

SLATE, SANDSTONE & OTHER DIMENSION STONES



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**SLATE, SANDSTONE & OTHER
DIMENSION STONES**

(FINAL RELEASE)

**GOVERNMENT OF INDIA
MINISTRY OF MINES
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45 Slate, Sandstone & Other Dimension Stones

The principal rock types used as dimension stones other than granite and marble are slate, sandstone, limestone and quartzite. India is endowed with abundant resources of these types of dimension stones which are increasingly used domestically. These stones are also important export commodities. India is one of the largest producers of dimensional stones in the world.

1. Slate

Slate is a low-cost decorative stone used for exterior and interior decoration of buildings. It is one of the important materials used for roofing. Slate is a fine-grained, very low-to-low metamorphic rock possessing a well developed fissility (splitting attitude) parallel to the planes of slaty cleavage. It has been formed by the metamorphism of pre-existing clay rocks such as claystone, shale or siltstone. The most remarkable feature of this rock is that it has very marked cleavage planes which enable it to be split manually or mechanically into relatively thin slabs. Slate is used as school slate and also as building dimension stone. Slate has the aesthetic value like other dimension stones, granite and marble. Slate has emerged as a low cost alternative to granite and marble which are comparatively expensive. The exports of slate have increased over the years resulting in a boost to slate mining industry in the country. Micaceous and chlorite slates are generally preferred.

OCCURRENCES

The Aravalli Mountain ranges in Rajasthan and Haryana; rock assemblages under Cuddapah System in Andhra Pradesh and Tamil Nadu; and Himalayan region in Northern India have undergone metamorphism and given rise to the slate deposits along with other metamorphosed products. The availability of slates has been reported from Madhya Pradesh, Haryana, Himachal Pradesh, Jharkhand, Andhra Pradesh, Rajasthan, Uttarakhand, Bihar and Gujarat.

RESOURCES

An attempt has been made to prepare inventory of slate. This may not be complete. The total resources of slate as on 1.4.2010 as per UNFC system are placed at 2.4 million tonnes under unclassified grade. All the resources are located in Andhra Pradesh (Table - 1).

PRODUCTION, STOCKS & PRICES

There was no production of slate reported during the year 2010-11 and 2011-12.

Value of production of slate (as dimension stones) increased to ₹ 255.6 lakh in 2010-11 from ₹ 222.1 lakh in the previous year as per the data available (Table-2).

**Table – 1 : Reserves/Resources of Slate as on 1.4.2010
(By Grades / States)**

	Reserves Total (A)	Remaining Resources				Total (B)	Total Resources (A+B)
		Feasibility STD211	Pre-feasibility		Inferred STD333		
			STD221	STD222			
All India : Total	-	-	113	1187	1069	2369	2369
By Grade							
Unclassified	-	-	113	1187	1069	2369	2369
By State							
Andhra Pradesh	-	-	113	1187	1069	2369	2369

Figures rounded off.

**Table – 2 : Value of Production of Slate
2008-09 to 2010-11
(By States)**

State	(In ₹'000)		
	2008-09	2009-10	2010-11(P)
India	30169	22209	25557
Andhra Pradesh	19629	18261	21978
Himachal Pradesh	10198	1838	1216
Jammu & Kashmir	13	1440	21
Rajasthan	329	670	2342

Source: State Governments.

MINING AND PROCESSING

Mining of slate is done by opencast method. The slate bands are exposed by removing the overburden by means of drilling and controlled blasting. The mining in many places is carried out by manual means but in some mines, semi-mechanised method of mining is also adopted. After removing a thick slab of slate, preferably of larger size, the slab is split using hammers and specially-made chisels and cutting knives. The saleable tile or slab of slate is obtained in 6 to 10 mm thickness for cladding and 20 to 35 mm thickness for flooring or for panels. The edges are cut manually by using machines to have a smooth and regular edge. The slate as building stone is marketed under the commercial names, such as Golden Copper, Green, Black, Panther, Mica, Speckled, Deoli, Mahi, Silver Grey and Peacock. Peacock is the only premier variety produced in Kund area, Haryana.

The overall recovery of slate is very low, being a fragile material among all the building/dimension stones. Normally, huge accumulation of broken pieces in and around the slate quarry is observed incidental to mining & processing. Proper mining and processing techniques by using modern equipment may improve the situation in future.

USES AND SPECIFICATIONS

There are two main uses or applications of slate as a natural stone in building work: 1) for roofing in the form of roofing tiles, and 2) for flooring in the form of tiles and for cladding purposes.

