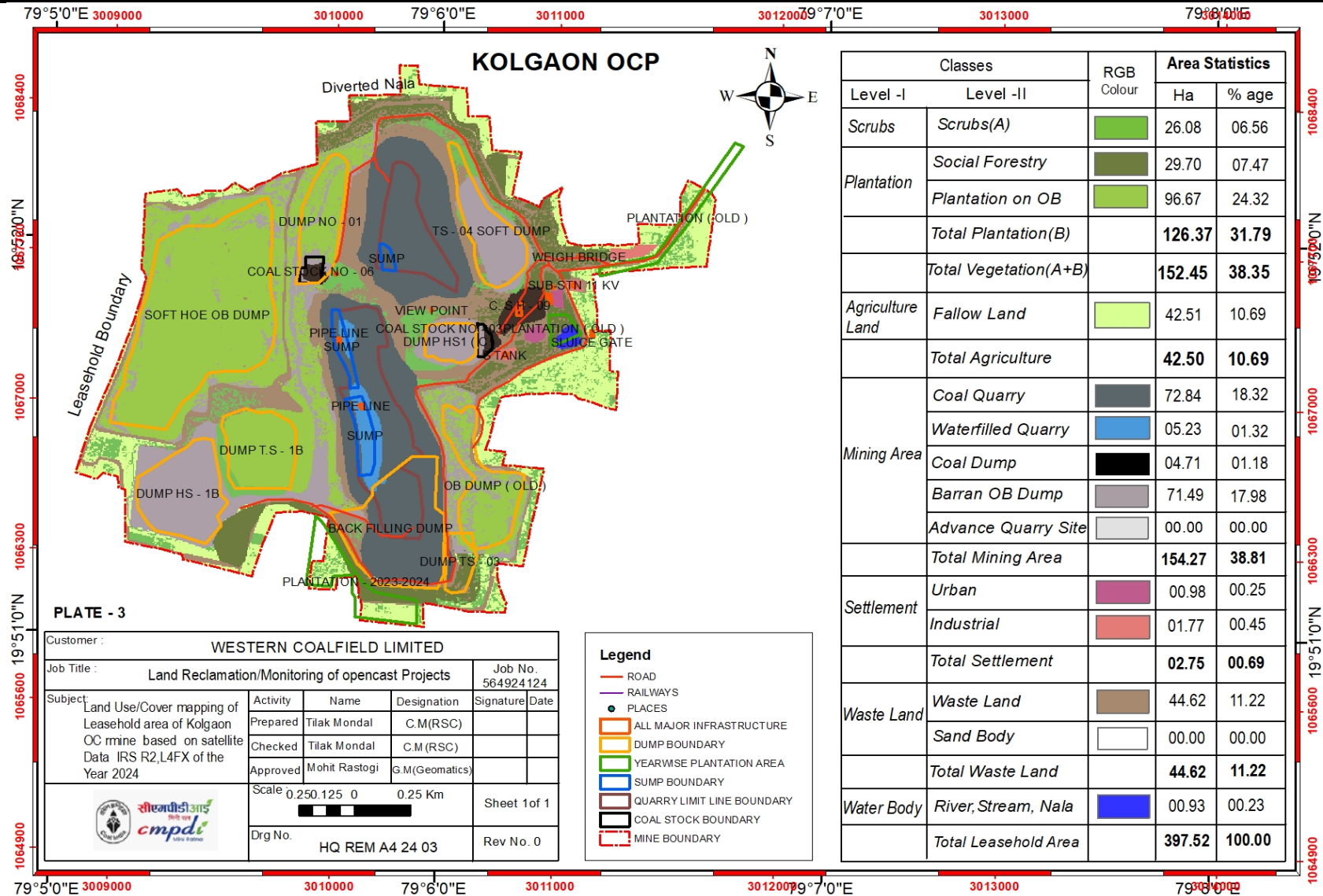


Plate 5.1: Land Use/Cover map of Kolgaon OCP

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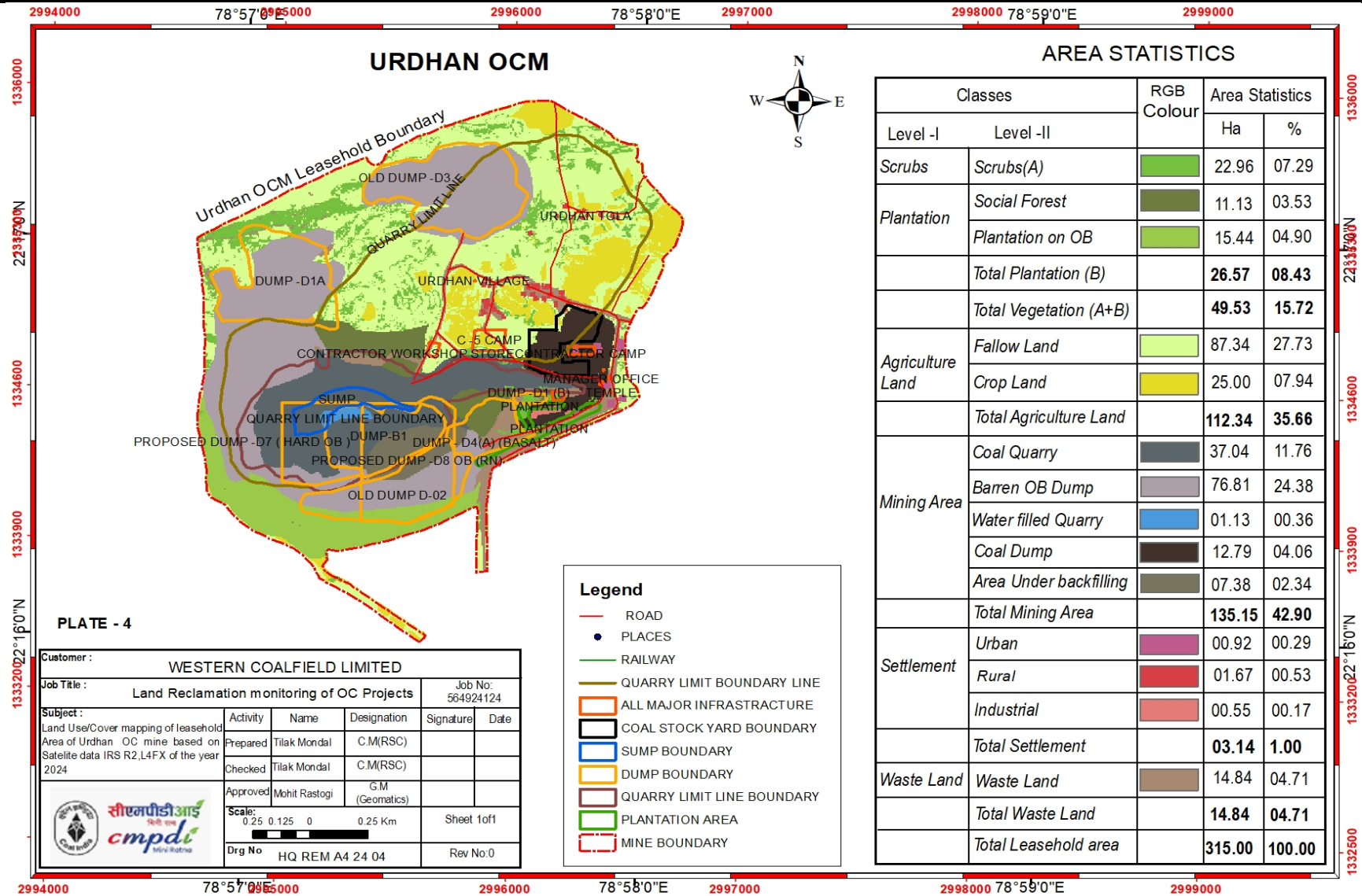


Plate 5.3: Land Use/Cover map of Urdhan OCP

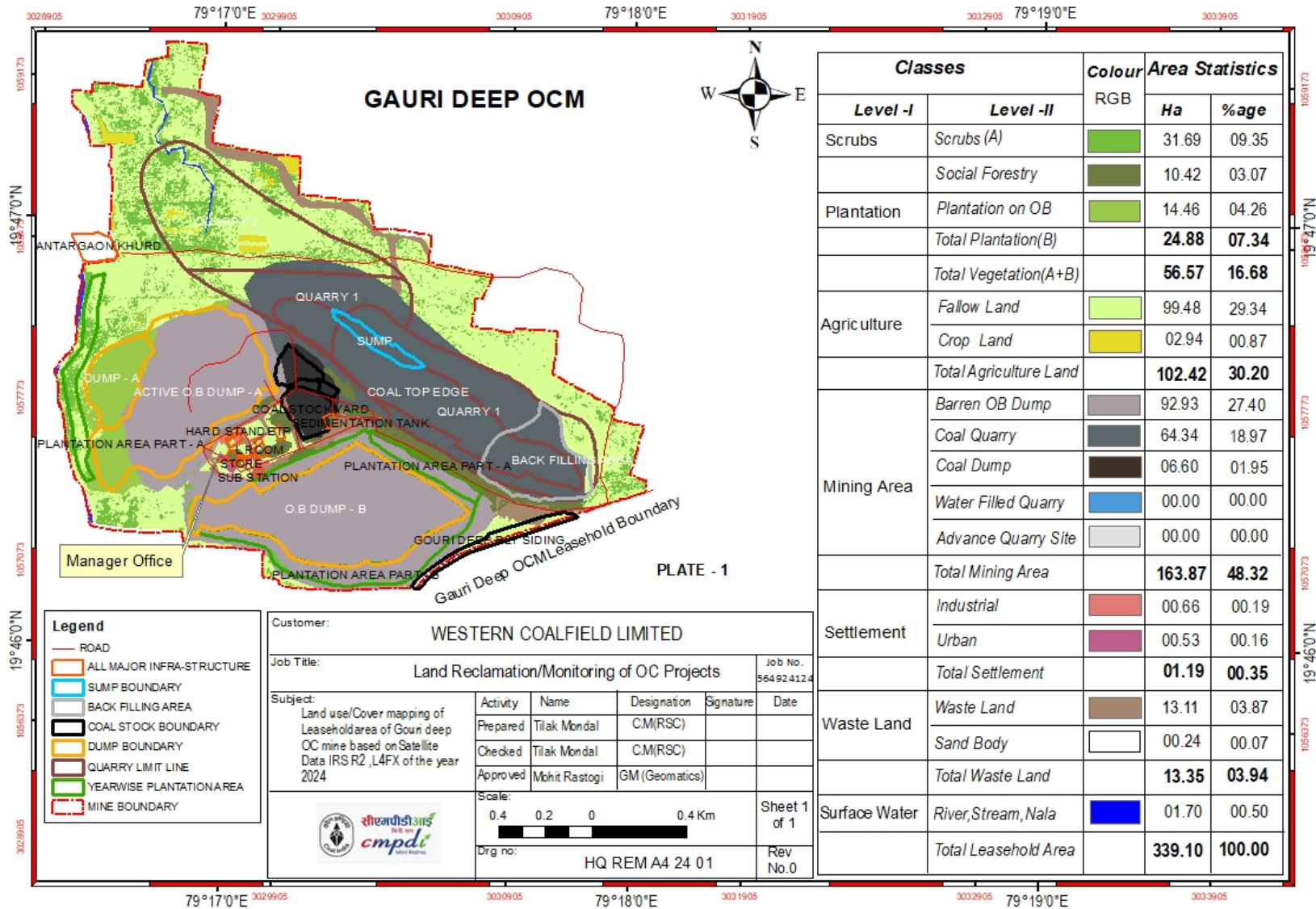


Plate 5.4: Land Use/Cover map of Gauri OCP

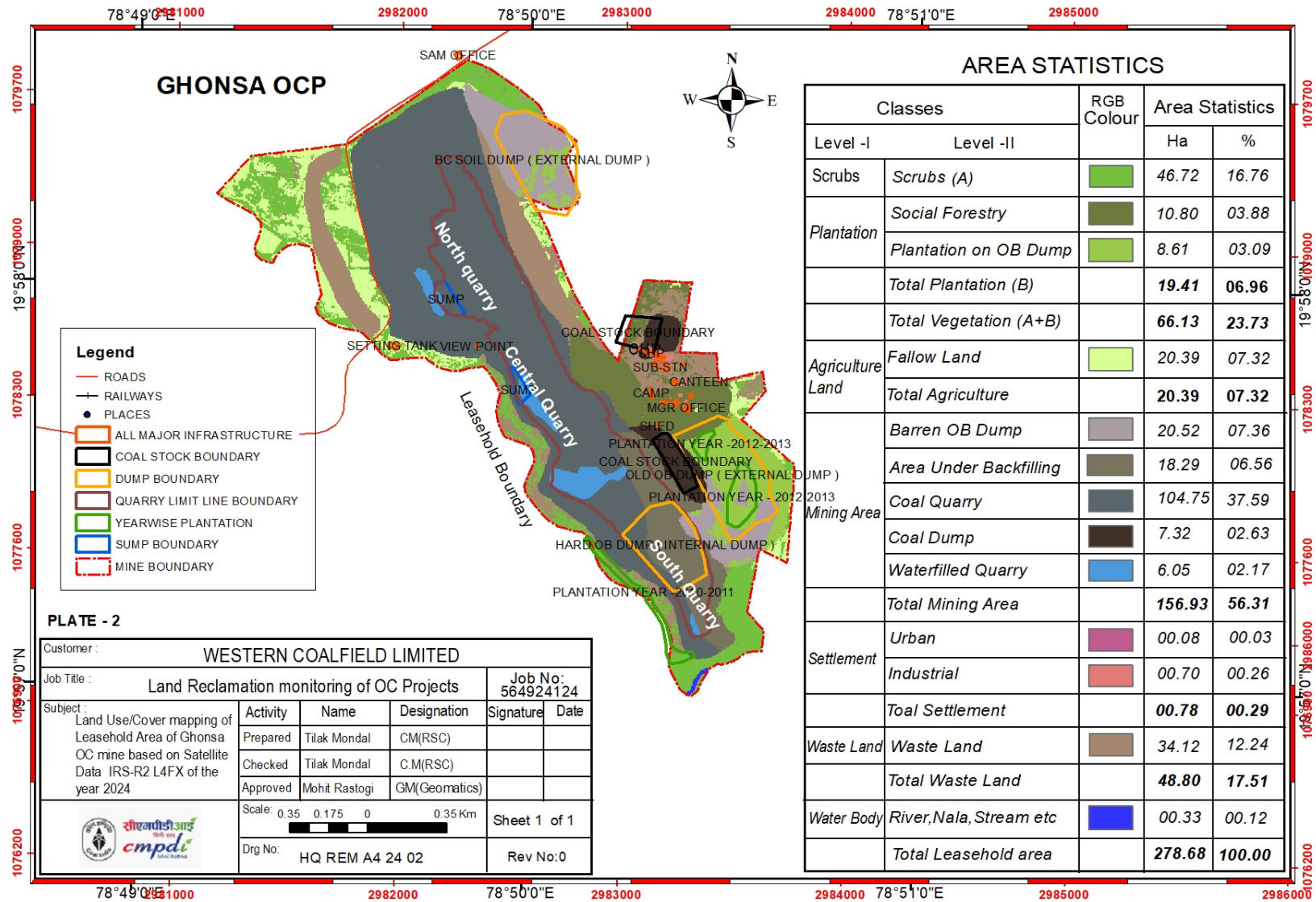


Plate 5.5: Land Use/Cover map of Ghonsa OCP

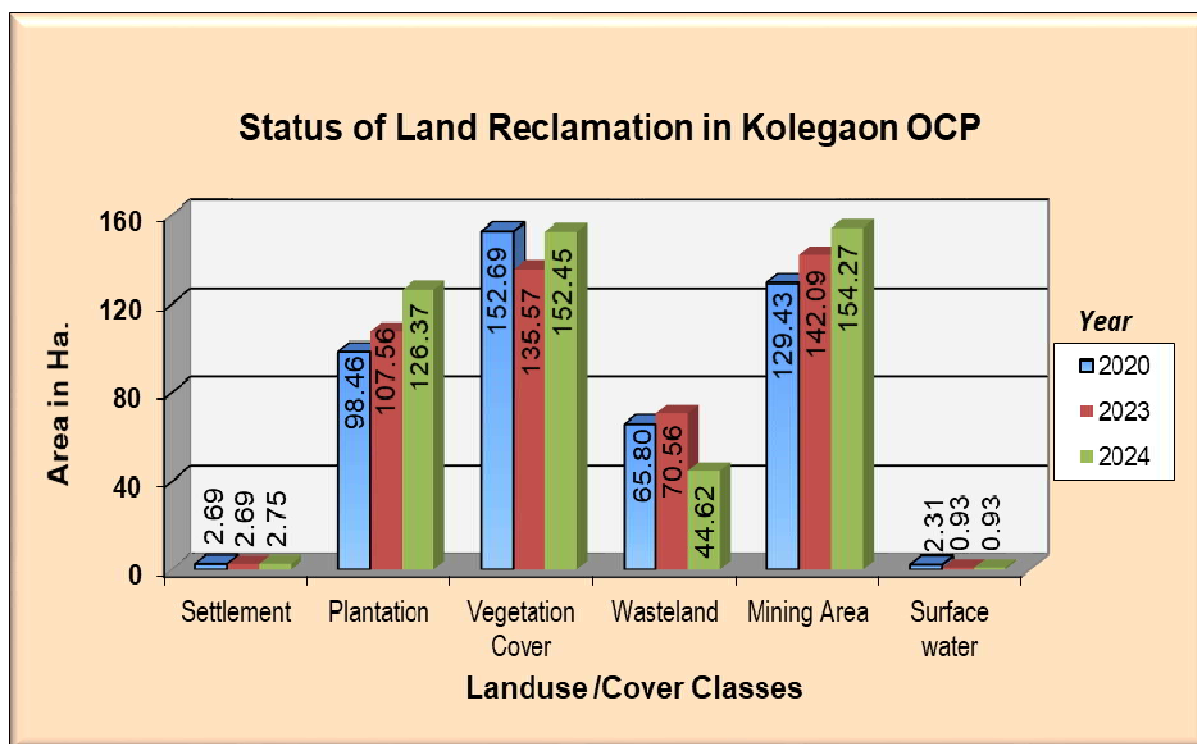


Chart 5.2: Status of Land Reclamation in Kolegaon OCP

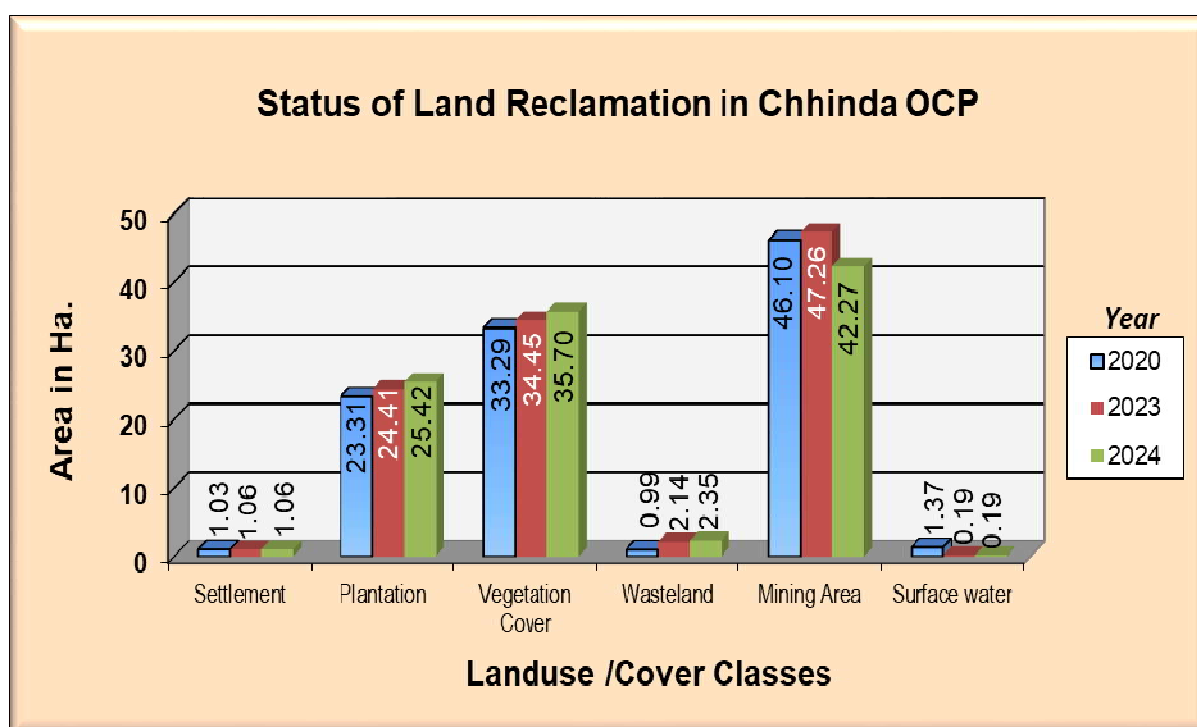


Chart 5.3: Status of Land Reclamation in Chhinda OCP

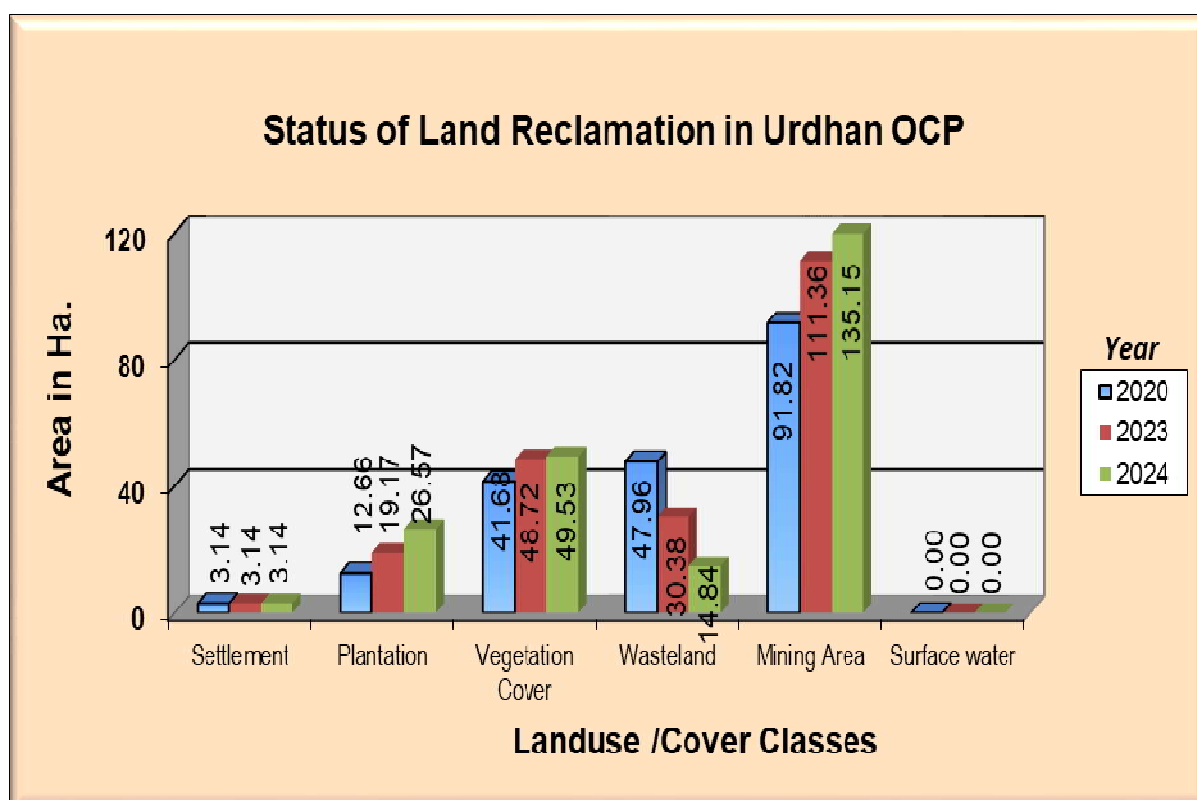


Chart 5.4: Status of Land Reclamation in Urdhan OCP

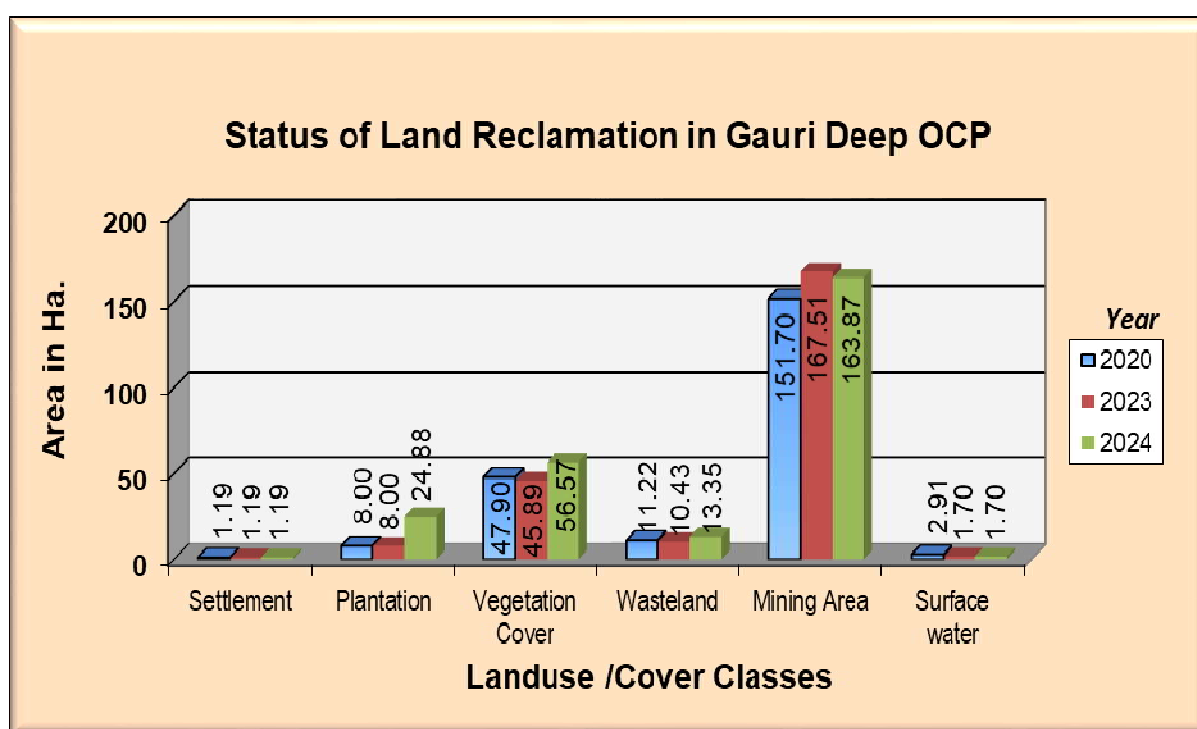


Chart 5.5: Status of Land Reclamation in Gauri OCP

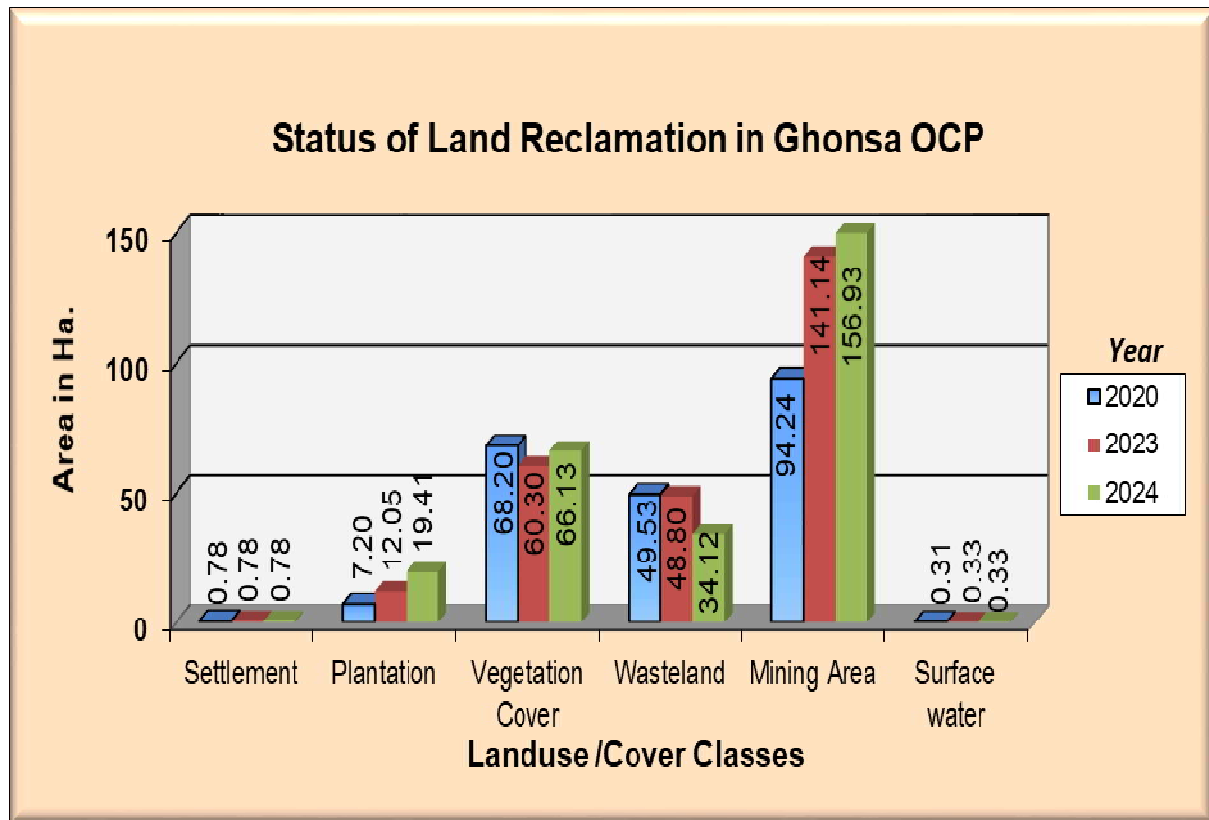
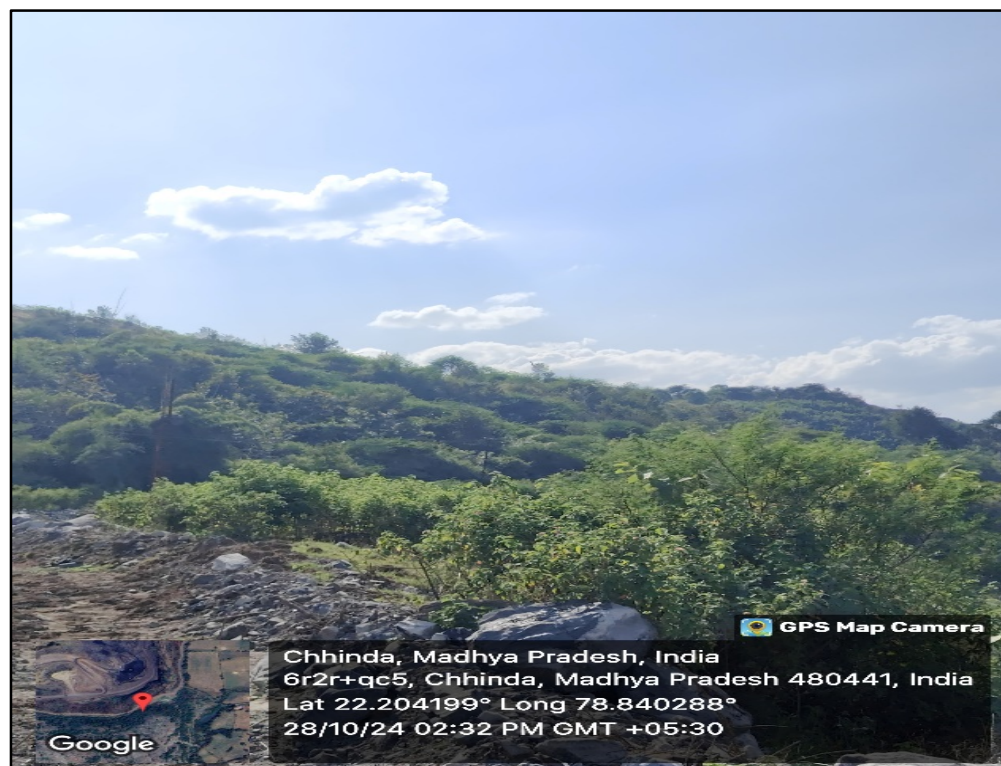


Chart 5.6: Status of Land Reclamation in Ghonsa OCP



Photograph 5.1: Social Forestry Plantation in Kolegaon OCP



Photograph 5.2: Plantation on Barren OB in Chhinda OCP



Photograph 5.3: Plantation on Barren OB Dump in Urdhan OCP



Photograph 5.4: Plantation undersocial forestry in Gauri Deep OCP

Note- No recent plantation has been carried out at Ghonsa OCP.

SOUTH EASTERN COALFIELDS LIMITED

6. Land Reclamation Status in South Eastern Coalfields Limited

6.1 Following fifteen (15) opencast and underground projects of SECL producing less than 5 million cubic m. (Coal+OB) together were taken up for land reclamation monitoring based on satellite data during the year 2024-25:

- Kurasia OC
- Kalyani UG and Shiwani UG
- Gayatri UG
- Ketki UG
- Chirimiri UG
- Rani Atari UG
- Bijuri UG
- Baherabandh UG
- Rajnagar UG
- Jhiria UG
- West Jhagrakhand UG
- Haldibari UG
- Umaria UG
- Vindhya UG
- Singhali UG

6.2 Area statistics of different land use classes present in the mine leasehold of the above projects for the year 2024 are shown in Table - 2. Land use maps derived from satellite data are shown in Plate 1 - 15. This time both local grid and UTM grid is used for map preparation along with all essential boundaries and shape file such as EC Boundary, Coal Stock Boundary, OB Dump, Sump, Plantation area etc. as per the work order from CIL. Different land use classes based on satellite data are depicted in Bar Charts in Chart 1-15.

6.3 Leasehold area of Kalyani U/G has decreased from 450.94 Ha (Yr 2021) to 369.89 Ha (Yr 2024), for Shiwani U/G from 562.95 Ha (Yr 2021) to 561.51 Ha (Yr 2024). For many the Leasehold area has increased as well, Gayatri U/G Leasehold area has increased from 531.59 Ha (Yr 2019) to 616.96 Ha (Yr 2024), for Ketki U/G from 497.49 Ha (Yr 2019) to 548.65 Ha (Yr 2024), for Umaria U/G from 509.35 Ha (Yr 2019) to 512.54 Ha (Yr 2024) and for Vindhya U/G from 348.01 Ha (Yr 2019) to 350.00 Ha (Yr 2024). The modification has been done as per data received from SECL.

- 6.4** Study reveals that out of total leasehold area 10239.95 Ha, excavated area is 952.147 Ha. Total area under reclamation is 845.94 Ha (88.85% of excavated area), out of which 275.26 Ha. (28.91% of excavated area) is under technical reclamation and 570.68 Ha. (59.94% of excavated area) has been revegetated (Biologically Reclaimed). The study also reveals that technical reclamation has been done in 3 projects, Kurasia OCP, Rajnagar U/G and West Jhagrakhand U/G, missing in others, their reason being underground projects.
- 6.5** After analyzing the satellite data of year 2024, it is evident that Green Cover which includes plantation carried out on backfilled area, external OB dumps as well as under social forestry in all the mines of SECL taken up for study has reached to 999.99 Ha area as compared to 833.39 Ha in the previous studies within the entire leasehold area of 10239.95 Ha. The increase being a significant area of 166.60 Ha.
- 6.6** Study reveals that Chirimiri U/G, Rani Atari U/G and Jhiria U/G have dense mixed Sal Jungles on surface, hence either nil or limited surface right approved to SECL. Hence very less area available for land reclamation.
- 6.7** Out of the 15 projects of SECL producing less than 5 million cubic m. (Coal+OB), Kurasia OCP ranks on top for area under reclamation (100.00%) followed by West Jhagrakhand U/G (87.71%) and Rajnagar U/G (87.30%).

Table 6.1: Summarized Land Reclamation Status in SECL

Status of Land Reclamation in Southern Eastern Coalfields Limited based on Satellite Data for the Year 2024 (Projects producing less than 5 mcm of Coal+OB annually)																			
SL.N o.	Project	Total Leasehold Area (2019/2020/ 2021/2023)	Total Leasehold Area(2024)	Technical Reclamation		Plantation						Area under Active Mining	Total Excavated Area		Total Area under Plantation (% Green Cover Generated in Leasehold)		Total Area under Reclamation		
						Biological Reclamation		Other Plantations											
				Area under Backfilling		Plantation on Excavated / Backfilled Area		Plantation on External Over Burden Dumps		Social Forestry, Avaneu Plantation Etc.									
1	2	3		4		5		6		7		8		9 (=4+5+8)		10 (=5+6+7)		11(=4+5)	
				2019/2020/ 2021/2023	2024	2019/2020/ 2021/2023	2024	2019/2020/ 2021/2023	2024	2019/2020/ 2021/2023	2024	2019/2020/ 2021/2023	2024	2019/2020/ 2021/2023	2024	2019/2020/ 2021/2023	2024	2019/2020/ 2021/2023	2024
1)	Kurasia OCP	523.00	523.30	86.00	36.65	140.00	189.35	0.00	0.00	80.00	82.96	0.00	0.00	226.00	226.00	220.00	272.31	226.00	226.00
				38.05%	16.22%	61.95%	83.78%					0.00%	0.00%			42.07%	52.04%	100.00%	100.00%
2A)	Kalyani U/G	450.94	369.89	0.00	0.00	0.00	0.00	0.00	0.00	31.58	35.79	0.00	0.00	0.00	0.00	31.58	35.79	0.00	0.00
				0.00%	0.00%	0.00%	0.00%					0.00%	0.00%			7.00%	9.68%	0.00%	0.00%
2B)	Shiwani U/G	562.95	561.51	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.94	0.00	1.94	0.00	0.00	0.00	0.00
				0.00%	0.00%	0.00%	0.00%					0.00%	100.00%			0.00%	0.00%	0.00%	0.00%
3)	Gayatri U/G	531.59	616.96	0.00	0.00	0.00	0.00	0.00	0.00	6.64	19.58	2.47	2.21	2.47	2.21	6.64	19.58	0.00	0.00
				0.00%	0.00%	0.00%	0.00%					100.00%	100.00%			1.25%	3.17%	0.00%	0.00%
4)	Ketki U/G	497.49	548.65	0.00	0.00	0.00	0.00	0.00	0.00	1.02	20.83	0.00	0.97	0.00	0.97	1.02	20.83	0.00	0.00
				0.00%	0.00%	0.00%	0.00%					0.00%	100.00%			0.21%	3.80%	0.00%	0.00%
5)	Chirimiri U/G	686.00	686.29	0.00	0.00	0.00	0.00	0.00	0.00	7.77	6.71	0.00	0.00	0.00	0.00	7.77	6.71	0.00	0.00
				0.00%	0.00%	0.00%	0.00%					0.00%	0.00%			1.13%	0.98%	0.00%	0.00%
6)	Rani Atari U/G	361.50	361.49	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.28	2.34	2.20	2.34	2.20	0.00	0.28	0.00	0.00
				0.00%	0.00%	0.00%	0.00%					100.00%	100.00%			0.00%	0.08%	0.00%	0.00%
7)	Bijuri U/G	216.15	216.15	0.00	0.00	0.00	0.00	0.00	0.00	11.04	21.31	0.00	0.00	0.00	0.00	11.04	21.31	0.00	0.00
				0.00%	0.00%	0.00%	0.00%					0.00%	0.00%			5.11%	9.86%	0.00%	0.00%
8)	Baherabandh U/G	770.13	770.13	0.00	0.00	0.00	0.00	0.00	0.00	24.19	24.70	0.00	3.23	0.00	3.23	24.19	24.70	0.00	0.00
				0.00%	0.00%	0.00%	0.00%					0.00%	100.00%			3.14%	3.21%	0.00%	0.00%
9)	Rajnagar U/G	1848.11	1848.11	133.62	104.73	243.85	270.43	0.00	0.00	81.04	103.78	48.02	54.55	425.49	429.71	324.89	374.21	377.47	375.16
				31.40%	24.37%	57.31%	62.93%					11.29%	12.70%			17.58%	20.25%	88.71%	87.30%
10)	Jhiria U/G	557.00	557.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
				0.00%	0.00%	0.00%	0.00%					0.00%	0.00%			0.00%	0.00%	0.00%	0.00%
11)	West Jhagrakhand U/G	1065.67	1065.67	112.98	133.88	111.00	110.90	3.84	3.38	35.46	36.09	62.39	34.29	286.37	279.07	150.30	150.37	223.98	244.79
				39.45%	47.97%	38.76%	39.74%					21.79%	12.29%			14.10%	14.11%	78.21%	87.71%
12)	Haldibari U/G	390.00	390.00	0.00	0.00	0.00	0.00	0.94	0.92	17.78	16.81	1.00	0.70	1.00	0.70	18.72	17.73	0.00	0.00
				0.00%	0.00%	0.00%	0.00%					100.00%	100.00%			4.80%	4.55%	0.00%	0.00%
13)	Umariya U/G	509.35	512.54	0.00	0.00	3.60	0.00	0.00	0.00	13.60	36.92	1.54	0.66	5.14	0.66	17.20	36.92	3.60	0.00
				0.00%	0.00%	70.04%	0.00%					29.96%	100.00%			3.38%	7.20%	70.04%	0.00%
14)	Vindhya U/G	348.01	350.00	0.00	0.00	0.00	0.00	0.00	0.00	7.54	6.91	3.47	3.45	3.47	3.45	7.54	6.91	0.00	0.00
				0.00%	0.00%	0.00%	0.00%					100.00%	100.00%			2.17%	1.97%	0.00%	0.00%
15)	Singhali U/G	862.28	862.27	0.00	0.00	0.00	0.00	0.32	0.31	12.18	12.05	3.72	2.02	3.72	2.02	12.50	12.36	0.00	0.00
				0.00%	0.00%	0.00%	0.00%					100.00%				1.45%	1.43%	0.00%	0.00%
	TOTAL (A)	10180.17	10239.95	332.60	275.26	498.45	570.68	5.10	4.61	329.84	424.70	124.95	106.20	956.00	952.14	833.39	999.99	831.05	845.94
				34.79%	28.91%	52.14%	59.94%					13.07%	11.15%	9.39%	9.30%	8.19%	9.77%	86.93%	88.85%
(%) calculated is in respect to Total Excavated Area except for "Total Area under Plantation" where % is in terms of "Leasehold Area".																			
* Area under Active Mining Includes Coal dump, Coal Quarry, Advance Quarry Site and Quarry filled with water etc., if any.																			
* For Vindhya U/G, the Leasehold boundary is used for the Land Reclamation Monitoring instead of the EC boundary as provided by SECL for the years 2021 and 2024.																			
Note- The Land Reclamation Monitoring of Rani Atari U/G mine was previously conducted in the year 2023, for Kurasia OCP,Chirimiri, Kalyani, Shiwani, Rajnagar, West JKD & Vindhya U/G mine in the year 2021, for Bijuri, Jhiria, Baherabandh, Haldibari & Singhali U/G mine in theyear 2020, for Ketki, Gayatri & Umaria U/G mine in the year 2019 as indicated.																			

Table 6.1.1: Composite land reclamation status in remaining mines of SECL (<5 MCM Coal+OB) as per clause 2.(ii) of the received work order from CIL

Sl.No.	Cluster No.	Total Leasehold Area		Technical Reclamation		Plantation						Area under Active Mining		Total Excavated Area		Total Area under Plantation (% Green Cover Generated in Leasehold)		Total Area under Reclamation	
						Biological		Other Plantations											
		Area under Backfilling		Plantation on Excavated / Backfilled Area		Plantation on External OB Dumps		Social Forestry, Avenue Plantation Etc.											
1	2	3		4		5		6		7		8		9 (=4+5+8)		10 (=5+6+7)		11(=4+5)	
		2022	2023	2022	2023	2022	2023	2022	2023	2022	2023	2022	2023	2022	2023	2022	2023	2022	2023
16	Ambika OC**	134.00	134.00	0.00	0.00	0.00	0.00	0.00	0.00	3.00	3.00	0.00	0.00	0.00	0.00	3.00	3.00	0.00	0.00
				0.00%	0.00%	0.00%	0.00%					0.00%	0.00%			2.24%	2.24%	0.00%	0.00%
17	Mahan II OC**	297.00	297.00	100.00	101.00	53.00	54.00	5.00	5.00	4.00	7.00	69.00	69.00	222.00	224.00	62.00	66.00	153.00	155.00
				45.05%	45.09%	23.87%	24.11%					31.08%	30.80%			20.88%	22.22%	68.92%	69.20%
18	Jamuna OC**	885.00	885.00	67.00	54.00	516.00	530.00	0.00	0.00	0.15	15.00	79.00	79.00	662.00	663.00	516.15	545.00	583.00	584.00
				10.12%	8.14%	77.95%	79.94%					11.93%	11.92%			58.32%	61.58%	88.07%	88.08%
19	Dhanpuri OC ***		1268.00		340.00		239.00		180.00		17.00		72.00		651.00		436.00		579.00
					52.23%		36.71%						11.06%				34.38%		88.94%
	TOTAL (B)	1316.00	2584.00	167.00	495.00	569.00	823.00	5.00	185.00	7.15	42.00	148.00	220.00	884.00	1538.00	581.15	1050.00	736.00	1318.00
				18.89%	32.18%	64.37%	53.51%					16.74%	14.30%			44.16%	40.63%	83.26%	85.70%
		2020	2023	2020	2023	2020	2023	2020	2023	2020	2023	2020	2023	2020	2023	2020	2023	2020	2023
20	Sharda OC	871.21	871.21	62.00	72.15	124.00	135.68	34.20	34.20	3.39	3.39	63.38	47.54	249.38	255.37	161.59	173.27	186.00	207.83
				24.86%	28.25%	49.72%	53.13%					25.42%	18.62%			18.55%	19.89%	74.58%	81.38%
21	Vijay West UG*		425.00		0.00		0.00		0.00		0.00		0.00		0.00		0.00		0.00
					0.00%		0.00%						0.00%				0.00%		0.00%
22	Rajgamar UG	3486.58	3486.58	0.00	0.00	0.00	0.00	0.00	0.00	37.53	46.70	0.00	0.00	0.00	0.00	37.53	46.70	0.00	0.00
				0.00%	0.00%	0.00%	0.00%					0.00%	0.00%			1.08%	1.34%	0.00%	0.00%
	TOTAL (C)	4357.79	4782.79	62.00	72.15	124.00	135.68	34.20	34.20	40.92	50.09	63.38	47.54	249.38	255.37	199.12	219.97	186.00	207.83
				24.86%	28.25%	49.72%	53.13%					25.42%	18.62%			4.57%	4.60%	74.58%	81.38%
		2019	2022	2019	2022	2019	2022	2019	2022	2019	2022	2019	2022	2019	2022	2019	2022	2019	2022
23	Kotma OC	826.11	826.11	8.07	3.17	55.59	60.49	0.00	0.00	42.98	42.98	6.22	6.22	69.88	69.88	98.57	103.47	63.66	63.66
				11.55%	4.54%	79.55%	86.56%					8.90%	8.90%			11.93%	12.52%	91.10%	91.10%
24	Mahan OC	194.63	194.63	38.22	44.92	0.61	4.19	1.45	5.29	0.00	0.00	9.11	3.20	47.94	52.31	2.06	9.48	38.83	49.11
				79.72%	85.87%	1.27%	8.01%					19.00%	6.12%			1.06%	4.87%	81.00%	93.88%
25	West Chirimiri OC	728.39	728.39	35.03	22.53	49.70	62.20	0.00	0.00	14.93	14.93	4.94	4.94	89.67	89.67	64.63	77.13	84.73	84.73
				39.07%	25.13%	55.43%	69.37%					5.51%	5.51%			8.87%	10.59%	94.49%	94.49%
26	Churcha RO UG	3590.15	3590.15	0.00	0.00	0.00	0.00	0.00	0.00	40.21	40.35	0.63	0.81	0.63	0.81	40.21	40.35	0.00	0.00
				0.00%	0.00%	0.00%	0.00%					100.00%	100.00%			1.12%	1.12%	0.00%	0.00%
27	Katkona UG	1130.93	1130.93	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.66	0.24	0.37	0.24	0.37	0.00	0.66	0.00	0.00
				0.00%	0.00%	0.00%	0.00%					100.00%	100.00%			0.00%	0.06%	0.00%	0.00%
28	Jhimili UG	1313.52	1313.52	0.00	0.00	0.00	0.00	0.00	0.00	7.23	8.73	0.47	1.35	0.47	1.35	7.23	8.73	0.00	0.00
				0.00%	0.00%	0.00%	0.00%					100.00%	100.00%			0.55%	0.66%	0.00%	0.00%
29	Pandavpara UG	1313.52	1313.52	0.00	0.00	0.00	0.00	0.00	0.00	7.23	8.73	0.47	1.35	0.47	1.35	7.23	8.73	0.00	0.00
				0.00%	0.00%	0.00%	0.00%					100.00%	100.00%			0.55%	0.66%	0.00%	0.00%
30	Kumda UG*		500.56		16.85		9.70		0.00		165.45		16.85		43.40		175.15		26.55
					38.82%		22.35%						38.82%				34.99%		61.18%
31	Jamuna UG*		912.69		0.00		0.00		0.00		157.05		0.00		0.00		157.05		0.00
					0.00%		0.00%						0.00%				17.21%		0.00%
32	Damni UG*		335.00		0.00		0.00		0.00		0.00		2.08		2.08		0.00		0.00
					0.00%		0.00%						100.00%				0.00%		0.00%
33	Khairaha UG*		472.06		0.00		0.00		0.00		0.00		2.10		2.10		0.00		0.00
					0.00%		0.00%						100.00%				0.00%		0.00%
34	Rajendra UG*		590.00		0.00		0.00		0.00		0.00		1.04		1.04		0.00		0.00
					0.00%		0.00%						100.00%				0.00%		0.00%
35	Dhelwadih UG*		742.98		0.00		0.00		0.00		17.93		0.00		0.00		17.93		0.00
					0.00%		0.00%						0.00%				2.41%		0.00%
36	Bagdewa UG*		502.37		0.00		0.00		0.00		23.80		0.00		0.00		23.80		0.00
					0.00%		0.00%						0.00%				4.74%		0.00%
	TOTAL (D)	9097.25	13152.91	81.32	87.47	105.90	136.58	1.45	5.29	112.58	480.61	22.08	40.31	209.30	264.36	219.93	622.48	187.22	224.05
				38.85%	33.09%	50.60%	51.66%					10.55%	15.25%			2.42%	4.73%	89.45%	84.75%
#GRAND TOTAL (A+B+C+C)		24951.21	30759.65	642.92	929.88	1297.35	1665.94	45.75	229.10	490.49	997.40	358.41	414.05	2298.68	3009.87	1833.59	2892.44	1940.27	2595.82
				27.97%	30.89%	56.44%	55.35%					15.59%	13.76%			7.35%	9.40%	84.41%	86.24%
#Grand Total (A+B+C+D) is the composite value of all 36 mines of SECL (Less than 5 MTY capacity) covered in 3 years cycle of Land Reclamation Monitoring																		#Grand Total (A+B+C+D) is the composite value of all 36 mines of SECL (Less than 5 MTY capacity) covered in 3 years cycle of Land Reclamation Monitoring	
* The Land Reclamation Monitoring for these mines was first conducted in the year 2022 or 2023, as indicated.																			
** The Land Reclamation Monitoring for these mines was previously conducted under the category of more than 5 MTY capacity. For normalized calculations, the data from these mines has been converted from Sq.Kms to Ha.																			
***The Land Reclamation Monitoring for this mine was previously done as the Dhanpuri Amlai Group of Mines under the category of more than 5 MTY capacity. The data shown here is derived by subtracting Amlai Sector B's area statistics from the Dhanpuri Amlai Group of Mines for the Year 2023. For normalized calculations, the data has been converted from Sq.Kms to Ha, as indicated.																			

