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Research Paper

APPLICATION OF REMOTE SENSING AND GIS IN REVENUE MOBILIZATION OF LIMESTONE DEPOSITS OF AMRELI DISTRICT, GUJARAT, WEST INDIA

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Remote sensing and GIS are much useful in revenue mobilization of various mineral deposits, and the same is used here for revenue mobilization of limestone deposits present in Amreli district of Gujarat in west India. How much revenue is generated through limestone deposit of the area and what is the use of the deposit and how much revenue is generated through which type of deposit can also be known from such RS and GIS study.

INTRODUCTION

Remote sensing and GIS offer an abundant opportunity to monitor and manage natural resources at multi-temporal, multi-spectral and multi-spatial resolution (Kumar *et al.*, 2015).

Remote Sensing, unlike on-site observation, is the acquisition of information about an object or phenomenon without making physical contact with the object. It is used in various fields like geography, landscaping, land surveying, earth science disciplines like oceanography, geology and also military intelligence and commercial, economic, planning and humanitarian applications. A Geographic Information System (GIS) is a system designed to capture, store, manipulate, analyse, manage, and present all types of geographical data as spatial data. GIS

functionality plays a key role in spatial decision making (Ghaffari *et al.*, 2000). Remote sensing combined with GIS is a powerful tool to integrate and interpret the real-world situation in a most realistic and transparent way (Kumar *et al.*, 2015).

The economic efficiency of remote sensing data applications to natural resources can be expressed both directly in the reduction of the cost of mapping and indirectly by an increase in the quality, reliability, detail and information of the result (Ngangom Priya Devi, 2013). Lately, the data received through remote sensing has been widely used for its applicability in various natural resources management.

With the rising pressure on natural resources due to the increasing human population, remote sensing and GIS can be used to manage this

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precious limited resource in an effective and efficient manner (Kumar *et al.*, 2015).

The present study utilizes the application of remote sensing and GIS to the study of natural resources, specifically the mineral limestone and its deposition in various regions of Gujarat. Gujarat accounts for about 11% of the total limestone produced in the country. Deposits of the mineral are distributed over the coastal districts of Gujarat like Junagadh, Jamnagar, Amreli, Porbandar, etc.

MATERIALS AND METHODOLOGY

Data on the Royalty received on limestone and District wise income from the limestone (major) and building limestone was collected from the Commissioner of Geology and Mining, Government of Gujarat. This data was sorted as per the study needs, tabulated, analysed and conclusions were arrived upon scientifically.