For roofing tiles, the slate should be exfoliated easily and it should be free from minerals like iron sulphides or carbonates which in time could cause corrosion and staining on roofing tiles. For cladding or flooring purposes, the slate should be able to bear the cutting processes in required sizes, polishing or smoothing process by machines and should not peel off during the process of fixing or laying. Bureau of Indian Standard has laid down Standard IS : 6250-1981 (First revision; reaffirmed 2008) namely, Specification for roofing slate tiles (First revision) in respect of requirement of dimensions, physical properties and workmanship of slate tiles used for sloped roof covering.

2. Sandstone

Sandstone is a sedimentary rock largely made up of sand grains in size ranging from 2 mm to 120 mm of varying compositions. The sand may consist of grains of quartz, felspar and other detrital minerals with interstitial cementing material. The composition of sand particles and the cementing material, by and large, defines the colour of sandstone, while the mode of formation decides the thickness of bed which gives rise to various types of sandstones.

The colour of sandstone may range from dark red to brown, earthy to buff, white, yellow and a number of other shades. The pattern of the sandstone depends upon the thickness of bed. Sandstone produced in the country is being marketed as Vindhyan Red, Rainbow, Teak, Modak, Bundi, Bansi Pink, Mandana, Dholpur Cream, etc. The sandstone may occur as massive, thick, non-splittable bands or thin beds or layers that can be split by applying slight pressure.

RESOURCES

The occurrences of sandstone in India are spread over Andhra Pradesh, Assam, Bihar, Gujarat, Haryana, Madhya Pradesh, Meghalaya, Mizoram, Karnataka, Odisha, Punjab, Rajasthan, Uttar Pradesh, Tamil Nadu and West Bengal.

The resource estimation has not been considered important because of its abundance and easy availability. Hence, there is no comprehensive inventory of sandstone. However, the Centre for Development of Stones (CDOS), a Government of Rajasthan undertaking has reported estimated reserves of sandstone at over 1,000 million tonnes in the country. Huge deposits of sandstone in Rajasthan are associated with Vindhyan and Trans-Aravalli Formations, exposed over an area of nearly 35,000 sq km covering districts of Dholpur, Bharatpur, Karauli, Sawai Madhopur, Tonk, Bundi, Jhalawar, Kota, Bhilwara and Chittorgarh. It is also found scattered in the districts of western desert plane. Splittable sandstone deposits are confined to an area of 16,000 sq km out of which 10,000 sq km lies in eastern and south-eastern Rajasthan and 6,000 sq km in western Rajasthan.

In Gujarat, fine to medium-grained sandstone of varying colours ranging from white, light-purplish, reddish-brown, cream to yellow are found in the district of Kachchh. A brownish-yellow sandstone occurs near Chabari and Mainapara in Bhachau tehsil. The sandstone at Rampur, Katada-Roha and Rajoda Dungar near Mangwana in Nakhtrana tehsil is cream coloured and is fairly hard. Extensive

deposits are found around Songir, Naswadi, Ghautoli, Namaria and Lachharas in district Vadodara.

The Vindhyan and Satpura Mountains in Madhya Pradesh have vast resources of sandstone. The red, cream and white sandstone are being quarried extensively in Panna and Shivpuri districts and in many areas near Jabalpur.

In Uttar Pradesh, sandstones suitable for making slabs and tiles are located in Agra, Mirzapur, Lalitpur, Allahabad and Sonbhadra districts. The sandstone of Lalitpur district is yellow, light green and maroon and takes good polish. The sandstone in Lalitpur occurs in Madanpur and Rampura (near Deogarh) areas and is traded under the commercial name Royal Gold, Beach Sand and U.P. Green. The sandstone of Agra occurring in Tatpur area is red and mottled and is used for interior as well as exterior flooring and cladding. In Mirzapur and Sonbhadra areas, good quality buff to pale and creamish sandstone is available.

The felspathic sandstone occurring with the coal seams as overburden is also used as building stone. The Kamthi Sandstone occurring in and around tehsil Saoner, district Nagpur in Maharashtra, is being quarried in huge quantities and is used as building stone.

EXPLORATION & DEVELOPMENT

The DMG, Rajasthan, has carried out exploration for sandstone in 2011-12. The details of exploration are given in Table -3.