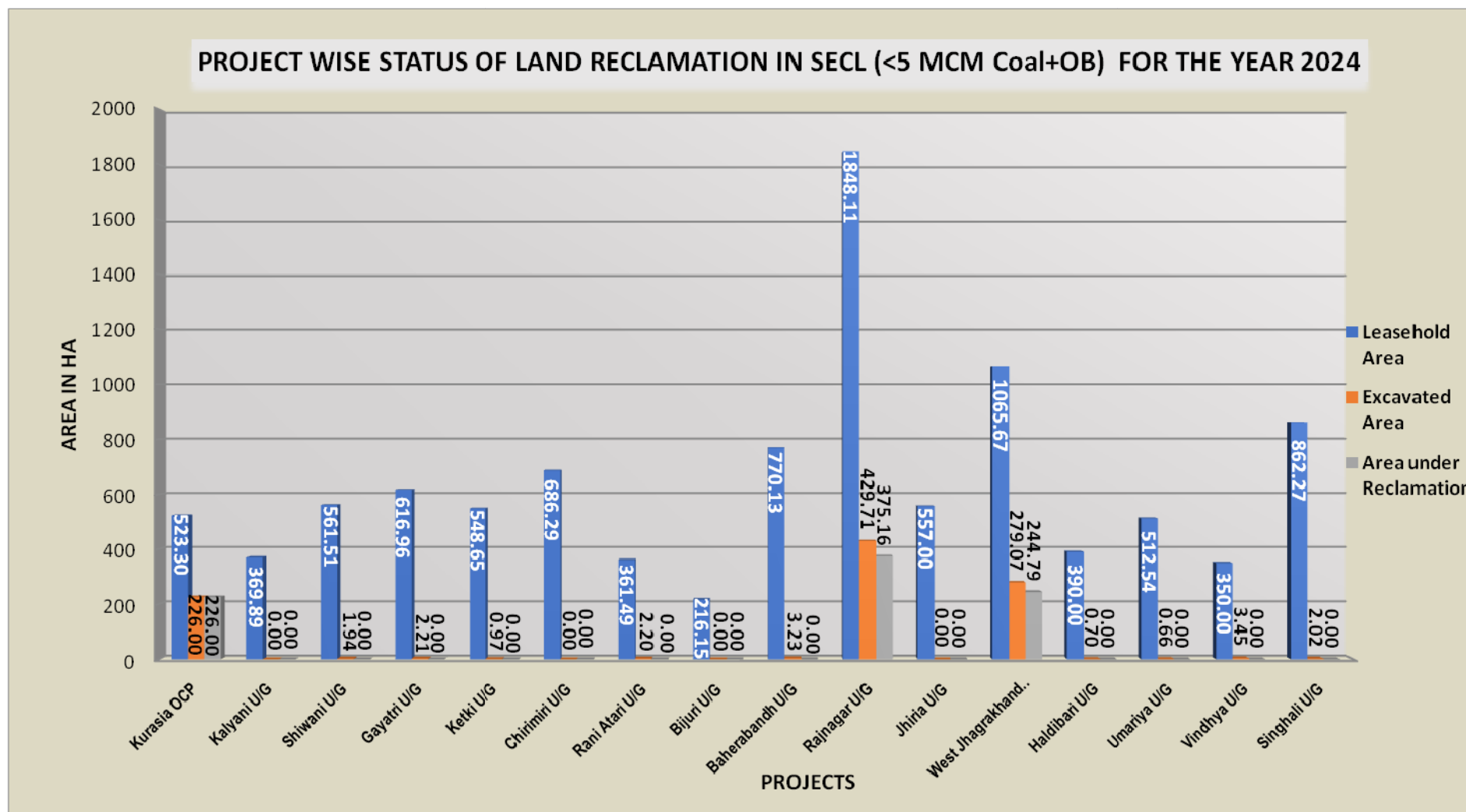


Chart 6.1: Bar Chart showing Land Reclamation Status in SECL

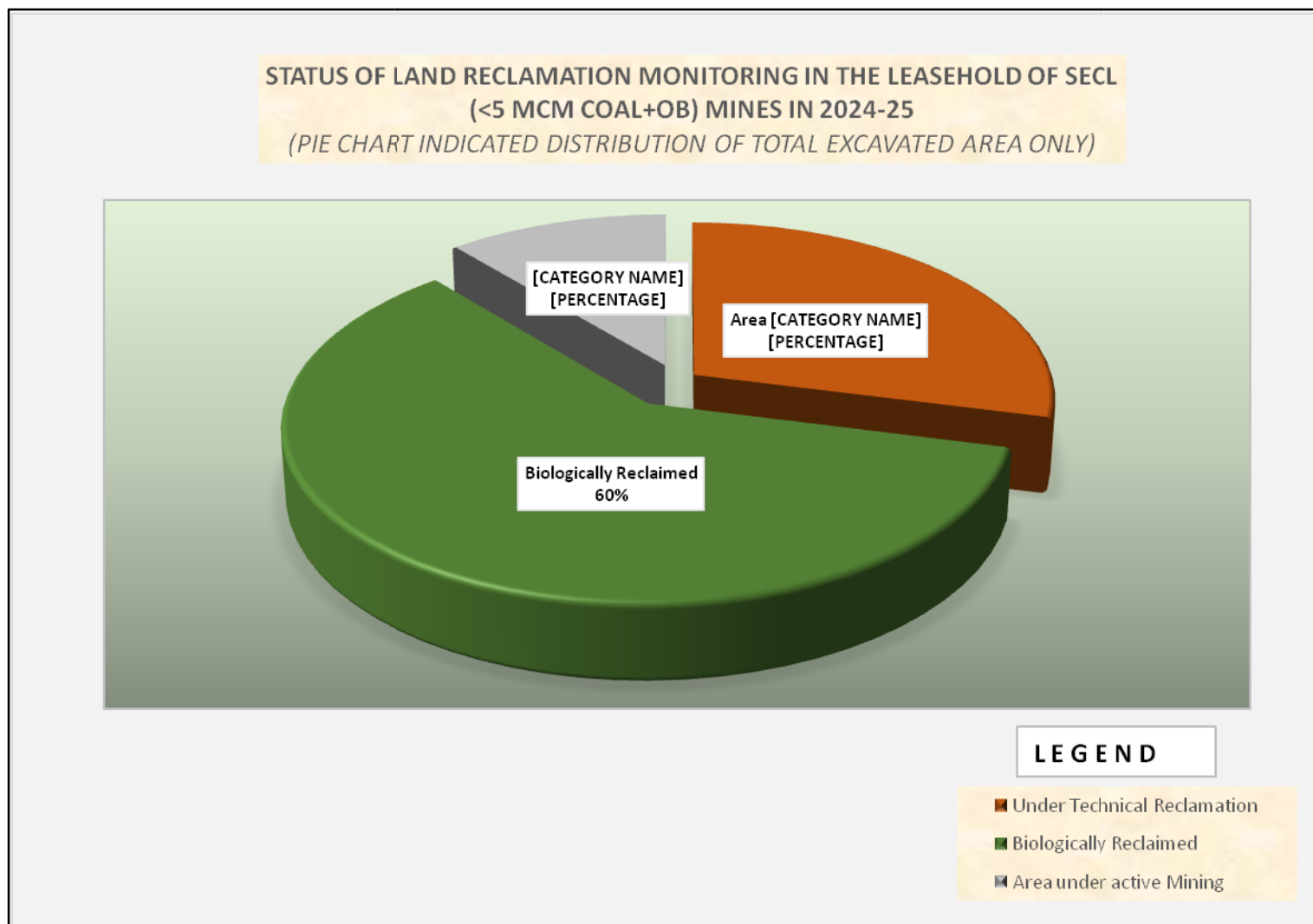


Figure 6.1: Pie Chart showing distribution of total Excavated area in SECL (<5MCM Coal+OB) Mines

Table 6.2: Project-wise Land Reclamation Status in Opencast Projects of SECL (2024)

Status of Land Use / Reclamation in UG Mines producing Less than 5 mcm (Coal+OB) annually of Southern Eastern Coalfields Ltd. based on Satellite data of the Year 2024																		
			(Area in ha)															
FORESTS			KURASIA OCP		KALYANI U/G		SHIWANI U/G		GAYATRI U/G		KETKI U/G		CHIRIMIRI U/G		RANI ATARI U/G		BIJURI U/G	
			Area	%	Area	%	Area	%	Area	%	Area	%	Area	%	Area	%	Area	%
			Dense Forest		0.00	0.00	4.31	1.17	16.45	2.93	49.48	8.02	62.03	11.31	245.58	35.78	206.78	57.20
	Open Forest		0.00	0.00	22.49	6.08	297.92	53.06	208.90	33.86	43.51	7.93	305.01	44.44	86.21	23.85	1.47	0.68
	Total Forest		0.00	0.00	26.80	7.24	314.37	55.99	258.38	41.88	105.54	19.24	550.59	80.23	292.99	81.05	1.47	0.68
SCRUBS																		
	Scrubs		54.01	10.32	13.56	3.66	77.57	13.81	68.45	11.09	83.81	15.27	79.78	11.62	12.69	3.51	35.46	16.41
PLANTATION	Social Forestry		82.96	15.85	35.79	9.68	0.00	0.00	19.58	3.17	20.83	3.80	6.71	0.98	0.28	0.08	21.31	9.86
	Plantation on OB Dump		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Plantation on Backfill/ Excavated Area (Biological Reclamation)		189.35	36.18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Plantation Area under Plantation (Green Cover)		272.31	52.04	35.79	9.68	0.00	0.00	19.58	3.17	20.83	3.80	6.71	0.98	0.28	0.08	21.31	9.86
	Total Vegetation		326.32	62.36	76.14	20.58	391.94	69.80	346.41	56.15	210.17	38.31	637.08	92.83	305.96	84.64	58.24	26.94
AREAS UNDER ACTIVE MINING	Coal Dump		0.00	0.00	0.00	0.00	1.94	0.34	2.21	0.36	0.97	0.18	0.00	0.00	2.20	0.61	0.00	0.00
	Coal Quarry		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Advance Quarry Site		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Quarry Filled With Water		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Total Area under Active Mining		0.00	0.00	0.00	0.00	1.94	0.34	2.21	0.36	0.97	0.18	0.00	0.00	2.20	0.61	0.00	0.00
	Barren OB Dump		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TECHNICAL RECLAMATION	Barren Backfilling (Technical Reclamation)		36.65	7.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Total Area under Technical Reclamation		36.65	7.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Total Area under Mining Operations		36.65	7.00	0.00	0.00	1.94	0.34	2.21	0.36	0.97	0.18	0.00	0.00	2.20	0.61	0.00	0.00
WASTELANDS	Waste Lands		111.42	21.29	29.92	8.09	13.14	2.34	59.88	9.71	114.93	20.95	42.92	6.25	51.93	14.37	27.51	12.73
	Gullied Land		0.00	0.00	3.60	0.97	12.67	2.26	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.40	0.65
	Barren Rocky Land		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Sand Body		0.00	0.00	0.00	0.00	1.72	0.31	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Total Wasteland		111.42	21.29	33.52	9.06	27.53	4.90	59.88	9.71	114.93	20.95	42.92	6.25	51.93	14.37	28.91	13.38
WATERBODIES	Reservoir, nallah, ponds		0.12	0.02	0.64	0.17	2.14	0.38	0.89	0.14	1.87	0.34	0.19	0.03	0.09	0.03	2.50	1.16
	Total Waterbodies		0.12	0.02	0.64	0.17	2.14	0.38	0.89	0.14	1.87	0.34	0.19	0.03	0.09	0.03	2.50	1.16
AGRICULTURE	Crop Lands		0.00	0.00	18.70	5.05	62.25	11.09	16.25	2.63	3.57	0.65	0.00	0.00	0.00	0.00	9.58	4.43
	Fallow Lands		0.00	0.00	216.27	58.47	69.70	12.41	173.82	28.17	202.76	36.96	0.00	0.00	0.00	0.00	103.84	48.04
	Total Agriculture		0.00	0.00	234.97	63.52	131.95	23.50	190.07	30.81	206.33	37.61	0.00	0.00	0.00	0.00	113.42	52.47
SETTLEMENTS	Urban Settlement		46.38	8.86	7.15	1.93	0.00	0.00	0.00	0.00	0.00	0.00	5.35	0.78	0.00	0.00	9.76	4.51
	Rural Settlement		1.33	0.25	17.45	4.72	4.62	0.82	14.22	2.30	10.18	1.85	0.00	0.00	0.00	0.00	1.70	0.79
	Industrial Settlement		1.09	0.21	0.02	0.01	1.41	0.25	3.29	0.53	4.21	0.77	0.75	0.11	1.31	0.36	1.63	0.75
	Total Settlement		48.79	9.32	24.62	6.66	6.02	1.07	17.51	2.84	14.38	2.62	6.10	0.89	1.31	0.36	13.09	6.05
Grand Total			523.30	100.00	369.89	100.00	561.51	100.00	616.96	100.00	548.65	100.00	686.29	100.00	361.49	100.00	216.15	100.00

Status of Land Use / Reclamation in UG Mines producing Less than 5 mcm (Coal+OB) annually of Southern Eastern Coalfields Ltd. based on Satellite data of the Year 2024																			(Area in ha)
		BAHERABANDH U/G		RAJNAGAR U/G		JHIRIA U/G		WEST JKD U/G		HALDIBARI U/G		UMARIYA U/G		VINDHYA U/G		SINGHALI U/G		TOTAL	
		Area	%	Area	%	Area	%	Area	%	Area	%	Area	%	Area	%	Area	%	Area	%
FORESTS	Dense Forest	0.00	0.00	0.00	0.00	391.73	70.33	0.74	0.07	0.31	0.08	0.00	0.00	0.00	0.00	25.96	3.01	595.18	5.81
	Open Forest	0.00	0.00	159.48	8.63	96.13	17.26	203.99	19.14	141.82	36.36	0.00	0.00	0.00	0.00	134.07	15.55	1306.95	12.76
	Total Forest	0.00	0.00	159.48	8.63	487.86	87.59	204.73	19.21	142.12	36.44	0.00	0.00	0.00	0.00	160.03	18.56	2704.35	26.41
SCRUBS	Scrubs	117.19	15.22	398.91	21.58	30.27	5.43	104.09	9.77	77.28	19.82	38.40	7.49	41.94	11.98	196.52	22.79	1322.08	12.91
	Total Scrubs	117.19	15.22	398.91	21.58	30.27	5.43	104.09	9.77	77.28	19.82	38.40	7.49	41.94	11.98	196.52	22.79	1322.08	12.91
PLANTATION	Social Forestry	24.70	3.21	103.78	5.62	0.00	0.00	36.09	3.39	16.81	4.31	36.92	7.20	6.91	1.97	12.05	1.40	424.70	4.15
	Plantation on OB Dump	0.00	0.00	0.00	0.00	0.00	0.00	3.38	0.32	0.92	0.23	0.00	0.00	0.00	0.00	0.31	0.04	4.61	0.04
	Plantation on Backfill / Excavated Area (Biological Reclamation)	0.00	0.00	270.43	14.63	0.00	0.00	110.90	10.41	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	570.68	5.57
	Total Area under Plantation (Green Cover)	24.70	3.21	374.21	20.25	0.00	0.00	150.37	14.12	17.73	4.54	36.92	7.20	6.91	1.97	12.36	1.44	999.99	9.77
	Total Vegetation	141.89	18.42	932.60	50.46	518.13	93.02	459.20	43.10	237.13	60.80	75.31	14.69	48.85	13.95	368.90	42.79	5134.26	50.14
AREA UNDER ACTIVE MINING	Coal Dump	3.23	0.42	1.35	0.07	0.00	0.00	0.12	0.01	0.70	0.18	0.66	0.13	3.45	0.99	1.99	0.23	16.86	0.16
	Coal Quarry	0.00	0.00	14.39	0.78	0.00	0.00	11.45	1.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	25.84	0.25
	Advance Quarry Site	0.00	0.00	0.00	0.00	0.00	0.00	4.71	0.44	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.00	4.74	0.05
	Quarry Filled With Water	0.00	0.00	38.82	2.10	0.00	0.00	18.02	1.69	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	56.84	0.56
	Total Area under Active Mining	3.23	0.42	54.55	2.95	0.00	0.00	34.29	3.21	0.70	0.18	0.66	0.13	3.45	0.99	2.02	0.23	106.20	1.04
TECHNICAL RECLAMATION	Barren OB Dump	0.00	0.00	0.00	0.00	0.00	0.00	2.78	0.26	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.78	0.03
	Barren Backfilling (Technical Reclamation)	0.00	0.00	104.73	5.67	0.00	0.00	133.88	12.56	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	275.26	2.69
	Total Area under Technical Reclamation	0.00	0.00	104.73	5.67	0.00	0.00	133.88	12.56	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	275.26	2.69
WASTELANDS	Total Area under Mining Operations	3.23	0.42	159.28	8.62	0.00	0.00	170.95	16.03	0.70	0.18	0.66	0.13	3.45	0.99	2.02	0.23	384.24	3.75
	Waste Lands	130.72	16.97	465.84	25.21	31.80	5.71	241.83	22.70	13.56	3.48	15.84	3.09	16.32	4.66	88.63	10.27	1411.24	13.78
	Gullied Land	0.00	0.00	1.76	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.76	0.07
	Barren Rocky Land	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	93.65	24.01	0.00	0.00	0.00	0.00	0.00	0.00	93.65	0.91
	Sand Body	2.28	0.30	3.25	0.18	0.76	0.14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.11	0.01	5.63	0.05
WATERBODIES	Total Wasteland	133.00	17.27	470.85	25.48	32.56	5.85	241.83	22.70	107.21	27.49	15.84	3.09	16.32	4.66	88.74	10.28	1577.37	15.40
	Reservoir, nallah, ponds	13.35	1.73	5.42	0.29	6.31	1.13	4.40	0.41	0.00	0.00	5.61	1.09	3.57	1.02	13.78	1.60	52.42	0.51
AGRICULTURE	Total Waterbodies	13.35	1.73	5.42	0.29	6.31	1.13	4.40	0.41	0.00	0.00	5.61	1.09	3.57	1.02	13.78	1.6	60.87	0.59
	Crop Lands	52.47	6.81	10.32	0.56	0.00	0.00	11.15	1.05	14.40	3.69	228.03	44.49	6.61	1.89	19.14	2.22	390.22	3.81
	Fallow Lands	411.37	53.42	167.77	9.08	0.00	0.00	154.92	14.54	21.34	5.47	102.03	19.91	268.54	76.72	358.81	41.61	2181.46	21.30
SETTLEMENTS	Total Agriculture	463.84	60.23	178.09	9.64	0.00	0.00	166.07	15.59	35.74	9.16	330.06	64.40	275.14	78.61	377.95	43.83	2703.63	26.40
	Urban Settlement	0.00	0.00	75.03	4.06	0.00	0.00	4.06	0.38	0.00	0.00	82.97	16.19	0.00	0.00	1.53	0.18	232.21	2.27
	Rural Settlement	13.94	1.81	19.64	1.06	0.00	0.00	18.48	1.73	7.45	1.91	1.72	0.34	2.68	0.77	8.76	1.02	117.54	1.15
	Industrial Settlement	0.88	0.11	7.20	0.39	0.00	0.00	0.69	0.06	1.78	0.46	0.38	0.07	0.00	0.00	0.59	0.07	23.81	0.23
Grand Total	Total Settlement	14.82	1.92	101.87	5.51	0.00	0.00	23.23	2.17	9.22	2.37	85.07	16.60	2.68	0.77	10.87	1.27	379.57	3.71
	Grand Total	770.13	100.00	1848.11	100.00	557.00	100.00	1065.67	100.00	390.00	100.00	512.54	100.00	350.00	100.00	862.27	100.00	10239.95	100.00