Figure 1: Map Showing Distribution of Limestone in Amreli District, Gujarat, Western India
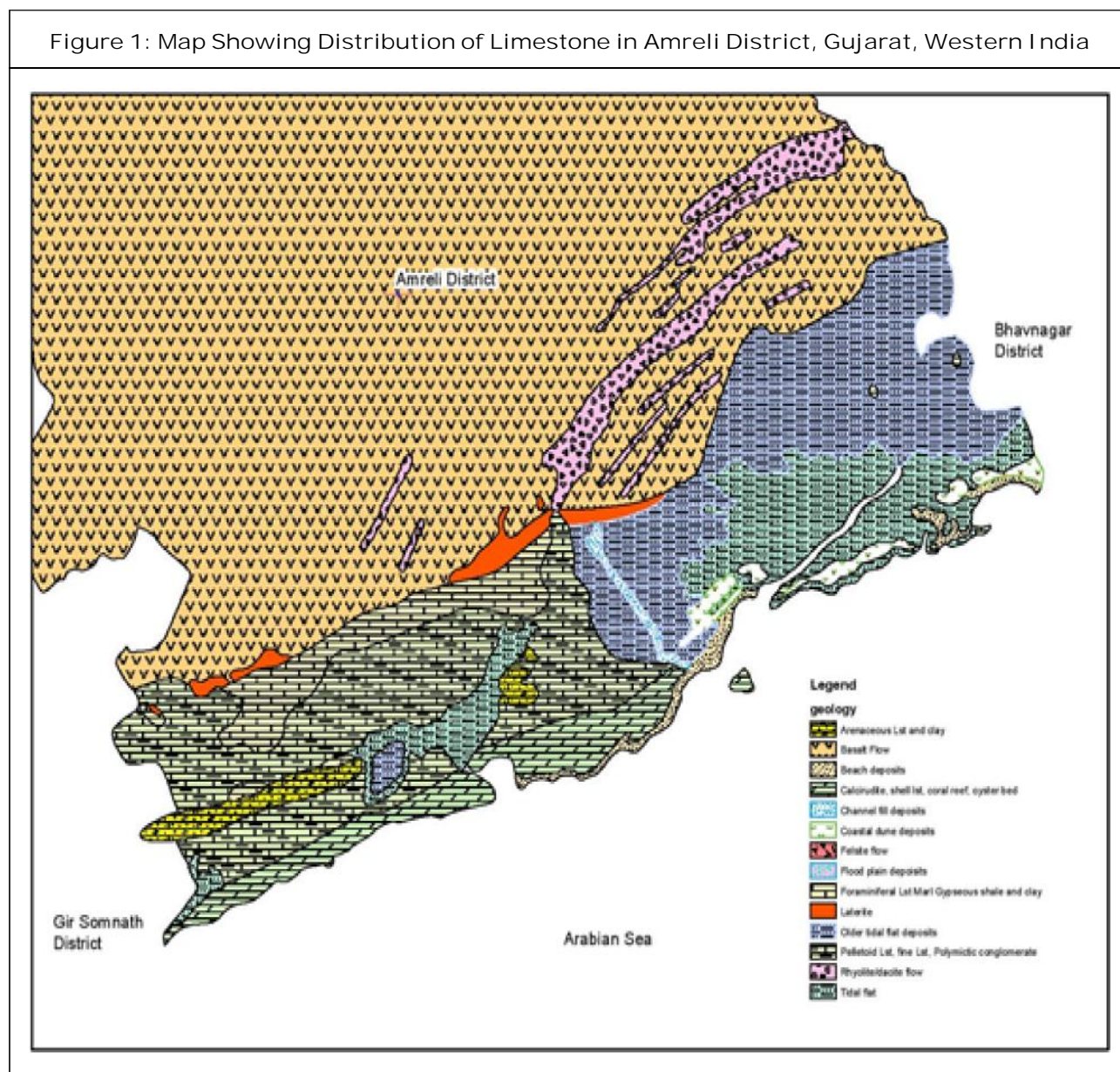
Table 1: District-Wise Production of Limestone (Major Mineral) in Various Districts of Gujarat, Western India

S. No.	District	2012	2013	2014	2015	2016
1	Amreli	41.56	43.43	43.36	47.24	44.78
2	Kutch	52.17	53.59	72.99	67.87	64.94
3	Jamnagar	15.58	7.55	5.22	5.63	5.35
4	Junagadh	55.91	24.5	4.81	6.57	44.95
5	Porbandar	24.45	41.2	35.78	42.71	38.58
6	Rajkot	1.22	0.81	0.66	0.88	0.67
7	Surat	1.49	0.34	0	1.63	1.62
8	Dwarka	0	2.84	4.99	3.96	4.08
9	Gir Somnath	0	35.22	62.3	71.85	76.46

Table 2: District-Wise Production of Building Limestone in Various Districts of Gujarat, Western India

S. No.	District	2012	2013	2014	2015	2016
1	Amreli	0.04	0.04	0.06	0.06	0.03
2	Kutch	1.54	1.13	1.06	0.76	0.98
3	Gandhinagar	0.05	0	0	0.06	0.04
4	Jamnagar	2.22	1.33	2.04	2.13	2.46
5	Junagadh	10.31	3.25	2.22	3.83	5.87
6	Porbandar	19.37	9.99	6.73	5.83	8.65
7	Banaskantha	1.1	1.35	1.45	1.99	2.48
8	Rajkot	0.96	0.35	0.54	0.47	0.95
9	Sabarkantha	0.53	0.44	0.41	0.51	4.7
10	Dwarka	0	0.13	0.28	0.01	0.35
11	Gir Somnath	0	2.41	3.56	3.57	3

Figure 2: District-Wise Limestone Production-Major Mineral in Various Districts of Gujarat, Western India

Figure 1 shows the distribution of limestone in Amreli district of Gujarat, western India.

Based on the analysis of the data in Table 1, the study was streamlined to the limestone deposits in the district of Amreli and the revenue generated by the lease of limestone mines in the district.