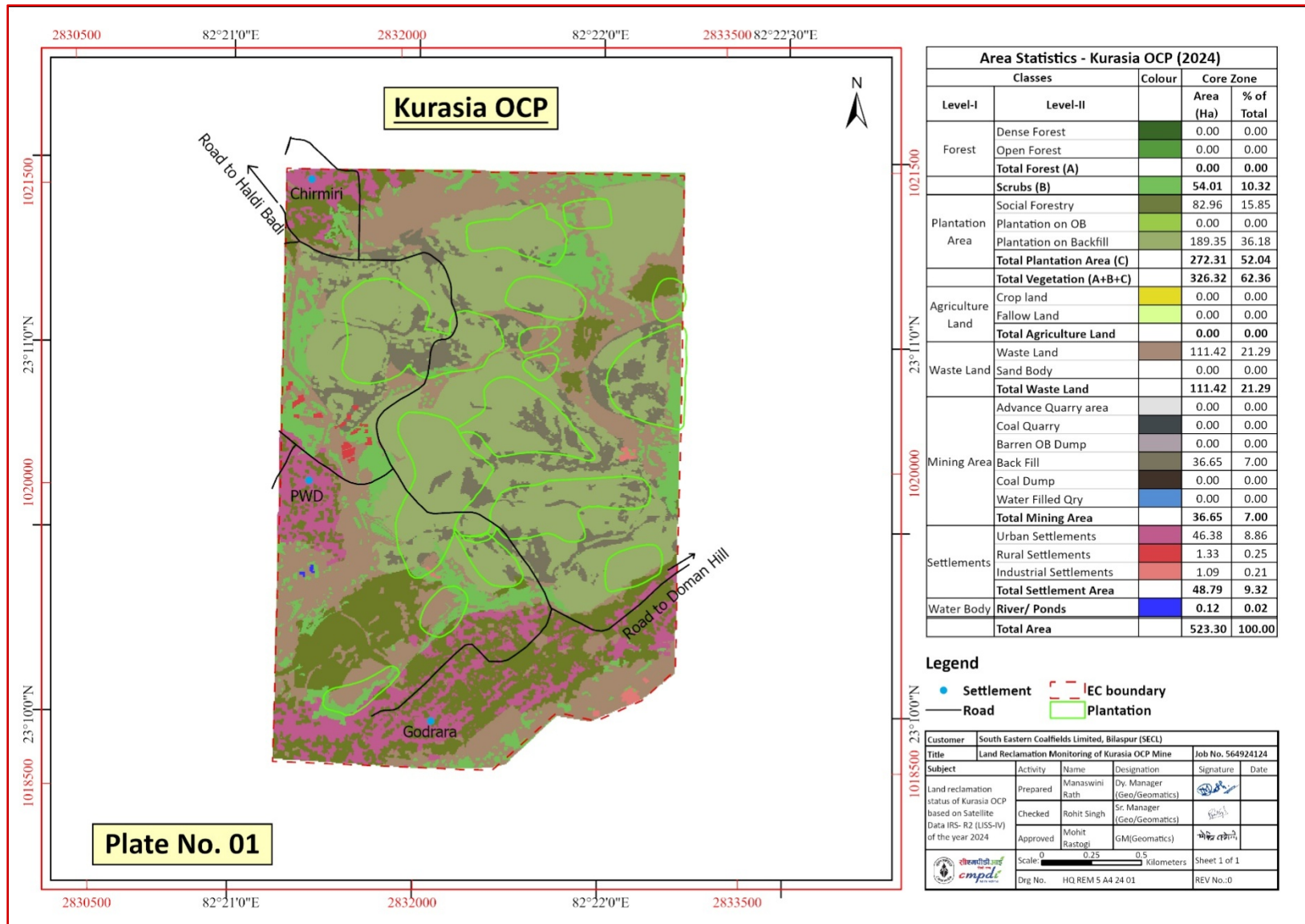


Plate 6.1: Land Use/Cover map of Kurasia OCP

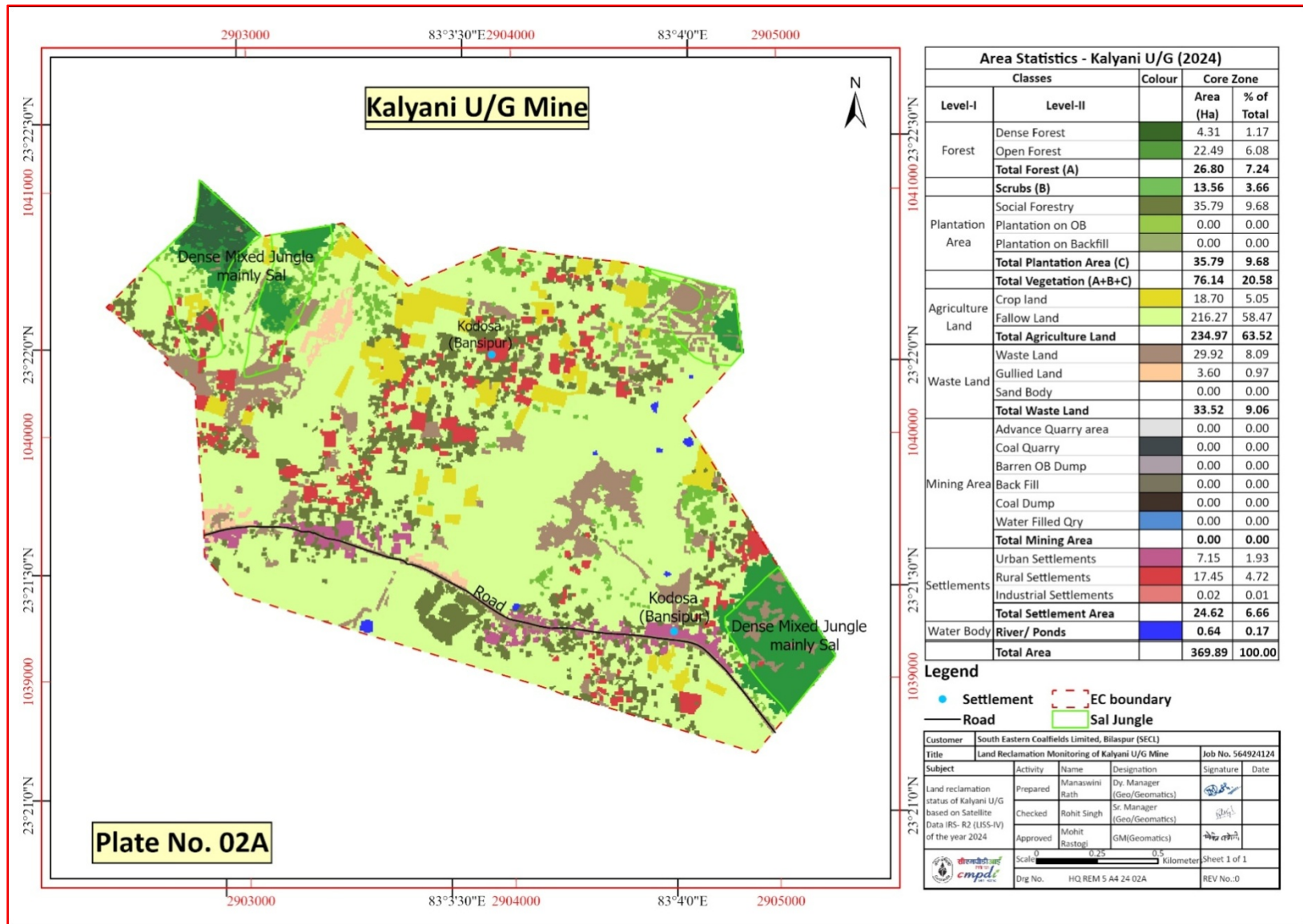


Plate 6.2a: Land Use/Cover map of KalyaniUG

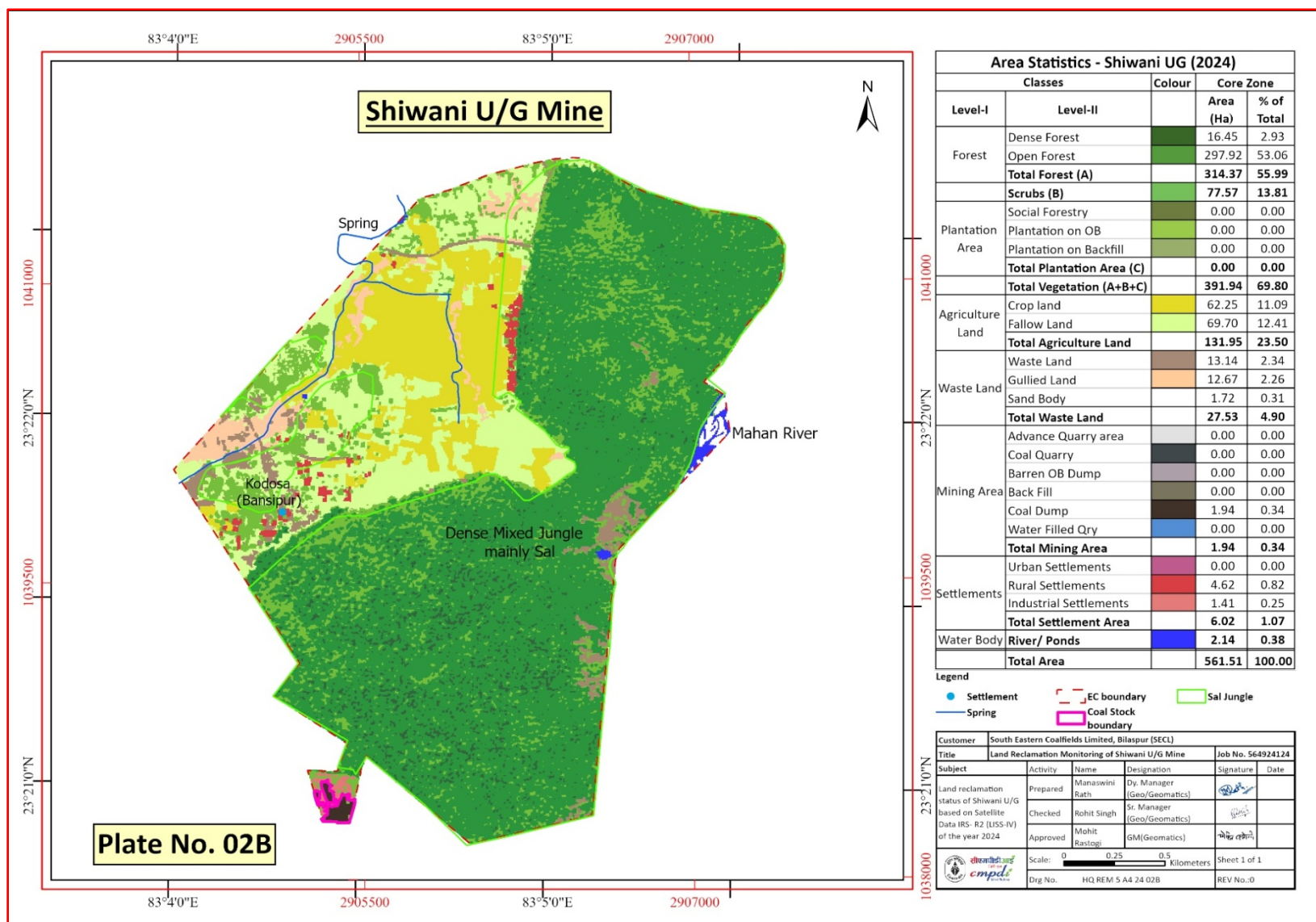


Plate 6.2b: Land Use/Cover map of ShiwaniUG

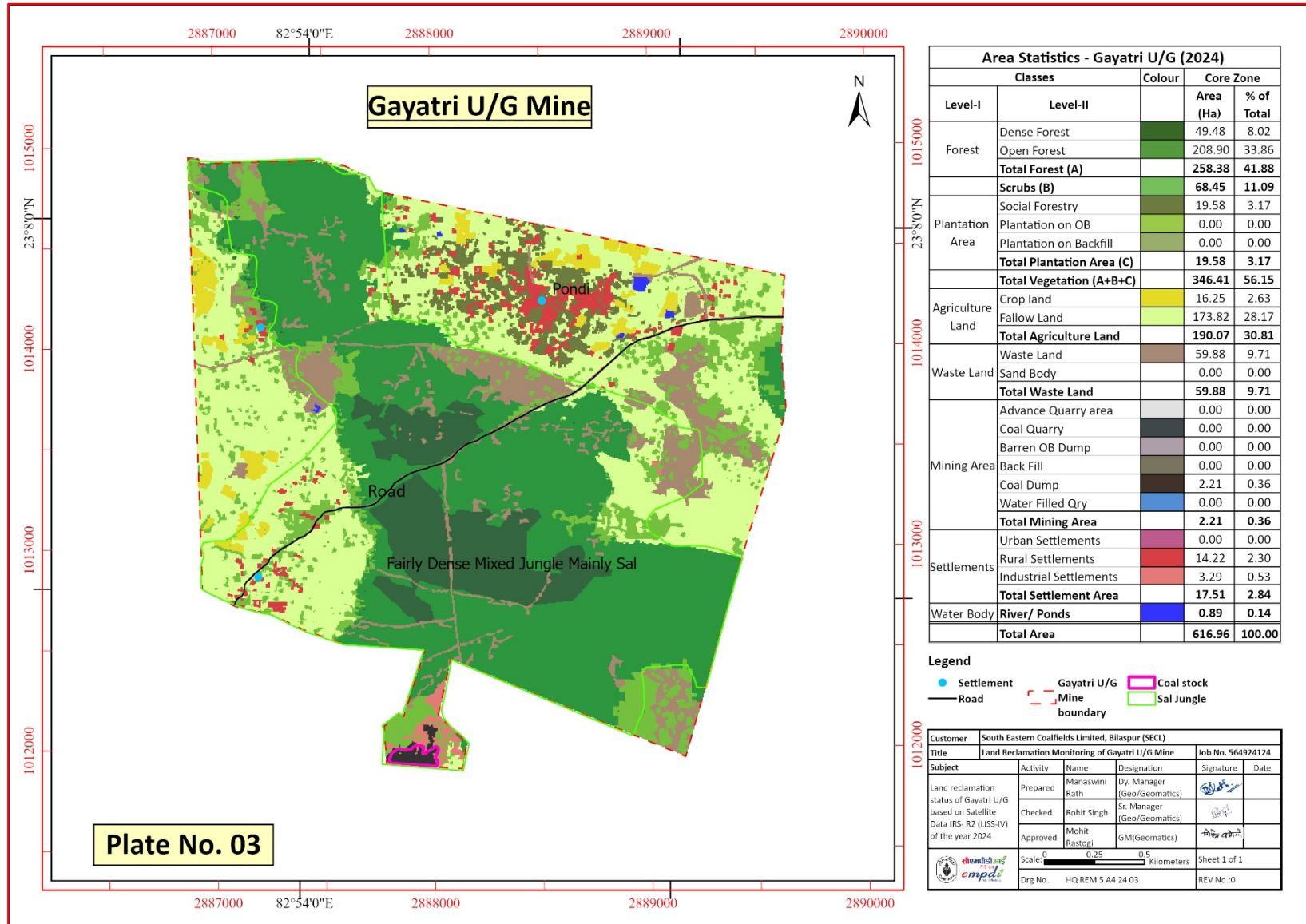


Plate 6.3: Land Use/Cover map of Gayatri UG

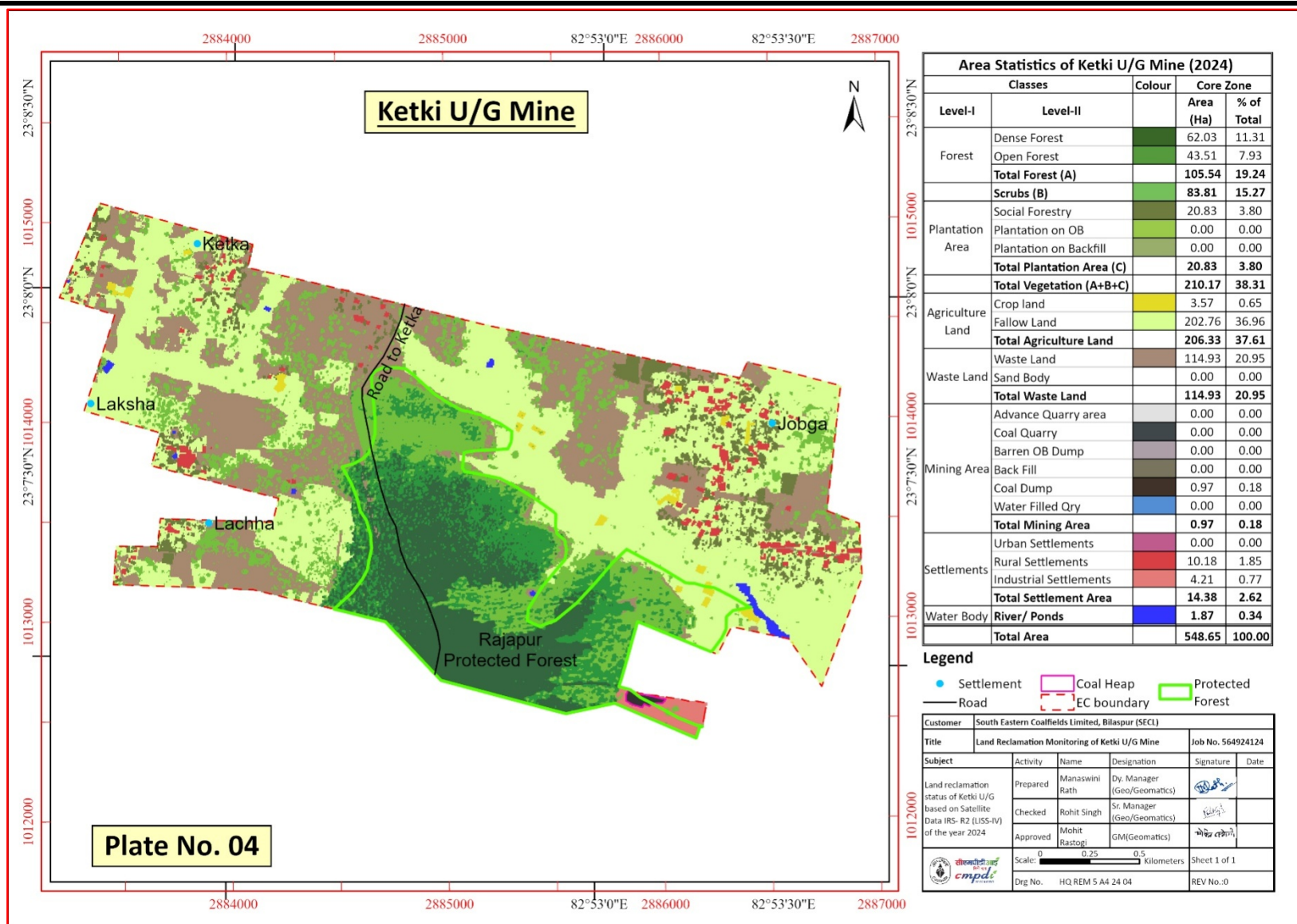


Plate 6.4: Land Use/Cover map of Ketki UG



Plate 6.5: Land Use/Cover map of Chirimiri UG

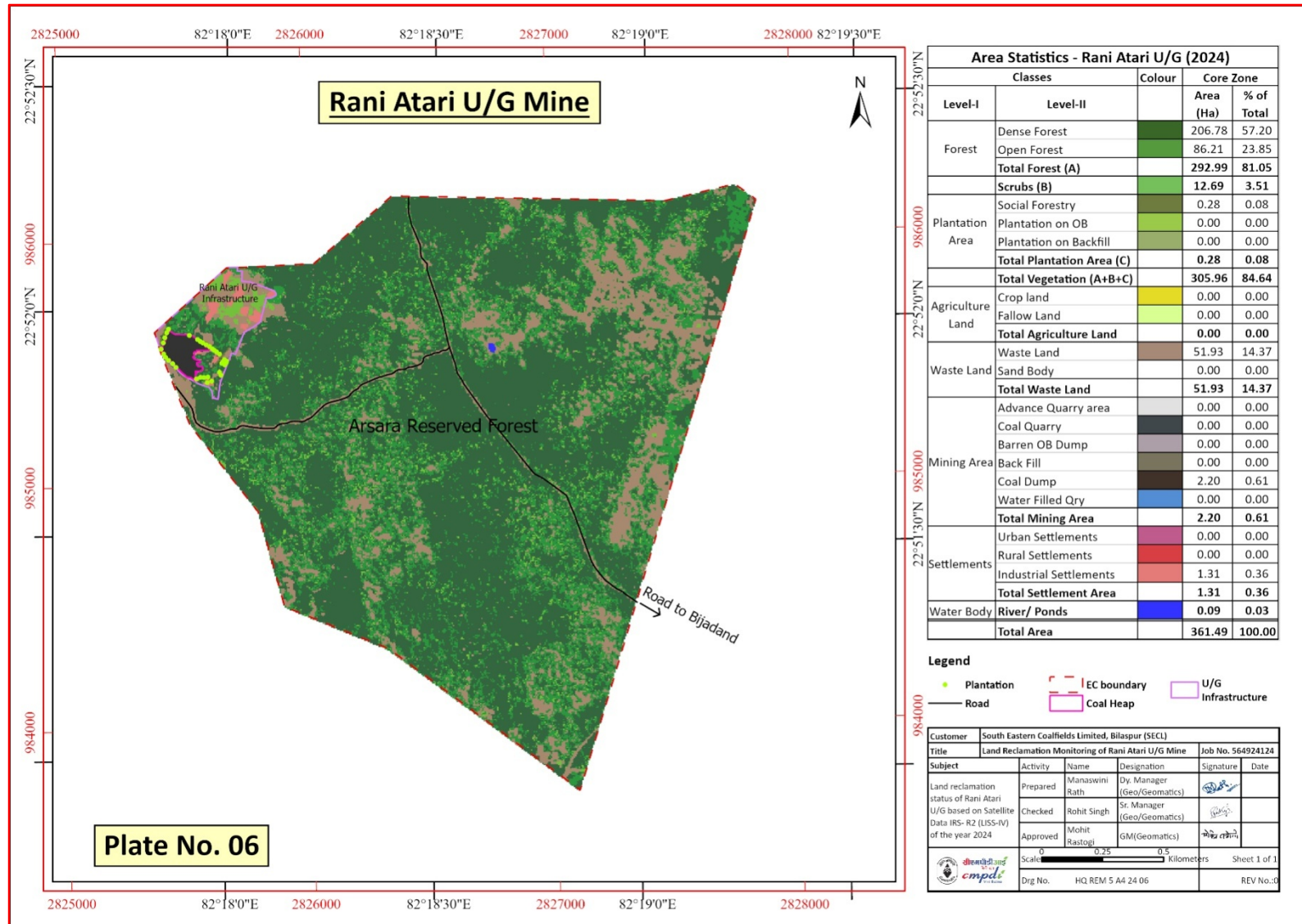


Plate 6.6: Land Use/Cover map of Rani Atari UG

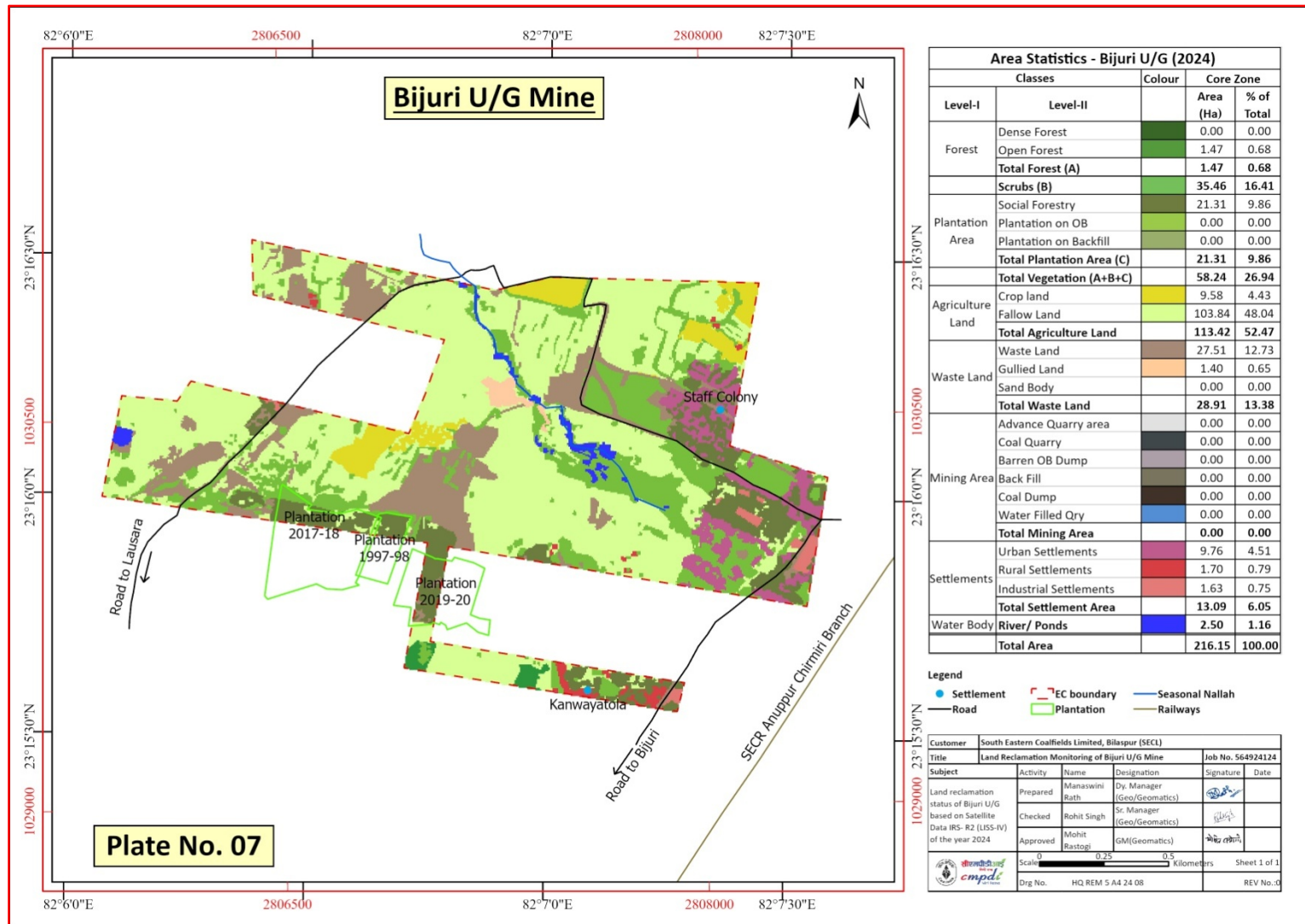


Plate 6.7: Land Use/Cover map of Bijuri UG

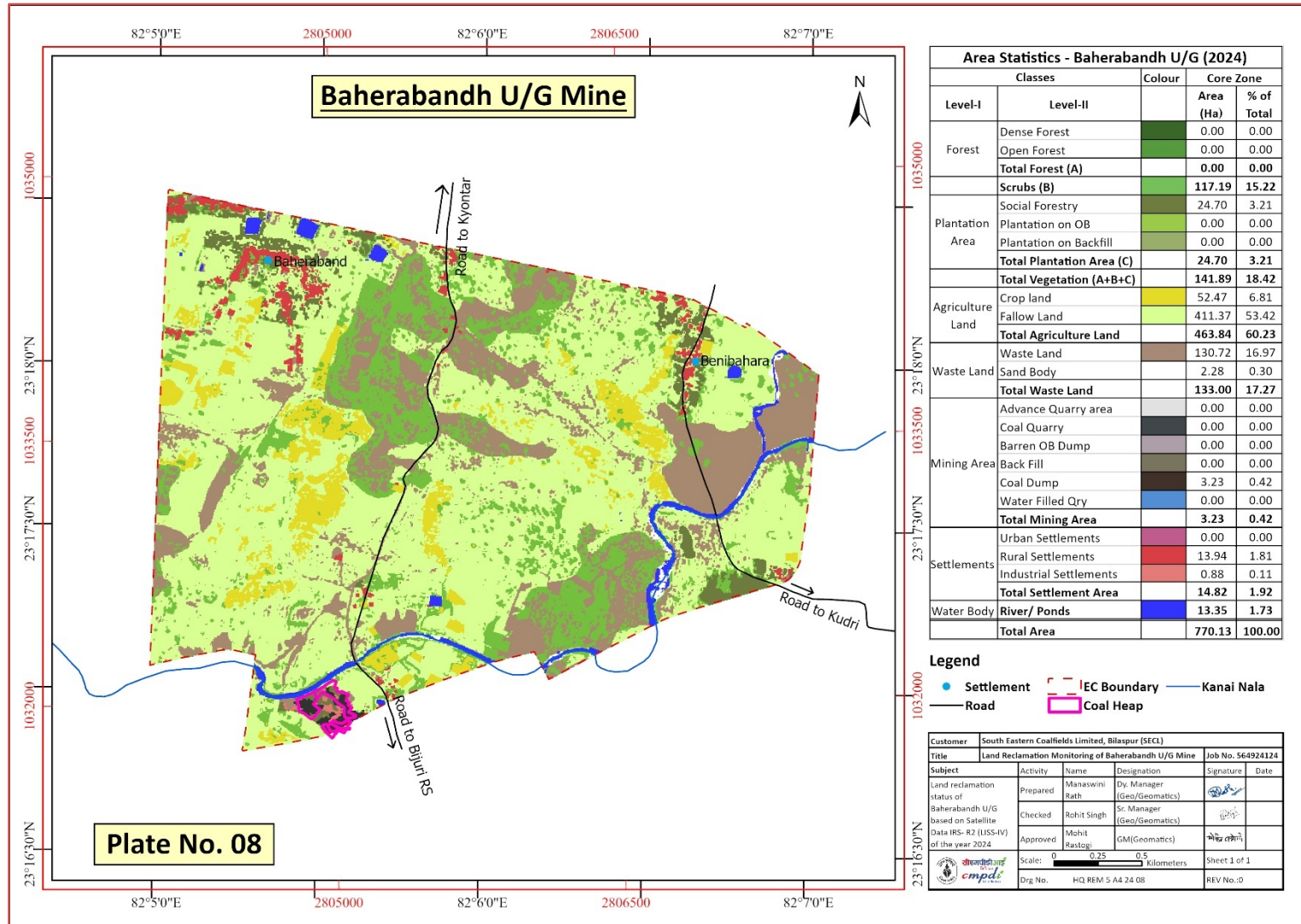


Plate 6.8: Land Use/Cover map of Baherabandh UG

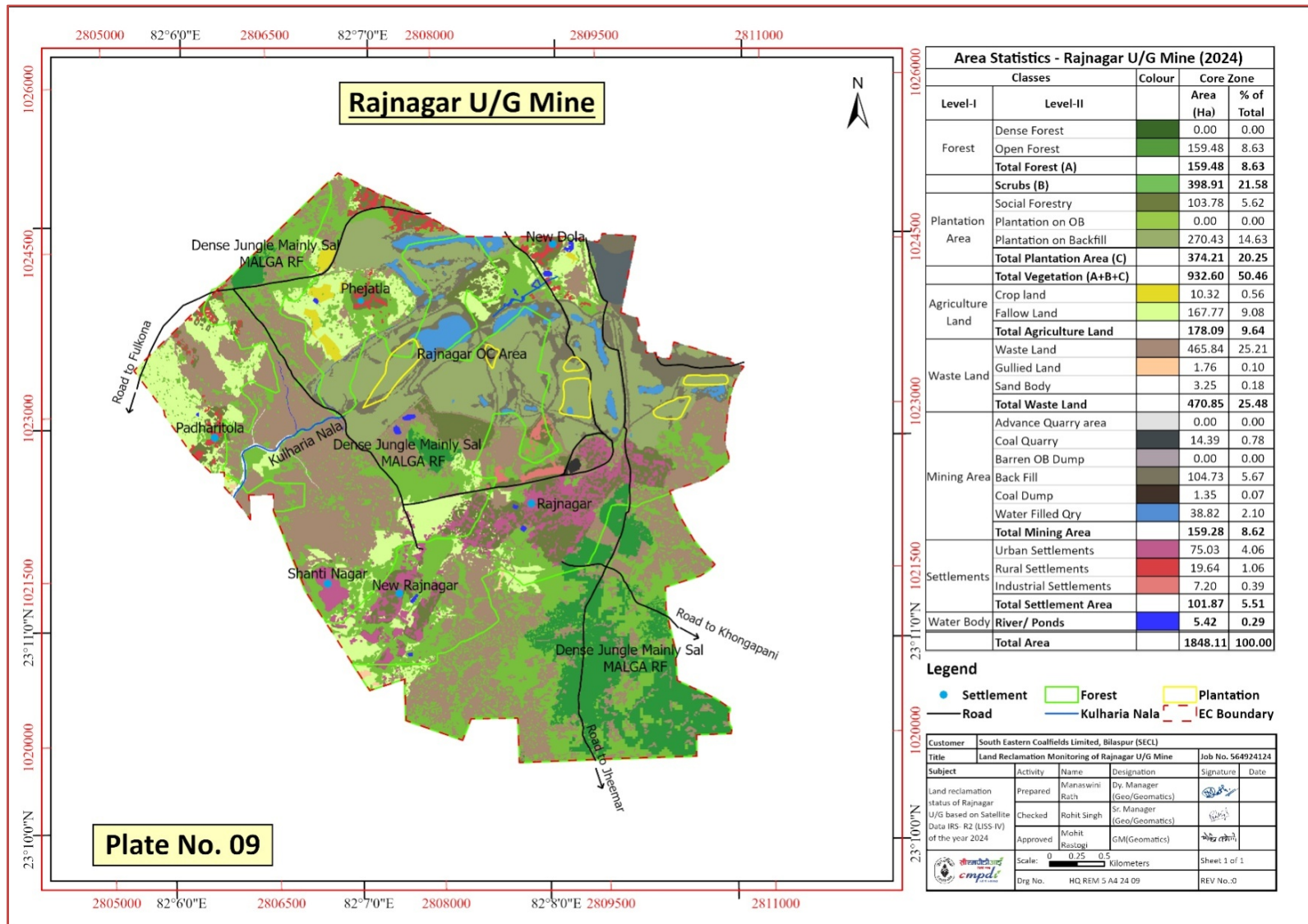


Plate 6.9: Land Use/Cover map of Rajnagar UG

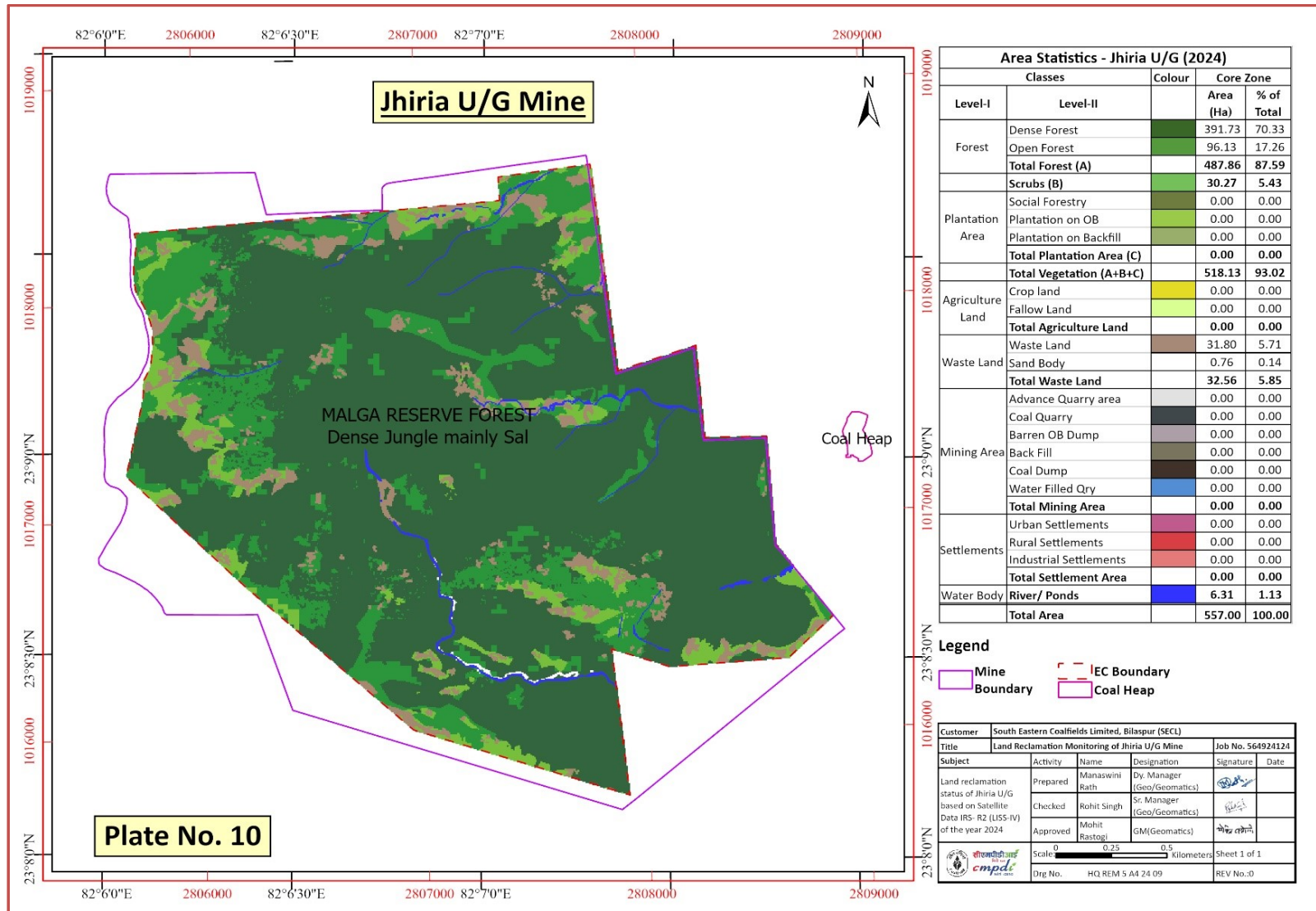


Plate.6.10: Land Use/Cover map of Jhiria UG

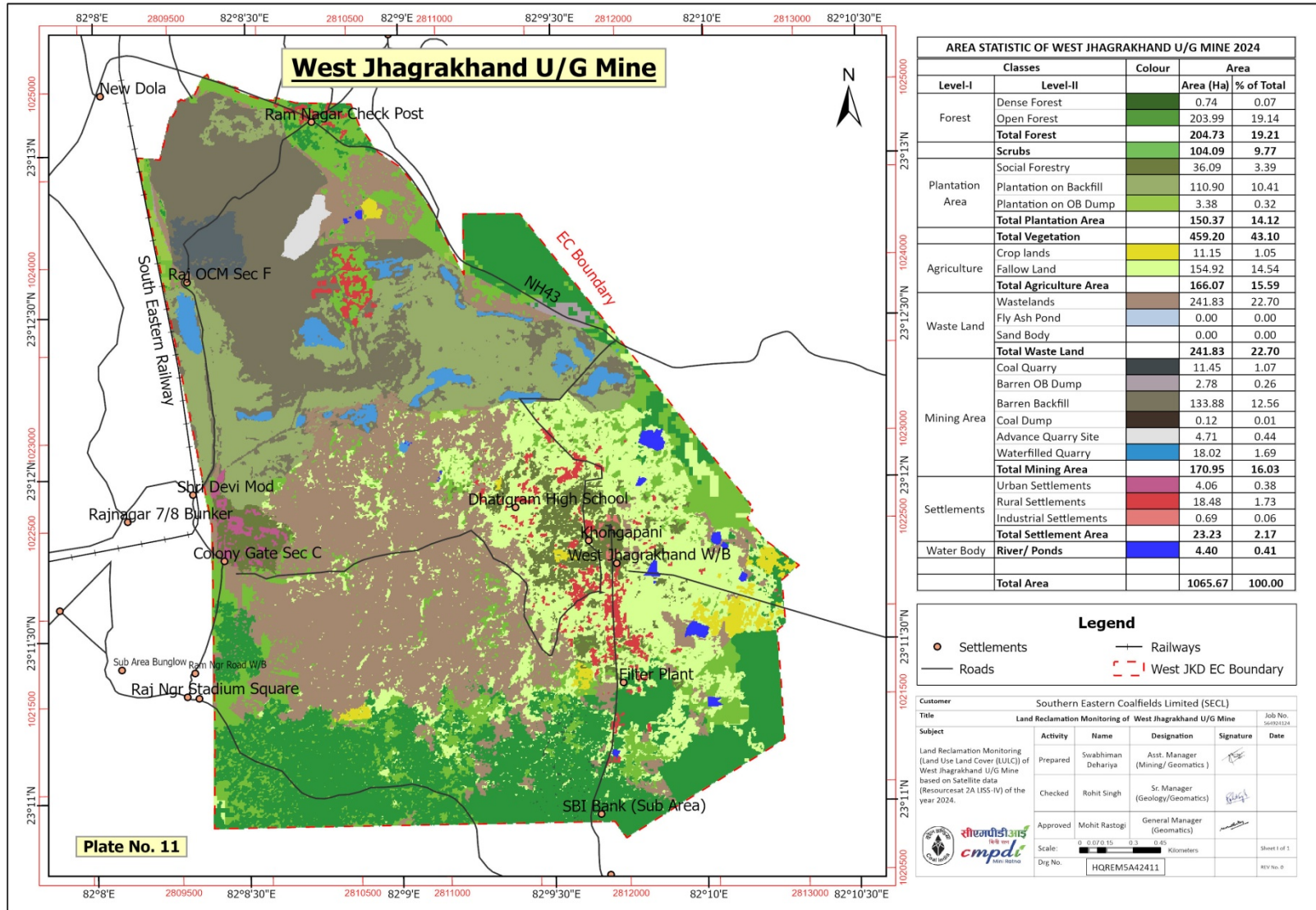


Plate 6.11: Land Use/Cover map of West Jhagrakhand UG

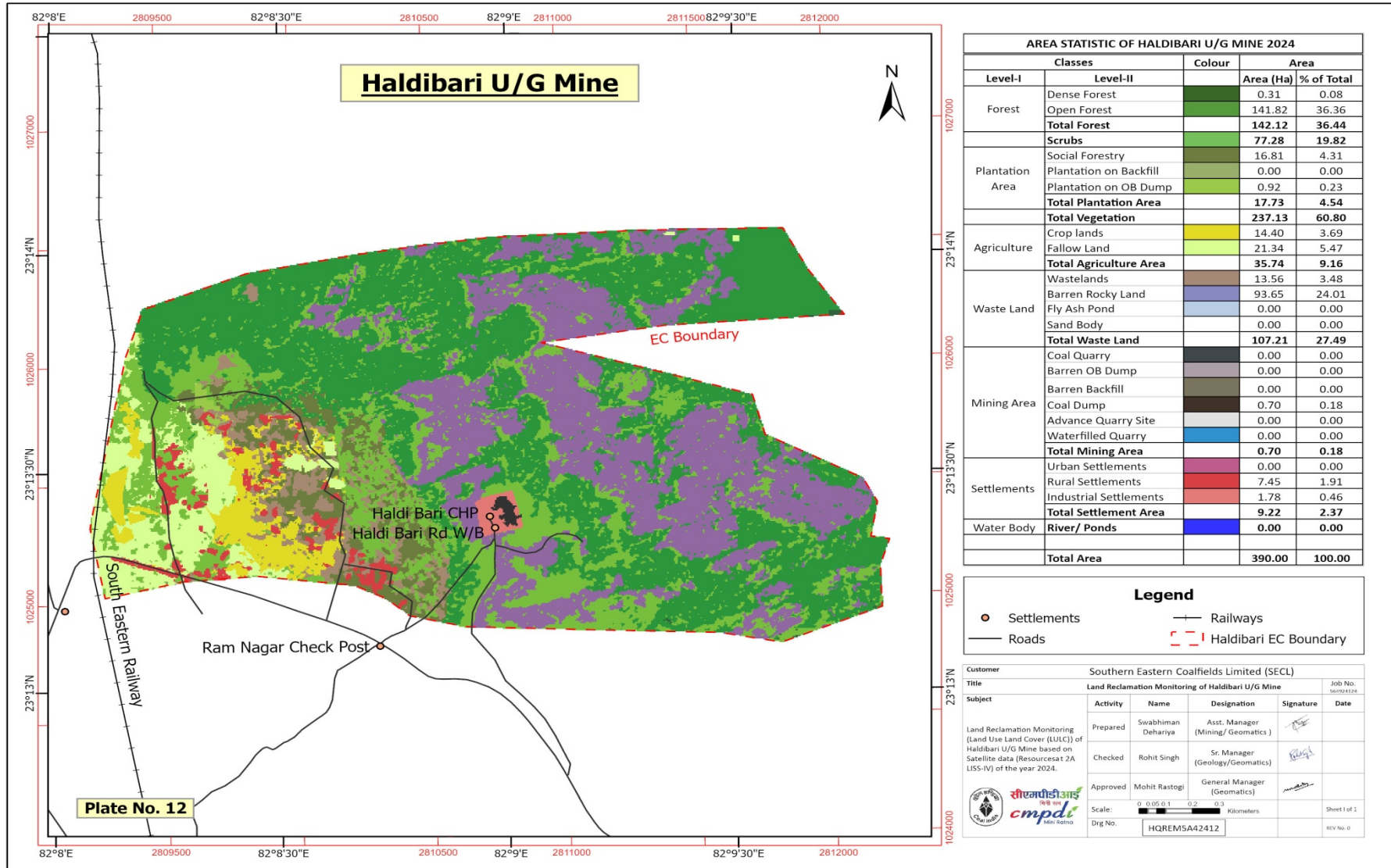


Plate 6.12: Land Use/Cover map of Haldibari UG

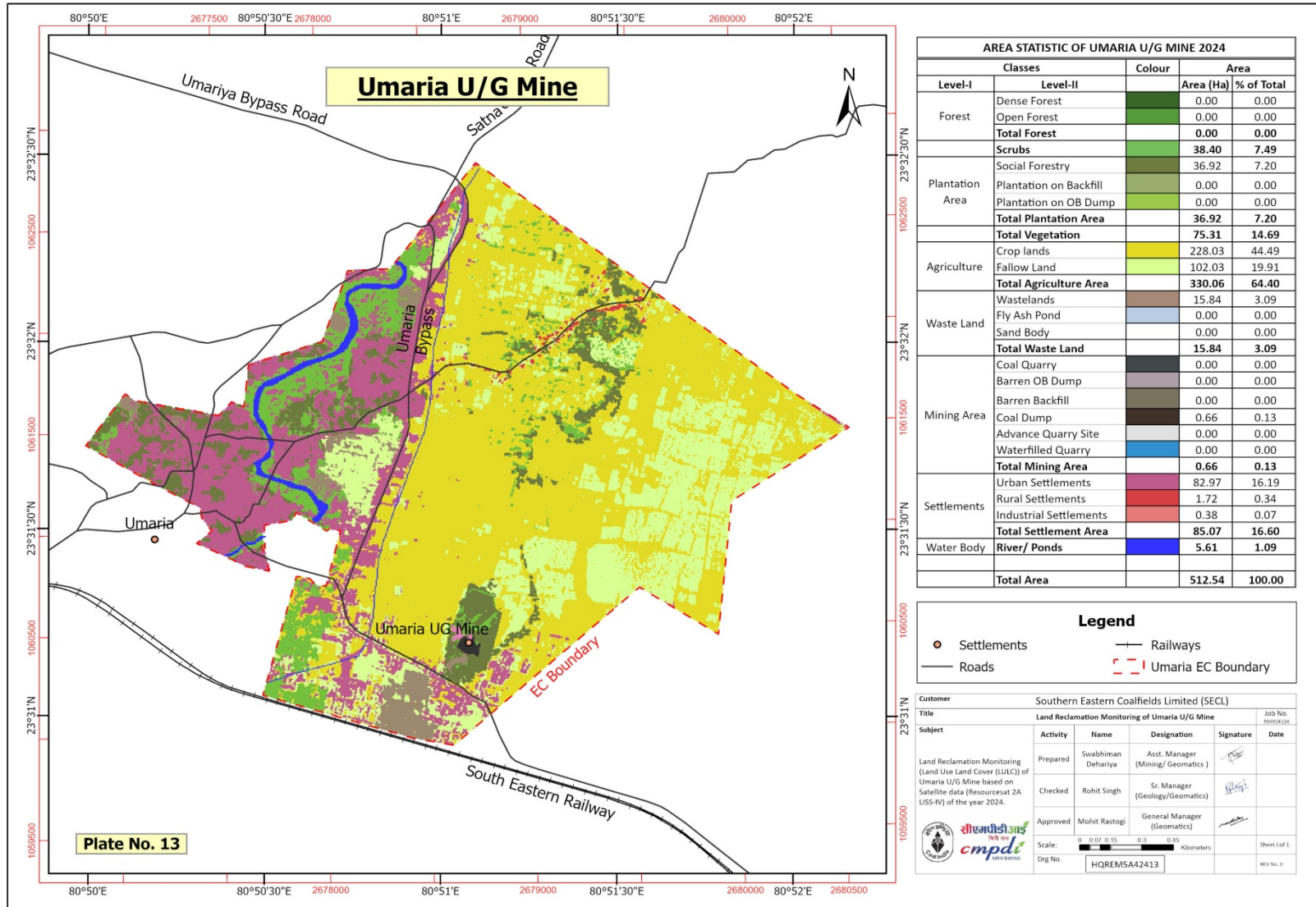


Plate 6.13: Land Use/Cover map of Umara UG

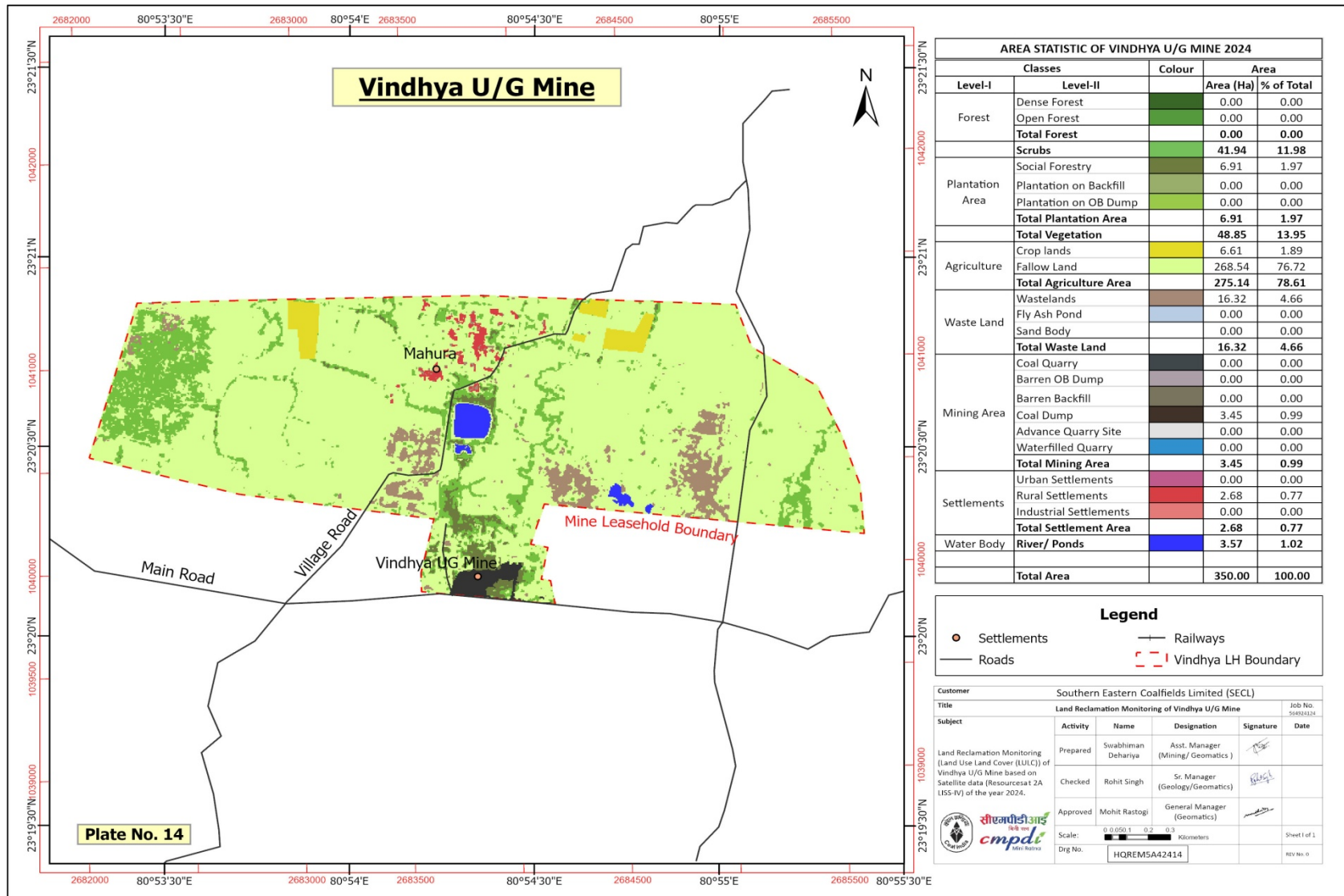


Plate 6.14: Land Use/Cover map of Vindhya UG

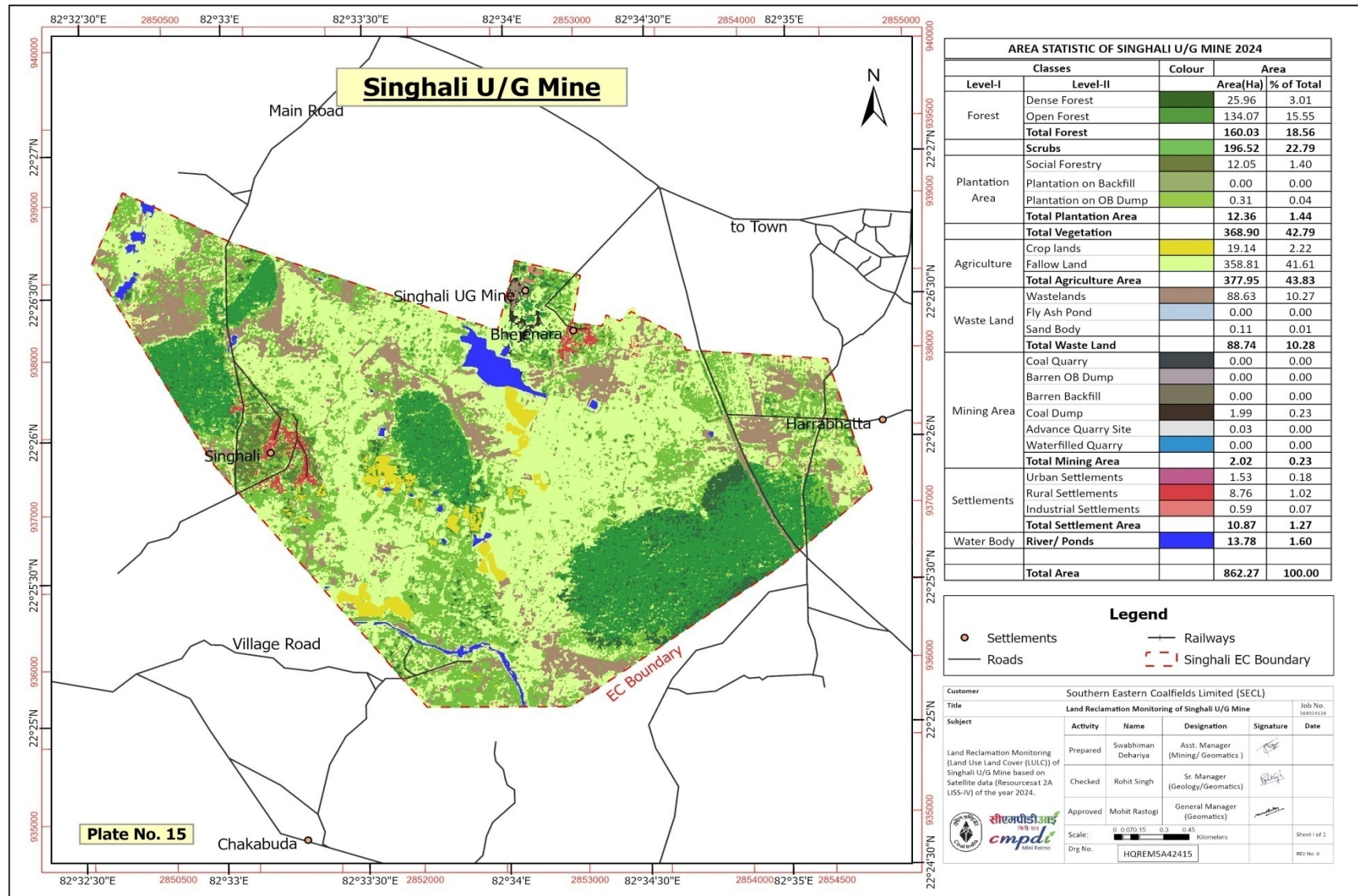


Plate 6.15: Land Use/Cover map of Singhali UG

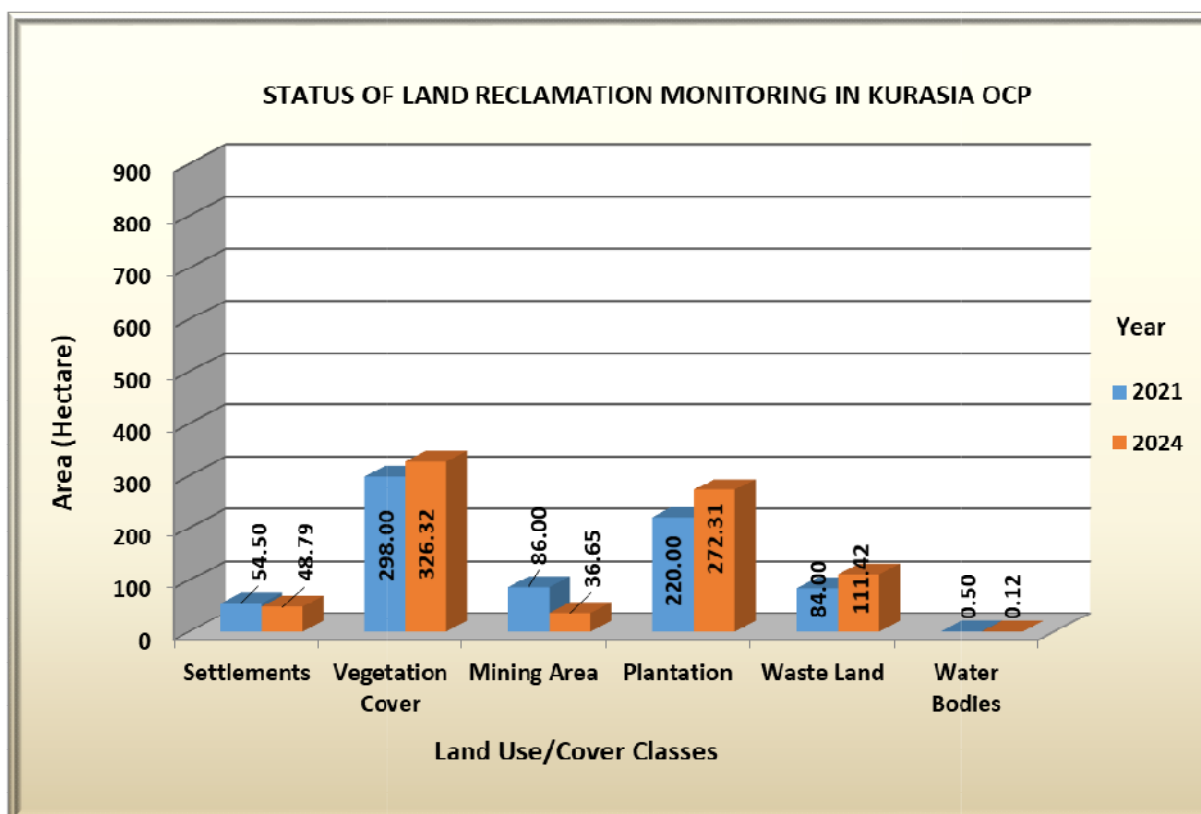


Chart 6.2: Status of Land Reclamation in Kurasia OCP

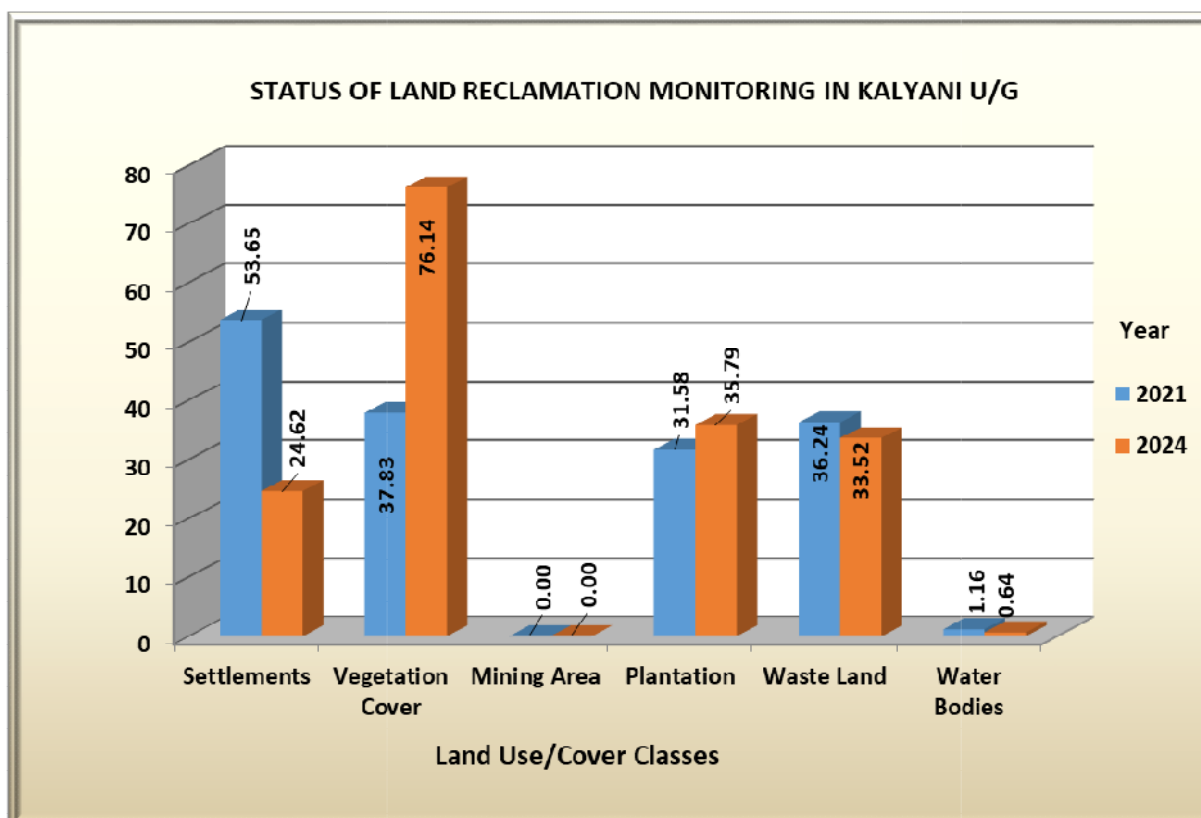


Chart 6.3a: Status of Land Reclamation in Kalyani UG

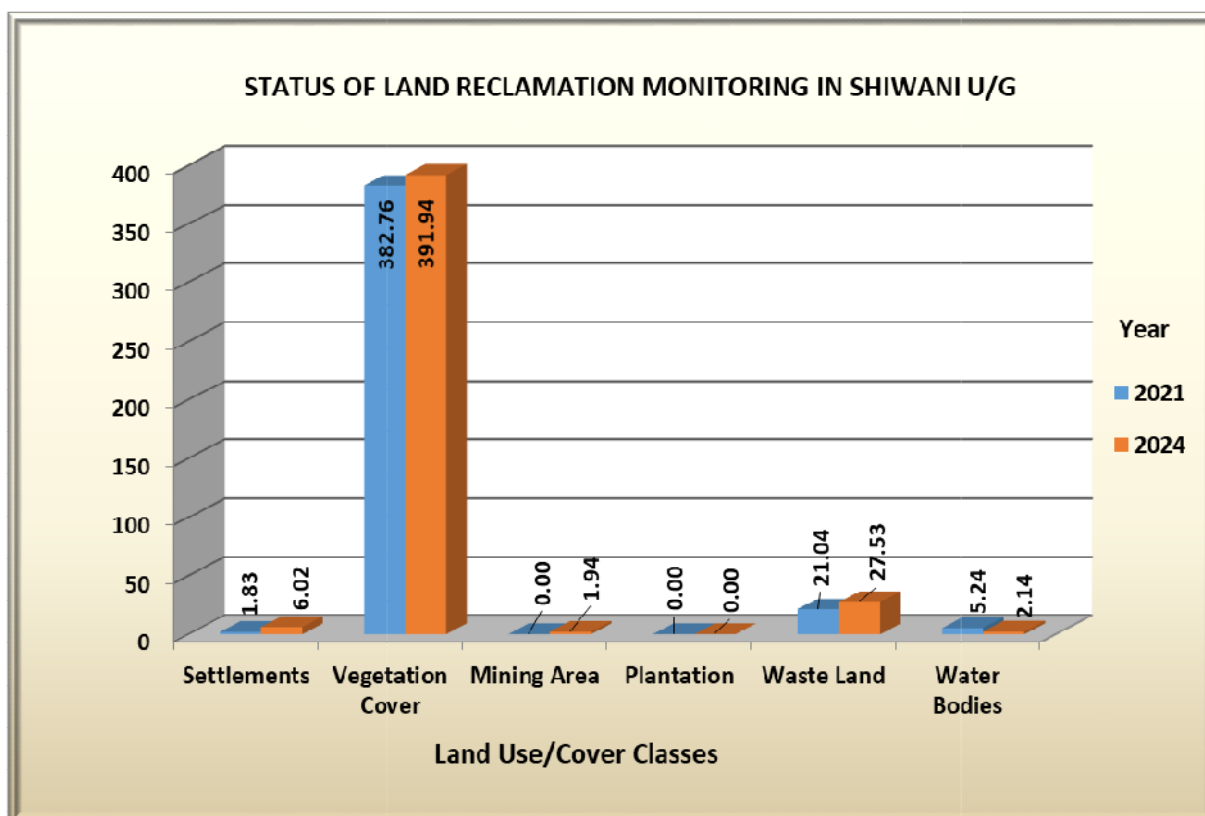


Chart 6.3b: Status of Land Reclamation in Shiwani UG

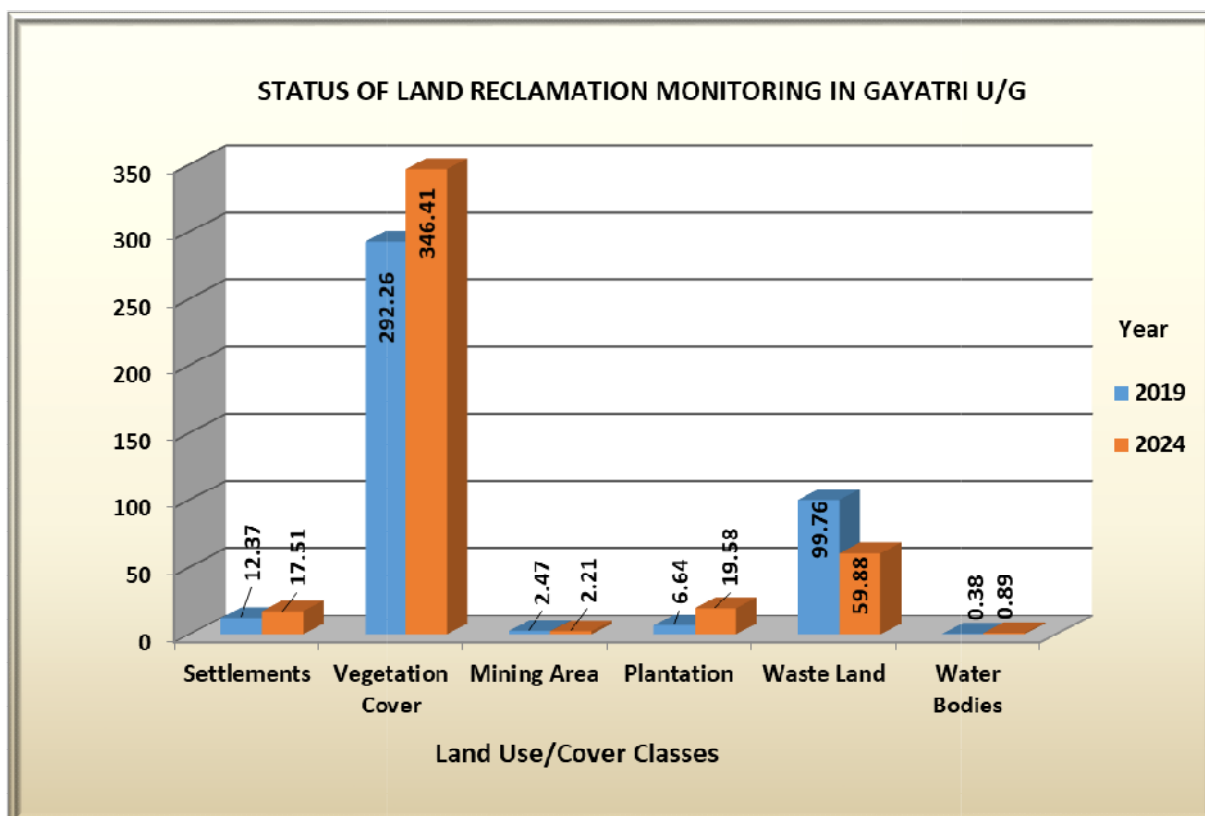


Chart 6.4: Status of Land Reclamation in Gayatri UG

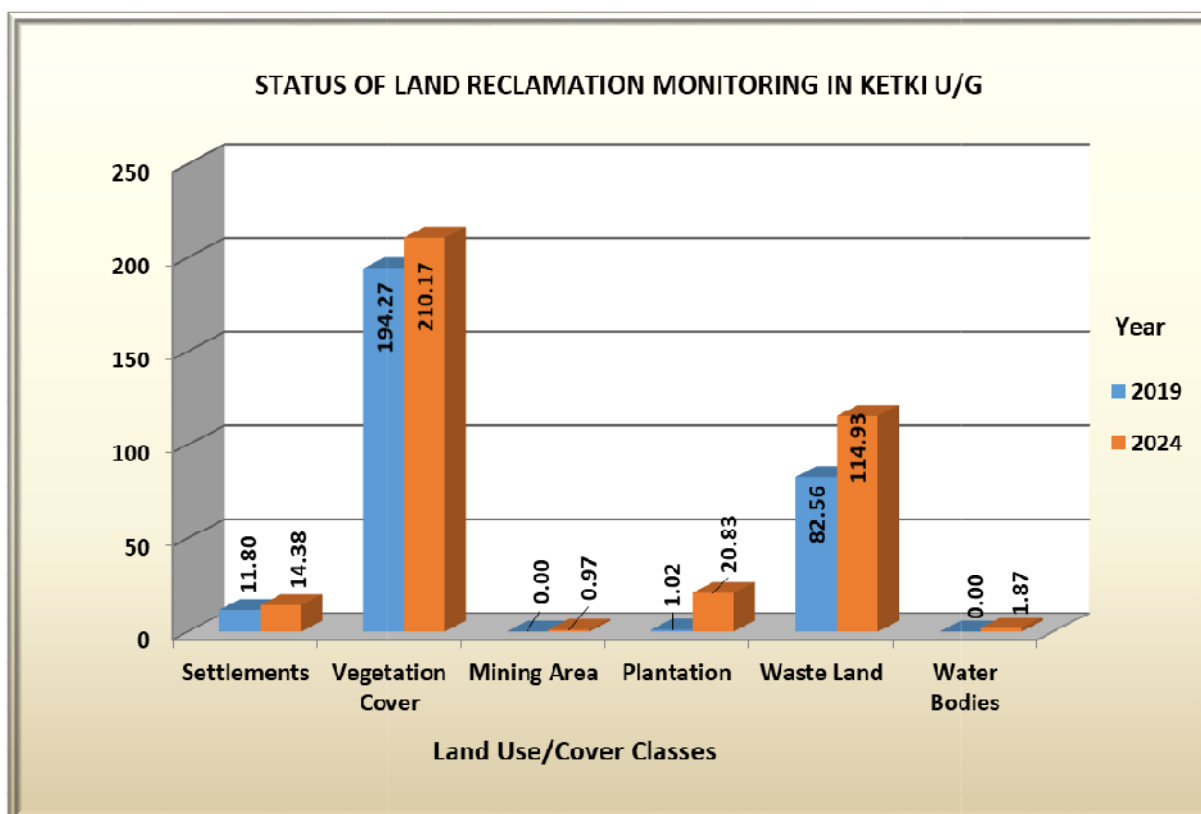


Chart 6.5: Status of Land Reclamation in Ketki UG

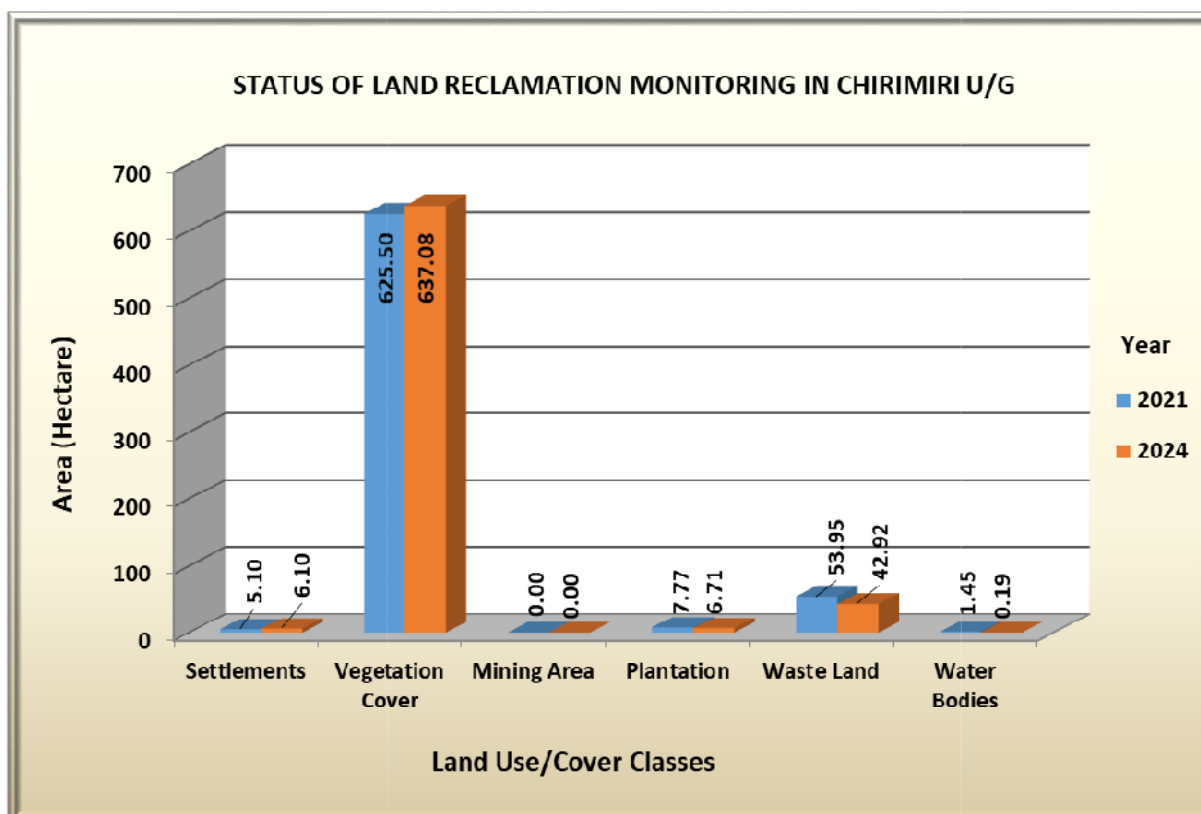


Chart 6.6: Status of Land Reclamation in Chirimiri UG

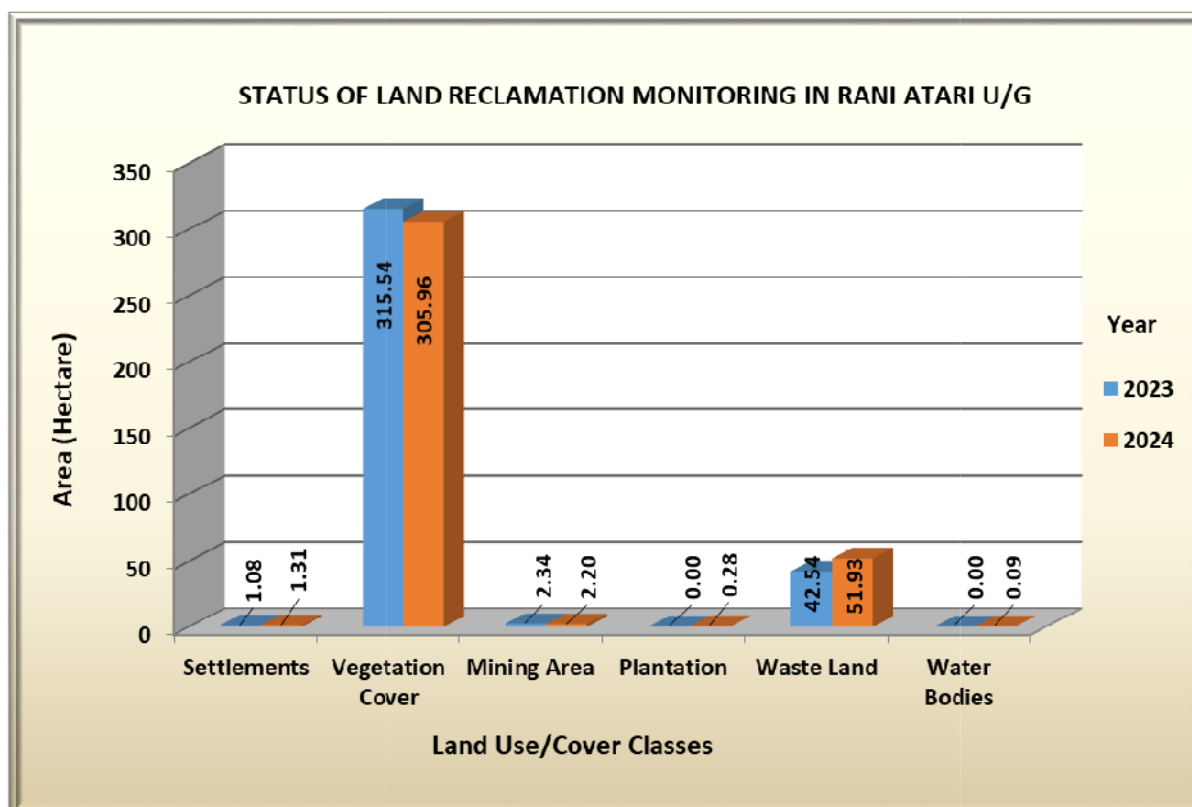


Chart 6.7: Status of Land Reclamation in Rani Atari UG

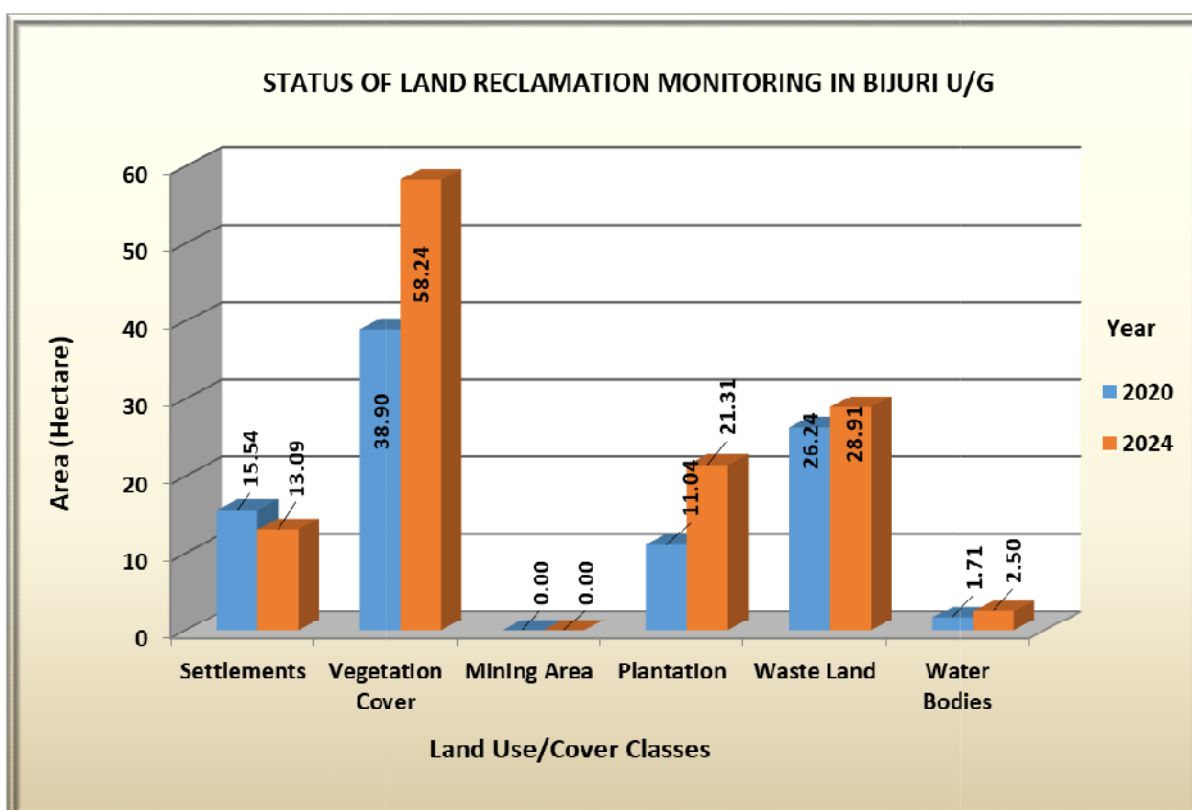


Chart 6.8: Status of Land Reclamation in Bijuri UG

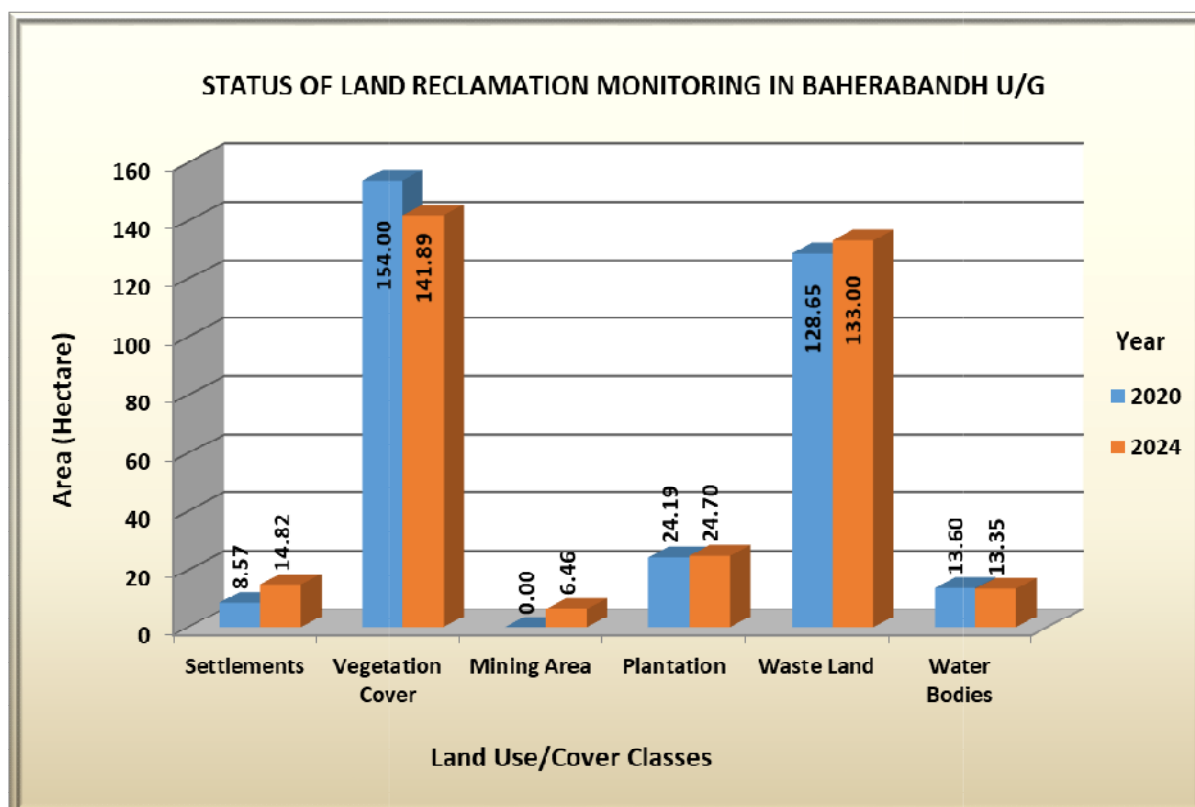


Chart 6.9: Status of Land Reclamation in Beherabandh UG

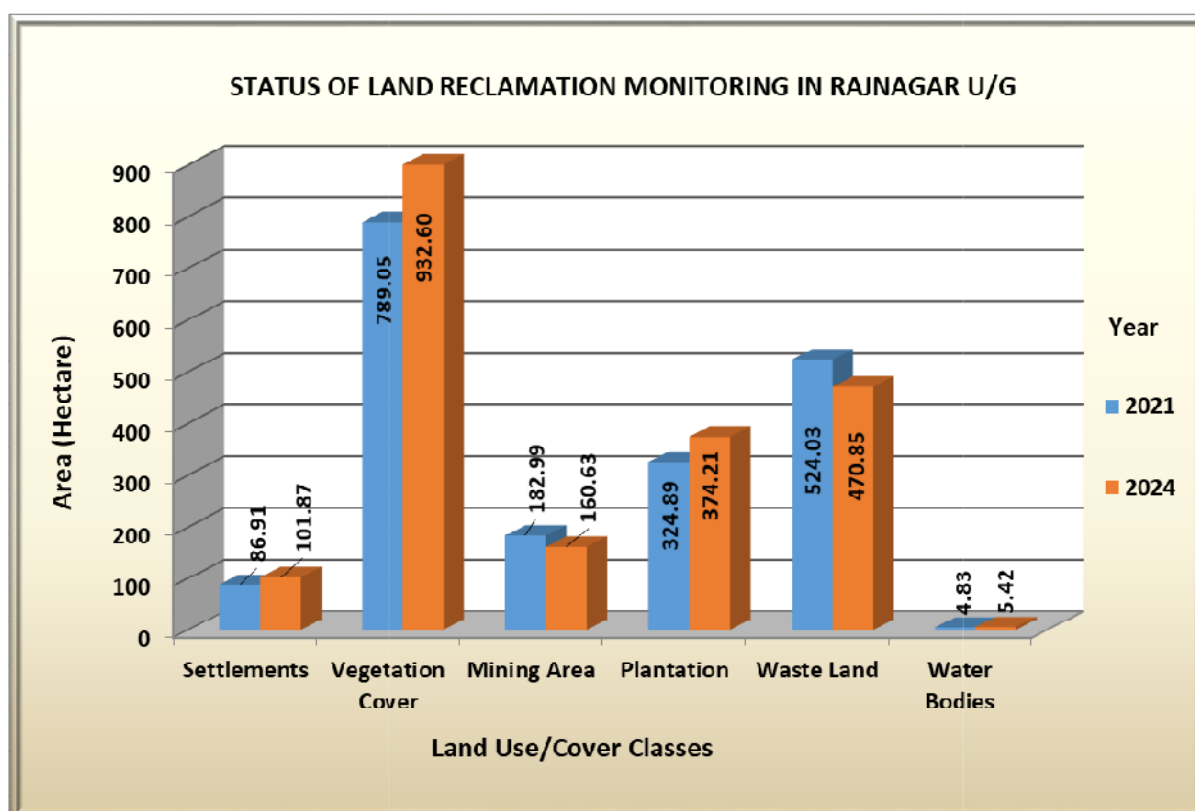


Chart 6.10: Status of Land Reclamation in Rajnagar UG

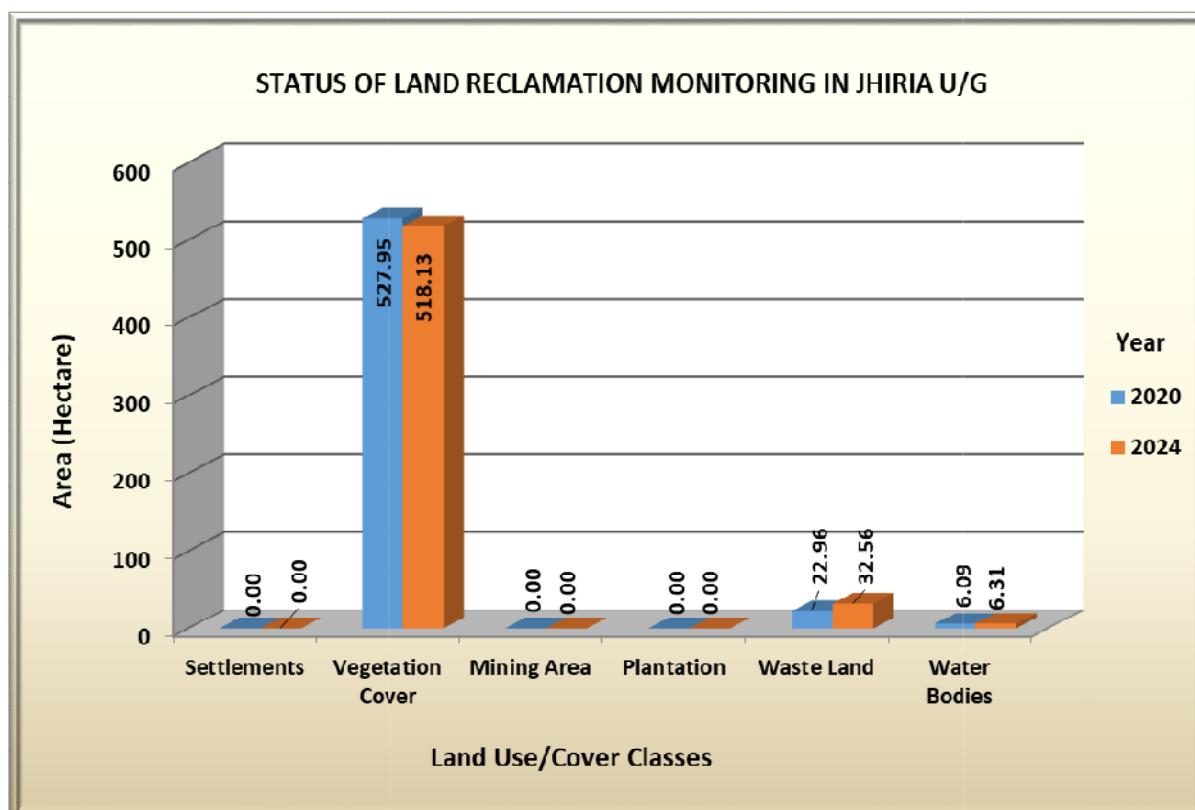


Chart 6.11: Status of Land Reclamation in Jhiria UG

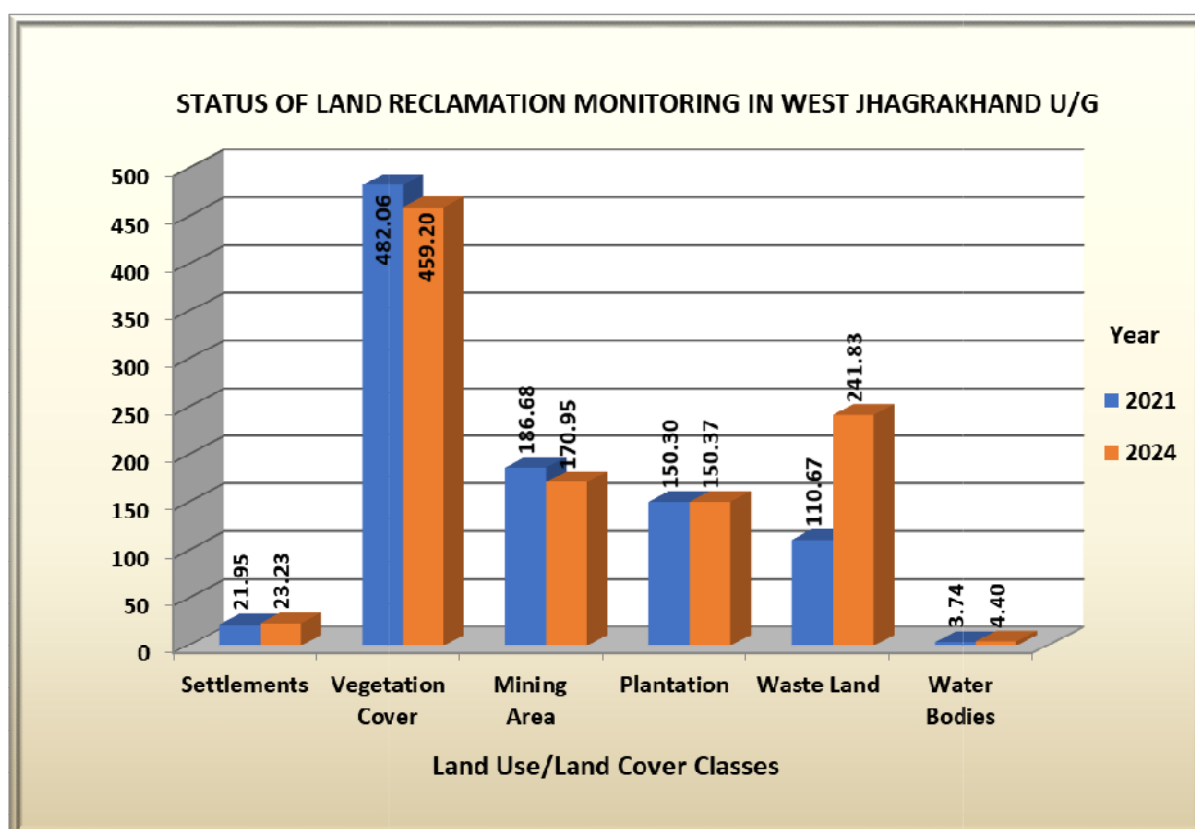


Chart 6.12: Status of Land Reclamation in West Jhagrakhand UG

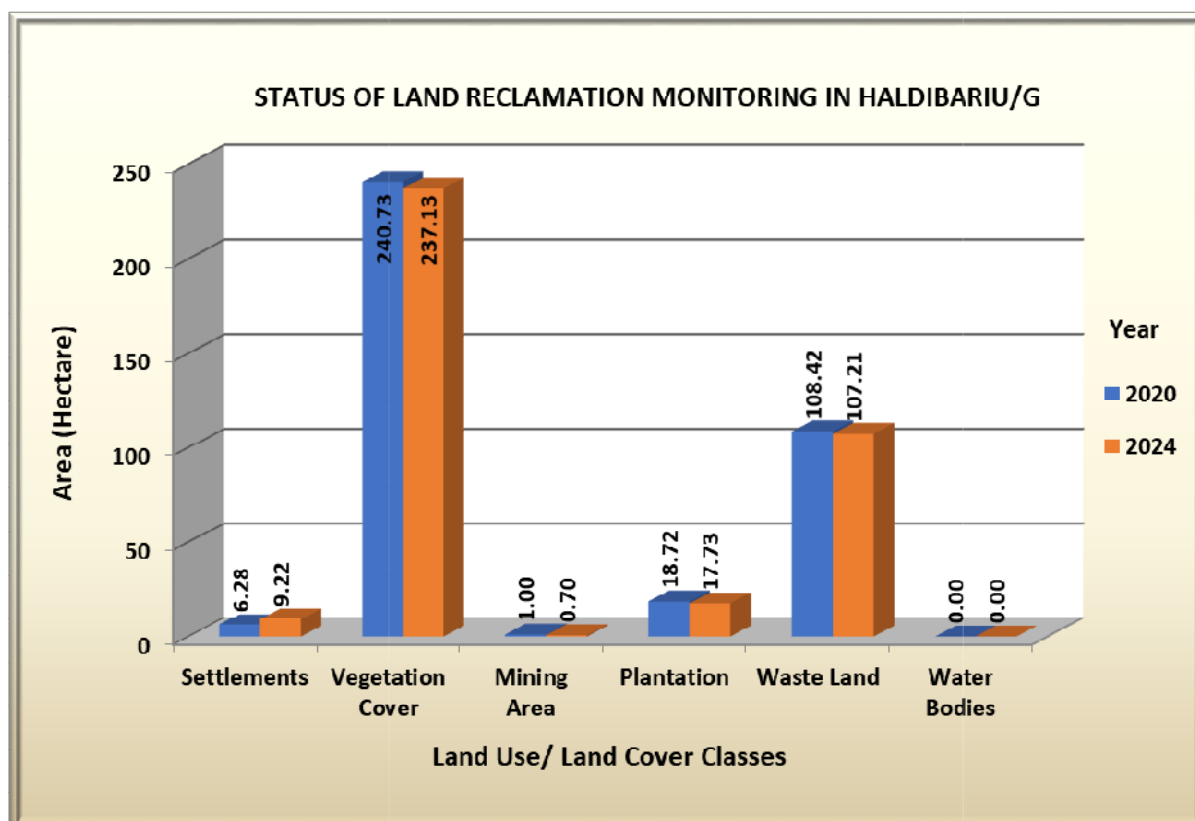


Chart 6.13: Status of Land Reclamation in Haldibari UG

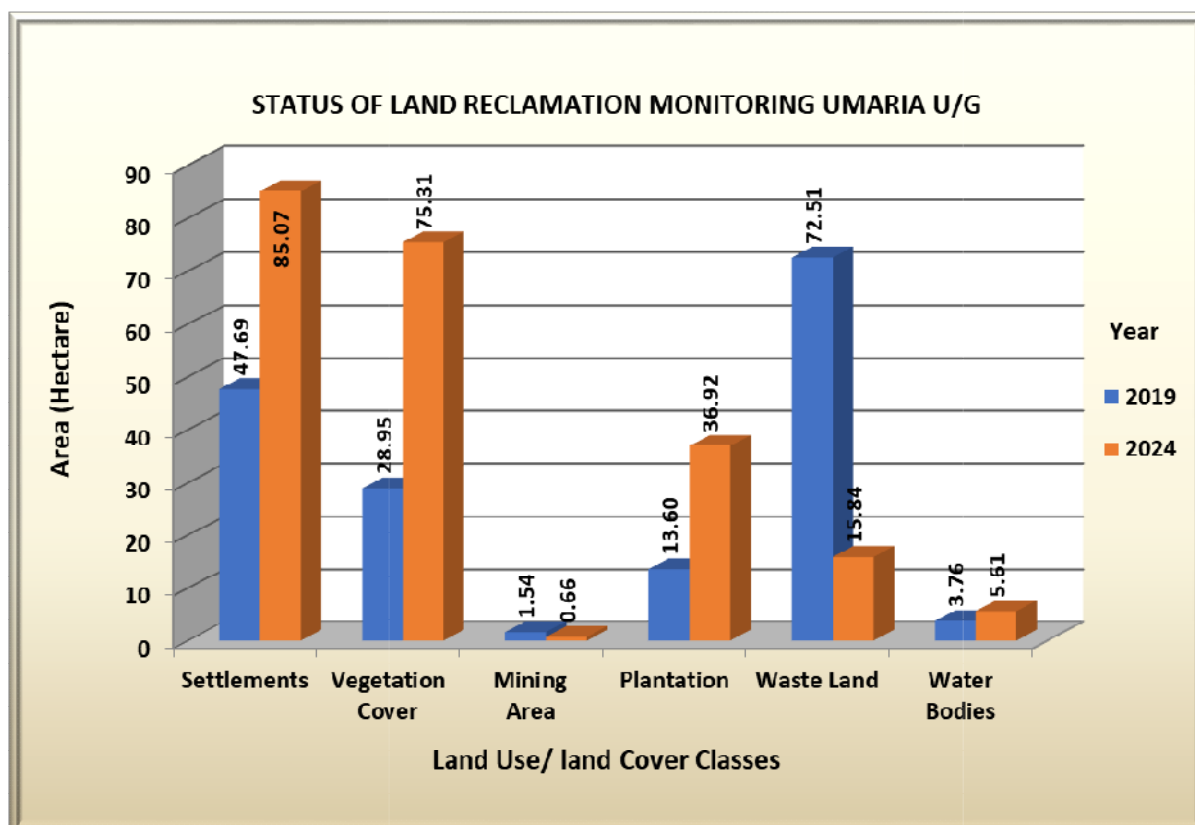


Chart 6.14: Status of Land Reclamation in Umaria UG

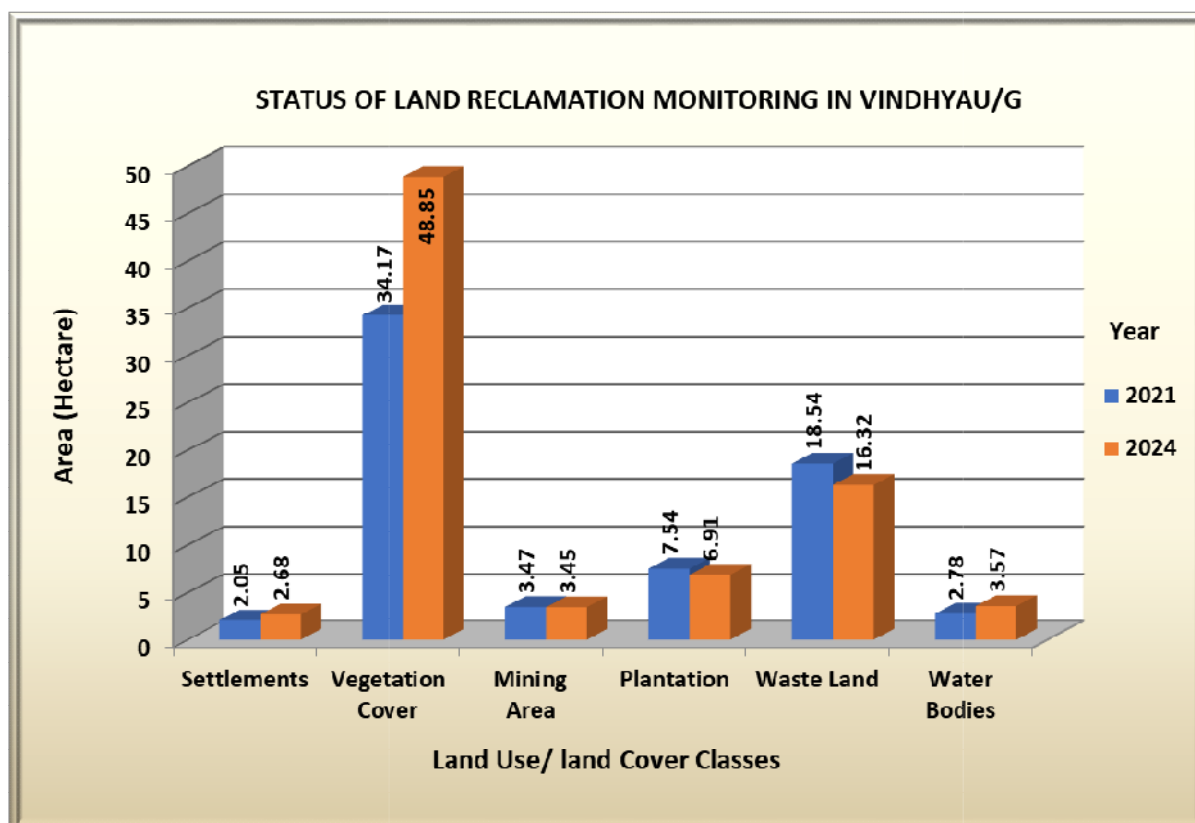


Chart 6.15: Status of Land Reclamation in Vindhya UG

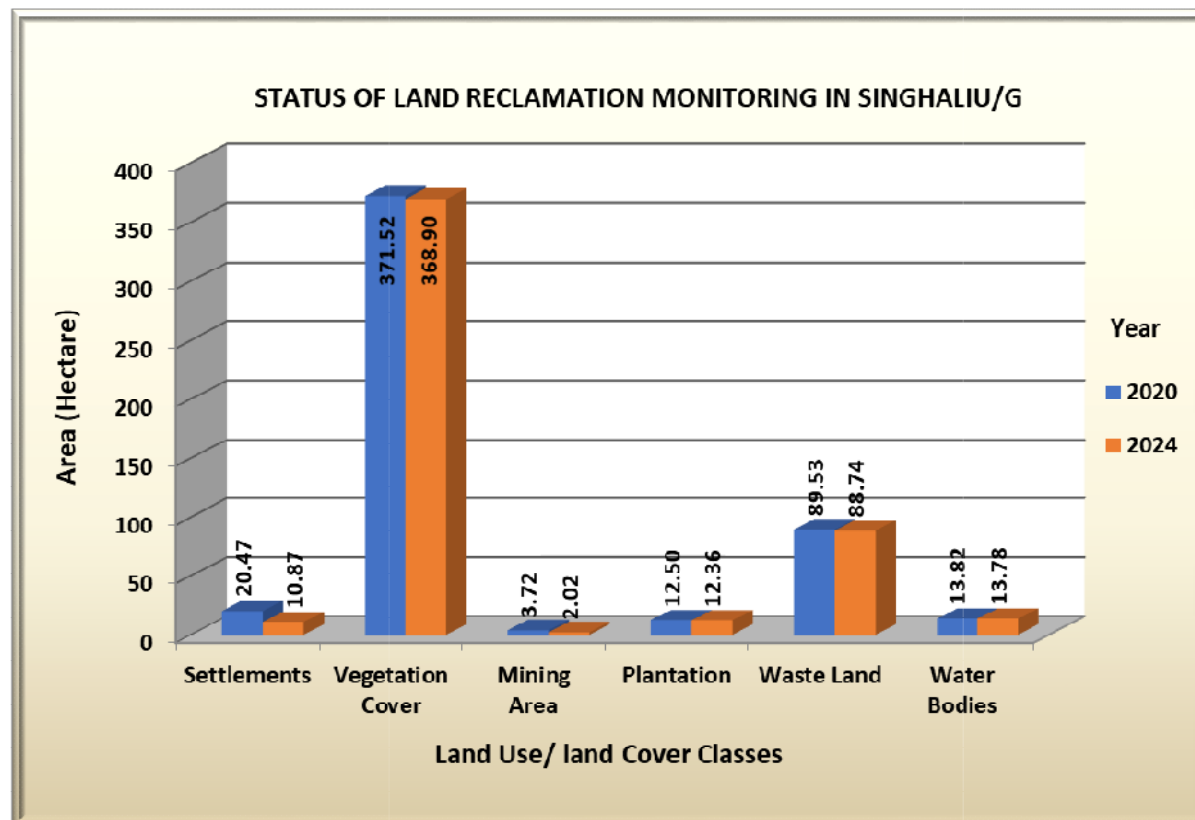


Chart 6.16: Status of Land Reclamation in Singhali UG



Photo 6.1: Kurasia OCP- Plantation 2023-24



Photo 6.2: Kurasia OCP-Newly Plantation growing on Backfill Area



Photo 6.3: Shiwani U/G-Coal Heap



Photo 6.4: Gayatri U/G- Coal Heap



Photo 6.5: Ketki U/G- Coal Heap

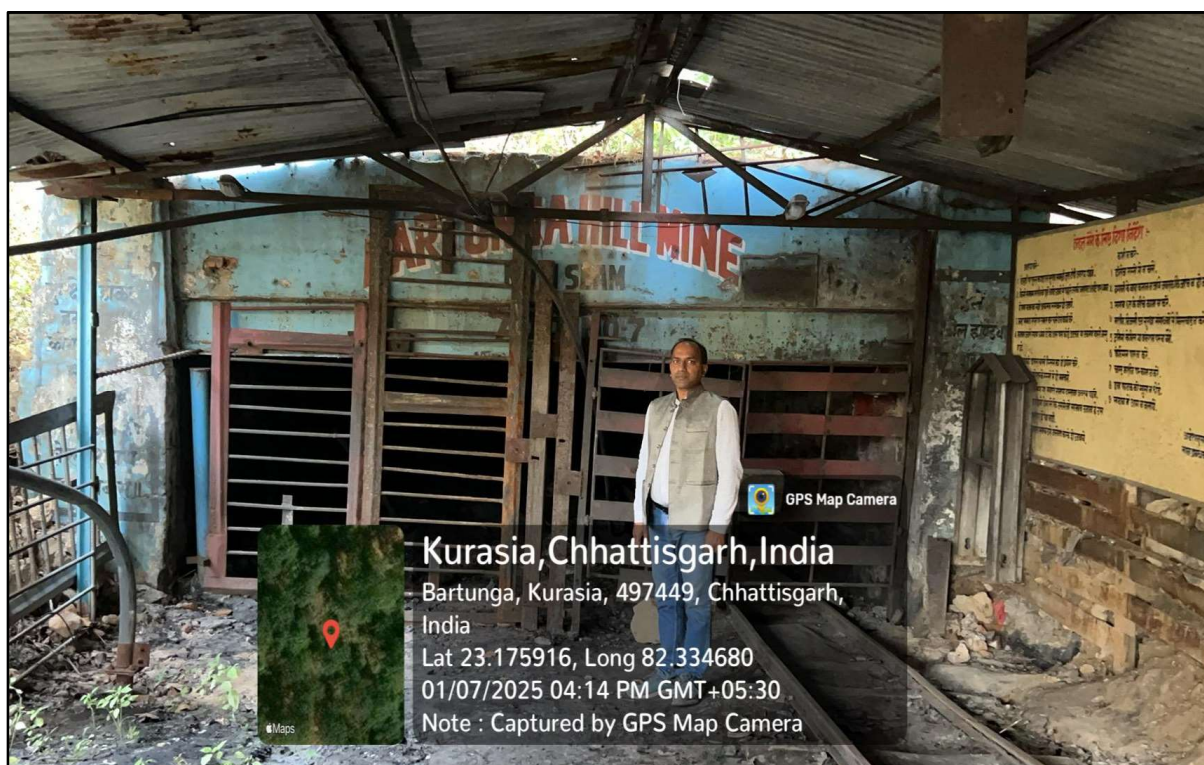


Photo 6.6: Chirimiri U/G- Incline (Outside EC boundary) of Chirimiri U/G Mine



Photo 6.7: Rani Atari U/G- Social Forestry Plantation done in FY 2024-25 near U/G Infrastructure



Photo 6.8: Rani Atari U/G- Coal Heap

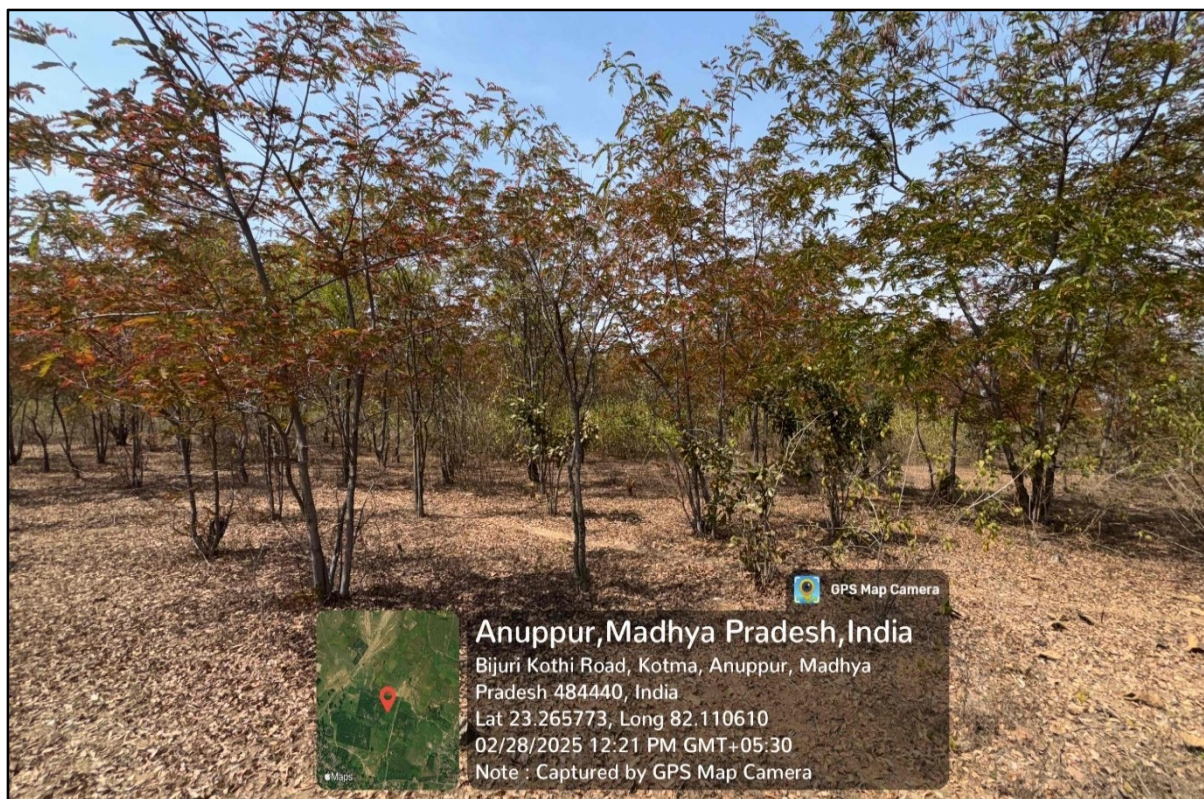


Photo 6.9: Bijuri U/G – Social Forestry Plantation done in FY 2017-18



Photo 6.10: Bijuri U/G- Incline of Bijuri U/G Mine



Photo 6.11: Baherabandh U/G- Coal Heap

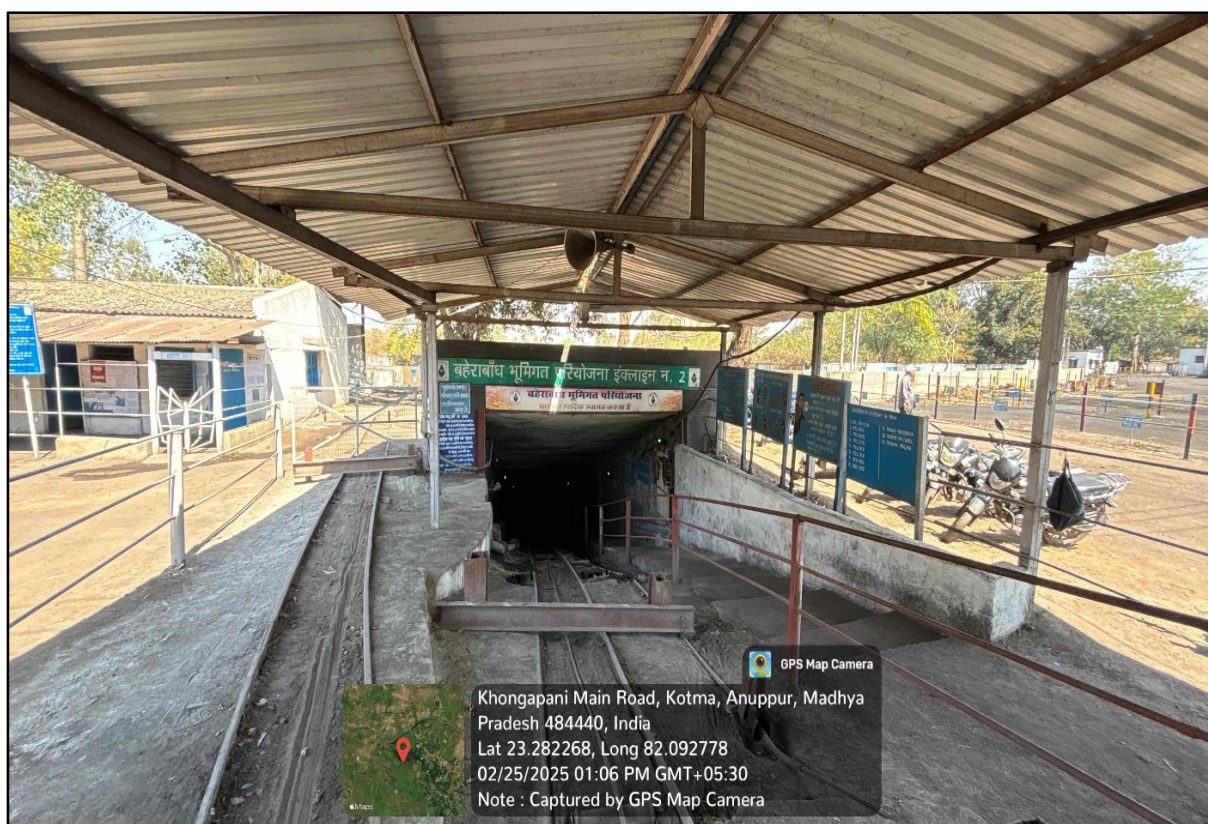


Photo 6.12: Baherabandh U/G- Incline of Baherabandh U/G Mine



Photo 6.13: Rajnagar U/G- Coal Heap



Photo 6.14: Rajnagar U/G- Plantation on Backfilled area



Photo 6.15: Jhiria U/G- Coal Heap



Photo 6.16: West Jhagrakhand U/G- Social Forestry

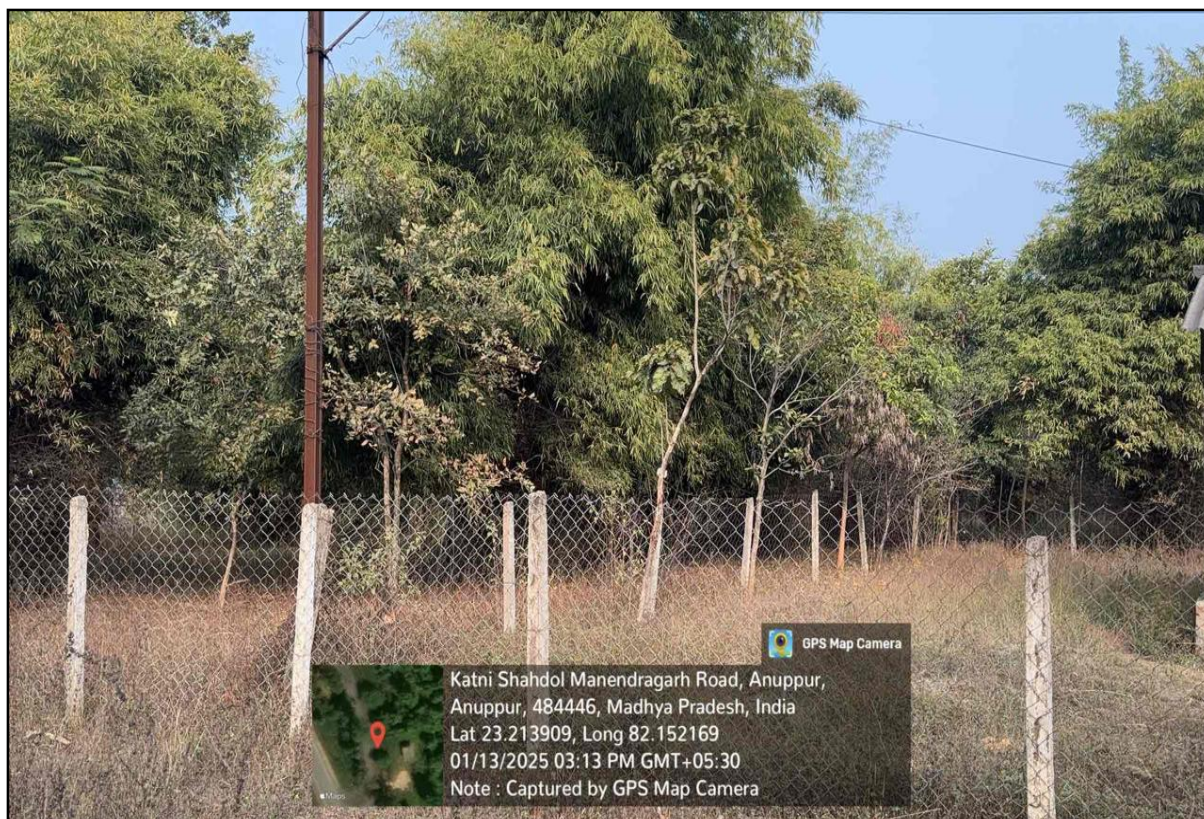


Photo 6.17: Haldibari U/G- Gap Plantation



Photo 6.18: Umaria U/G- Road side Plantation

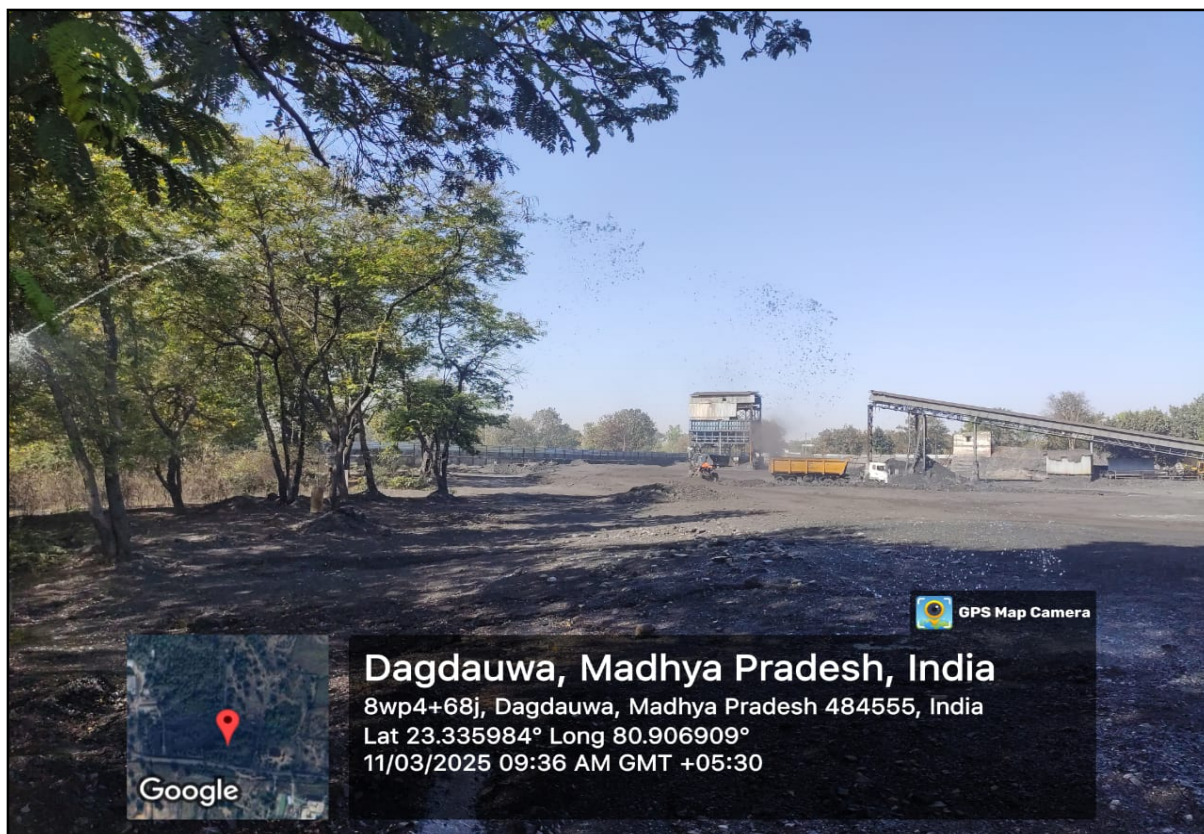


Photo 6.19: Vindhya U/G- Social Forestry



Photo 6.20: Singhali U/G- Social Forestry

BHARAT COKING COAL LIMITED

7. Land Reclamation Status in Bharat Coking Coal Ltd

7.1 Following 5 Cluster projects producing less than 5 million cubic m. (Coal + OB together) of Bharat Coking Coal Ltd. have been taken up for land reclamation monitoring based on satellite data of the year 2024:

- Cluster I :(Damoda Colliery)
- ClusterIV:(Amalgamated Keshalpur West Mudidih Colliery, Amalgamated AngarpathraRamkanali Colliery, Salanpur Colliery, KatrasChoitudih Colliery, Gaslitand Colliery)
- Cluster VII:(Kusunda Colliery, AlkusaColliery, Amalgamated DhansarIndustryColliery, EnaColliery, KustoreColliery, ROCP/South Jharia, Amalgamated East BhuggatdihSimlabahalColliery,Burragarh Colliery, Hurriladih Colliery, Bhutgoria Colliery)
- Cluster X: (BhowrahNorthUG& OC, BhowrahSouthUG& OC, Amalgamated SudamdihPatherdihOC, Sudamdih Shaft UG, AmlabadUG)
- Cluster XI: (Kendwadih Colliery, Gopalichak Colliery, Pootkee Colliery, 5/6 Pit KB, 5/7 Pit SB, 10/12Pit KBColliery, BhagabandColliery, MoonidihColliery)

7.2 Project wise Land Reclamation status in BCCL for the year 2024 is given in Table 7.1 and also shown graphically in Fig 7.1. Area statistics of different land use / cover classes present in the mine leasehold of the above projects for the year 2024 are shown in the Table – 7.2. Land use/cover maps derived from satellite data are shown in Plate 7.1 –7.5. Year wise changes in the different land use classes based on satellite data for the last three years are depicted in Bar Charts in Fig. 7.2 to 7.6.

7.3 Study reveals that out of total mine leasehold area of 9411.54ha.of the 5 clusters of mines (Opencast +Underground)of BCCL mentioned above taken for this study in 2024-25, total excavated area is 1461.77 ha. out of which 81.06 ha. (5.55%) has been planted (*Biologically Reclaimed*), 923.48ha. (63.18%) is under backfilling(*Technically Reclaimed*) and balance 457.23 ha. (31.28%) is under active mining.

7.4 The leasehold boundaries of the above mentioned 5 clusters are as per EC.

- 7.5** It is seen that technical reclamation in the above 5 Clusters has increased from 712.90 ha (Year 2021) to 923.48ha. (Year 2024).
- 7.6** Study indicates that Cluster I, Cluster IV, Cluster X and Cluster XI of BCCL considered for this study in the year 2024-25 indicate increasing trend in Biological Reclamation (plantation on backfill) with respect to the year 2021. Whereas in Cluster VII plantation on backfill has decreased from 25.47ha. (Year 2021) to 8.56ha. (Year 2024) due to rehandling of backfill. But in this Cluster new plantations has been started by BCCL but their height and canopy cover are not enough to be captured in satellite imagery.
- 7.7** On comparing the status of plantation on OB dumps for the year 2024 with respect to the year 2021 in the above Cluster of mines of BCCL, it is evident from the analysis that area under plantation on OB dumps has decreased from 45.21ha. (Year 2021) to 32.94ha. (Year 2024) in Cluster I and from 11.43ha. (Year 2021) to 1.33ha. (Year 2024) in Cluster VII due to rehandling of OB dumps. In Cluster IV plantation on OB dumps has increased marginally from 27.11ha. (Year 2021) to 27.45ha. (Year 2024). The decrease in area under plantation on OB in Cluster X is due to reclassification of plantation on OB to plantation on backfill classes (updated as per surface plan received from RI II and area). In Cluster XI plantation on OB dumps has been started during the last three-year duration.
- 7.8** It is seen that total plantation under social forestry has decreased from 757.18ha. (Year 2021) to 752.62ha. (Year 2024) which is due to decrease in plantation under social forestry in Cluster IV from 165.09ha. (Year 2021) to 160.53ha. (Year 2024). This decrease in 4.56ha. in Cluster IV is due to increase in mining area. In all the other Clusters there is no change or plantation under social forestry is static during the last three-year duration.
- 7.9** It is seen that total excavated area has increased from 1218.18ha. (Year 2021) to 1461.77ha. (Year 2024).

- 7.10** After analyzing the satellite data of the year 2021 vs 2024, it reveals that area under total plantation (Green cover) carried out on backfilled area, OB dumps as well as under social forestry in the above clusters of BCCL has decreased from 968.94ha. (10.30%) to 932.37ha. (9.91%) in span of last three years. The reason for this reduction in area under green cover has been described separately earlier in point no. 4.6, 4.7 and 4.8.
- 7.11** On comparing the status of land reclamation for the year 2024 with respect to the year 2021 it is evident from the analysis that total area under land reclamation has increased from 774.82ha. (Year 2021) to 1004.54ha. (Year 2024). This increase of 229.72ha. area under land reclamation is due to increase in reclamation activities in Cluster I, Cluster IV, Cluster X & Cluster XI. In Cluster VII, it is seen that total area under reclamation has decreased from 377.15ha. (Year 2021) to 370.68ha. (Year 2024). This decrease of 6.47ha. area is due to rehandling of area under backfilling in this cluster.
- 7.12** The area under total plantation (Green Cover) is maximum in Cluster IV (17.38%) followed by Cluster VII with (11.68%), Cluster I with (11.65%), Cluster X with (11.23%) and Cluster XI with (5.40%).
- 7.13** Out of the 5 Clusters in BCCL considered for satellite data based land reclamation monitoring in 2024-25, Cluster X tops with 78.57% reclamation followed by Cluster IV with 69.50%, Cluster VII with 65.08%, Cluster XI with 59.35% and Cluster I with 57.67%.

Table 7.1: Summarized Land Reclamation Status in BCCL
Summarized Land Reclamation Status in Opencast Projects of NCL based on Satellite Data of the year 2024

(Area in Hectare)

Sl. No.	Cluster No.	Total Leasehold Area		Technical Reclamation		Plantation						Area under Active Mining		Total Excavated Area		Total Area under Plantation (% Green Cover Generated in Leasehold)		Total Area under Reclamation	
						Biological Reclamation		Other Plantations											
				Area under Backfilling		Plantation on Excavated / Backfilled Area		Plantation on External OB Dumps		Social Forestry, Avaneue Plantation Etc.									
1	2	3		4		5		6		7		8		9 (=4+5+8)		10 (=5+6+7)		11(=4+5)	
		2021	2024	2021	2024	2021	2024	2021	2024	2021	2024	2021	2024	2021	2024	2021	2024	2021	2024
1	Cluster I	575.00	575.00	11.10	31.80	7.29	8.53	45.21	32.94	25.53	25.53	27.61	29.60	46.00	69.93	78.03	67.00	18.39	40.33
				24.13%	45.47%	15.85%	12.20%					60.02%	42.33%			13.57%	11.65%	39.98%	57.67%
2	Cluster IV	1123.79	1123.79	176.03	259.63	0.00	7.29	27.11	27.45	165.09	160.53	152.29	117.13	328.32	384.05	192.20	195.27	176.03	266.92
				53.62%	67.60%	0.00%	1.90%					46.38%	30.50%			17.10%	17.38%	53.62%	69.50%
3	Cluster VII	2127.70	2127.70	351.68	362.12	25.47	8.56	11.43	1.33	238.67	238.67	183.42	198.90	560.57	569.58	275.57	248.56	377.15	370.68
				62.74%	63.58%	4.54%	1.50%					32.72%	34.92%			12.95%	11.68%	67.28%	65.08%
4	Cluster X	2057.47	2057.47	143.64	217.71	29.16	54.25	66.09	36.00	140.75	140.75	45.71	74.17	218.51	346.13	236.00	231.00	172.80	271.96
				65.74%	62.90%	13.34%	15.67%					20.92%	21.43%			11.47%	11.23%	79.08%	78.57%
5	Cluster XI	3527.58	3527.58	30.45	52.22	0.00	2.43	0.00	0.97	187.14	187.14	34.33	37.43	64.78	92.08	187.14	190.54	30.45	54.65
				47.01%	56.71%	0.00%	2.64%					52.99%	40.65%			5.31%	5.40%	47.01%	59.35%
	TOTAL (A)	9411.54	9411.54	712.90	923.48	61.92	81.06	149.84	98.69	757.18	752.62	443.36	457.23	1218.18	1461.77	968.94	932.37	774.82	1004.54
				58.52%	63.18%	5.08%	5.55%					36.40%	31.28%			10.30%	9.91%	63.60%	68.72%
(% is calculated with respect to Excavated Area as applicable)																			

(% is calculated with respect to Excavated Area as applicable)

Note: In reference of the above Table-7.1, different parameters are classified as follows:

1. Area under **Biological Reclamation** includes Areas under Plantation done on Backfilled Area Only.
2. Area under **Technical Reclamation** includes Area under Barren Backfilling only
3. Area under Active Mining Includes Coal Quarry, Advance Quarry Site, Quarry filled with water etc.
4. Social Forestry and Plantation on External OB Dumps are not included in Biological Reclamation and are put under separate categories as shown in the Table above.
5. (%) calculated in the above Table is in respect to Total Excavated Area except for "Total Area under Plantation" where % is in terms of "Leasehold Area".