Table 3: Royalty Received by the Government of Gujarat from Limestone (Major) Mines in Amreli During 2012-2017 (in Lac Rupees)

S. No	District	2012-13	2013-14	2014-15	2015-16	2016-17
1	Amreli	3740.4	3909	3902.5	4252	4030.5

Figure 3: District-Wise Production of Building Limestone in Various Districts of Gujarat, Western India
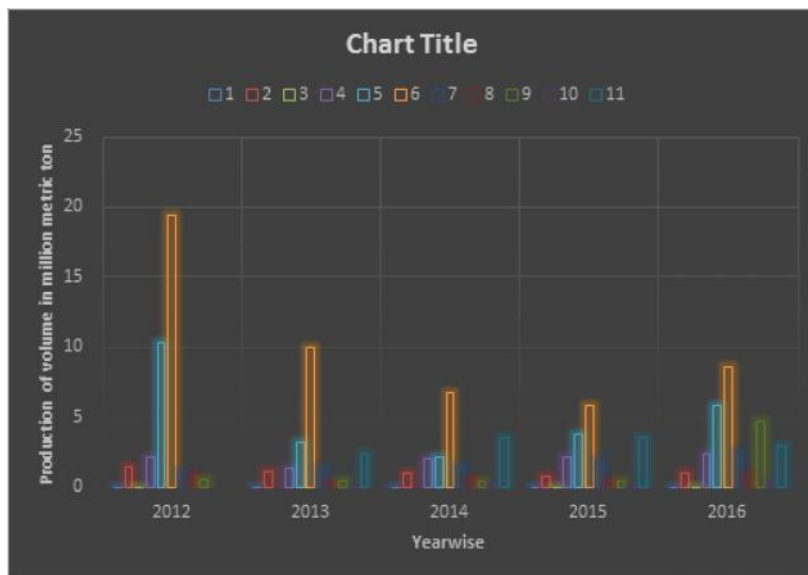

Table 4: Royalty Received by the Government of Gujarat from Building Limestone Mines in Amreli During 2012-2017 (in Lac Rupees)

S. No	District	2012-13	2013-14	2014-15	2015-16	2016-17
1	Amreli	2.05	2.42	3.11	3.3	1.74

DATA

Following data have been collected on limestone (major) and building limestone of Amreli district of Gujarat state and have been analysed for revenue received from the district.