Table 7.1.1: Composite Land Reclamation Status in remaining ten Clusters (Underground + Opencast Mines) of BCCL as per clause 2.(ii) of the received work order from CIL

(Area in Hectare)

Sl. No.	Cluster No.	Total Leasehold Area		Technical Reclamation		Plantation						Area under Active Mining		Total Excavated Area		Total Area under Plantation (% Green Cover Generated in Leasehold)		Total Area under Reclamation	
						Biological		Other Plantations											
				Area under Backfilling		Plantation on Excavated / Backfilled Area		Plantation on External OB Dumps		Social Forestry, Avaneue Plantation Etc.									
1	2	3		4		5		6		7		8		9 (=4+5+8)		10 (=5+6+7)		11(=4+5)	
		2020	2023	2020	2023	2020	2023	2020	2023	2020	2023	2020	2023	2020	2023	2020	2023	2020	2023
6	Cluster III	1552.53	1420.61	60.37	68.71	3.89	4.96	21.11	28.67	162.33	141.36	104.79	84.88	169.05	158.55	187.33	174.99	64.26	73.67
				35.71%	43.34%	2.30%	3.13%					61.99%	53.54%			12.07%	12.32%	38.01%	46.46%
7	Cluster V	1724.52	1957.08	187.59	193.60	7.19	7.41	23.85	19.84	105.29	158.45	103.52	182.86	298.30	383.87	136.33	185.70	194.78	201.01
				62.89%	50.43%	2.41%	1.93%					34.70%	47.64%			7.91%	9.49%	65.30%	52.36%
8	Cluster VIII	1331.95	1183.92	206.91	198.08	9.93	4.08	21.97	16.86	24.70	22.63	124.49	151.45	341.33	353.61	56.60	43.57	216.84	202.16
				60.62%	56.02%	2.91%	1.15%					36.47%	42.83%			4.25%	3.68%	63.53%	57.17%
9	Cluster IX	1967.22	1942.12	77.53	108.00	6.80	3.23	41.79	22.40	168.58	151.33	217.24	240.24	301.57	351.47	217.17	176.96	84.33	111.23
				25.71%	30.73%	2.25%	0.92%					72.04%	68.35%			11.04%	9.11%	27.96%	31.65%
10	Cluster XVII	1412.00	1397.18	125.09	125.09	0.00	0.00	5.00	5.00	43.33	43.33	65.40	65.40	190.49	190.49	48.33	48.33	125.09	125.09
				65.67%	65.67%	0.00%	0.00%					34.33%	34.33%			3.42%	3.46%	65.67%	65.67%
	TOTAL (B)	7988.22	7900.91	657.49	693.48	27.81	19.68	113.72	92.77	504.23	517.10	615.44	724.83	1300.74	1437.99	645.76	629.55	685.30	713.16
				50.55%	48.23%	2.14%	1.37%					47.31%	50.41%			8.08%	7.97%	52.69%	49.59%
		2019	2022	2019	2022	2019	2022	2019	2022	2019	2022	2019	2022	2019	2022	2019	2022	2019	2022
11	Cluster II	2260.54	2025.71	422.51	422.00	86.42	87.42	43.28	47.29	154.37	128.03	129.98	148.85	638.91	658.27	284.07	262.74	508.93	509.42
				66.13%	64.11%	13.53%	13.28%					20.34%	22.61%			12.57%	12.97%	79.66%	77.39%
12	Cluster VI	831.83	876.55	134.15	134.15	0.00	0.00	5.89	9.70	26.79	28.41	77.75	70.36	211.90	204.51	32.68	38.11	134.15	134.15
				63.31%	65.60%	0.00%	0.00%					36.69%	34.40%			3.93%	4.35%	63.31%	65.60%
13	Cluster XIV	1418.25	1577.22	0.00	0.00	0.00	0.00	0.00	0.00	74.13	72.42	0.00	0.00	0.00	0.00	74.13	72.42	0.00	0.00
				0.00%	0.00%	0.00%	0.00%					0.00%	0.00%			5.23%	4.59%	0.00%	0.00%
14	Cluster XV	-	1696.55	-	0.00	-	0.00	-	0.00	-	80.72	-	0.00	-	0.00	-	80.72	-	0.00
					0.00%		0.00%						0.00%				4.76%		0.00%
15	Cluster XVI	2008.4	1964.21	67.57	65.25	25.36	27.68	13.31	13.31	51.26	51.26	65.77	75.14	158.70	168.07	89.93	92.25	92.93	92.93
				42.58%	38.82%	15.98%	16.47%					41.44%	44.71%			4.48%	4.70%	58.56%	55.29%
	TOTAL (C)	6519.02	8140.24	624.23	621.40	111.78	115.10	62.48	70.30	306.55	360.84	273.50	294.35	1009.51	1030.85	480.81	546.24	736.01	736.50
				61.83%	60.28%	11.07%	11.17%					27.09%	28.55%			7.38%	6.71%	72.91%	71.45%
*GRAND TOTAL (A+B+C)		23918.78	25452.69	1994.62	2238.36	201.51	215.84	326.04	261.76	1567.96	1630.56	1332.30	1476.41	3528.43	3930.61	2095.51	2108.16	2196.13	2454.20
				56.53%	56.95%	5.71%	5.49%					37.76%	37.56%			8.76%	8.28%	62.24%	62.44%
*Grand Total (A+B+C) is the composite value of all 15 clusters of BCCL covered in 3 years cycle of Land Reclamation Monitoring (% is calculated with respect to Excavated Area as applicable)																			

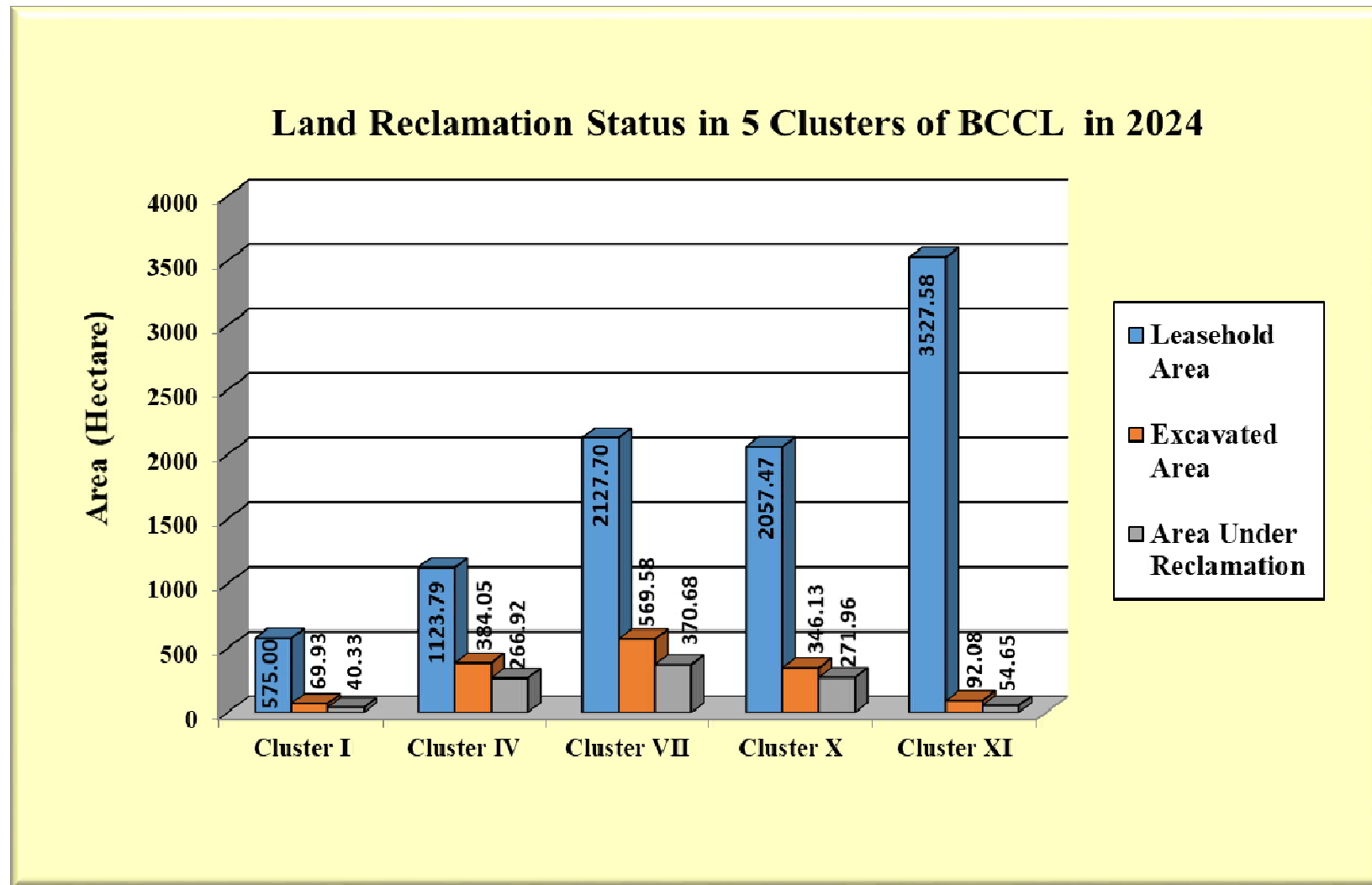


Chart 7.1: Bar Chart showing Land Reclamation Status in BCCL

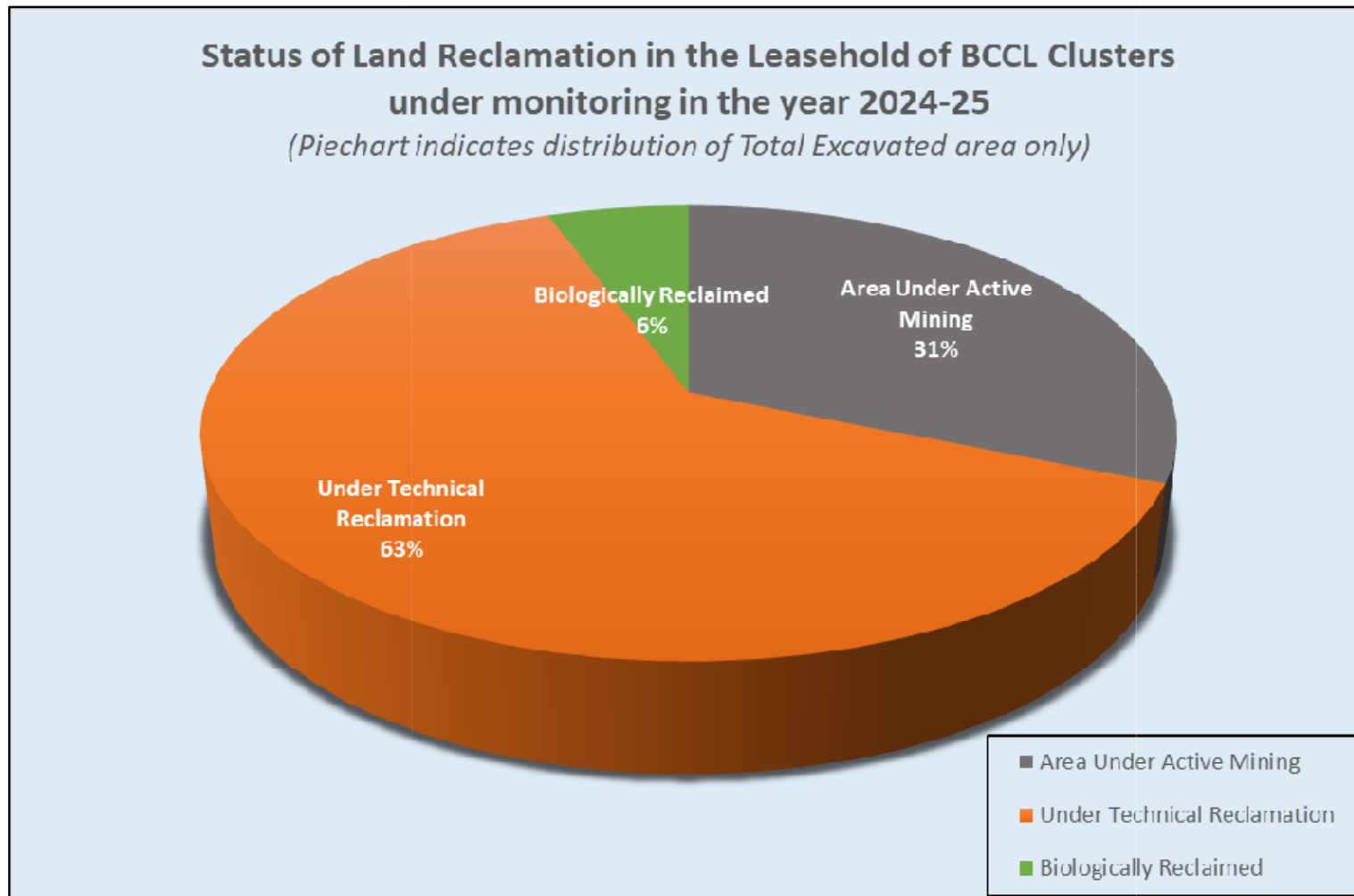


Fig.7.1: Pie Chart showing distribution of total Excavated area in BCCL Clusters

Table 7.2: Cluster-wise Land Reclamation Status in OC and UG Projects of BCCL (2024)

(Area in Hectare)														
			CLUSTER I		CLUSTER IV		CLUSTER VII		CLUSTER X		CLUSTER XI		TOTAL	
FORESTS			Area	%	Area	%	Area	%	Area	%	Area	%	Area	%
	Dense Forest		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Open Forest		0.00	0.00	0.00	0.00	0.00	0.00	61.92	3.01	0.00	0.00	61.92	0.66
	Total Forest (A)		0.00	0.00	0.00	0.00	0.00	0.00	61.92	3.01	0.00	0.00	61.92	0.66
SCRUBS	Scrubs (B)		223.19	38.82	160.93	14.32	553.54	26.02	641.93	31.20	1169.43	33.15	2749.02	29.21
PLANTATION	Social Forestry/Avenue Plantation		25.53	4.44	160.53	14.28	238.67	11.22	140.75	6.84	187.14	5.31	752.62	8.00
	Plantation on OB Dump		32.94	5.73	27.45	2.44	1.33	0.06	36.00	1.75	0.97	0.03	98.69	1.05
	Plantation on Backfill (Biological Reclamation)		8.53	1.48	7.29	0.65	8.56	0.40	54.25	2.64	2.43	0.07	81.06	0.86
	Total Plantation (C)		67.00	11.65	195.27	17.38	248.56	11.68	231.00	11.23	190.54	5.40	932.37	9.91
	Total Vegetation (A+B+C)		290.19	50.47	356.20	31.70	802.10	37.70	934.85	45.44	1359.97	38.55	3743.31	39.77
ACTIVE MINING	Coal Dump		1.96	0.34	0.00	0.00	12.51	0.59	1.12	0.05	1.66	0.05	17.25	0.18
	Coal Quarry		15.04	2.62	97.49	8.68	194.77	9.15	62.59	3.04	36.74	1.04	406.63	4.32
	Advance Quarry Site		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.69	0.02	0.69	0.01
	Quarry Filled With Water		14.56	2.53	19.64	1.75	4.13	0.19	11.58	0.56	0.00	0.00	49.91	0.53
	Total Area under Active Mining		29.60	5.15	117.13	10.42	198.90	9.35	74.17	3.60	37.43	1.06	457.23	4.86
RECLAIMED	Barren OB Dump		9.50	1.65	57.64	5.13	47.62	2.24	25.28	1.23	34.10	0.97	174.14	1.85
	Area Under Backfilling (Technical Reclamation)		31.80	5.53	259.63	23.10	362.12	17.02	217.71	10.58	52.22	1.48	923.48	9.81
	Total Area under Mine Operation		72.86	12.67	434.40	38.65	621.15	29.19	318.28	15.47	125.41	3.56	1572.10	16.70
WASTELAND	Waste Lands		70.46	12.25	90.67	8.07	189.11	8.89	142.45	6.92	673.11	19.08	1165.80	12.39
	Fly Ash Pond / Sand Body		14.67	2.55	0.00	0.00	0.00	0.00	53.69	2.61	15.83	0.45	84.19	0.89
WATERBODIES	Total Wasteland		85.13	14.81	90.67	8.07	189.11	8.89	196.14	9.53	688.94	19.53	1249.99	13.28
	Reservoir, Nallah, Ponds		17.34	3.02	15.32	1.36	21.67	1.02	180.72	8.78	63.87	1.81	298.92	3.18
	Total Waterbodies		17.34	3.02	15.32	1.36	21.67	1.02	180.72	8.78	63.87	1.81	298.92	3.18
AGRICULTURE	Crop Lands		3.42	0.59	3.45	0.31	36.41	1.71	17.28	0.84	81.12	2.30	141.68	1.51
	Fallow Lands		80.47	13.99	34.35	3.06	17.18	0.81	105.99	5.15	821.68	23.29	1059.67	11.26
	Total Agriculture		83.89	14.59	37.80	3.36	53.59	2.52	123.27	5.99	902.80	25.59	1201.35	12.76
SETTLEMENTS	Urban Settlement		7.17	1.25	171.01	15.22	409.25	19.23	228.39	11.10	336.58	9.54	1152.40	12.24
	Rural Settlement		14.04	2.44	18.15	1.62	9.41	0.44	54.55	2.65	14.68	0.42	110.83	1.18
	Industrial Settlement		4.38	0.76	0.24	0.02	21.42	1.01	21.27	1.03	35.33	1.00	82.64	0.88
	Total Settlements		25.59	4.45	189.40	16.85	440.08	20.68	304.21	14.79	386.59	10.96	1345.87	14.30
Grand Total			575.00	100.00	1123.79	100.00	2127.70	100.00	2057.47	100.00	3527.58	100.00	9411.54	100.00

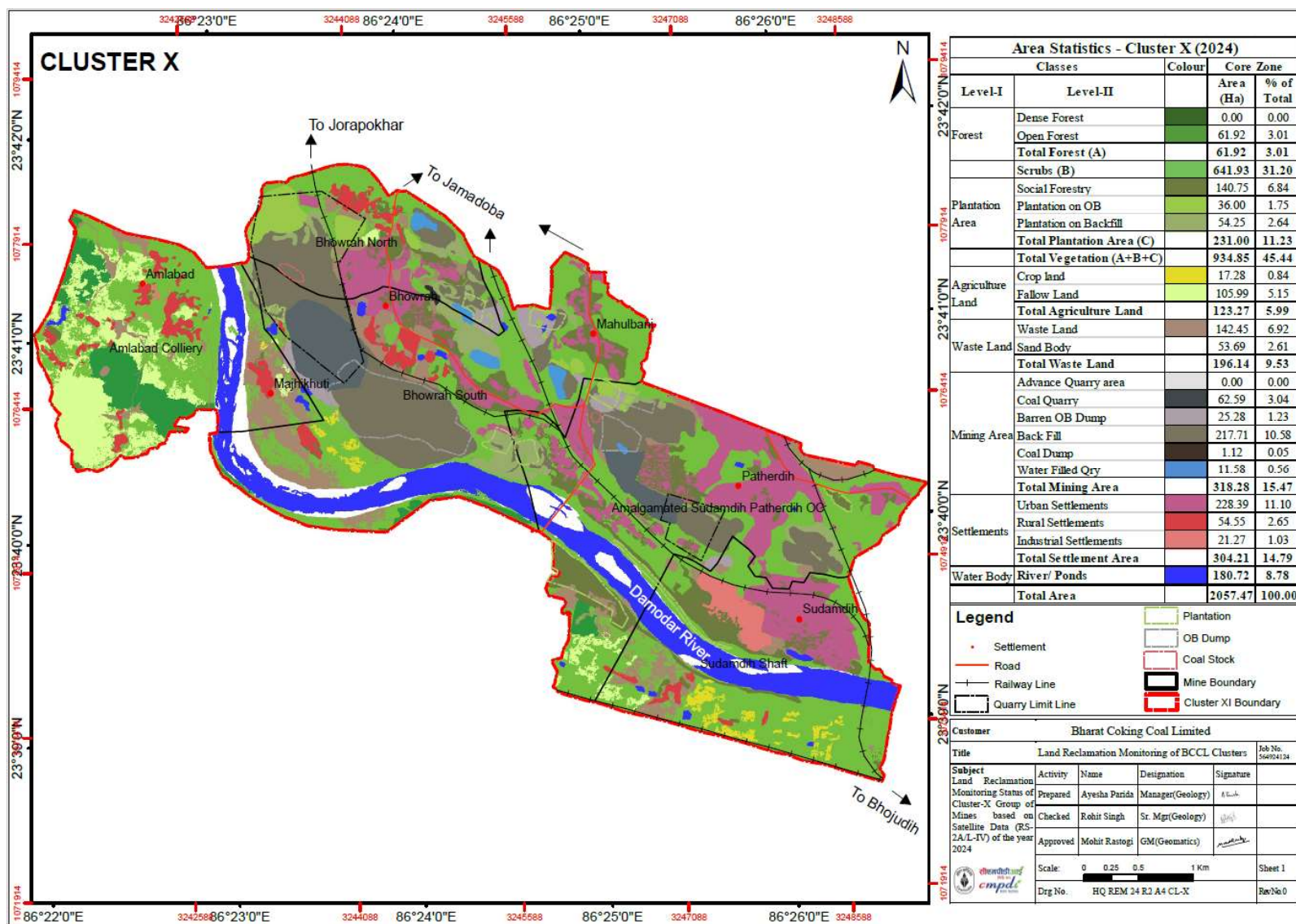


Plate 7.1: Land Use/Cover map of Cluster X

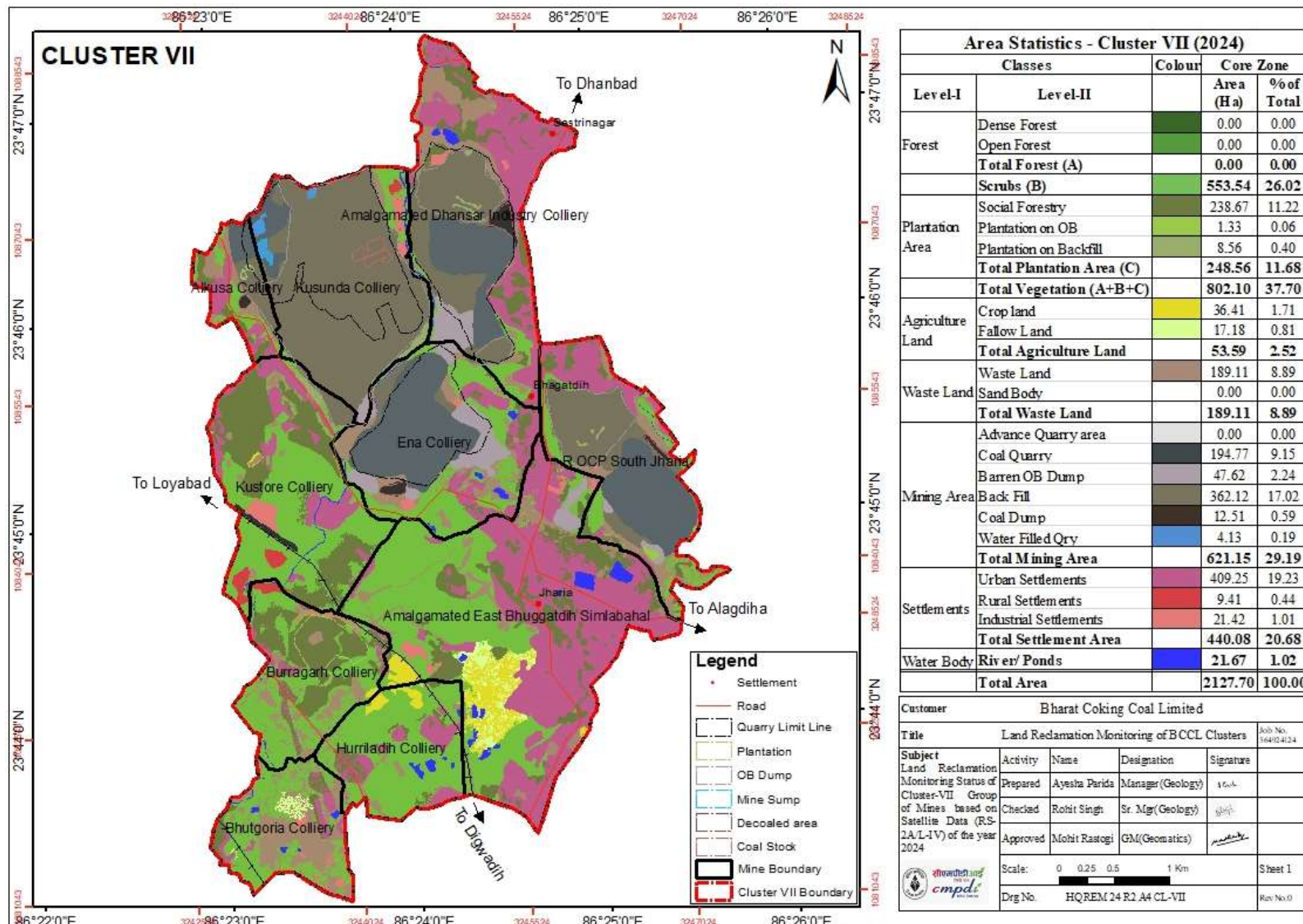


Plate 7.2: Land Use/Cover map of Cluster VII

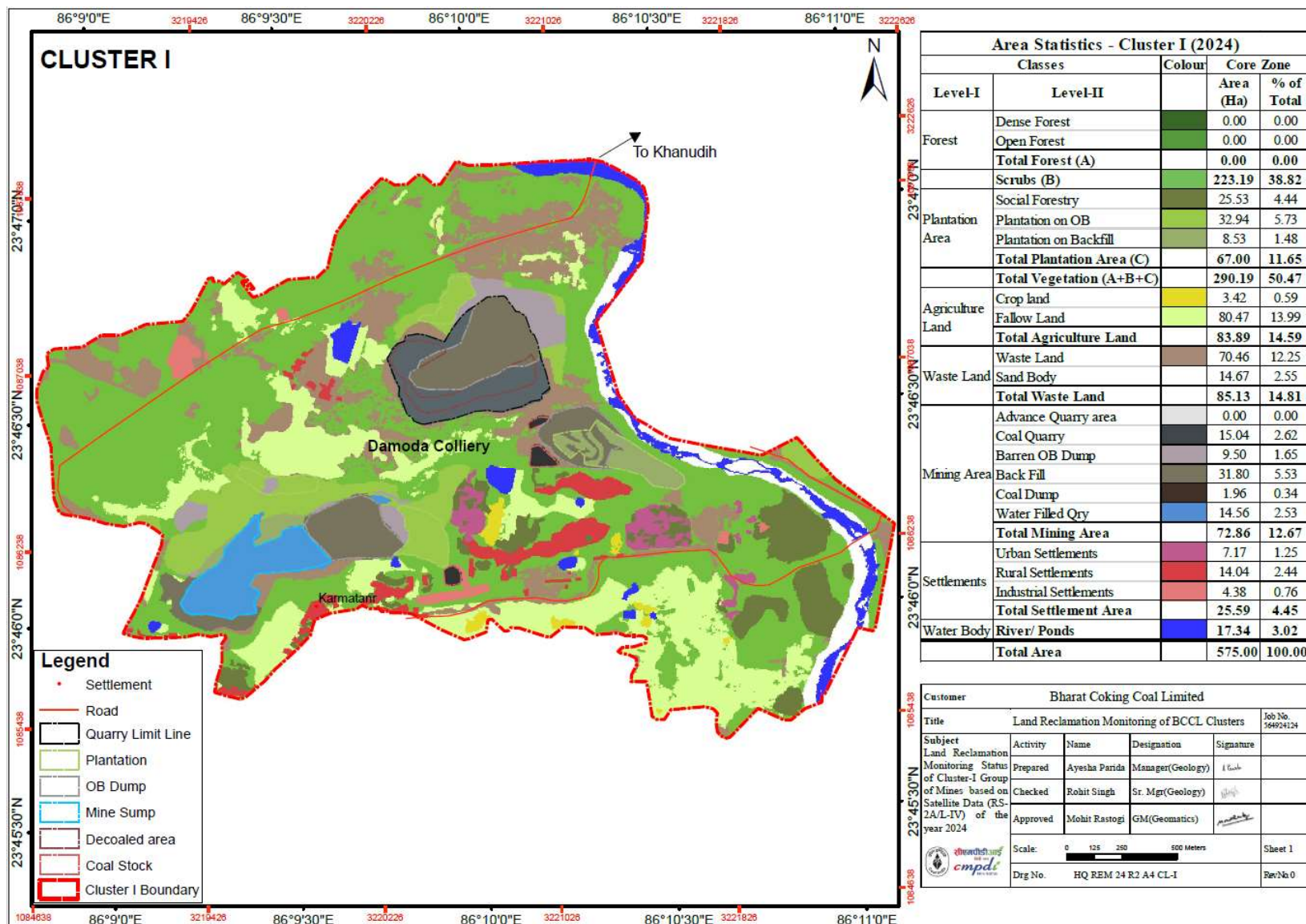


Plate 7.3: Land Use/Cover map of Cluster I

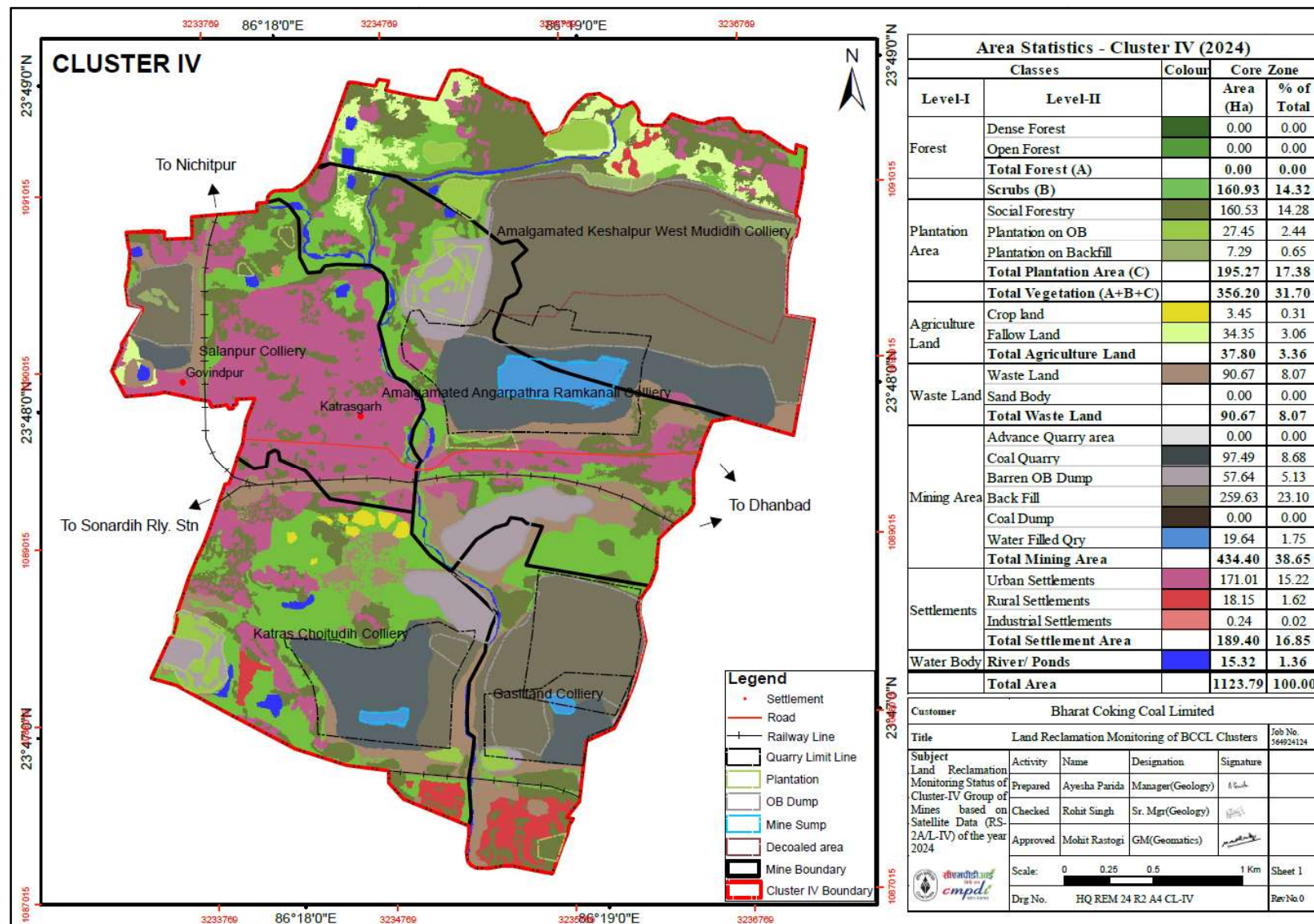


Plate 7.4: Land Use/Cover map of Cluster IV

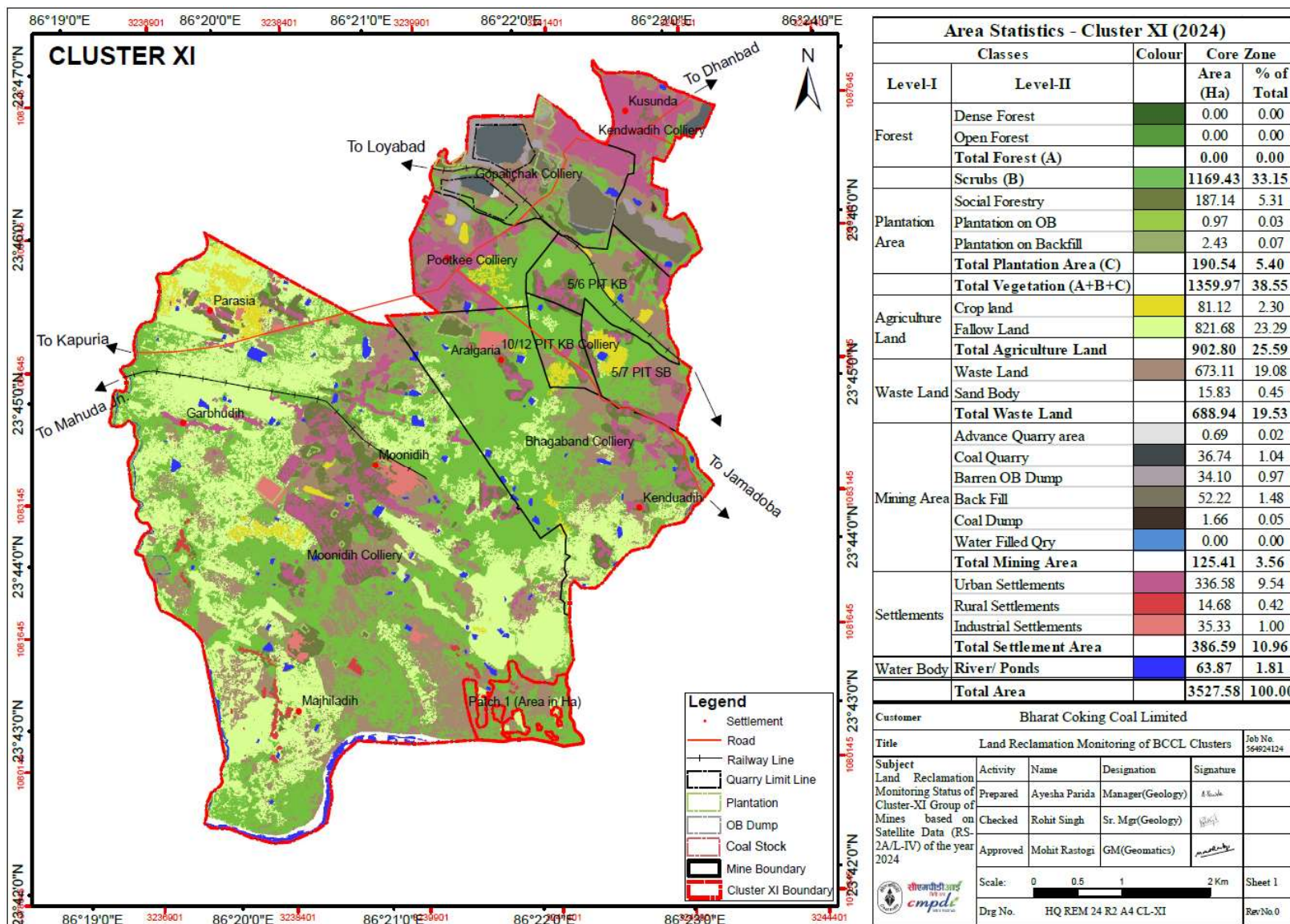


Plate 7.5: Land Use/Cover map of Cluster XI

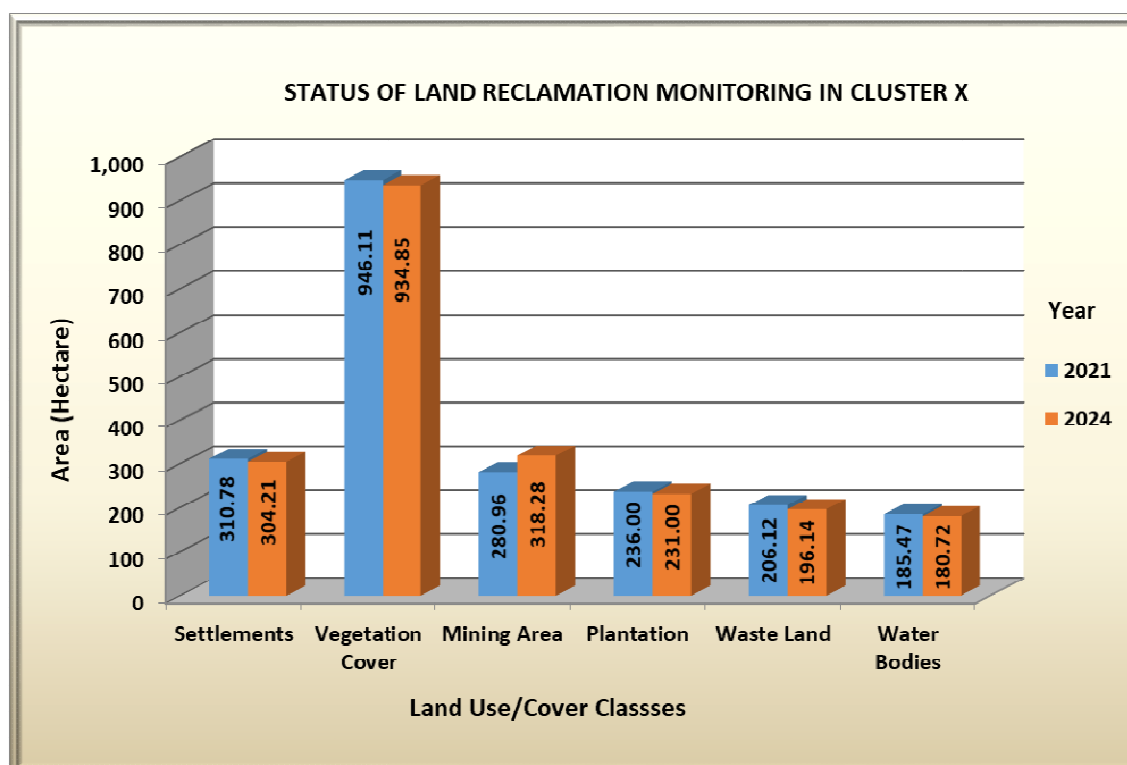


Chart 7.2: Status of Land Reclamation in Cluster X

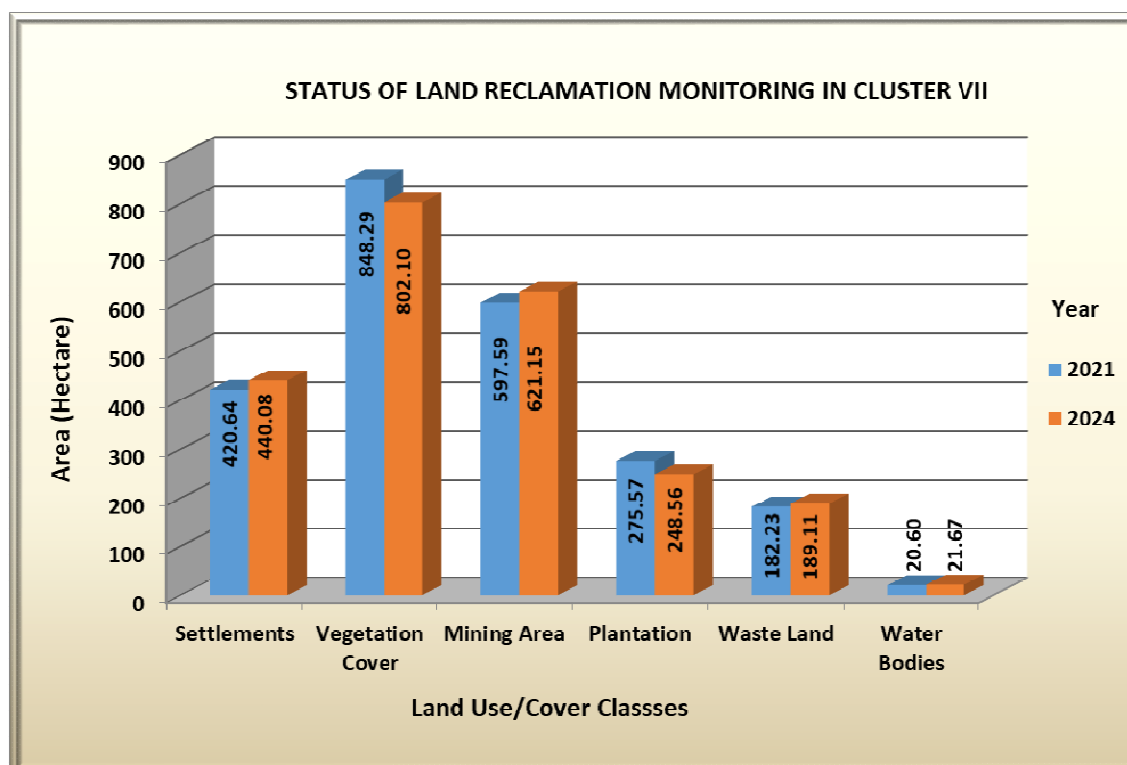


Chart 7.3: Status of Land Reclamation in Cluster VII

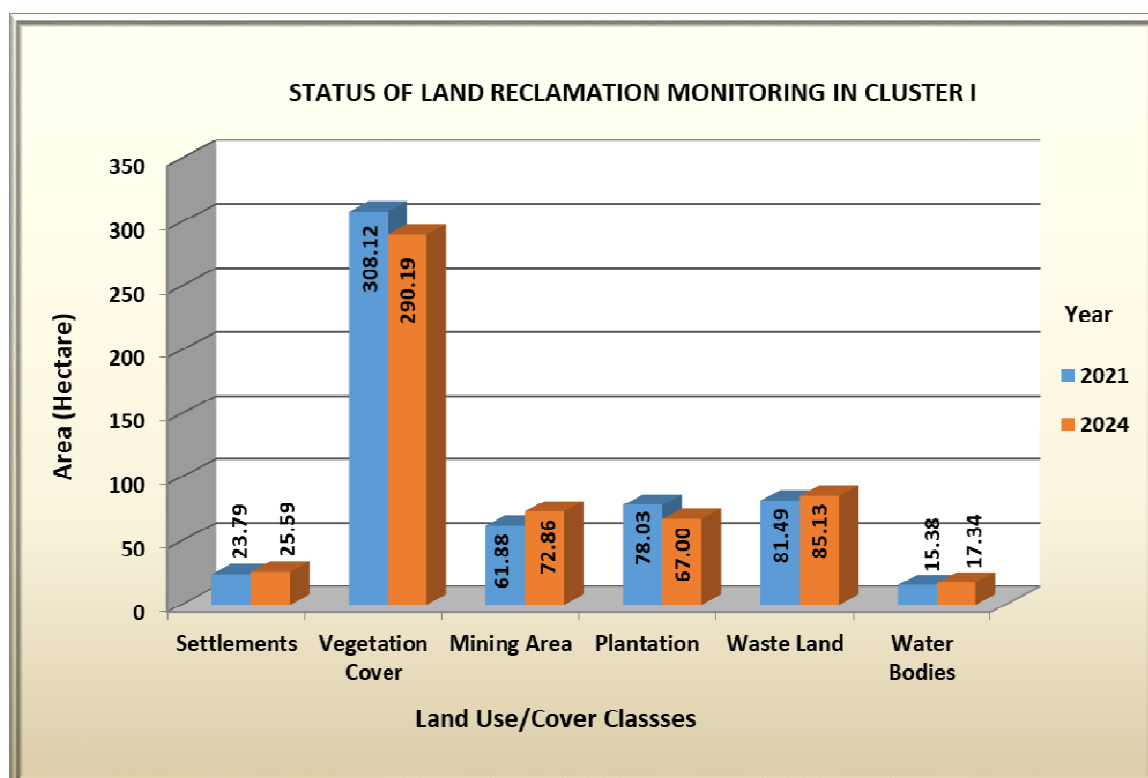


Chart 7.4: Status of Land Reclamation in Cluster I

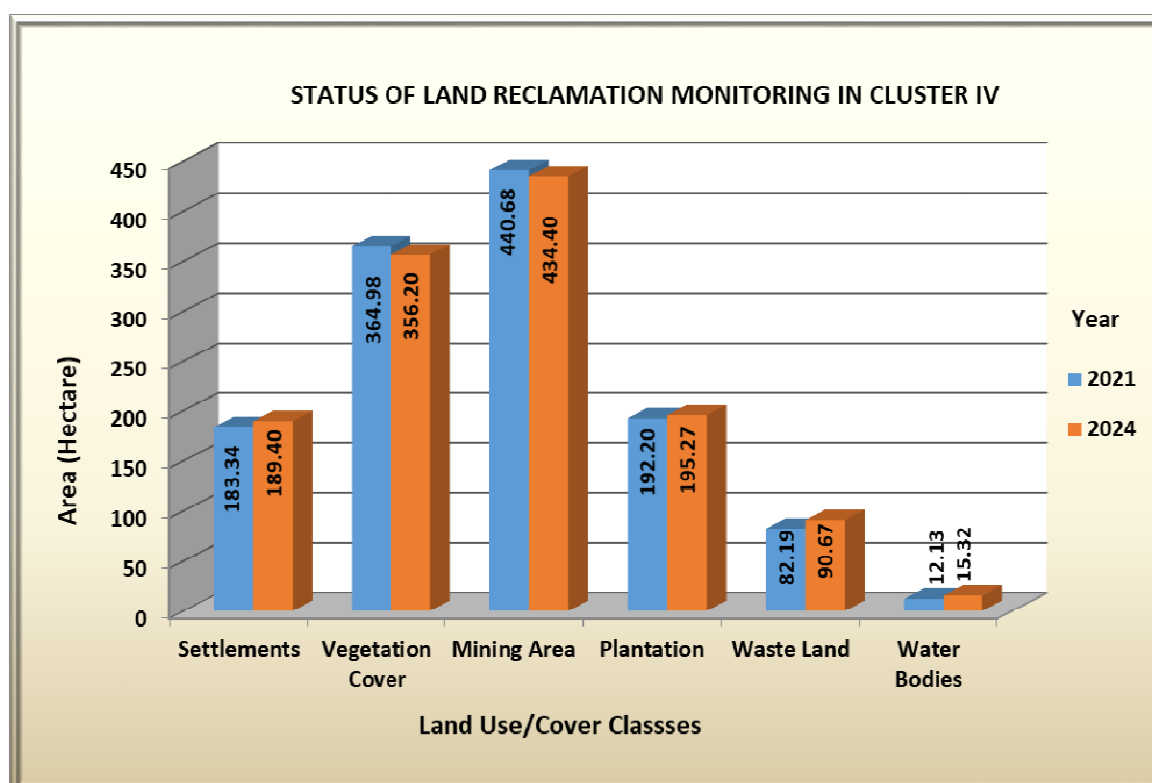


Chart 7.5: Status of Land Reclamation in Cluster IV

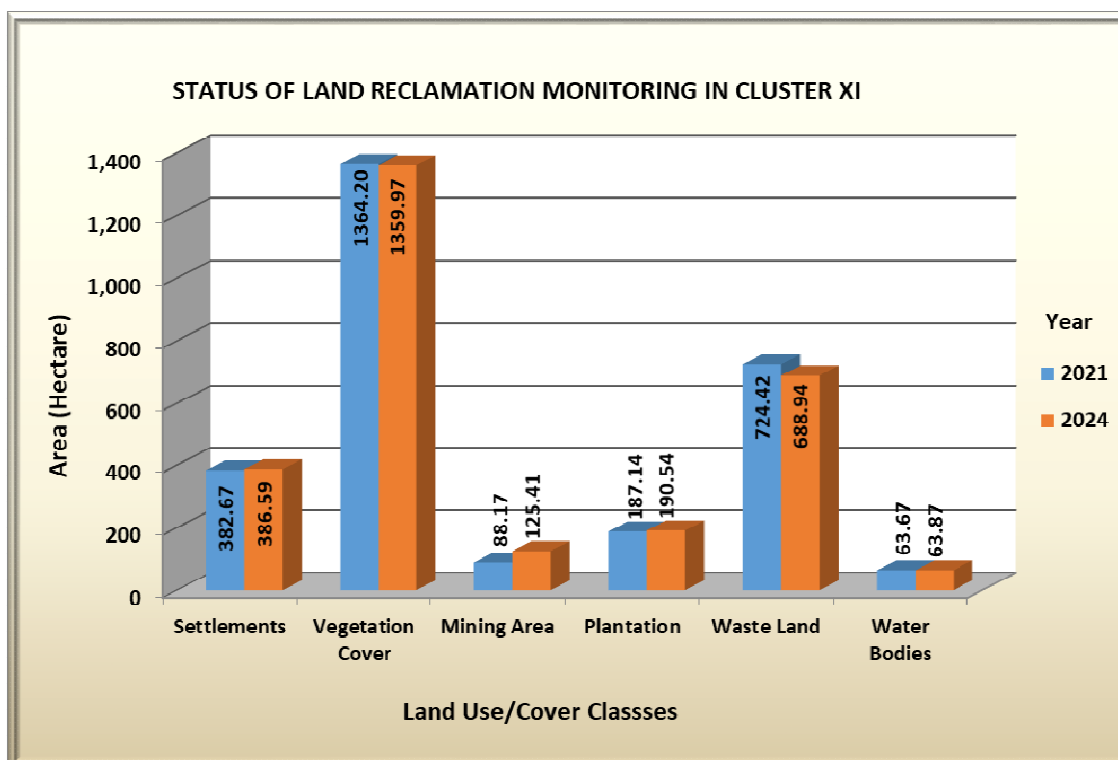


Chart 7.6: Status of Land Reclamation in Cluster XI



Photo 7.1: Plantation on OB dump, Cluster I



Photo 7.2: Plantation on OB dump, Cluster I



Photo 7.3: Plantation on Backfill, Cluster IV



Photo 7.4: Plantation on OB Dump, Cluster IV



Photo 7.5: Plantation on Backfill, Cluster VII



Photo 7.6: Social Forestry Plantation, Cluster VII



Photo 7.7: Plantation on Backfill, Cluster X



Photo 7.8: Plantation on OB Dump, Cluster X



Photo 7.9: Social Forestry Plantation, Cluster XI

MAHANADI COALFIELDS LIMITED

8. Land Reclamation Status in Mahanadi Coalfields Limited

8.1 Following One (1) opencast projects of MCL producing more than 5 million cubic meter and more (Coal + OB) were taken up for land reclamation monitoring based on satellite data of the year 2024.

- Basundhara OCP

8.2 Project wise Land Reclamation status in MCL for the year 2024 is given in Table 8.1 and also shown graphically in Fig 8.1. Area statistics of different land use / cover classes present in the mine leasehold of the above project for the year 2024-25 are shown in the Table -8.2. Land use maps derived from satellite data are shown in Plate 8.1. Year wise changes in the different land use classes based on satellite data are depicted in Bar Charts in Fig. 8.2 for the last three years only.

8.3 Study reveals that out of the total mine leasehold area of 437.10Ha. of the 1 OC project of MCL mentioned above taken for this study in 2024-25; total excavated area is 202.34Ha. out of which, 147.36Ha.(72.83%) is under backfilling (*Technically Reclaimed*) and balance 54.98Ha.(27.17%) is under active mining.

8.4 After analyzing the satellite data of the year 2021 and 2024, it is evident that total area of plantation (Green cover) which includes plantation on backfill, OB dump as well as under social forestry has decreased from 18.66 Ha. in the year 2021 to 16.45 Ha. in the year 2024. This decrease of 2.21 Ha. in the area of total green cover during three-year cycle is due to construction activities within leasehold area.

8.5 A composite land reclamation status of the remaining 7 Projects that are covered under monitoring in the three-year cycle is given in Table 1.1 so that information related to all projects will be made available every year as per clause 2.(ii) of the received work order from CIL.