Figure 4: Royalty Received by the Government of Gujarat from Limestone (Major) Mines in Amreli District During 2012-2017 (in Lac Rupees)
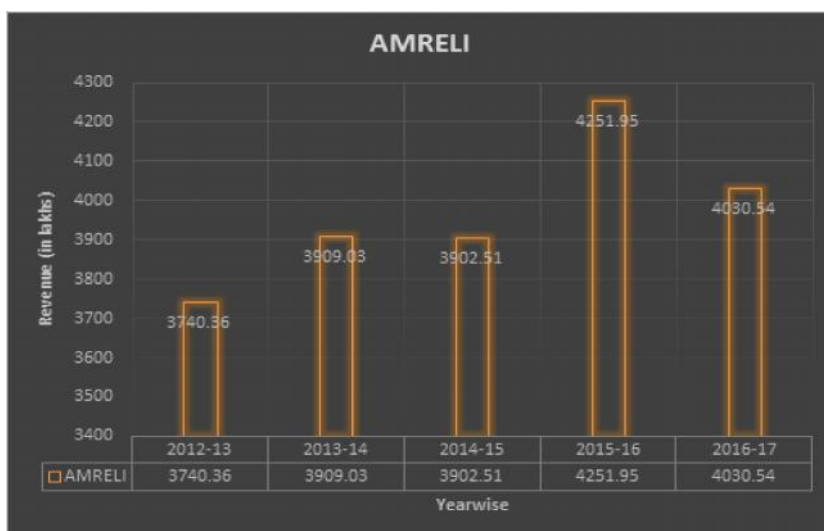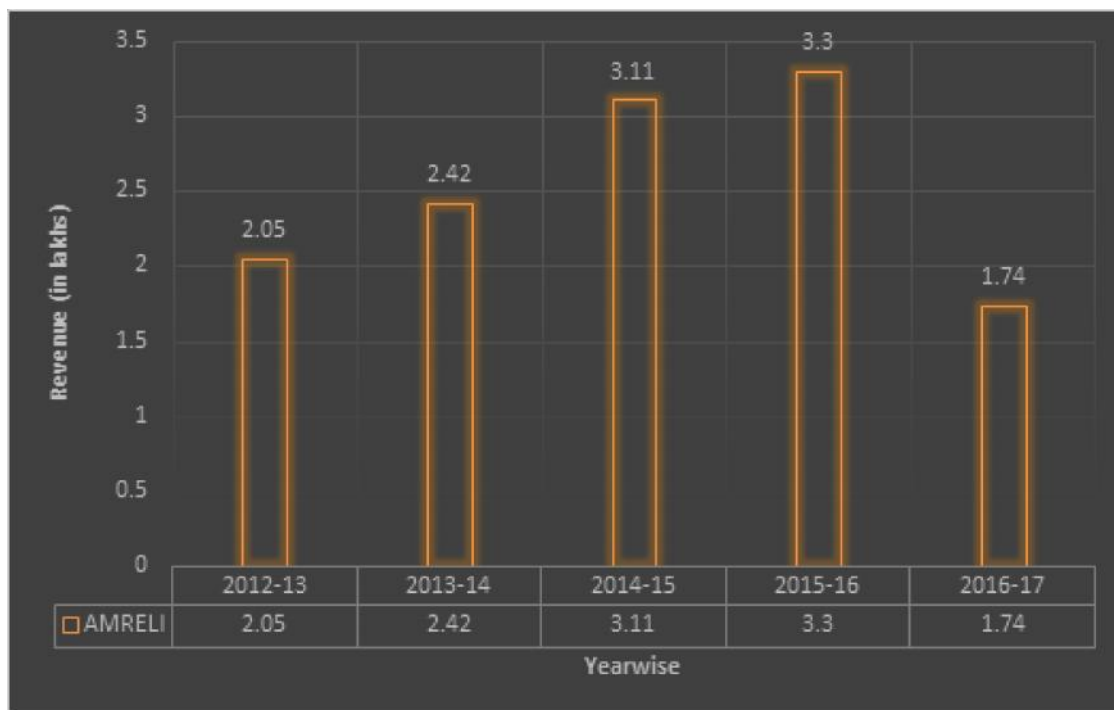
Figure 5: Royalty Received by the Government of Gujarat from Building Limestone Mines in Amreli District During 2012-2017 (in Lac Rupees)

RESULTS AND DISCUSSION

The data collected by remote sensing and GIS as also the royalty data obtained from the Government of Gujarat was analysed graphically. Comparative royalty receipts were calculated. Maximum revenue has been received in the year 2015-16 which is 4251.95 lac rupees for limestone (major) in Amreli district, while minimum revenue for the same is 3740.36 lac rupees for the year 2012-13. On the other end, highest revenue received is 3.3 lac rupees for the year 2015-16 for building limestone in the district, while lowest revenue received is during the year 2016-17 which is only rupees 1.74 lac for the same. For the remaining years, the revenue generated was intermediate between highest and lowest figures for both limestone (major) and building limestone in between the year 2012-13 to 2016-17.

CONCLUSION

From the data collected from the year 2012-13 to 2016-17, it is seen that remote sensing along with GIS data can be a helpful tool with respect to mineral deposits. It can save time since it is an onsite data.

The highest revenue during the year 2015-16 indicates the highest construction of soda ash from limestone produced in Amreli district in between the year 2012-13 to 2016-17.

The lowest revenue during the year 2012-13 indicates lowest construction of soda ash from limestone produced in Amreli district in between the year 2012-13 to 2016-17.

Normally, use of building limestone occurs locally, in that way the highest revenue during the year 2015-16 indicates the highest production of buildings from building limestone produced in

Amreli district in between the year 2012-13 to 2016-17.

In the same manner, the lowest revenue during the year 2016-17 indicates the lowest production of buildings from building limestone produced in Amreli district in between the year 2012-13 to 2016-17.

During all these years, i.e., 2012-13 to 2016-17 the slab of royalty was same i.e. for limestone (major) it was Rs. 90/- per tonne and for building limestone royalty was Rs. 50/- per tonne.

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