Table 8.1: Summarized Land Reclamation Status in MCL
Summarized Land Reclamation Status in Opencast Projects of MCL based on Satellite Data of the year 2024

Table - 1 Land Reclamation Status in Basundhara OC mine of MCL based on Satellite Data of the Year 2021 & 2024																			
(Area in Hectare)																			
Sl. No.	Project	Total Leasehold Area		Technical Reclamation		Plantation						Area under Active Mining		Total Excavated Area		Total Area under Plantation (% Green Cover Generated in Leasehold)		Total Area under Reclamation	
						Biological Reclamation		Other Plantations											
				Area under Backfilling		Plantation on Excavated / Backfilled Area		Plantation on External OB Dumps		Social Forestry, Avenue Plantation Etc.									
1	2	3		4		5		6		7		8		9 (=4+5+8)		10 (=5+6+7)		11(=4+5)	
		2021	2024	2021	2024	2021	2024	2021	2024	2021	2024	2021	2024	2021	2024	2021	2024	2021	2024
1	Basundhara OC	437.10	437.10	143.13	147.36	0.00	0.00	8.53	6.32	10.13	10.13	58.10	54.98	201.23	202.34	18.66	16.45	143.13	147.36
				71.13%	72.83%	0.00%	0.00%					28.87%	27.17%			4.27%	3.76%	71.13%	72.83%
	TOTAL (A)	437.10	437.10	143.13	147.36	0.00	0.00	8.53	6.32	10.13	10.13	58.10	54.98	201.23	202.34	18.66	16.45	143.13	147.36
				71.13%	72.83%	0.00%	0.00%					28.87%	27.17%			4.27%	3.76%	71.13%	72.83%
(% is calculated with respect to Excavated Area as applicable)																			

(% is calculated with respect to Excavated Area as applicable)

Note: In reference to the above Table-1, different parameters are classified as follows:

1. Area under **Biological Reclamation** includes Area under Plantation done on Backfilled Area only.
2. Area under **Technical Reclamation** includes Area under Barren Backfilling only.
3. Area under **Active Mining** includes Coal Quarry, Advance Quarry Site, Quarry Filled with Water, if any. Areas under coal dump have been excluded from Active Mining in this table.
4. Social Forestry and Plantation on External OB Dumps are not included in Biological Reclamation and are put under separate categories as shown in the Table above.
5. (%) calculated in the above Table is in respect to Total Excavated Area except for "Total Area under Plantation" where % is in terms of "Leasehold Area"

Table-8.1.1: Composite land reclamation status in remaining mines of MCL (<5 MCM Coal+OB) as per clause 2.(ii) of the received work order from CIL

Table - 1.1 Status of Land Reclamation in remaining 7 Projects of MCL																			
(Area in Hectare)																			
Sl. No.	Cluster No.	Total Leasehold Area		Technical Reclamation		Plantation						Area under Active Mining		Total Excavated Area		Total Area under Plantation (% Green Cover Generated in		Total Area under Reclamation	
						Biological		Other Plantations		Plantation on Excavated /	Plantation on External OB								
1	2	3		4		5		6				7		8		9 (=4+5+8)		10 (=5+6+7)	
		2019	2022	2019	2022	2019	2022	2019	2022	2019	2022	2019	2022	2019	2022	2019	2022	2019	2022
2	Gopalji (B)	1141.43	1141.43	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
				0.00%	0.00%	0.00%	0.00%					0.00%	0.00%			0.00%	0.00%	0.00%	0.00%
		2022	2023	2022	2023	2022	2023	2022	2023	2022	2023	2022	2023	2022	2023	2022	2023	2022	2023
3	Basundhara W Extn. [C]	323.00	323.00	0.00	0.00	0.00	0.00	0.00	0.00	3.00	3.00	0.00	0.00	0.00	0.00	3.00	3.00	0.00	0.00
				0.00%	0.00%	0.00%	0.00%					0.00%	0.00%			0.93%	0.93%	0.00%	0.00%
		2020	2023	2020	2023	2020	2023	2020	2023	2020	2023	2020	2023	2020	2023	2020	2023	2020	2023
4	Chhendipada	24.30	24.30	6.86	0.52	4.46	10.80	2.84	2.84	2.07	2.07	3.97	3.97	15.29	15.29	9.37	15.71	11.32	11.32
				44.87%	3.40%	29.17%	70.63%					25.96%	25.96%			38.56%	64.65%	74.04%	74.04%
5	Balanda	351.22	351.22	31.11	32.79	196.90	195.22	0.00	0.00	6.66	6.66	18.21	18.21	246.22	246.22	203.56	201.88	228.01	228.01
				12.64%	13.32%	79.97%	79.29%					7.40%	7.40%			57.96%	57.48%	92.60%	92.60%
6	Orient 1&2 UG	1144.28	1144.28	0.00	0.00	0.00	0.00	0.00	0.00	21.73	21.73	0.00	0.00	0.00	0.00	21.73	21.73	0.00	0.00
				0.00%	0.00%	0.00%	0.00%					0.00%	0.00%			1.90%	1.90%	0.00%	0.00%
7	Orient 3 UG	981.84	981.84	0.00	0.00	0.00	0.00	0.00	0.00	18.31	18.31	0.00	0.00	0.00	0.00	18.31	18.31	0.00	0.00
				0.00%	0.00%	0.00%	0.00%					0.00%	0.00%			1.86%	1.86%	0.00%	0.00%
8	Nandira UG	474.00	370.00	0.00	0.00	0.00	0.00	0.00	0.00	4.15	3.42	0.00	0.00	0.00	0.00	4.15	3.42	0.00	0.00
				0.00%	0.00%	0.00%	0.00%					0.00%	0.00%			0.88%	0.92%	0.00%	0.00%
	TOTAL (D)	2975.64	2871.64	37.97	33.31	201.36	206.02	2.84	2.84	52.92	52.19	22.18	22.18	261.51	261.51	257.12	261.05	239.33	239.33
				14.52%	12.74%	77.00%	78.78%					8.48%	8.48%			8.64%	9.09%	91.52%	91.52%
	*GRAND TOTAL (A+B+C+D)	4877.17	4773.17	181.10	180.67	201.36	206.02	11.37	9.16	66.05	65.32	80.28	77.16	462.74	463.85	278.78	280.50	382.46	386.69
				39.14%	38.95%	43.51%	44.42%					17.35%	16.63%			5.72%	5.88%	82.65%	83.37%
*Grand Total (A+B+C+D) is the composite value of all 8 projects of MCL covered in 3 years cycle of Land Reclamation Monitoring														% is calculated with respect to Excavated Area as applicable)					

Fig 1: Land Reclamation Status of Basundhara OC in Year 2024

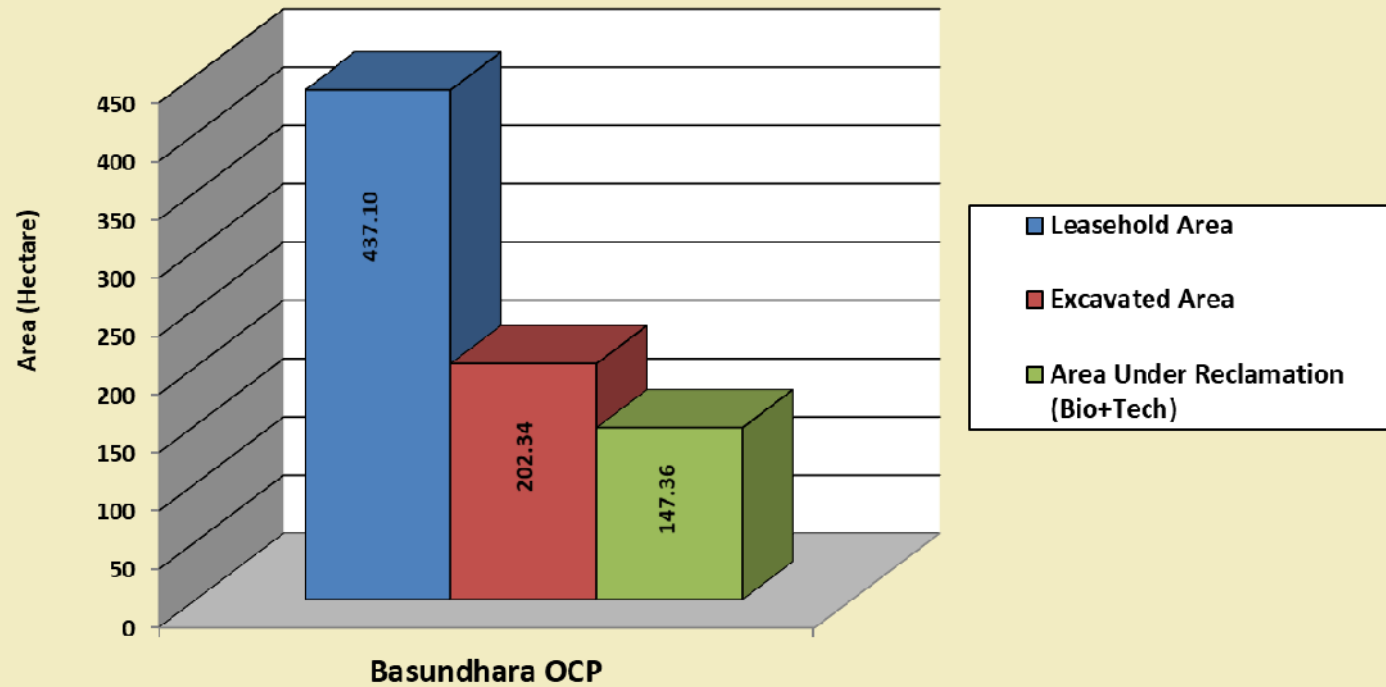


Chart 8.1: Bar Chart showing Land Reclamation Status in MCL

Table 8.2: Project-wise Land Reclamation Status in Opencast Projects of MCL (2024)

		Area	%	Area	%
FOREST	Dense Forest	0.00	0.00	0.00	0.00
	Open Forest	0.00	0.00	0.00	0.00
	Total Forest	0.00	0.00	0.00	0.00
SCRUBS	Scrubs	68.64	15.70	68.64	15.70
PLANTATION	Social Forestry/Avenue Plantation	10.13	2.32	10.13	2.32
	Plantation on OB Dump	6.32	1.45	6.32	1.45
	Plantation on Backfill (Biological Reclamation)	0.00	0.00	0.00	0.00
	Total Plantation	16.45	3.76	16.45	3.76
	Total Vegetation	85.10	19.47	85.10	19.47
ACTIVE MINING	Coal Dump	13.81	3.16	13.81	3.16
	Coal Quarry	2.90	0.66	2.90	0.66
	Advance Quarry Site	0.00	0.00	0.00	0.00
	Quarry Filled With Water	52.08	11.92	52.08	11.92
	Total Area under Active Mining	54.98	12.58	54.98	12.58
	Barren OB Dump	33.88	7.75	33.88	7.75
RECLAIMED	Area Under Backfilling (Technical Reclamation)	147.36	33.71	147.36	33.71
	Total Area under Technical Reclamation	147.36	33.71	147.36	33.71
	Total Area under Mine Operation	250.02	57.20	250.02	57.20
WASTELAND	Waste Land	59.64	13.64	59.64	13.64
	Fly Ash Pond / Sand Body	0.00	0.00	0.00	0.00
	Total Wasteland	59.64	13.64	59.64	13.64
WATERBODIES	Reservoir, Nallah, Ponds	5.38	1.23	5.38	1.23
	Total Waterbodies	5.38	1.23	5.38	1.23
AGRICULTURE	Crop Land	0.96	0.22	0.96	0.22
	Fallow Land	10.00	2.29	10.00	2.29
	Total Agriculture	10.96	2.51	10.96	2.51
SETTLEMENTS	Urban Settlement	7.72	1.77	7.72	1.77
	Rural Settlement	0.80	0.18	0.80	0.18
	Industrial Settlement	17.49	4.00	17.49	4.00
	Total Settlements	26.01	5.95	26.01	5.95
	Grand Total	437.10	100.00	437.10	100.00

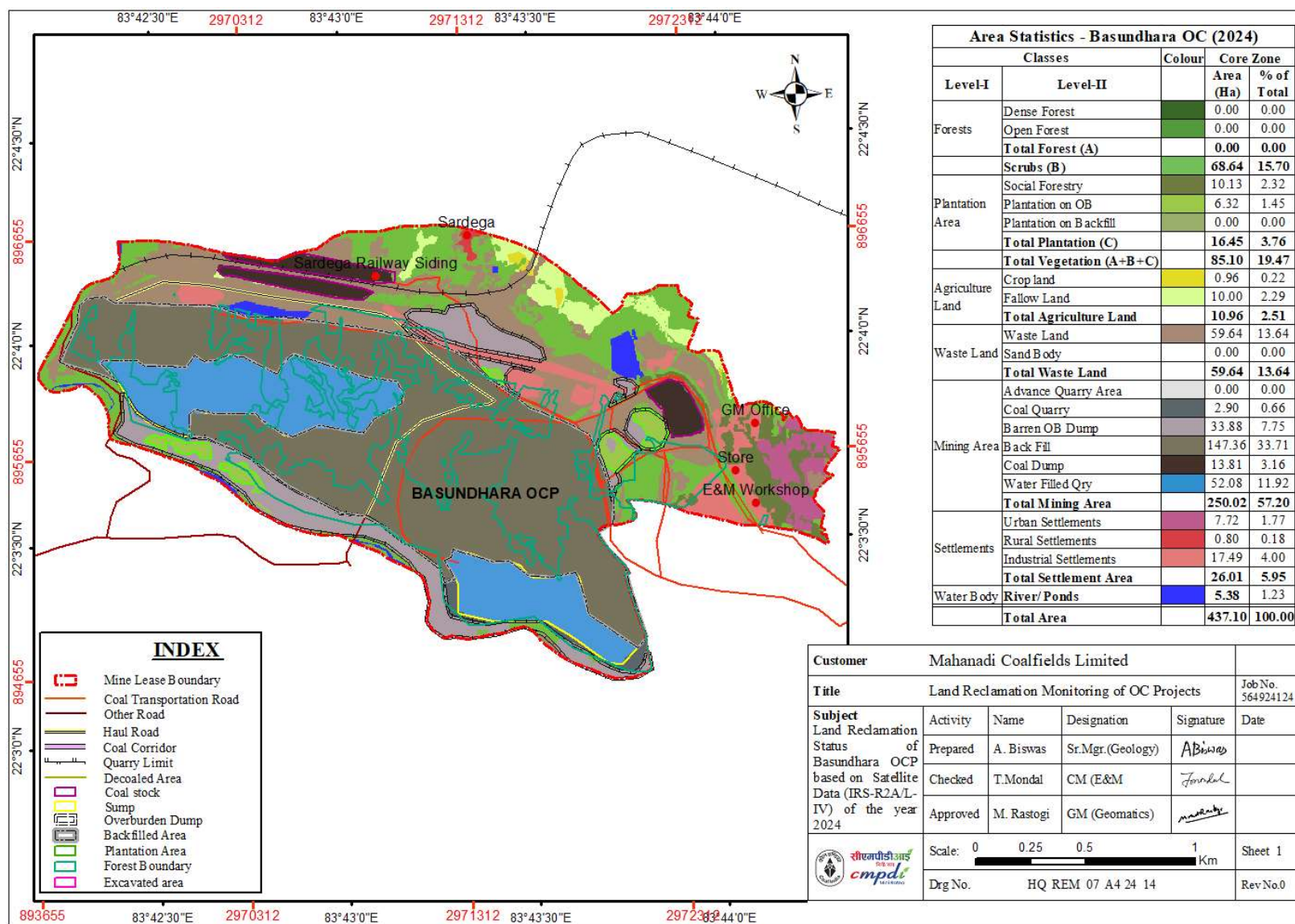


Plate 8.1: Land Use/Cover map of Basundhara OCP

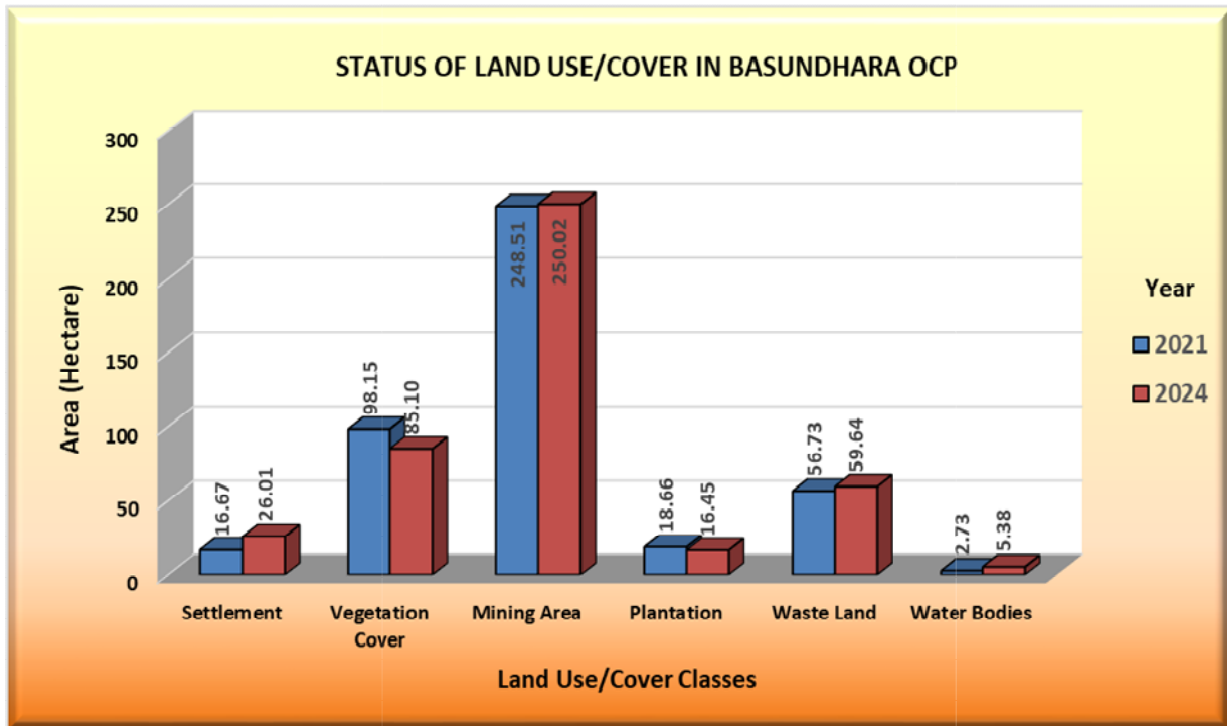


Chart 8.2: Status of Land Reclamation in Basundhara OCP



Photo 8.1: Plantation on External OB Dump (Basundhara OCP)



Photo 8.2: Social forestry Plantation (Basundhara OCP)

CENTRAL COALFIELDS LIMITED

9. Land Reclamation Status in Central Coalfields Ltd.

- 9.1** The following **8 OC** projects of Central Coalfields Ltd. producing less than 5 million m³. (Coal + OB) were taken up for land reclamation monitoring based on Satellite data of the year 2024.

No.	Name of OC Project	Name of Coalfield
1	Karma	Ramgarh
2	Sayal-D	South Karanpura
3	Giddi-A	
4	Dakra	North Karanpura
5	Tetariakhar	
6	Kabribad	Giridih
7	Tapin South	West Bokaro
8	Jarangdih	East Bokaro

- 9.2** Area statistics of different land use/ cover classes present in the leasehold area of the above 08 projects of CCL for the year 2024 are shown in Table 9.1. Land use/ cover maps derived from satellite data are shown in Plate 9.1 – 9.8. Year wise changes in different land use/ cover classes in the last three years based on satellite data are shown in Bar charts in Fig. 9.2 – 9.9.

- 9.3** Study based on Satellite data of the year 2024 reveals that out of total excavated area of 677.02 Ha, an area of 390.98 Ha (57.75%) has come under the process of reclamation in the above 8 OC projects of CCL taken together. Out of which, 256.68 Ha (37.91%) area has come under backfilling (Technical Reclamation) and 134.30 Ha (19.84%) area has come under plantation (Biological Reclamation).

- 9.4** Study also reveals that the area under backfilling (Technical Reclamation) has increased from 176.04 Ha in year 2021 to 256.68 Ha in year 2024.

- 9.5** Analysis of Satellite data also indicates that the area under plantation (Biological Reclamation) has increased from 129.93 Ha (Yr. 2021) to 134.30 Ha (Yr. 2024). This shows the continuous effort taken by the company CCL in reclamation activities for environmental protection.

- 9.6** The total area under reclamation also increased from 305.97 Ha in Yr. 2021 to 390.98 Ha in Yr. 2024.
- 9.7** It is also seen that the total area under plantation (**Green Cover** generated) which includes plantation carried out on backfilled area, OB dumps as well as plantation done on social forestry in all the 8 mines taken together of CCL has increased from 234.87 Ha in the year 2021 to 285.73 Ha in the year 2024.
- 9.8** Out of 8 projects of CCL taken for land reclamation monitoring in 2023-24, Dakra OC ranks on top for land reclamation (78.88%) followed by Giddi-A (73.45%), Kabriabad (61.40%), Jarangdih, Tapin South, Karma, Sayal-D and Tetariakhar.
- 9.9** Dakra and Tetariakhar OCP has successfully carried out plantation on OB dumps, and on slopes of OB dumps through the method of seed ball throwing.
- 9.10** Among the three new entrants to the land reclamation list, Kabriabad OCP has reclaimed 36.90 Ha area of total leasehold and 12.30 Ha area is under plantation.

Table 9.1: Summarized Land Reclamation Status in CCL

Summarized Land Reclamation Status in Opencast Projects of CCL based on Satellite Data of the year 2024

(Projects producing less than 5 mcm of Coal+OB annually)

(Area in Hectare)

(Projects producing less than 5 mcm of Coal+OB annually)																			(Area in hectare)	
SL.N o.	Project	Total Leasehold Area		Technical Reclamation		Plantation						Area under Active Mining		Total Excavated Area		Total Area under Plantation (% Green Cover Generated in Leasehold)		Total Area under Reclamation		
						Biological Reclamation		Other Plantations												
				Area under Backfilling		Plantation on Excavated / Backfilled Area		Plantation on External Over Burden Dumps		Social Forestry, Avanneu Plantation Etc.										
1	2	3		4		5		6		7		8		9 (=4+5+8)		10 (=5+6+7)		11(=4+5)		
		2021	2024	2021	2024	2021	2024	2021	2024	2021	2024	2021	2024	2021	2024	2021	2024	2021	2024	
1	Karma	298.96	298.96	7.74	18.28	0.00	0.00	9.62	8.67	1.27	1.27	41.29	41.95	49.03	60.23	10.89	9.94	7.74	18.28	
				15.79%	30.35%	0.00%	0.00%					84.21%	69.65%			3.64%	3.32%	15.79%	30.35%	
2	Jarangdih	179.05	179.05	29.51	28.33	7.19	7.20	3.44	2.93	17.83	17.52	22.24	24.23	58.94	59.76	28.46	27.65	36.70	35.53	
				50.07%	47.41%	12.20%	12.05%					37.73%	40.55%			15.90%	15.44%	62.27%	59.45%	
3	Dakra	249.72	249.72	47.98	56.02	37.86	37.86	1.11	0.10	15.77	18.51	22.38	25.14	108.22	119.02	54.74	56.47	85.84	93.88	
				44.34%	47.07%	34.98%	31.81%					20.68%	21.12%			21.92%	22.61%	79.32%	78.88%	
4	Giddi-A	510.00	510.00	90.81	91.55	84.88	83.14	40.61	40.62	13.84	14.13	67.74	63.15	243.43	237.84	139.33	137.89	175.69	174.69	
				37.30%	38.49%	34.87%	34.96%					27.83%	26.55%			27.32%	27.04%	72.17%	73.45%	
5	Tetariakhar	208.47	208.47	0.00	0.00	0.00	0.00	0.00	0.00	1.45	5.13	40.19	40.64	40.19	40.64	1.45	5.13	0.00	0.00	
				0.00%	0.00%	0.00%	0.00%					100.00%	100.00%			0.70%	2.46%	0.00%	0.00%	
	TOTAL (a)	1446.20	1446.20	176.04	194.18	129.93	128.20	54.78	52.32	50.16	56.56	193.84	195.11	499.81	517.49	234.87	237.08	305.97	322.38	
				35.22%	37.52%	26.00%	24.77%					38.78%	37.70%			16.24%	16.39%	61.22%	62.30%	
6	Tapin South*	-	178.06	-	31.19	-	0.00	-	17.62	-	0.00	-	30.84	-	62.03	-	17.62	-	31.19	
					50.28%		0.00%						49.72%				9.90%		50.28%	
7	Kabribad*	-	93.34	-	30.80	-	6.10	-	6.20	-	0.00	-	23.20	-	60.10	-	12.30	-	36.90	
					51.25%		10.15%						38.60%				13.18%		61.40%	
8	Sayal-D*	-	398.00	-	0.51	-	0.00	-	0.00	-	18.73	-	36.89	-	37.40	-	18.73	-	0.51	
					1.36%		0.00%						98.64%				4.71%		1.36%	
	TOTAL (b)	-	669.40	-	62.50	-	6.10	-	23.82	-	18.73	-	90.93	-	159.53	-	48.65	-	68.60	
					39.18%		3.82%						57.00%				7.27%		43.00%	
	TOTAL (A) (a+b)	1446.20	2115.60	176.04	256.68	129.93	134.30	54.78	76.14	50.16	75.29	193.84	286.04	499.81	677.02	234.87	285.73	305.97	390.98	
				35.22%	37.91%	26.00%	19.84%					38.78%	42.25%			16.24%	13.51%	61.22%	57.75%	

(% is calculated with respected to Excavated Area as applicable)

Note: In reference of the above Table, different parameters are classified as follows:

- * OCPs are new entrant for Land Reclamation Monitoring for the year 2024-25
- Area under Biological Reclamation includes Areas under Plantation done on Backfilled Area Only.
- Area under Technical Reclamation includes Area under Barren Backfilling only.
- Area under Active Mining Includes Coal Quarry, Advance Quarry Site and Quarry filled with water etc., if any.
- Social Forestry and Plantation on External OB Dumps are not included in Biological Reclamation and are put under separate categories as shown in the above Table.
- (%) calculated in the above Table is in respect to Total Excavated Area except for "Total Area under Plantation" where % is in terms of "Leasehold Area".

Table 9.1.1: Composite land reclamation status in remaining mines of CCL (<5 MCM Coal+OB) as per clause 2.(ii) of the received work order from CIL

Sl.No.	Mine Name	Total Leasehold Area		Technical Reclamation		Plantation						Area under Active Mining		Total Excavated Area		Total Area under Plantation (% Green Cover Generated in		Total Area under Reclamation	
						Biological		Other Plantations											
				Area under Backfilling		Plantation on Excavated /		Plantation on External OB Dumps		Social Forestry, Avenue Plantation									
1	2	3		4		5		6		7		8		9 (=4+5+8)		10 (=5+6+7)		11(=4+5)	
		2019	2022	2019	2022	2019	2022	2019	2022	2019	2022	2019	2022	2019	2022	2019	2022	2019	2022
9	Bhurkunda	910.16	910.16	32.11	31.06	41.12	41.06	86.52	89.37	99.30	103.90	77.07	90.45	150.30	162.57	226.94	234.33	73.23	72.12
				21.36%	19.11%	27.36%	25.26%					51.28%	55.64%			24.93%	25.75%	48.72%	44.36%
10	Religera	301.75	301.75	36.02	41.55	0.00	0.00	8.90	9.95	33.02	32.32	60.21	61.17	96.23	102.72	41.92	42.27	36.02	41.55
				37.43%	40.45%	0.00%	0.00%					62.57%	59.55%			13.89%	14.01%	37.43%	40.45%
11	Bokaro [#]	607.30	775.00	58.84	90.04	97.96	124.44	13.22	16.94	58.79	79.67	60.72	75.61	217.52	290.09	169.97	221.05	156.80	214.48
				27.05%	31.04%	45.03%	42.90%					27.91%	26.06%			27.99%	28.52%	72.09%	73.94%
12	Sirka	362.40	362.40	22.02	22.69	2.96	5.96	0.00	0.00	6.07	6.07	65.74	70.75	90.72	99.40	9.03	12.03	24.98	28.65
				24.27%	22.83%	3.26%	6.00%					72.46%	71.18%			2.49%	3.32%	27.54%	28.82%
13	Kedla	1157.42	1157.42	90.56	83.28	20.24	32.59	32.61	20.24	1.46	1.35	47.60	48.35	158.40	164.22	54.31	54.18	110.80	115.87
				57.17%	50.71%	12.78%	19.85%					30.05%	29.44%			4.69%	4.68%	69.95%	70.56%
	TOTAL (B)	3339.03	3506.73	240.65	269.75	163.04	204.79	141.25	136.50	198.64	223.31	313.48	348.45	713.17	819.00	502.86	564.58	403.69	474.55
				33.74%	32.94%	22.86%	25.01%					43.96%	42.55%			15.06%	16.10%	56.60%	57.94%
		2020	2023	2020	2023	2020	2023	2020	2023	2020	2023	2020	2023	2020	2023	2020	2023	2020	2023
14	Urimari [#]	1443.50	243.09	91.58	73.61	48.80	17.62	0.06	0.00	42.67	0.88	63.74	102.97	204.12	194.20	91.53	18.50	140.38	91.23
				44.87%	37.90%	23.91%	9.07%					31.23%	53.02%			6.34%	7.61%	68.77%	46.98%
15	Govindpur	274.95	274.95	66.56	58.79	17.50	12.58	2.03	1.46	0.22	0.00	60.02	136.18	144.08	207.55	19.75	14.04	84.06	71.37
				46.20%	28.33%	12.15%	6.06%					41.66%	65.61%			7.18%	5.11%	58.34%	34.39%
16	Topa [#]	520.91	276.66	20.89	10.62	3.75	2.53	43.81	5.89	14.22	12.72	55.71	108.72	80.35	121.87	61.78	21.14	24.64	13.15
				26.00%	8.71%	4.67%	2.08%					69.33%	89.21%			11.86%	7.64%	30.67%	10.79%
17	Jharkhand [#]	323.88	261.84	91.21	61.14	38.25	34.98	0.33	0.32	2.48	0.96	48.93	136.45	178.39	232.57	41.06	36.26	129.46	96.12
				51.13%	26.29%	21.44%	15.04%					27.43%	58.67%			12.68%	13.85%	72.57%	41.33%
18	New Giddi-C	210.32	210.32	31.22	7.39	10.34	0.00	3.02	19.96	5.83	6.56	26.78	73.16	68.34	80.55	19.19	26.52	41.56	7.39
				45.68%	9.17%	15.13%	0.00%					39.19%	90.83%			9.12%	12.61%	60.81%	9.17%
19	Amlo	247.59	247.59	39.51	31.01	14.58	15.23	15.27	18.02	1.53	2.00	39.62	120.38	93.71	166.62	31.38	35.25	54.09	46.24
				42.16%	18.61%	15.56%	9.14%					42.28%	72.25%			12.67%	14.24%	57.72%	27.75%
	TOTAL (C)	3021.15	1514.45	340.97	242.56	133.22	82.94	64.52	45.65	66.95	23.12	294.80	677.86	768.99	1003.36	264.69	151.71	474.19	207.83
				44.34%	24.17%	17.32%	8.27%					38.34%	67.56%			8.76%	10.02%	61.66%	20.71%
**		2022	2023	2022	2023	2022	2023	2022	2023	2022	2023	2022	2023	2022	2023	2022	2023	2022	2023
20	KDH [#]	620.00	489.00	177.00	156.00	139.00	139.00	3.00	3.00	21.00	18.00	52.00	33.00	368.00	328.00	163.00	160.00	316.00	295.00
				48.10%	47.56%	37.77%	42.38%					14.13%	10.06%			26.29%	32.72%	85.87%	89.94%
21	Parej East [#]	620.00	346.00	76.00	76.00	75.00	76.00	6.00	6.00	9.00	9.00	21.00	21.00	172.00	173.00	90.00	91.00	151.00	152.00
				44.19%	43.93%	43.60%	43.93%					12.21%	12.14%			14.52%	26.30%	87.79%	87.86%
22	Rajrappa	1982.00	1982.00	238.00	236.00	127.00	127.00	302.00	302.00	202.00	202.00	103.00	110.00	468.00	473.00	631.00	631.00	365.00	363.00
				50.85%	49.89%	27.14%	26.85%					22.01%	23.26%			31.84%	31.84%	77.99%	76.74%
23	Sel Dhori	265.00	265.00	35.00	38.00	3.00	5.00	7.00	7.00	1.00	3.00	67.00	60.00	105.00	103.00	11.00	15.00	38.00	43.00
				33.33%	36.89%	2.86%	4.85%					63.81%	58.25%			4.15%	5.66%	36.19%	41.75%
24	Kathara	771.00	771.00	68.00	68.00	32.00	32.00	108.00	108.00	80.00	80.00	68.00	68.00	168.00	168.00	220.00	220.00	100.00	100.00
				40.48%	40.48%	19.05%	19.05%					40.48%	40.48%			28.53%	28.53%	59.52%	59.52%
25	Rohini	256.00	256.00	133.00	134.00	48.00	50.00	11.00	11.00	0.00	0.00	46.00	45.00	227.00	229.00	59.00	61.00	181.00	184.00
				58.59%	58.52%	21.15%	21.83%					20.26%	19.65%			23.05%	23.83%	79.74%	80.35%
26	Purnadih	752.00	752.00	103.00	107.00	23.00	25.00	12.00	12.00	3.00	4.00	53.00	54.00	179.00	186.00	38.00	41.00	126.00	132.00
				57.54%	57.53%	12.85%	13.44%					29.61%	29.03%			5.05%	5.45%	70.39%	70.97%
27	Karo	526.00	526.00	74.00	71.00	26.00	27.00	10.00	10.00	27.00	22.00	32.00	36.00	132.00	134.00	63.00	59.00	100.00	98.00
				56.06%	52.99%	19.70%	20.15%					24.24%	26.87%			11.98%	11.22%	75.76%	73.13%
	TOTAL (D)	5792.00	5387.00	904.00	886.00	473.00	481.00	459.00	459.00	343.00	338.00	442.00	427.00	1819.00	1794.00	1275.00	1278.00	1377.00	1367.00
				49.70%	49.39%	26.00%	26.81%					24.30%	23.80%			22.01%	23.72%	75.70%	76.20%
GRAND TOTAL (A+B+C+D)		13598.38	12523.78	1661.66	1654.99	899.19	903.03	719.55	717.29	658.75	659.72	1244.12	1739.35	3800.97	4293.38	2277.42	2280.02	2560.85	2440.36
				43.72%	38.55%	23.66%	21.03%					32.73%	40.51%			16.75%	18.21%	67.37%	56.84%
#Grand Total (A+B+C+D) is the composite value of all 27 mines of CCL (< 5 MTY capacity) covered in 3 years cycle of Land Reclamation Monitoring																(* is calculated with respect to Excavated Area as applicable)			
# The Leasehold area for these mines has been changed for the year, as indicated.																			
** The Land Reclamation Monitoring for these mines was previously conducted under the category of more than 5 MTY capacity. For normalized calculations, the data from these mines has been converted from Sq.Kms to Ha.																			

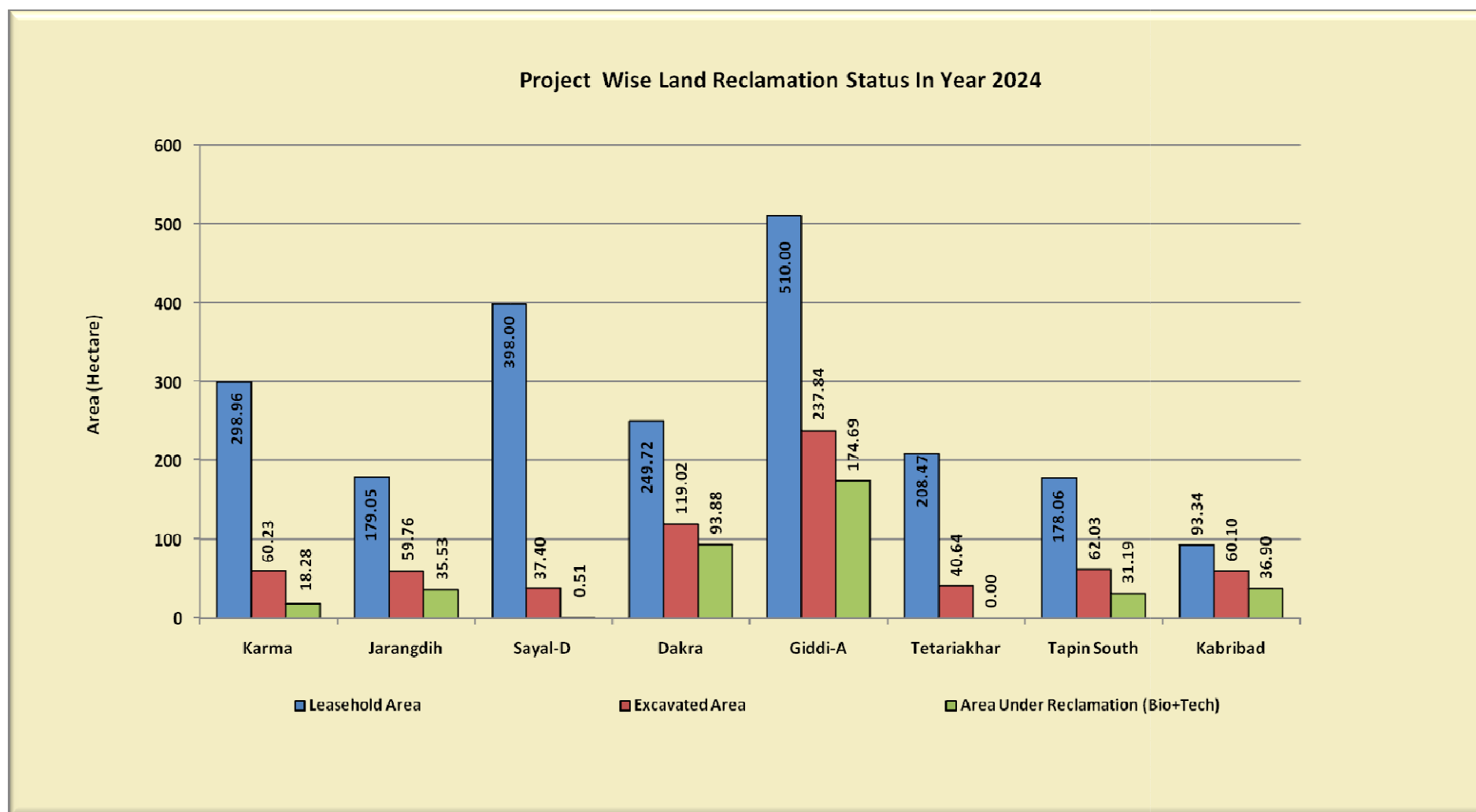


Chart 9.1: Bar Chart showing Land Reclamation Status in CCL

Table 9.2: Project-wise Land Reclamation Status in Opencast Projects of CCL (2024)

TABLE - 2																			
Project wise Area Statistics of Land Use/ Cover Classes in OC Mines(< 5 m.cu.m) of CCL based on Satellite data of the Year 2024																			
		KARMA		JARANGDIH		SAYAL-D		DAKRA		GIDDI-A		TETARIAKHAR		TAPIN SOUTH		KABRIBAD		TOTAL	
		Area	%	Area	%	Area	%	Area	%	Area	%	Area	%	Area	%	Area	%	Area	%
FORESTS	Dense Forest	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.01	0.02	0.01	0.00	0.00	0.04	0.00
	Open Forest	11.14	3.73	0.00	0.00	56.23	14.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	67.37	3.18
	Total Forest (A)	11.14	3.73	0.00	0.00	56.23	14.13	0.00	0.00	0.00	0.00	0.02	0.01	0.02	0.01	0.00	0.00	67.41	3.19
	Scrubs(B)	55.09	18.43	26.68	14.90	120.39	30.25	50.08	20.05	56.16	11.01	40.01	19.19	30.61	17.19	2.50	2.68	381.52	18.03
PLANTATION	Social Forestry	1.27	0.42	17.52	9.78	18.73	4.71	18.51	7.41	14.13	2.77	5.13	2.46	0.00	0.00	0.00	0.00	75.29	3.56
	Plantation on OB Dump	8.67	2.90	2.93	1.64	0.00	0.00	0.10	0.04	40.62	7.96	0.00	0.00	17.62	9.90	6.20	6.64	76.14	3.60
	Plantation on Backfill (Biological Reclamation)	0.00	0.00	7.20	4.02	0.00	0.00	37.86	15.16	83.14	16.30	0.00	0.00	0.00	0.00	6.10	6.54	134.30	6.35
	Total Plantation(C)	9.94	3.32	27.65	15.44	18.73	4.71	56.47	22.61	137.89	27.04	5.13	2.46	17.62	9.90	12.30	13.18	285.73	13.51
	Total Vegetation(A+B+C)	76.17	25.48	54.33	30.34	195.35	49.08	106.55	42.67	194.05	38.05	45.16	21.66	48.25	27.10	14.80	15.86	734.66	34.73
ACTIVE MINING	Coal Quarry	39.93	13.36	22.92	12.80	35.77	8.99	20.21	8.09	16.08	3.15	23.89	11.46	30.84	17.32	17.10	18.32	206.74	9.77
	Advance Quarry Site	0.97	0.32	0.80	0.45	0.69	0.17	1.67	0.67	1.82	0.36	1.23	0.59	0.00	0.00	0.00	0.00	7.18	0.34
	Quarry Filled With Water	1.05	0.35	0.51	0.28	0.43	0.11	3.26	1.31	45.25	8.87	15.52	7.44	0.00	0.00	6.10	6.54	72.12	3.41
	Total Area under Active Mining(D)	41.95	14.03	24.23	13.53	36.89	9.27	25.14	10.07	63.15	12.38	40.64	19.49	30.84	17.32	23.20	24.86	286.04	13.52
(E)	Coal Dump	3.08	1.03	2.87	1.60	4.82	1.21	2.94	1.18	2.89	0.57	7.47	3.58	1.96	1.10	3.20	3.43	29.23	1.38
	Barren OB Dump	30.91	10.34	12.78	7.14	43.35	10.89	0.58	0.23	18.29	3.59	48.08	23.06	16.66	9.36	14.20	15.21	184.85	8.74
	Area Under Backfilling (Technical Reclamation)	18.28	6.11	28.33	15.82	0.51	0.13	56.02	22.43	91.55	17.95	0.00	0.00	31.19	17.52	30.80	33.00	256.68	12.13
	Total Area under Mine Operation(D+E)	94.22	31.52	68.21	38.10	85.57	21.50	84.68	33.91	175.88	34.49	96.19	46.14	80.65	45.29	71.40	76.49	756.80	35.77
WASTELANDS	Waste Lands	42.91	14.35	18.80	10.50	81.66	20.52	4.15	1.66	32.19	6.31	31.23	14.98	13.56	7.62	7.14	7.65	231.64	10.95
	Fly Ash Pond / Sand Body	9.83	3.29	0.90	0.50	0.00	0.00	0.00	0.00	5.98	1.17	0.00	0.00	0.00	0.00	0.00	0.00	16.71	0.79
	Total Wasteland	52.74	17.64	19.70	11.00	81.66	20.52	4.15	1.66	38.17	7.48	31.23	14.98	13.56	7.62	7.14	7.65	248.35	11.74
WATERBODIES	Reservoir, Nallah, Ponds	12.32	4.12	2.16	1.21	0.00	0.00	1.28	0.51	17.95	3.52	5.68	2.72	0.44	0.25	0.00	0.00	39.83	1.88
	Total Waterbodies	12.32	4.12	2.16	1.21	0.00	0.00	1.28	0.51	17.95	3.52	5.68	2.72	0.44	0.25	0.00	0.00	39.83	1.88
AGRICULTURE	Crop Lands	0.00	0.00	0.62	0.35	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	7.70	4.32	0.00	0.00	8.32	0.39
	Fallow Lands	52.96	17.71	0.00	0.00	23.22	5.83	0.97	0.39	2.49	0.49	29.10	13.96	24.78	13.92	0.00	0.00	133.52	6.31
	Total Agriculture	52.96	17.71	0.62	0.35	23.22	5.83	0.97	0.39	2.49	0.49	29.10	13.96	32.48	18.24	0.00	0.00	141.84	6.70
SETTLEMENTS	Urban Settlement	0.00	0.00	31.96	17.85	2.28	0.57	27.19	10.89	60.90	11.94	0.00	0.00	0.00	0.00	0.00	0.00	122.33	5.78
	Rural Settlement	8.28	2.77	0.00	0.00	6.50	1.63	16.25	6.51	0.00	0.00	0.24	0.12	1.91	1.07	0.00	0.00	33.18	1.57
	Industrial Settlement	2.27	0.76	2.07	1.16	3.42	0.86	8.65	3.46	20.56	4.03	0.87	0.42	0.77	0.43	0.00	0.00	38.61	1.83
	Total Settlements	10.55	3.53	34.03	19.01	12.20	3.07	52.09	20.86	81.46	15.97	1.11	0.53	2.68	1.51	0.00	0.00	194.12	9.18
	Grand Total	298.96	100.00	179.05	100.00	398.00	100.00	249.72	100.00	510.00	100.00	208.47	100.00	178.06	100.00	93.34	100.00	2115.60	100.00

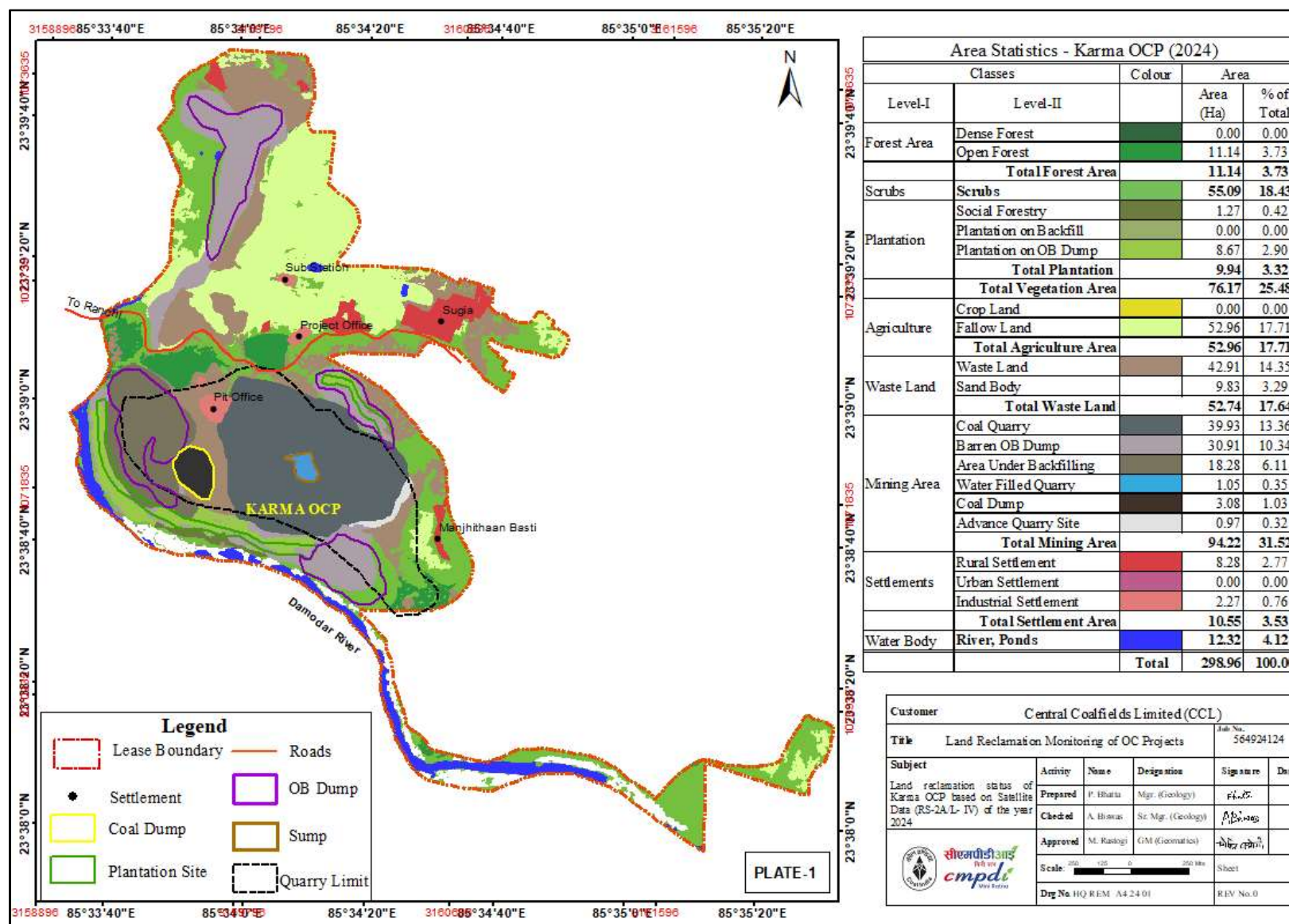


Plate 9.1: Land Use/Cover map of Karma OCP



Plate 9.2: Land Use/Cover map of Jarangdih OCP

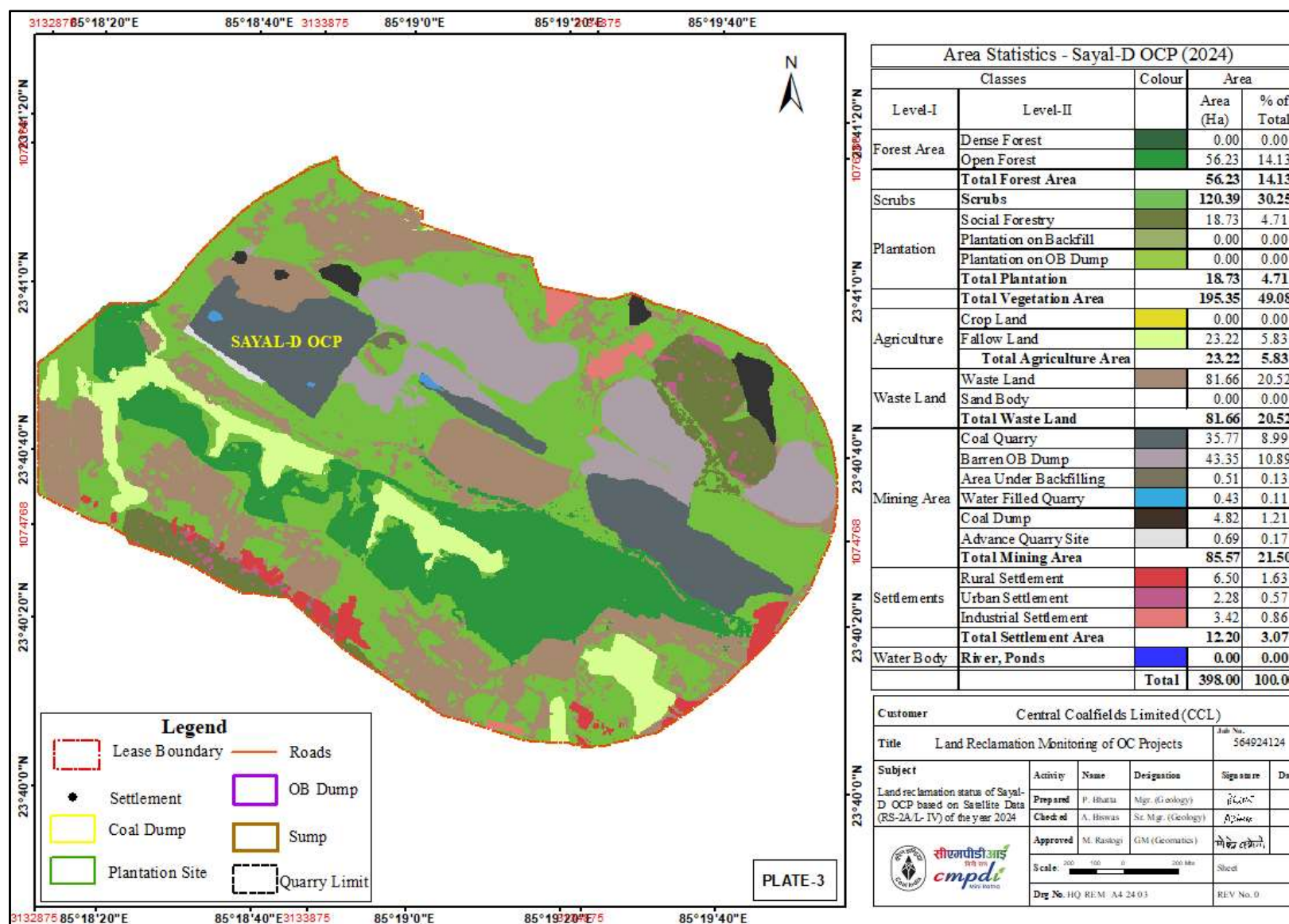
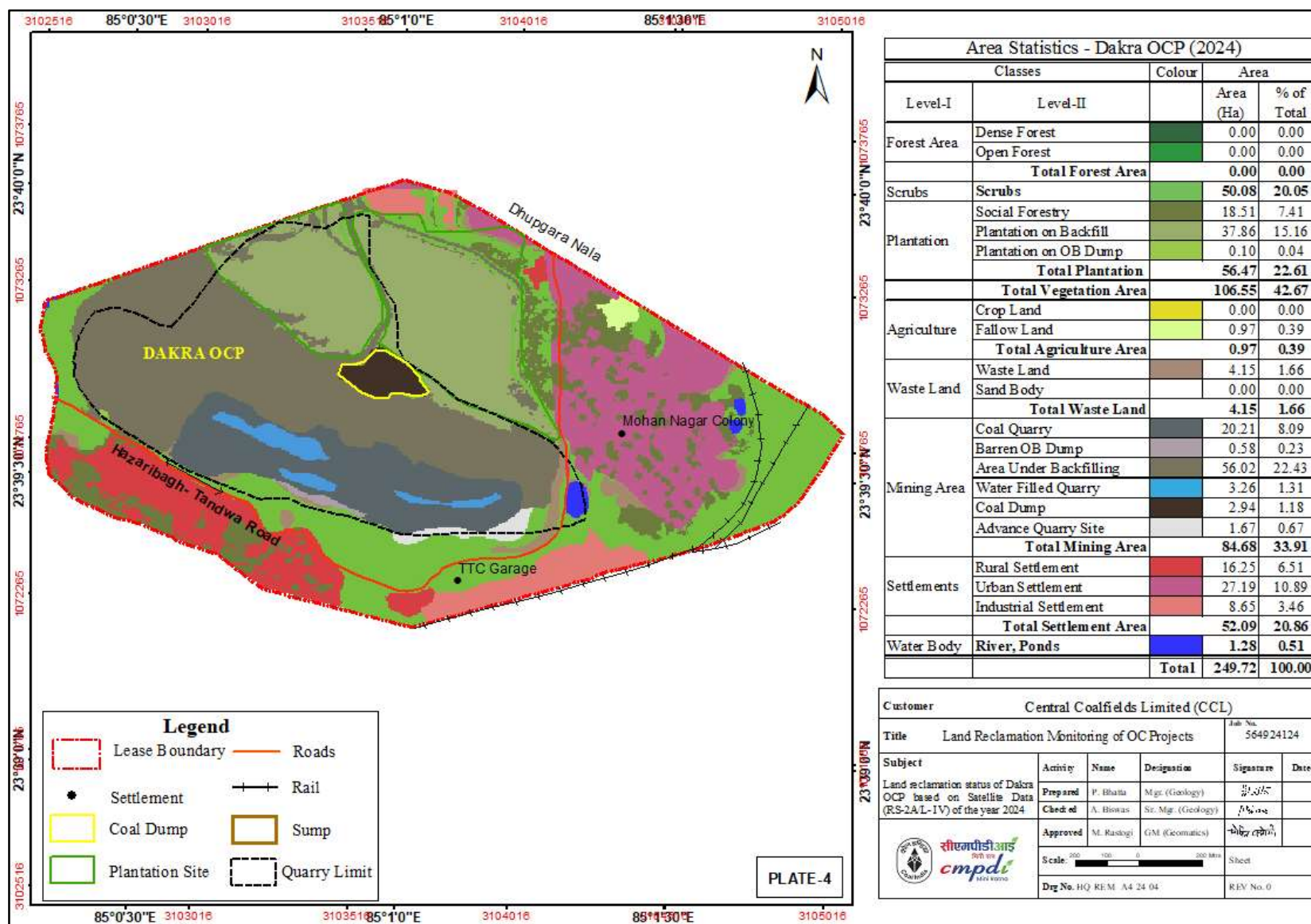


Plate 9.3: Land Use/Cover map of Sayal-D OCP



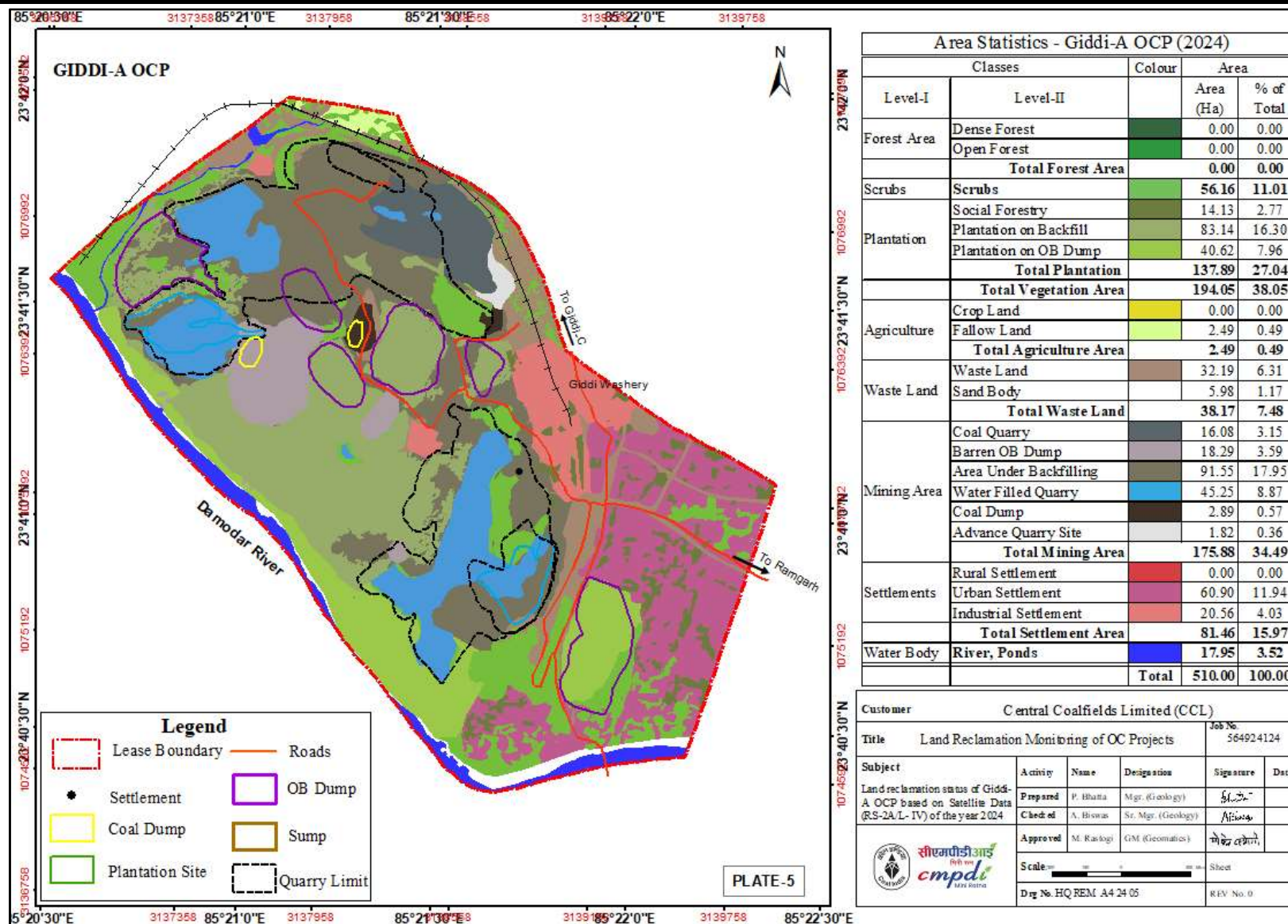


Plate 9.5: Land Use/Cover map of Giddi-A OCP

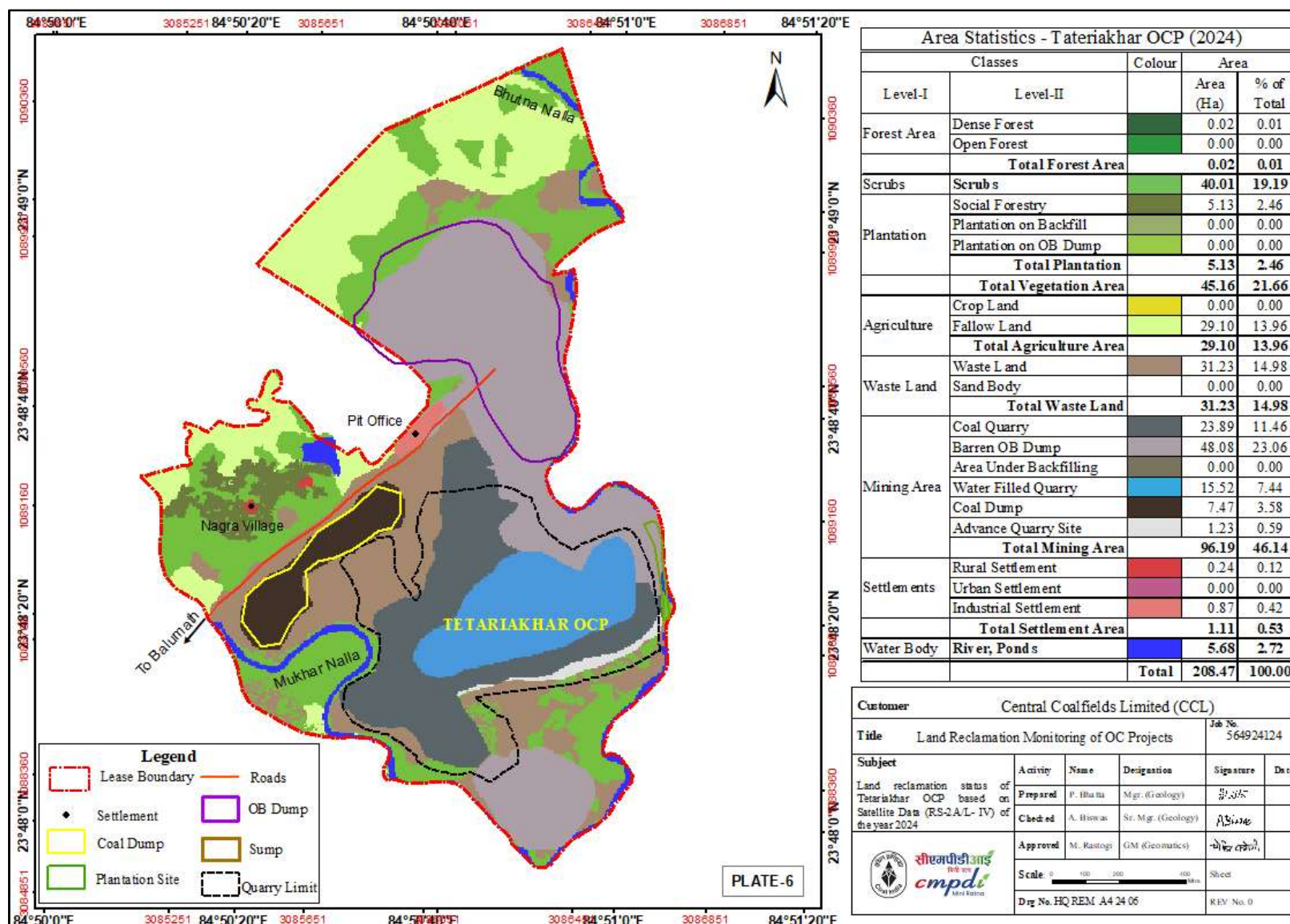


Plate 9.6: Land Use/Cover map of Tetariakhar OCP

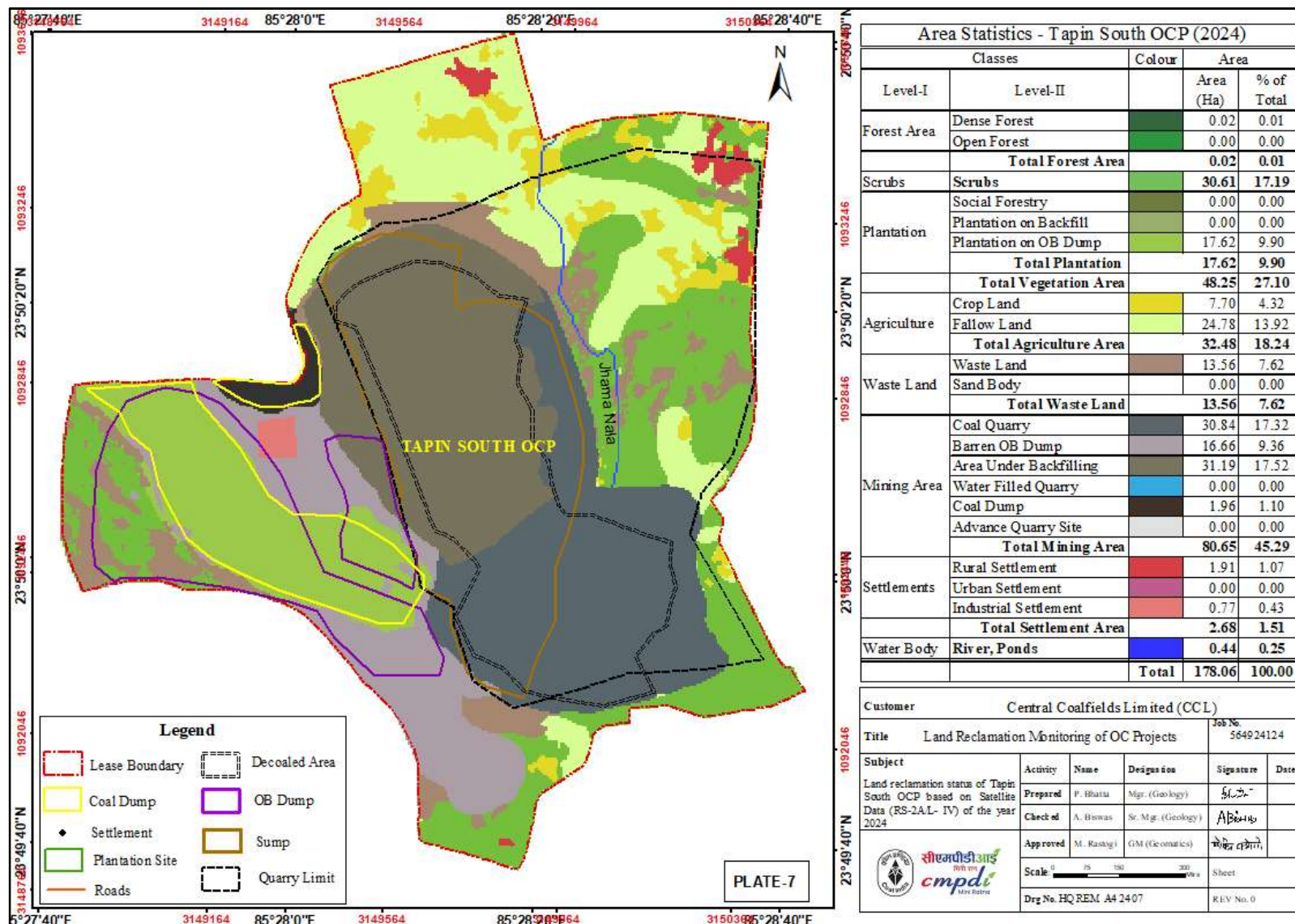


Plate 9.7: Land Use/Cover map of Tapin South OCP

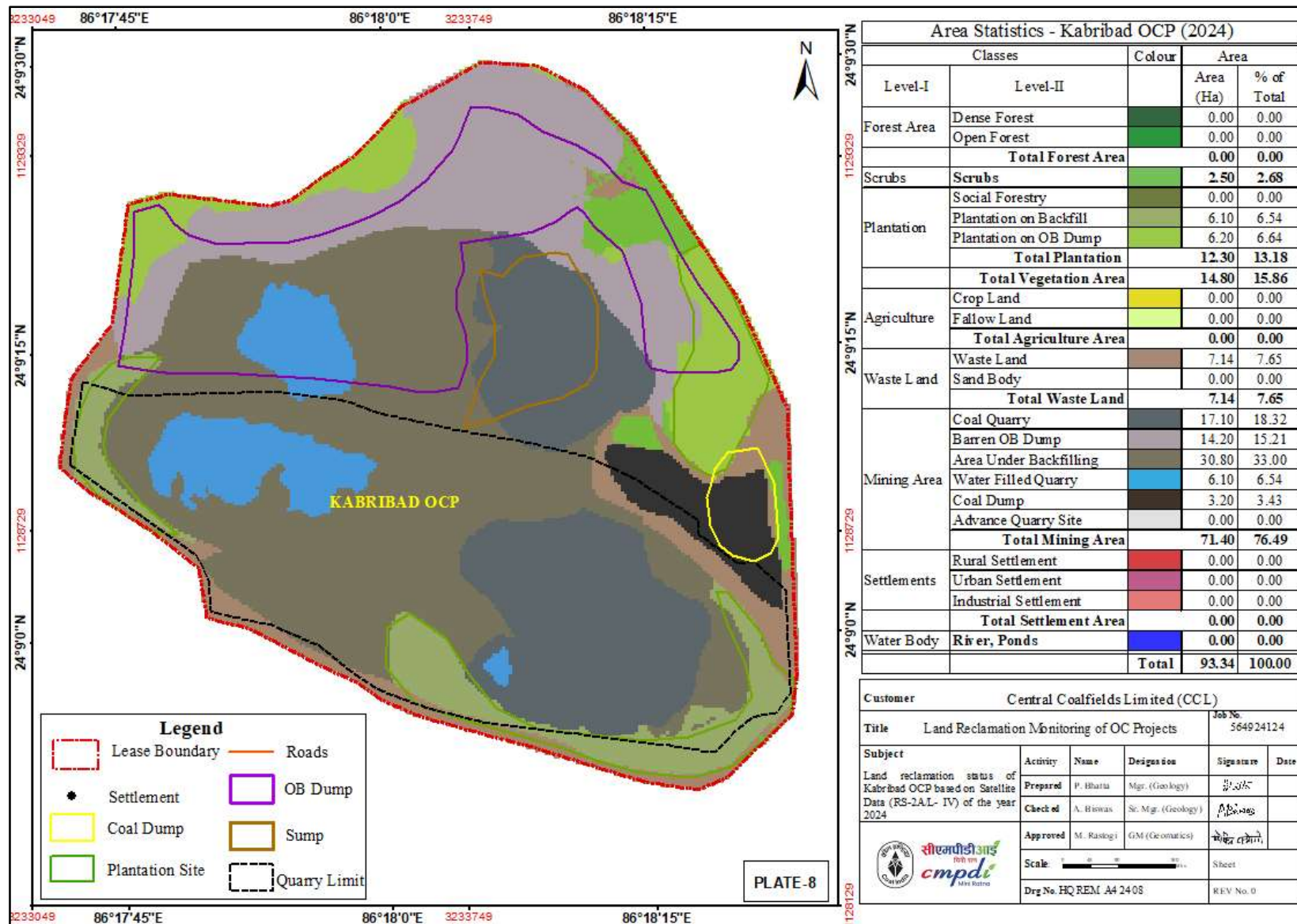


Plate 9.8: Land Use/Cover map of Kabribad OCP

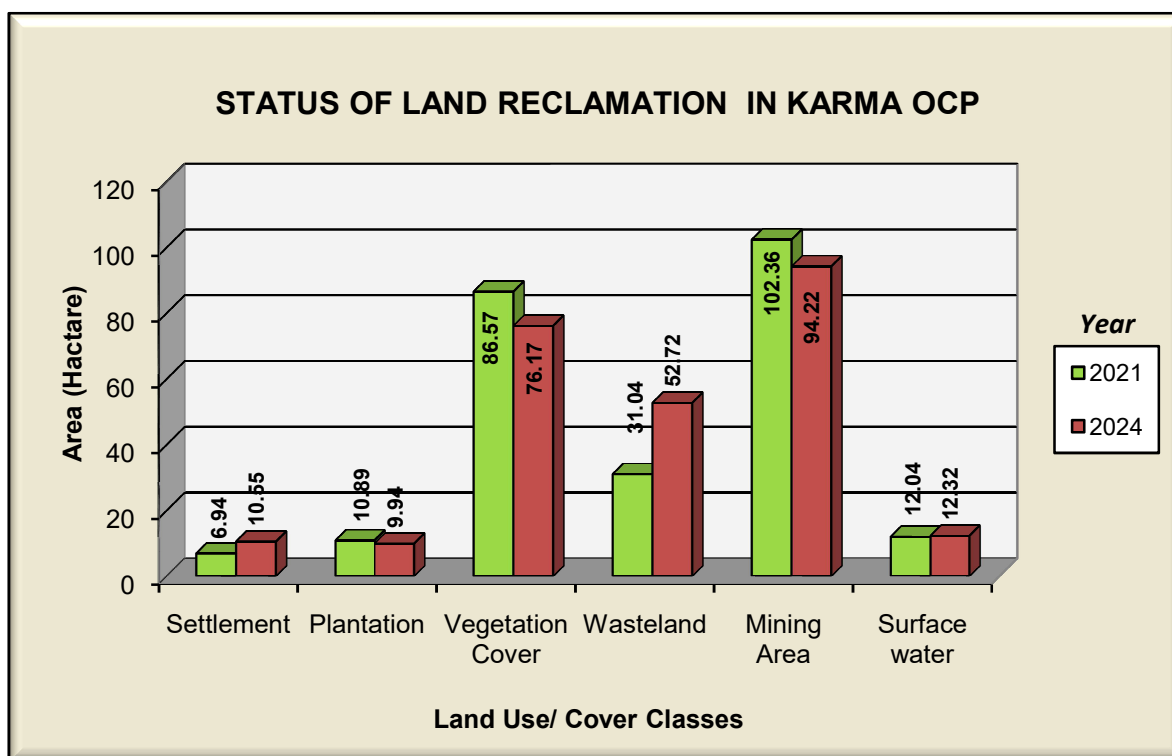


Chart 9.2: Status of Land Reclamation in Karma OCP

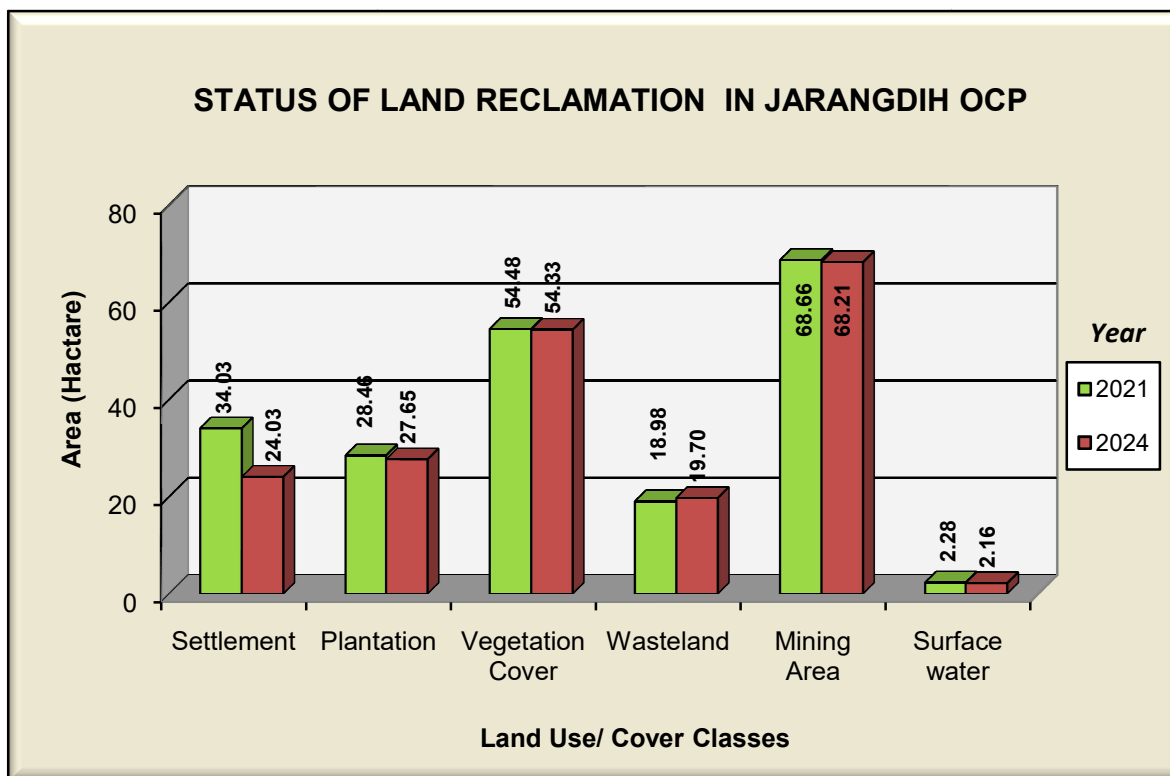


Chart 9.3: Status of Land Reclamation in Jarangdih OCP

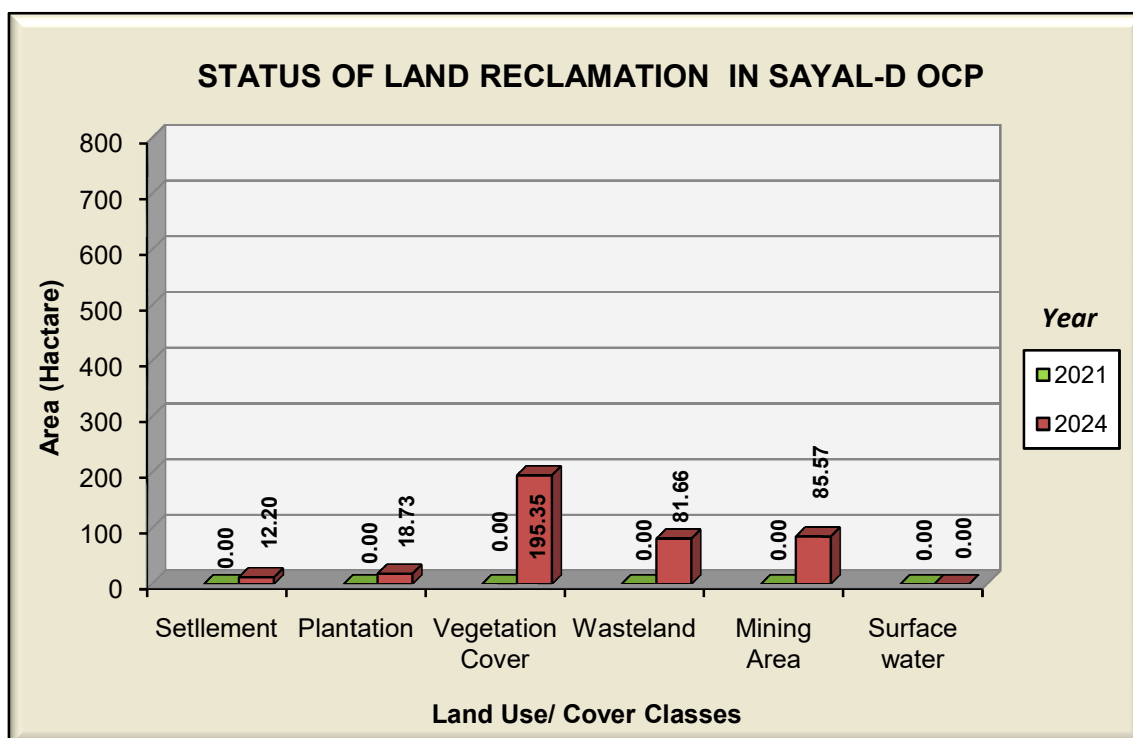


Chart 9.4: Status of Land Reclamation in Sayal-D OCP

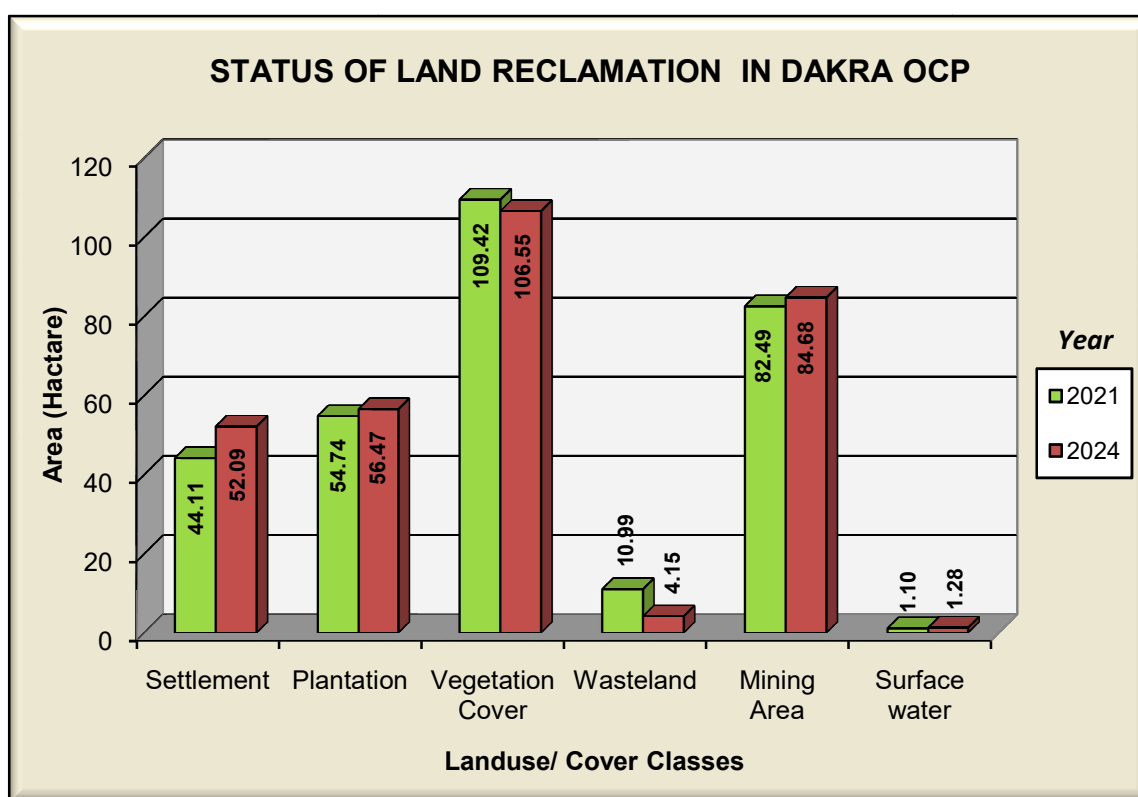


Chart 9.5: Status of Land Reclamation in Dakra OCP

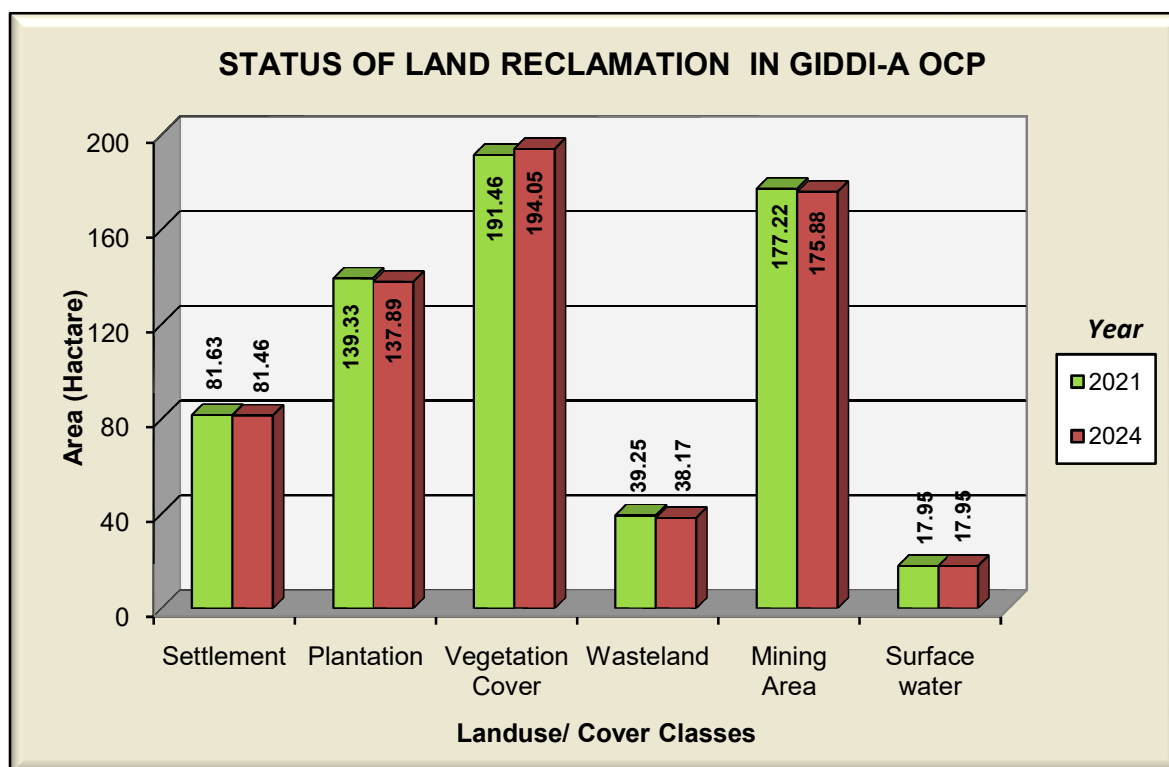


Chart 9.6: Status of Land Reclamation in Giddi-A OCP

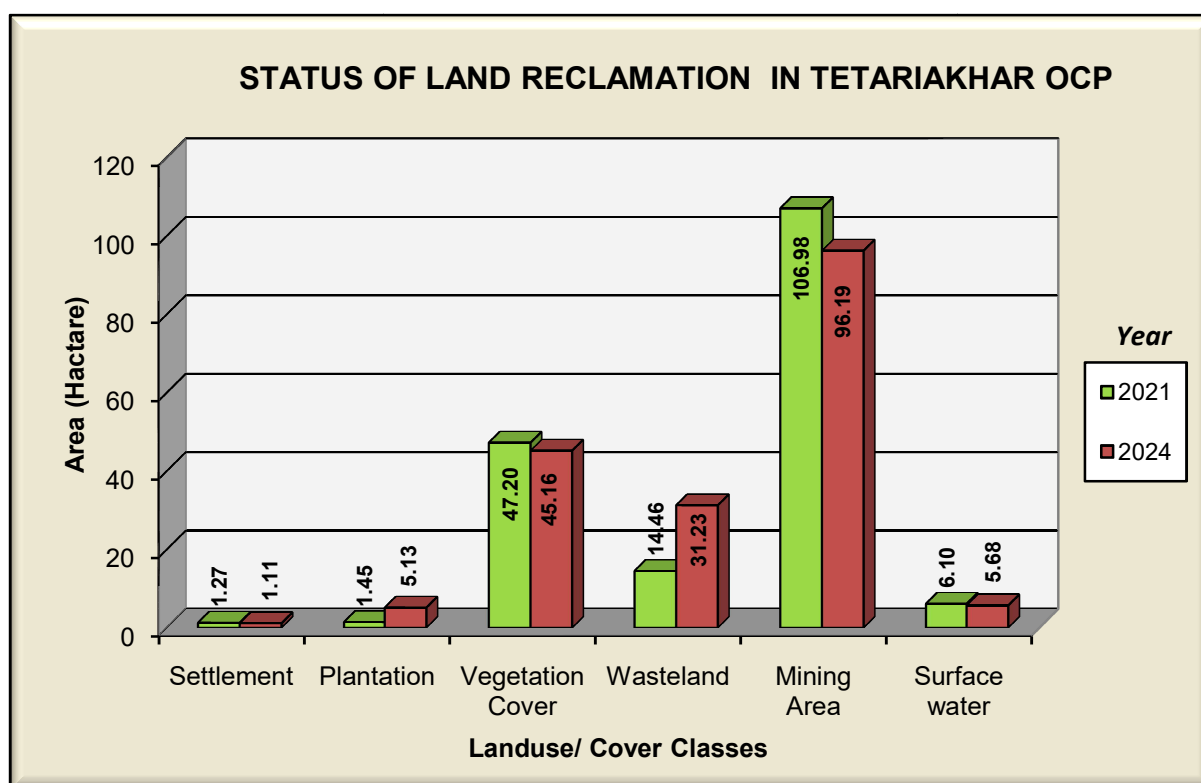


Chart 9.7: Status of Land Reclamation in Tetariakhar OCP

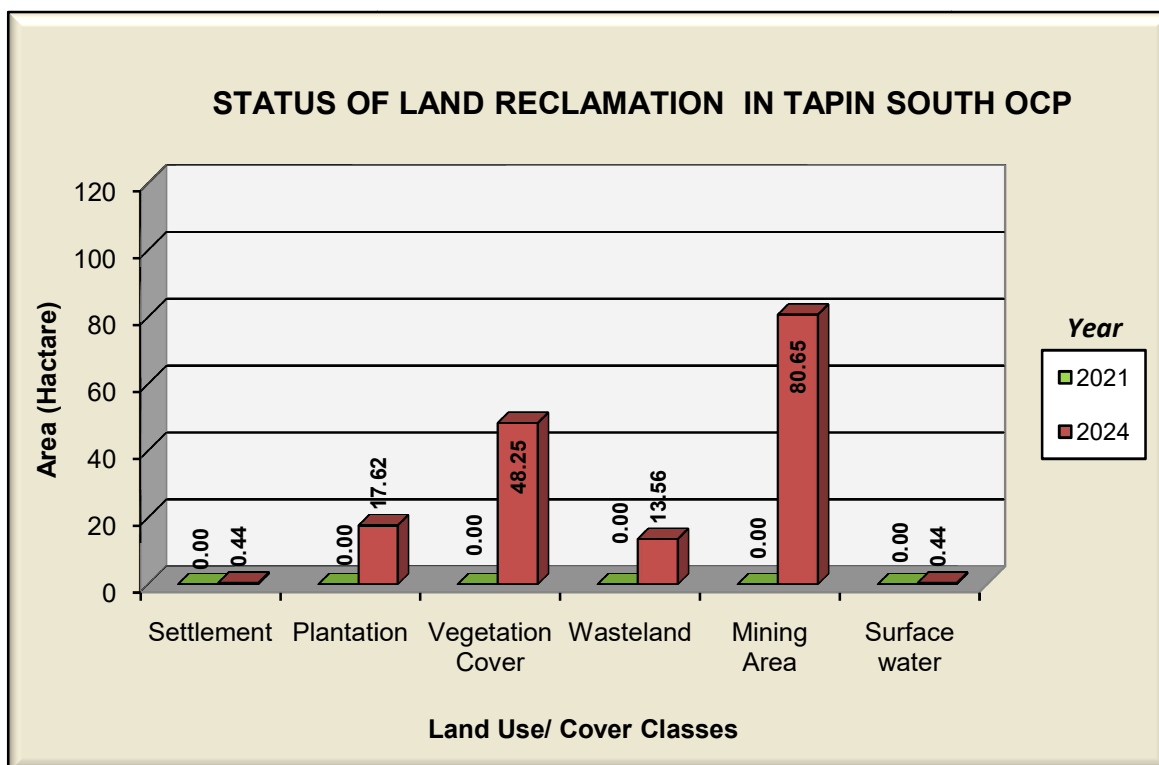


Chart 9.8: Status of Land Reclamation in Tapin South OCP

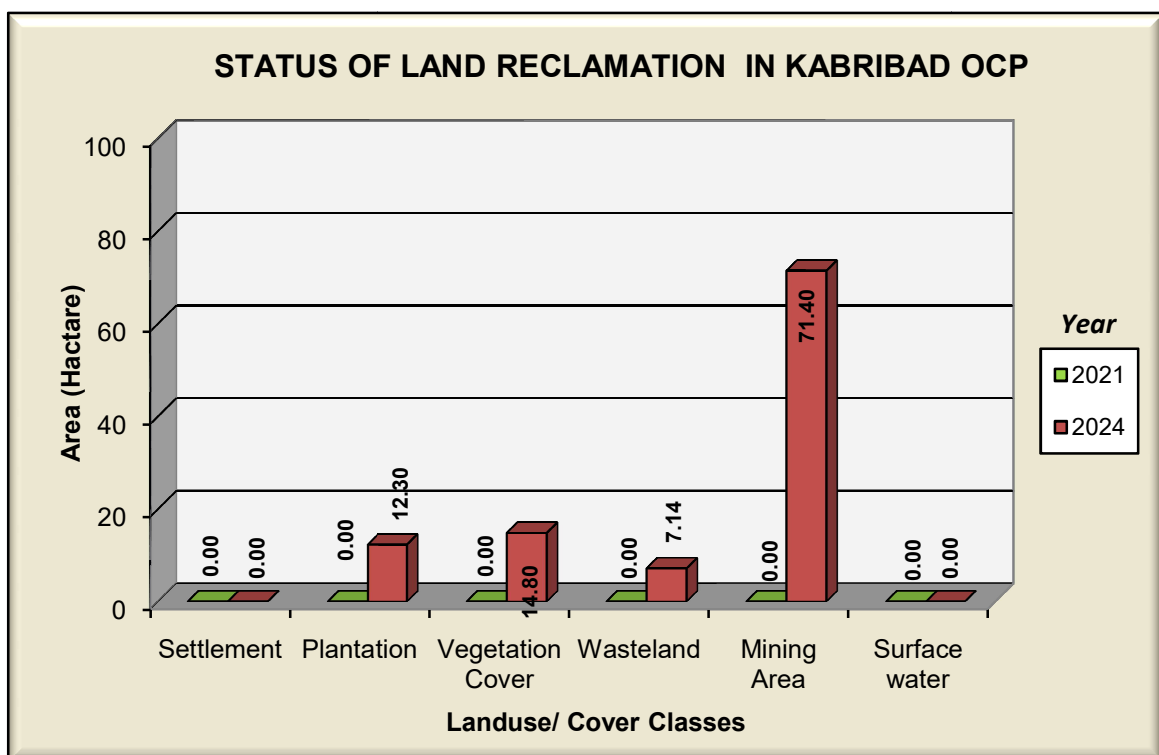


Chart 9.9: Status of Land Reclamation in Kabribad OCP



Photo 9.1: Plantation on Backfill at Dakra OCP



Photo 9.2: Plantation on Backfill at Jarangdih OCP



Photo 9.3: Green cover around Quarry No. 1 of Giddi-A OCP



Photo 9.4: Fruit bearing plants at Kabribad OCP



Photo 9.5: Plantation on dump site at Karma OCP



Photo 9.6: Initial Plantation at Tetariakhar OCP

EASTERN COALFIELDS LIMITED

10. Land Reclamation Status in Eastern Coalfields Ltd.

10.1 In ECL, there are a total of twelve clusters of mines. Following four clusters of mines comprising both underground and OC projects and Kalidaspur project producing less than 5 million cubic m.(Coal+OB together)of Eastern Coalfields Ltd. were taken up for land reclamation monitoringbased on satellite data in the year 2024-25,on once in three-year basis.

- Cluster5:(Parbelia UG & OC, Dubeshwari UG& OC)
- Cluster6:(DhemomainUG,Sodepur UG & OC, Narsamuda UG, Patmohana UG & OC Patch, Chinakuri I UG,Chinakuri III UG & OC Patch, BejidiUG, Methani UG &OC Patch, Sheetalpur UG)
- Cluster 7: (Barmondia UG, Chakballavpur UG, Manoharbahal UG, Bhanora West UG & OCP
- Cluster8: (Bhanora UG& OC, Girmint /KDI Incline UG, Sirpur UG, Sirpur Seam Incline UG& OC,Ningah UG, Mithapur West UG, SatgramUG)
- Kalidaspur OC

10.2 All the above four clusters were mapped during the year 2021 and 2024, for assessing the changes in land use classes and monitoring the progress of land reclamation.

10.3 Kalidaspur Project has been included from this year for land reclamation monitoring

10.4 Project wise Land Reclamation status in ECL for the year 2024 is given in Table-10.1 and shown graphically in Chart 10.1Area statistics of different land classes present in OC projects for the year 2024is given in Table 10.2. Land use/ cover maps derived using the satellite data are given in Plate no. 10.1 & 10.5. Changes in land use status are shown in Fig. 10.2 & 10.6.

10.5 Study reveals that majority of the mines under the four clusters considered for monitoring are underground mines. It is seen that till monitoring time in the year 2024, 55.07% of total excavated areas are under active mining and remaining 44.93% is under technical reclamation. Social forestry/ plantation covers an area of 5.07% of the total leasehold area of the four clusters and one project.

Table 10.1: Summarized Land Reclamation Status in ECL

Summarized Land Reclamation Status in Opencast Projects of ECL based on Satellite Data of the year 2024

Sl. No.	Cluster No.	Total Leasehold Area		Technical Reclamation		Plantation						Area under Active Mining		Total Excavated Area		Total Area under Plantation (% Green Cover Generated in Leasehold)		Total Area under Reclamation	
						Biological Reclamation		Other Plantations											
				Area under Backfilling		Plantation on Excavated / Backfilled Area		Plantation on External OB Dumps		Social Forestry, Avaneue Plantation Etc.									
1	2	3		4		5		6		7		8		9 (=4+5+8)		10 (=5+6+7)		11(=4+5)	
		2021	2024	2021	2024	2021	2024	2021	2024	2021	2024	2021	2024	2021	2024	2021	2024	2021	2024
1	Cluster 5	2970.00	2970.00	0.00	0.00	0.00	0.00	0.00	0.00	123.00	123.00	0.00	0.00	0.00	0.00	123.00	123.00	0.00	0.00
				0.00%	0.00%	0.00%	0.00%					0.00%	0.00%			4.14%	4.14%	0.00%	0.00%
2	Cluster 6	4775.00	4775.00	0.00	2.00	0.00	0.00	0.00	0.00	520.00	520.00	2.00	0.00	2.00	2.00	520.00	520.00	0.00	2.00
				0.00%	100.00%	0.00%	0.00%					100.00%	0.00%			10.89%	10.89%	0.00%	100.00%
3	Cluster 7	2313.00	2313.00	24.00	24.00	0.00	0.00	0.00	0.00	140.00	100.00	26.00	26.00	50.00	50.00	140.00	100.00	24.00	24.00
				48.00%	48.00%	0.00%	0.00%					52.00%	52.00%			6.05%	4.32%	48.00%	48.00%
4	Cluster 8	8281.00	8281.00	0.00	0.00	0.00	0.00	0.00	0.00	205.00	205.00	0.00	0.00	0.00	0.00	205.00	205.00	0.00	0.00
				0.00%	0.00%	0.00%	0.00%					0.00%	0.00%			2.48%	2.48%	0.00%	0.00%
5	Kalidaspur	-	600.00	-	5.00	-	0.00	-	0.00	-	13.00	-	12.00	-	17.00	-	13.00	-	5.00
				-	29.41%	-	0.00%					-	70.59%			-	2.17%	-	29.41%
	TOTAL (A)	18339.00	18939.00	24.00	31.00	0.00	0.00	0.00	0.00	988.00	961.00	28.00	38.00	52.00	69.00	988.00	961.00	24.00	31.00
				46.15%	44.93%	0.00%	0.00%					53.85%	55.07%			5.39%	5.07%	46.15%	44.93%

Note: In reference to the above Table-1, different parameters are classified as follows:

1. Area under **Biological Reclamation** includes Area under Plantation done on Backfilled Area only.
2. Area under **Technical Reclamation** includes Area under Barren Backfilling only.
3. Area under **Active Mining** includes Coal Quarry, Advance Quarry Site, Quarry Filled with Water, if any. Coal Dump is excluded from Active Mining Area.
4. Social Forestry and Plantation on External OB Dumps are not included in Biological Reclamation and are put under separate categories as shown in the Table above.
5. (%) calculated in the above Table is in respect to Total Excavated Area except for "Total Area under Plantation" where % is in terms of "Leasehold Area".

Table 10.1.1: Composite Land Reclamation Status in remaining 8 Clusters (Underground + Opencast Mines) & 3 OCPs of ECL as per clause 2.(ii) of the received work order from CIL.

(Area in Hectare)

SL.No.	Cluster No.	Total Leasehold Area		Technical Reclamation		Plantation						Area under Active Mining	Total Excavated Area	Total Area under Plantation (% Green Cover Generated in Leasehold)		Total Area under Reclamation			
						Biological	Other Plantations												
						Plantation on Excavated / Backfilled Area	Plantation on External OB Dumps	Social Forestry, Avamue Plantation Etc.											
1	2	3		4		5		6		7		8		9 (=4+5+8)		10 (=5+6+7)		11(=4+5)	
		2020	2023	2020	2023	2020	2023	2020	2023	2020	2023	2020	2023	2020	2023	2020	2023	2020	2023
6	Cluster 1	3692.00	3692.00	90.00	110.00	60.00	60.00	148.00	152.00	87.00	87.00	74.00	83.00	224.00	253.00	295.00	299.00	150.00	170.00
				40.18%	43.48%	26.79%	23.72%					33.04%	32.81%			7.99%	8.10%	66.96%	67.19%
7	Cluster 2	1018.00	1018.00	48.00	50.00	35.00	37.00	17.00	19.00	37.00	37.00	29.00	24.00	112.00	111.00	89.00	93.00	83.00	87.00
				42.86%	45.05%	31.25%	33.33%					25.89%	21.62%			8.74%	9.14%	74.11%	78.38%
8	Cluster 3	1628.00	1628.00	48.00	63.00	0.00	0.00	6.00	6.00	90.00	87.00	49.00	49.00	97.00	112.00	96.00	93.00	48.00	63.00
				49.48%	56.25%	0.00%	0.00%					50.52%	43.75%			5.90%	5.71%	49.48%	56.25%
9	Cluster 4	2721.00	2721.00	1.00	29.00	1.00	1.00	23.00	23.00	30.00	30.00	55.00	44.00	57.00	74.00	54.00	54.00	2.00	30.00
				1.75%	39.19%	1.75%	1.35%					96.49%	59.46%			1.98%	1.98%	3.51%	40.54%
10	Chitra East	714.00	714.00	31.81	47.13	0.00	0.00	14.90	14.90	27.99	27.00	77.74	70.86	109.55	117.99	42.89	41.90	31.81	47.13
				29.04%	39.94%	0.00%	0.00%					70.96%	60.06%			6.01%	5.87%	29.04%	39.94%
11	Mohanpur	164.91	397.00	22.00	29.60	0.00	0.00	11.00	12.50	6.00	0.60	18.00	43.00	40.00	72.60	17.00	13.10	22.00	29.60
				55.00%	40.77%	0.00%	0.00%					45.00%	59.23%			10.31%	3.30%	55.00%	40.77%
12	Hurra C	946.00	946.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.00	0.00	6.00	0.00	0.00	0.00	0.00
				0.00%	0.00%	0.00%	0.00%					0.00%	100.00%			0.00%	0.00%	0.00%	0.00%
	TOTAL (B)	10883.91	11116.00	240.81	328.73	96.00	98.00	219.90	227.40	277.99	268.60	302.74	319.86	639.55	746.59	593.89	594.00	336.81	426.73
				37.65%	44.03%	15.01%	13.13%					47.34%	42.84%			5.46%	5.34%	52.66%	57.16%
		2019	2022	2019	2022	2019	2022	2019	2022	2019	2022	2019	2022	2019	2022	2019	2022	2019	2022
13	Cluster 9	7145.00	7145.00	56.00	62.00	8.00	9.00	17.00	17.00	292.00	310.00	71.00	76.00	135.00	147.00	317.00	336.00	64.00	71.00
				41.48%	42.18%	5.93%	6.12%					52.59%	51.70%			4.44%	4.70%	47.41%	48.30%
14	Cluster 10	5979.00	5979.00	60.00	112.00	0.00	0.00	30.00	38.00	405.00	402.00	61.00	88.50	121.00	200.50	435.00	440.00	60.00	112.00
				49.59%	55.86%	0.00%	0.00%					50.41%	44.14%			7.28%	7.36%	49.59%	55.86%
15	Cluster 11	4218.00	4218.00	55.00	64.50	60.00	65.00	4.00	5.00	154.00	159.00	42.00	53.80	157.00	183.30	218.00	229.00	115.00	129.50
				35.03%	35.19%	38.22%	35.46%					26.75%	29.35%			5.17%	5.43%	73.25%	70.65%
16	Cluster 12	12736.00	12736.00	615.00	715.25	118.00	125.10	49.00	121.20	409.00	432.80	426.00	430.64	1159.00	1270.99	576.00	679.10	733.00	840.35
				53.06%	56.28%	10.18%	9.84%					36.76%	33.88%			4.52%	5.33%	63.24%	66.12%
	TOTAL (C)	30078.00	30078.00	786.00	953.75	186.00	199.10	100.00	181.20	1260.00	1303.80	600.00	648.94	1572.00	1801.79	1546.00	1684.10	972.00	1152.85
				50.00%	52.93%	11.83%	11.05%					38.17%	36.02%			5.14%	5.60%	61.83%	63.98%
*GRAND TOTAL (A+B+C)		59300.91	60133.00	1050.81	1313.48	282.00	297.10	319.90	408.60	2525.99	2533.40	930.74	1006.80	2263.55	2617.38	3127.89	3239.10	1332.81	1610.58
				46.42%	50.18%	12.46%	11.35%					41.12%	38.47%			5.27%	5.39%	58.88%	61.53%
*Grand Total (A+B+C) is the composite value of all 12 clusters & 4 mines of ECL covered in 3 years cycle of Land Reclamation Monitoring														% is calculated with respect to Excavated Area as applicable					

***Grand Total (A+B+C) is the composite value of all 12 clusters & 4 mines of ECL covered in 3 years cycle of Land Reclamation Monitoring (% is calculated with respect to Excavated Area as applicable)**

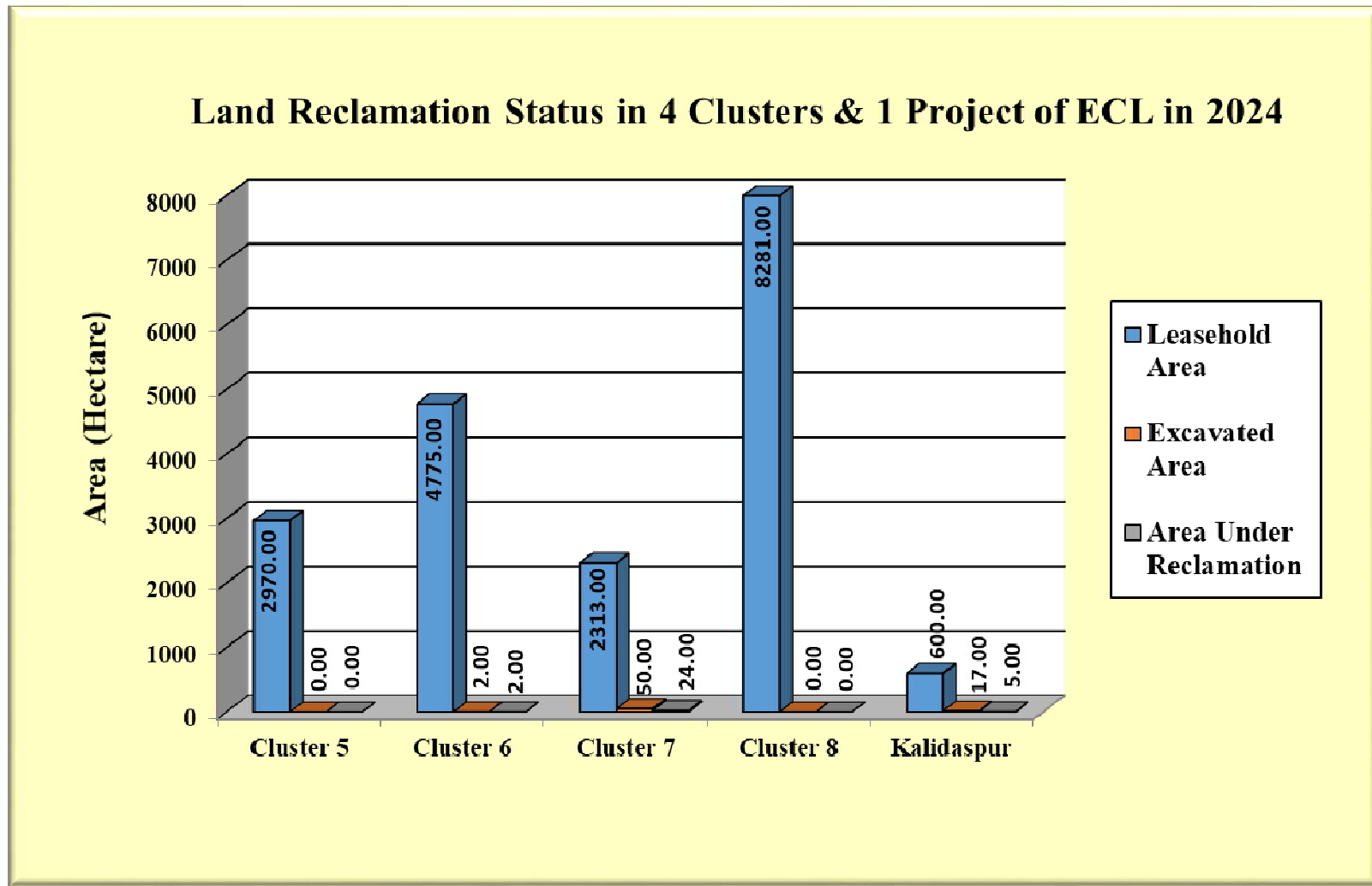


Chart 10.1: Bar Chart showing Land Reclamation Status in ECL

Table 10.2: Project-wise Land Reclamation Status in Opencast Projects of ECL (2024)

		CLUSTER 5		CLUSTER 6		CLUSTER 7		CLUSTER 8		KALIDASPUR		TOTAL	
		Area	%	Area	%	Area	%	Area	%	Area	%	Area	%
FORESTS	Dense Forest	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Open Forest	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Total Forest (A)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SCRUBS	Scrubs (B)	775.00	26.09	421.00	8.82	230.00	9.94	820.00	9.90	192.00	32.00	2438.00	12.87
PLANTATION	Social Forestry/Avenue Plantation	123.00	4.14	520.00	10.89	100.00	4.32	205.00	2.48	13.00	2.17	961.00	5.07
	Plantation on OB Dump	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Plantation on Backfill (Biological Reclamation)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Total Plantation (C)	123.00	4.14	520.00	10.89	100.00	4.32	205.00	2.48	13.00	2.17	961.00	5.07
	Total Vegetation (A+B+C)	898.00	30.24	941.00	19.71	330.00	14.27	1025.00	12.38	205.00	34.17	3399.00	17.95
ACTIVE MINING	Coal Dump	0.00	0.00	0.00	0.00	1.00	0.04	0.00	0.00	0.00	0.00	1.00	0.01
	Coal Quarry	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Advance Quarry Site	0.00	0.00	0.00	0.00	2.00	0.09	0.00	0.00	0.00	0.00	2.00	0.01
	Quarry Filled With Water	0.00	0.00	0.00	0.00	24.00	1.04	0.00	0.00	12.00	2.00	36.00	0.19
	Total Area under Active Mining	0.00	0.00	0.00	0.00	26.00	1.12	0.00	0.00	12.00	2.00	38.00	0.20
	Barren OB Dump	0.00	0.00	2.00	0.04	37.00	1.60	0.00	0.00	15.00	2.50	54.00	0.29
RECLAIMED	Area Under Backfilling (Technical Reclamation)	0.00	0.00	2.00	0.04	24.00	1.04	0.00	0.00	5.00	0.83	31.00	0.16
	Total Area under Mine Operation	0.00	0.00	4.00	0.08	88.00	3.80	0.00	0.00	32.00	5.33	124.00	0.65
WASTELAND	Waste Lands	72.00	2.42	145.00	3.04	72.00	3.11	405.00	4.89	18.00	3.00	712.00	3.76
	Fly Ash Pond / Sand Body	1.00	0.03	1.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	2.00	0.01
	Total Wasteland	73.00	2.46	146.00	3.06	72.00	3.11	405.00	4.89	18.00	3.00	714.00	3.77
WATERBODIES	Reservoir, Nallah, Ponds	52.00	1.75	106.00	2.22	54.00	2.33	322.00	3.89	10.00	1.67	544.00	2.87
	Total Waterbodies	52.00	1.75	106.00	2.22	54.00	2.33	322.00	3.89	10.00	1.67	544.00	2.87
AGRICULTURE	Crop Lands	294.00	9.90	803.00	16.82	542.00	23.43	2289.00	27.64	81.00	13.50	4009.00	21.17
	Fallow Lands	1423.00	47.91	1850.00	38.74	976.00	42.20	3283.00	39.64	232.00	38.67	7764.00	40.99
	Total Agriculture	1717.00	57.81	2653.00	55.56	1518.00	65.63	5572.00	67.29	313.00	52.17	11773.00	62.16
SETTLEMENTS	Urban Settlement	92.00	3.10	769.00	16.10	154.00	6.66	679.00	8.20	0.00	0.00	1694.00	8.94
	Rural Settlement	107.00	3.60	80.00	1.68	73.00	3.16	190.00	2.29	22.00	3.67	472.00	2.49
	Industrial Settlement	31.00	1.04	76.00	1.59	24.00	1.04	88.00	1.06	0.00	0.00	219.00	1.16
	Total Settlements	230.00	7.74	925.00	19.37	251.00	10.85	957.00	11.56	22.00	3.67	2385.00	12.59
	Grand Total	2970.00	100.00	4775.00	100.00	2313.00	100.00	8281.00	100.00	600.00	100.00	18939.00	100.00

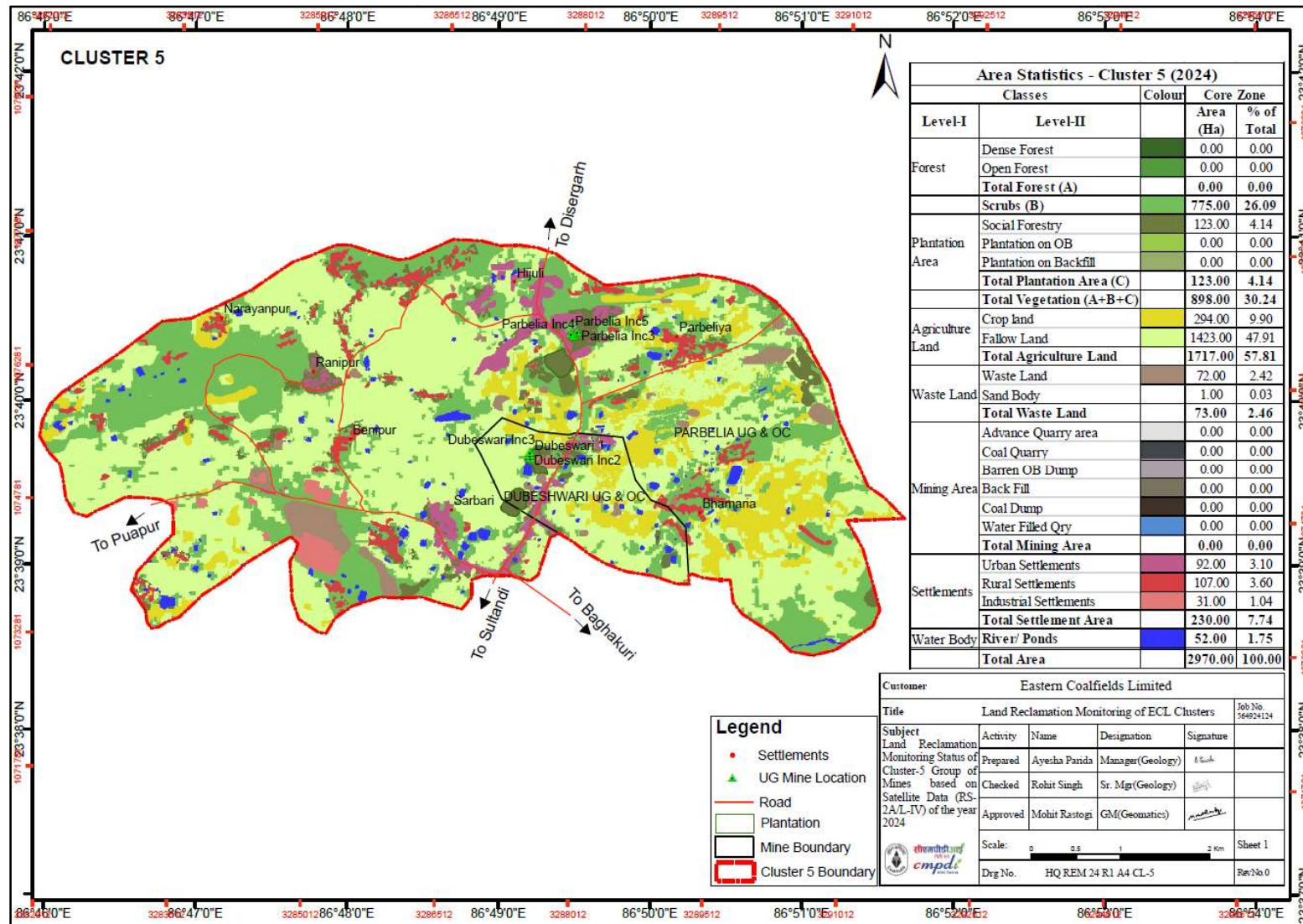


Plate 10.1: Land Use/Cover map of Cluster 5

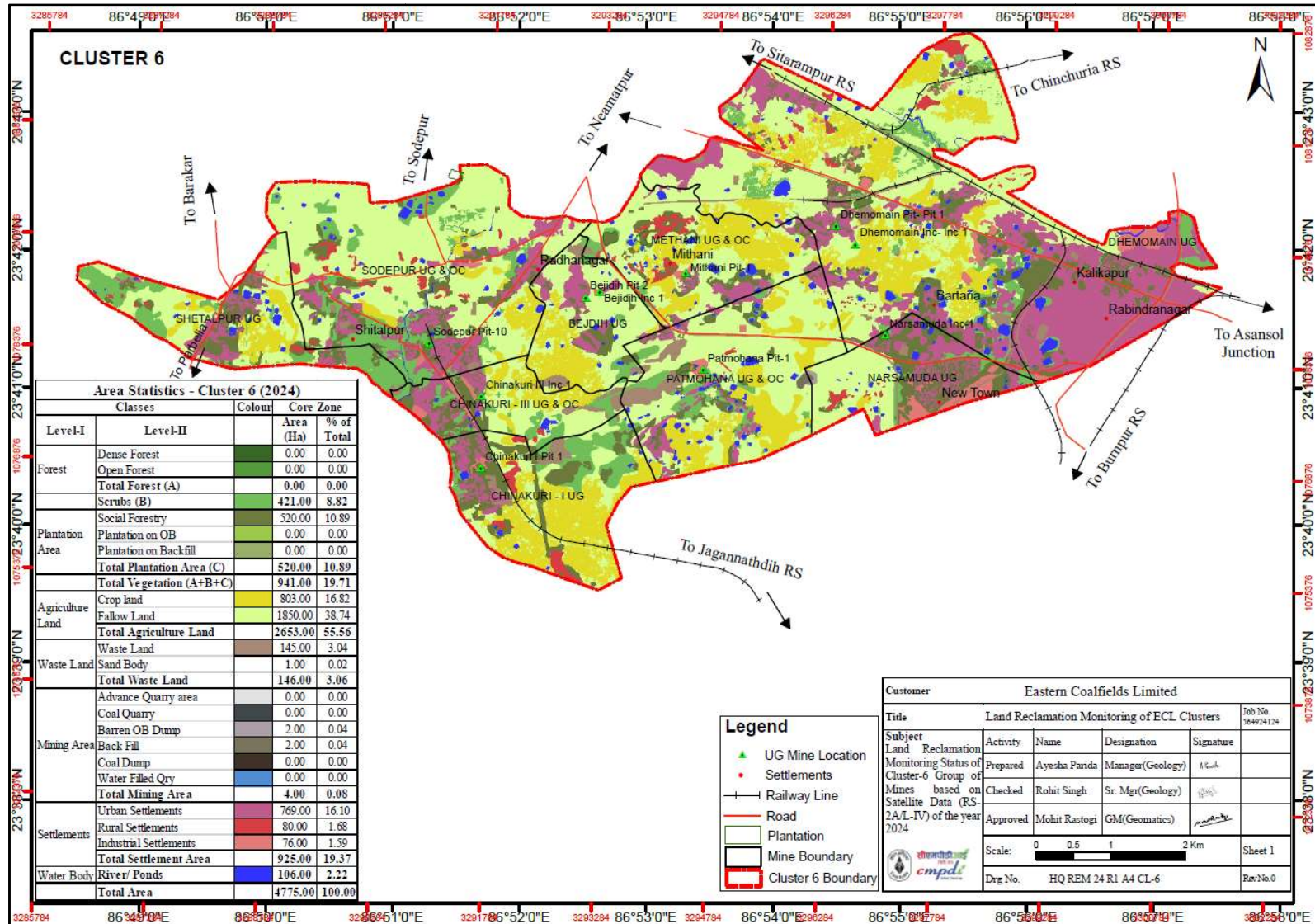


Plate 10.2: Land Use/Cover map of Cluster 6

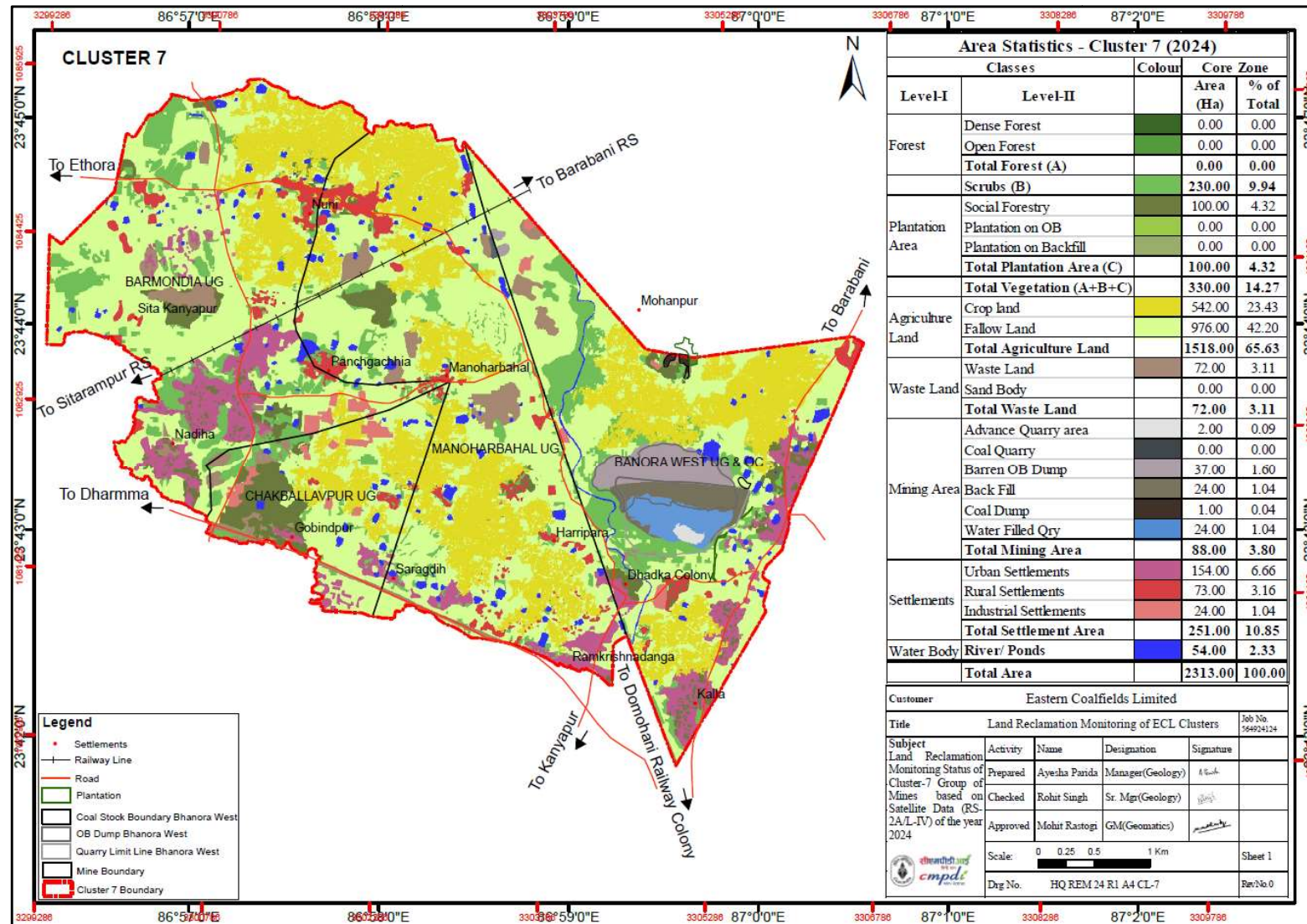


Plate 10.3: Land Use/Cover map of Cluster 7

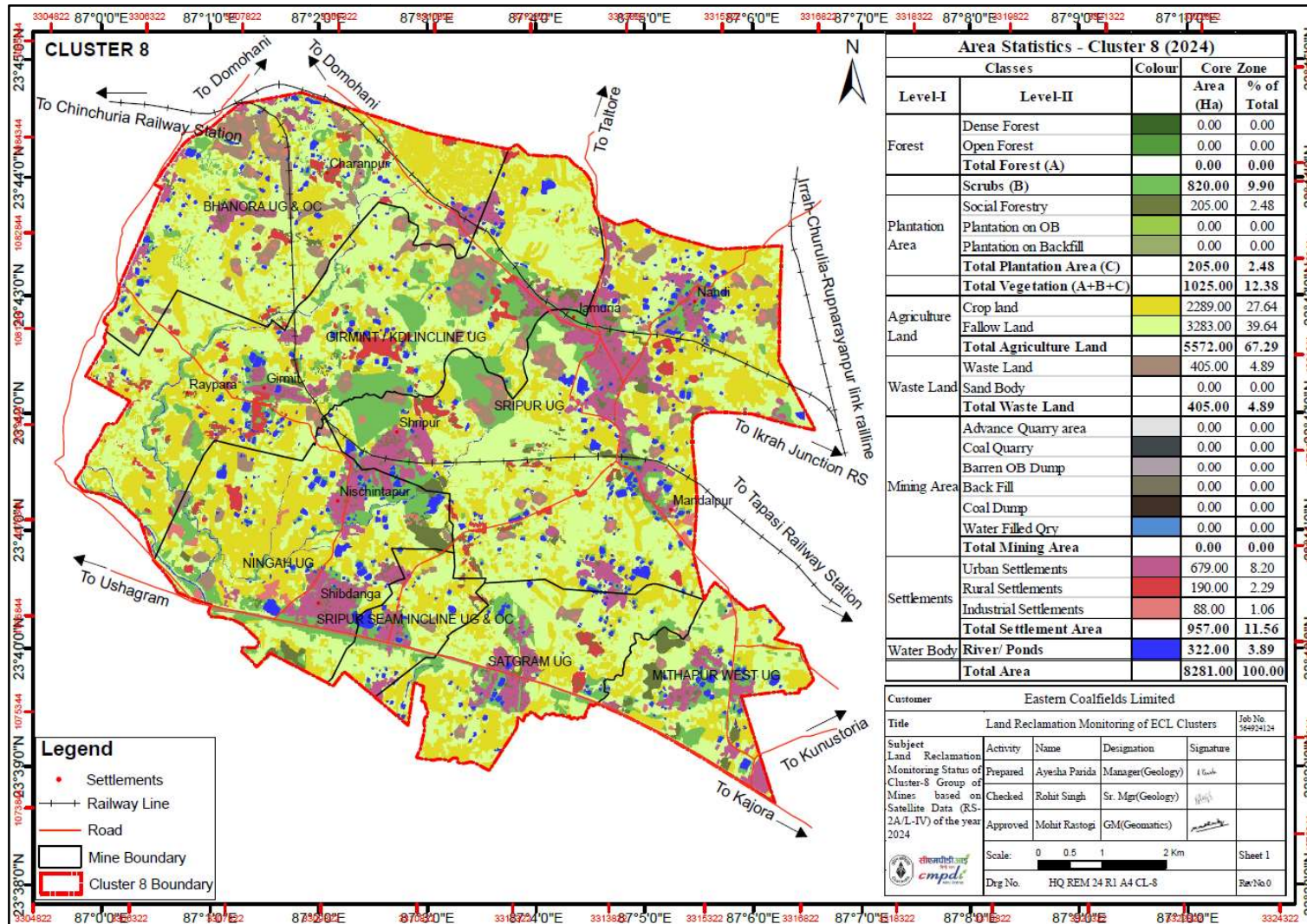


Plate 10.4: Land Use/Cover map of Cluster 8

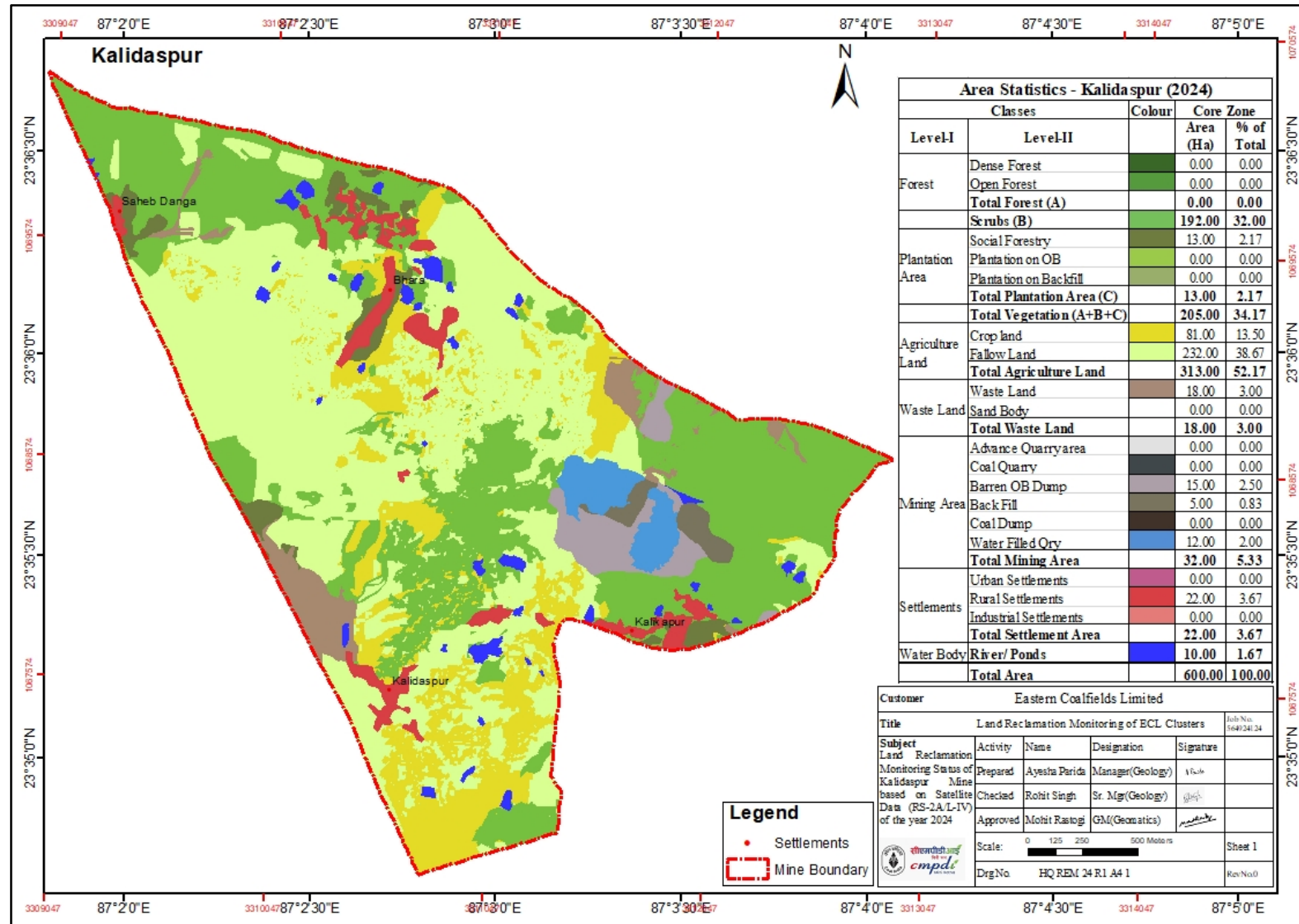


Plate 10.5: Land Use/Cover map of Kalidaspur

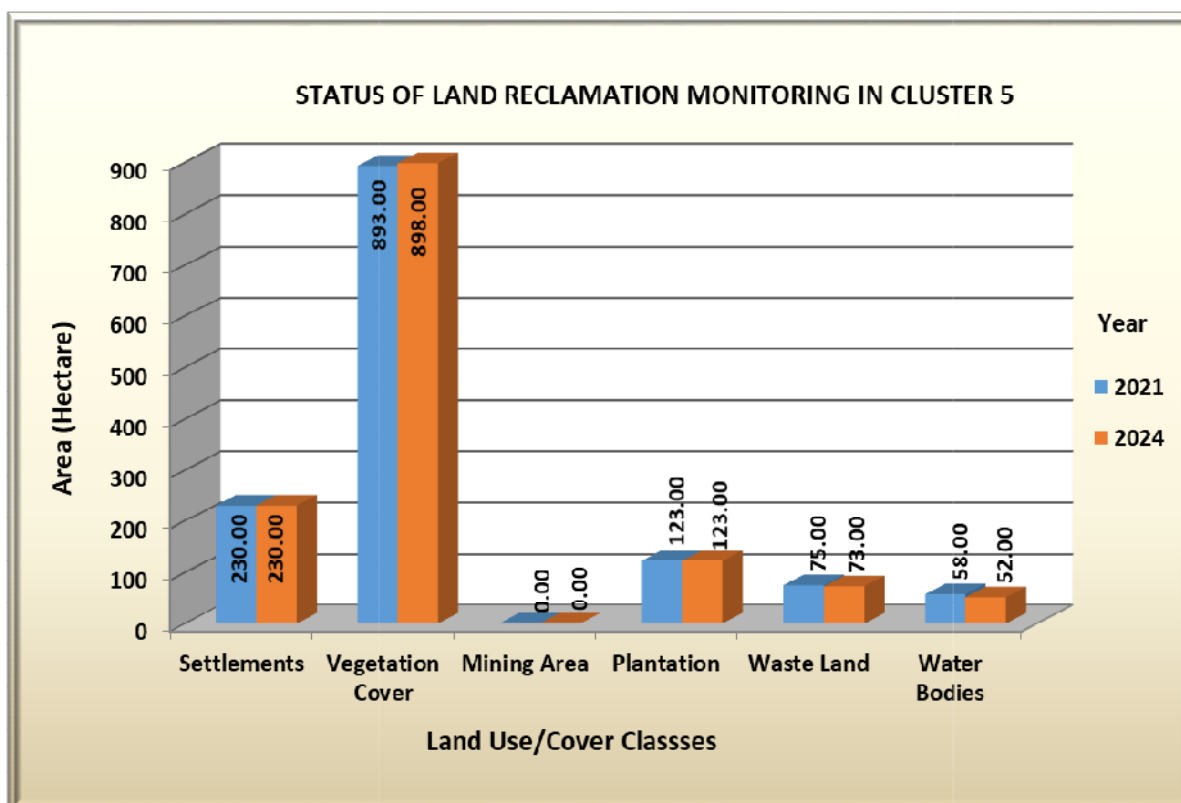


Chart 10.2: Status of Land Reclamation in Cluster 5

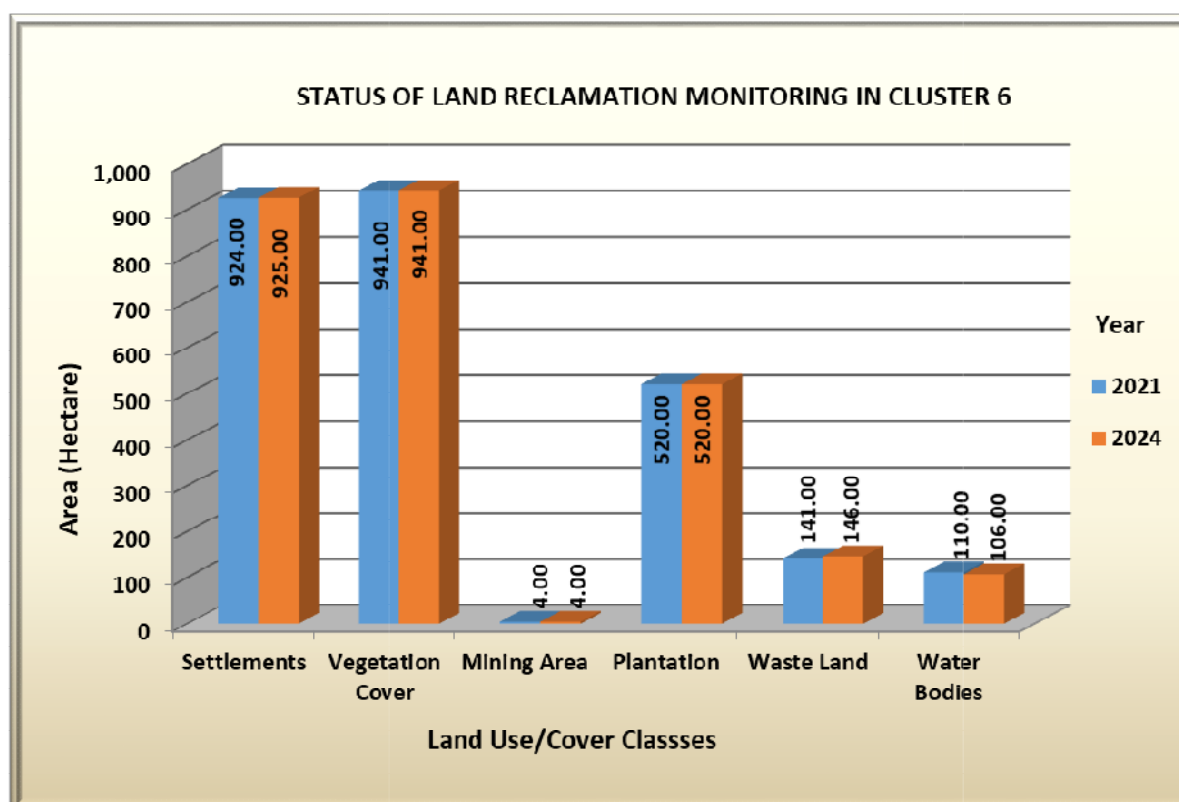


Chart 10.3: Status of Land Reclamation in Cluster 6

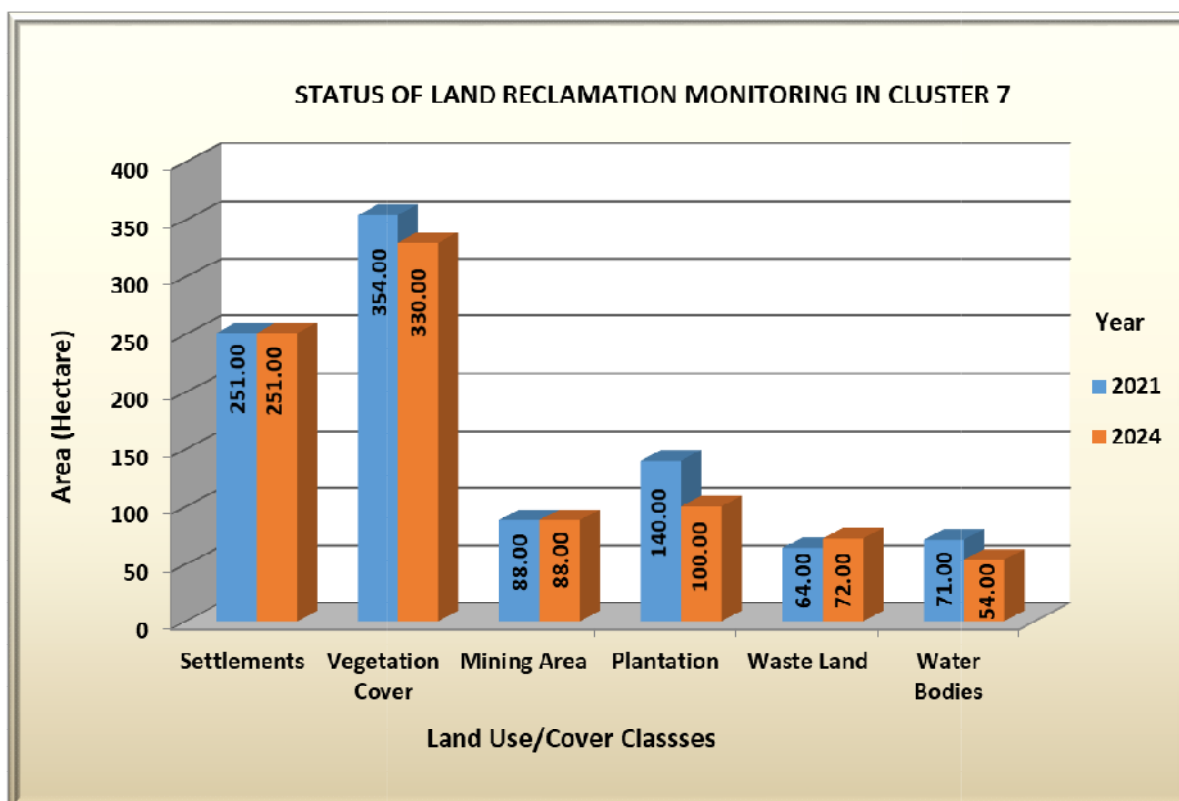


Chart 10.4: Status of Land Reclamation in Cluster 7

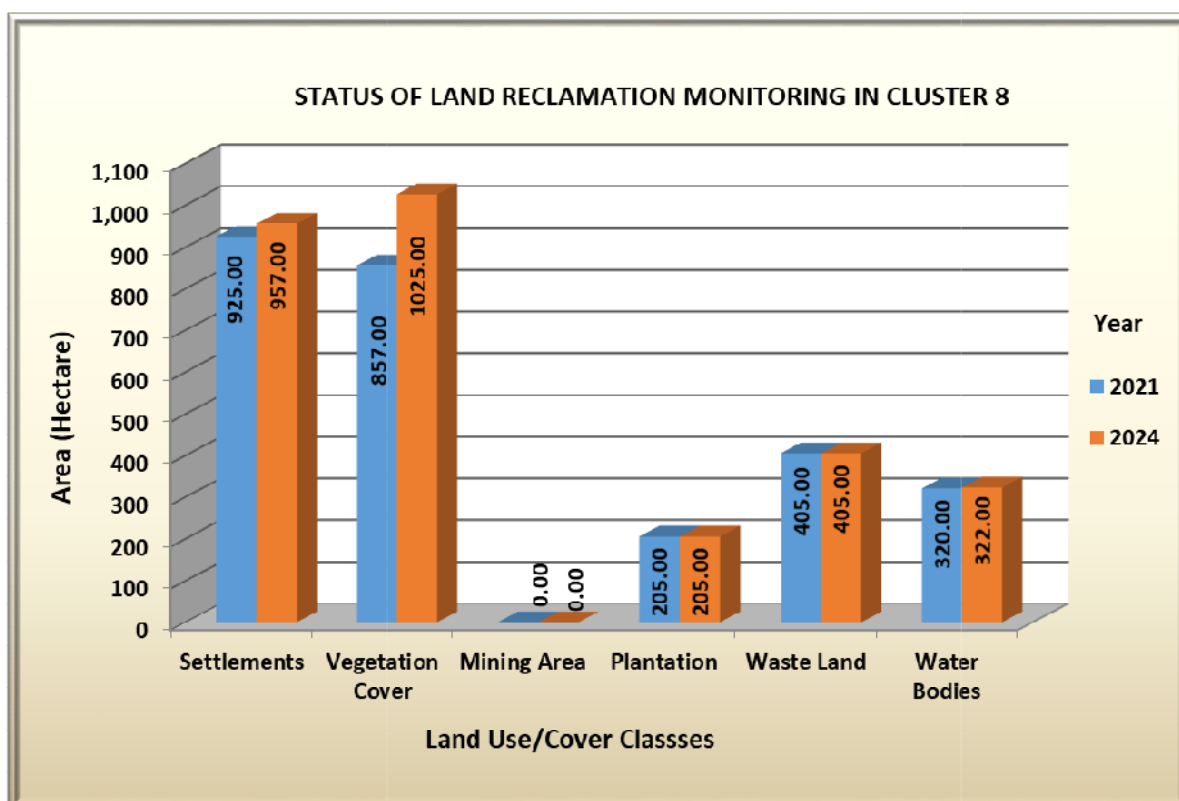


Chart 10.5: Status of Land Reclamation in Cluster 8

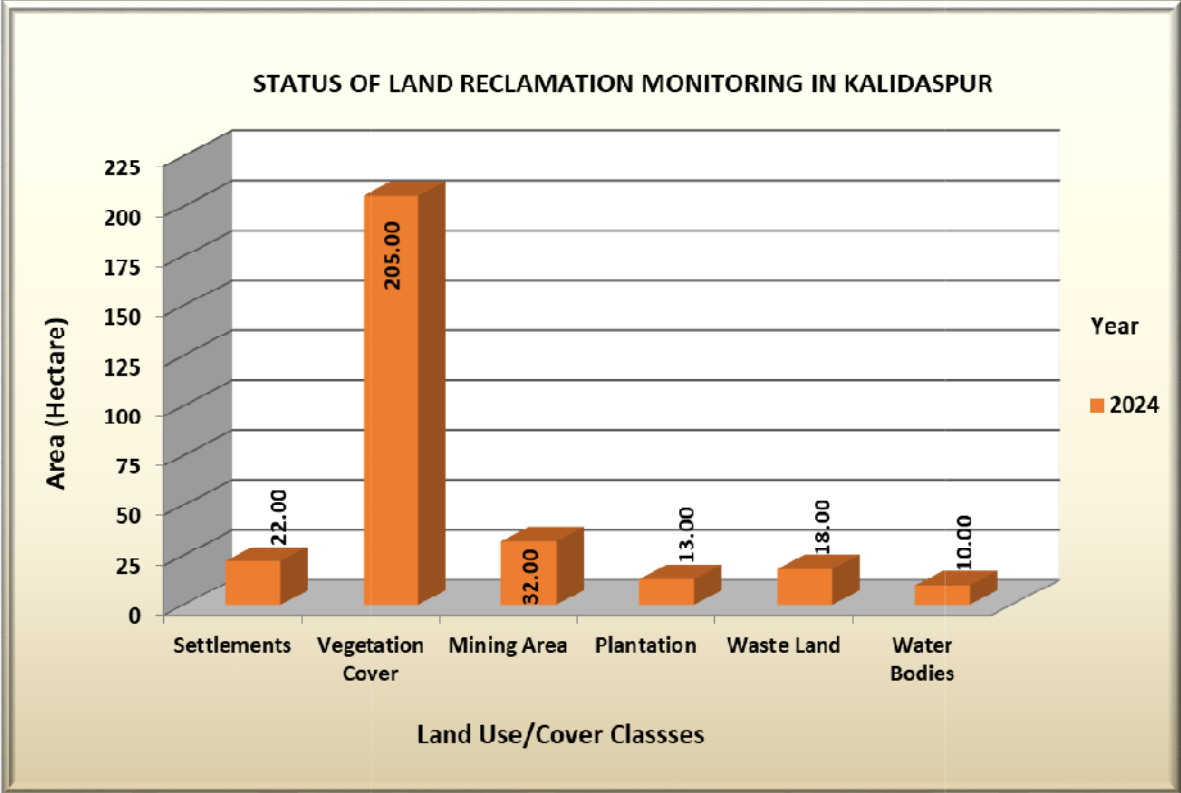


Chart 10.6: Status of Land Reclamation in Kalidaspur OCP



Photo 10.1: Plantation done in Dubeswari UG, Cluster 5



Photo 10.2: Plantation done in Methani UG, Cluster 6



Photo 10.3: Plantation done in Patmohana UG, Cluster 6



Photo 10.4: Plantation done in Sripur UG, Cluster 8



Photo 10.5: Plantation done in Sripur Seam Incline, Cluster 8



Photo 10.6: Plantation done in Satgram UG, Cluster 8

शब्दकोष

1	Land Reclamation	भूमि पुनरुद्धार
2	Over Burden	अधिभार
3	Monitoring	निगरानी
4	Report	प्रतिवेदन
5	Executive Summary	कार्यकारी सारांश
6	Opencast Mine	खुली खदान
7	Objective	उद्देश्य
8	Methodology	कार्य प्रणाली अथवा प्रक्रिया
9	Table	तालिका
10	List of Tables	तालिकाओं की सूची
11	Map	मानचित्र
12	Social Forestry	सामाजिक वानिकी
13	Plantation	पौधारोपण
14	Million	घनमीटर
15	Background	पृष्ठभूमि
16	Planning	योजनाबद्ध
17	Asses	आकलन
18	Status	स्थिति
19	Regularly	निरंतर
20	Satellite	उपग्रह
21	Subsidiary	अनुषांगिक
22	Production	उत्पादन
23	Biological Reclamation	जैविक पुनरुद्धार
24	Technical Reclamation	तकनीकी पुनरुद्धार
25	Leasehold Area	पट्टा क्षेत्र
26	Excavated Area	उत्खनन क्षेत्र
27	Active mining	सक्रिय खनन
28	Environmental Protection	पर्यावरण संरक्षण
29	Remedial Measure	उपचारात्मक उपाय
30	Interval	अंतराल
31	Systematic Error	व्यवस्थित त्रुटियाँ।
32	Error	अशुद्धियाँ
33	Curvature	वक्रता

शब्दकोष		
34	Geometric	ज्यामितिक
35	Distortion	विरूपण
36	Plantation	पौधारोपण
37	Capacity	क्षमता
38	Software	सॉफ्टवेयर
39	Class	वर्ग
40	Accuracy	सटीकता
41	Statistical Separation	सांख्यिकीय पृथक्करण
42	Cubic meter	घनमीटर
43	Depicted	दर्शाया गया
44	Percentage	प्रतिशत
45	Salient Findings	मुख्य निष्कर्ष
46	Methodology	पद्धति
47	Data Procurement	डाटा क्रय
48	Satellite data Processing	उपग्रह डेटा प्रसंस्करण
49	Rectification and geo-referencing	सुधार और भू-सन्दर्भ
50	Image enhancement	छवि- गुण बृद्धि
51	Training set selection	प्रशिक्षण सेट का चयन
52	Classification and Accuracy assessment	वर्गीकरण और मूल्यांकन की सटीकता
53	Area calculation	क्षेत्र ना-गण
54	Temporal	लौकिक
55	Processing	प्रसंस्करण
56	Overlay of Vector data base	वेक्टर डेटा बेस का आरोपन
57	Area calculation	क्षेत्र-गणना
58	Pre-field map preparation	क्षेत्र जाने के पहले नक्शे की तैयारी
59	Ground Truthing	भू-सत्यापन
60	Ground Information	भू-सूचना
61	Interpretation	व्याख्या
62	Eco-system	पारिस्थितिकी तंत्र

शब्दकोष		
63	Minor	मामुली
64	Water Drainage	जल निकाय
65	Interval	अंतराल
66	Maximum	अधिकतम
67	Coal field	कोयला क्षेत्र
68	Design	परिकल्पना
69	Superimpose	आरोपित
70	Update	अद्यतनीकरण/नवीनीकरण
71	Cumulative	संचयित
72	Embankment	तटबंध
73	Cluster	खुली तथा भूमिगत खदानों के समूह

ABBREVIATIONS

Sol	Survey of India
MoEF& CC	Ministry of Environment, Forest & Climate Change
CIL	Coal India Limited
ECL	Eastern Coalfields Limited
BCCL	Bharat Coking Coal Limited
CCL	Central Coalfields Limited
WCL	Western Coalfields Limited
SECL	South Eastern Coalfields Limited
NCL	Northern Coalfields Limited
MCL	Mahanadi Coalfields Limited
NEC	North Eastern Coalfields
CMPDIL	Central Mine Planning & Design Institute Ltd
NRSC	National Remote Sensing Centre
R2/ R2A	ResourceSat Satellite
LISS - 4	Linear Imaging and Self Scanning Sensor
FCC	False Colour Composite
OCP	Opencast Project
UGP	Underground Project
OB	Over Burden
GCP	Ground Control points
GIS	Geographic Information System
WGS-84	World Geodetic System
UTM	Universal Transverse Mercator

GLOSSARY

Sl.	Term	Definition
1.	Land Reclamation	To manage, reclaim and restore mined out/ degraded land as close as possible to its original stage.
2.	Over Burden	The material that lies above the coal seam/ deposit
3.	Monitoring	A process of evaluation to check or keep record for a period of time.
4.	Opencast Coal Mine	Open-pit mining, also known as opencast mining, is a surface mining technique that extracts minerals from an open pit in the ground.
5.	Social Forestry	Social forestry is the management and protection of forests and afforestation of barren and deforested lands with the purpose of helping environmental, social and rural development. Plantation (Social/ Avenue or other) carried out outside mining area.
6.	Biological Reclamation	Plantation on Backfilled areas (Stabilised Internal Dumps)
7.	Technical Reclamation	Area under backfilling (Over burden dumped inside the mine voids) in mining area.
8.	Green CoverGenerated	Total Plantation carried out in the lease area of Project. This includes Plantation on Backfill, Plantation on OB and Social Forestry.
9.	Leasehold Area	The area, for which lease is granted for the purpose of undertaking mining and allied operations.
10.	Excavated area	Mined out area which includes active mining, area under backfilling and plantation on backfilled areas
11.	Active Mining	Mining areas which include Coal Quarry, Advance Quarry, Quarry Filled with Water etc.
12.	Environmental Protection	It is the practice of protecting the natural environment by individuals, organizations and governments. Its objectives are to conserve natural resources and the existing natural environment and, where possible, to mitigate damage and reverse trends.
13.	Remedial Measure	Any measure or action required or undertaken to investigate, monitor, clean up, remove, treat, prevent, contain or otherwise remediate the presence or release of any hazardous substance or activity.
14.	Systematic Error	Every measurement differing from the true measurement in the same direction, and even by the same amount in some cases.

15.	Geometric Distortion	It refers to the improper positioning of any image with respect to their true geographic position when viewed in a properly scaled common image display plane.
16.	Land Use/ Cover Class	Land cover is what covers the surface of the earth and land use describes how the land is used.
17.	Accuracy	The closeness of agreement between a measured quantity value and a true quantity value.
18.	Environmental Clearance	Environmental Clearance (EC) for any developmental projects like coal mining projects etc. has been made mandatory by the Ministry of Environment, Forests and Climate Change (MoEF& CC) through its Notification issued on 27.01.1994 under the provisions of Environment (Protection) Act, 1986.
19.	Rectification and Geo-referencing	Geo-referencing is the assigning of absolute location of a data point or data points. Geo-rectification refers to the removal of geometric distortions between sets of data points, most often the removal of terrain, platform, and sensor induced distortions from remote sensing imagery.
20.	Image Enhancement	It is the process of modifying digital images so that the results are more suitable for processing or further image analysis.
21.	Training set selection	It is a portion of a data set used to fit or train a model for prediction or classification of values that are known in the training set, but unknown in other (future) data.
22.	Image Classification	It refers to the task of extracting information classes from a multiband raster image. The resulting raster from image classification can be used to create thematic maps.
23.	Temporal Changes	The 'temporal change' means the change in any entity with a period of time.
24.	Ground Truthing	Collection of primary/ basic information from ground realities for satellite image interpretation and thematic mapping.
25.	Cluster	Group of opencast and/ or underground mines clubbed together for administrative purposes.
26.	Arc GIS	GIS Software used for Map preparation
27.	ERDAS IMAGINE	Satellite Image Data Classification Software



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