Table – 3: Details of Exploration Activities for Sandstone, 2011-12

Agency/State/ District	Location/ Area	Mapping		Drilling		Sampling (No.)	Remarks/ Reserves/Resources estimated
		Scale	Area (sq km)	No. of boreholes	Meterage		
DMG Rajasthan							
Dhaulpur	N/v Tilaua,	1:50,000	105	–	–	19	Buff red, spotted red at places pink coloured splittable sandstone n/v Tilaua. About 0.432 million tonnes resources for sandstone (blockable) and 4.896 million tonnes of sandstone (splittable) were estimated.
	Chilachond,	1:10,000	15				
	Teh. Baseri	1:3,600	1.0				
Nagaur	N/v Nimbi Jodha,	1:50,000	150	–	–	19	Resources were not calculated. The sandstone is light to dark brown, medium to coarse grained and having thickness of about 2-3 m were encountered.
	Hirawati. Teh. Ladnu	1:10,000	10				

PRODUCTION

Data on production of sandstone are not available. However, Rajasthan may be producing about 90% of sandstone in the country used for building purposes and as road metal along with quartzite. Production value of quartzite and sandstone as available is given in Table-4.

Table – 4 : Value of Production of Quartzite & Sandstone*, 2008-09 to 2010-11 (By States)

(In ₹'000)

State	2008-09	2009-10	2010-11(P)
India	5344731	6746712	6274461
Madhya Pradesh	345495	426420	472788
Rajasthan	4999236	6320292	5801673

Source: State Governments

* Used for purposes of building or for making road metals and household utensils.

The intensive quarrying activities in Rajasthan are in the districts of Bharatpur, Sawai Madhopur, Karauli, Tonk, Bundi, Jhalawar, Kota, Bhilwara, Chittorgarh, Jodhpur, Nagaur and Bikaner. The red and blue Lower Bhander Sandstones which are exposed over a large area of about 5,000 sq km in south-eastern Rajasthan, covering Kota, Bundi, Bhilwara, Chittorgarh districts is quarried at a number of places, important ones being Bijolia, Barisal, Navanagar, Banio-ka-Talab in Bhilwara district and Dabi, Budhpura, Umarthan in Bundi district. The splittable sandstone areas are Bhanpura, Rajpura, Kasara, Chobe-ki-Guwari, Mokanpura, Berda and Bhakri in Karauli district. Other important areas of sandstone quarrying in Dholpur, Bharatpur and Sawai Madhopur districts are Sar Mathura, Bari Baseri, Hindon, Sapatra, Masalpur, Roopwas and Band-Barolla. In other districts, important places are Fidusar, Sursagar, Mandor and Balesar (Jodhpur district) and Chhoti and Badi Khatau (Nagaur district).

MINING & PROCESSING

Mining of sandstone is generally done manually by using hammers and chisels of various shapes. At the first stage, the overburden is removed which is in the form of soil, rubble or non-splittable sandstone. The hard non-splittable sandstone is drilled and blasted to expose the underlying splittable sandstone. But, with the advent of sandstone cutting and polishing machines, this operation is also executed carefully to obtain Khandas and blocks for further processing in the form of slabs.

In conventional mining, advantage of the natural vertical joints present in the range from 0.6 m to 60 m, is taken. The initial quarrying starts from these joints. After making the initial cut, blocks having 1.2 m width, 3 to 4 m length and thickness up to the nearest cleavage plane are removed.

In absence of joints, a 'jhiri' is opened in a line by drilling closely spaced (about 15 cm apart) oblong or eye-shaped holes (duggis) of about 8 to 10 cm depth and the eye-shaped steel wedges (Gullas) are hammered in these holes by expert miners. The continuous hammering develops a crack along the holes. The mining starts from these blocks. The required length and width of the slab to be obtained is marked and cut accordingly using the same technique of wedging. The splitting of individual slab is carried out using natural bedding plane by inserting sharp wedges or by hammering alone.

The majority of quarry owners produce hand-dressed slabs and tiles in different thicknesses. But, in the present export market, machine-cut tiles are in demand. Presently, the simple edge cutting machines with single or double cutters are used for getting machine-cut tiles. The further requirement of tiles in 10 to 12 mm thickness with one side natural and other calibrated has resulted in establishing cutting and polishing units of sandstone. In Rajasthan, there are four units

engaged in the production of polished sandstone tiles measuring 30 x 30 x 1 cm and 40 x 40 x 1.2 cm. The sandstone is also exported with natural, honed and polish-finishes. BIS has prescribed IS:3622-1977 (First Revision, reaffirmed 2003) as the specifications for sandstone slabs and tiles.

3. Dimensional Limestone

The limestone which is used as a dimension stone differs from the limestone used for cement making or for any other industrial purpose in two ways: firstly, chemical composition and secondly the mode of occurrence. In both the types, the major constituent is calcium carbonate but very high silica content gives limestone sufficient hardness to be utilised as dimension or building stone. The industrial limestone occurs as massive formation with less intercalations, while in case of dimensional limestone, thin-bedded deposits are preferred. Limestone which is compact and amorphous in texture is known as flaggy or splittable limestone and is quarried in the form of thin slabs ranging in thickness from 12 mm to 50 mm in ready-to-use form .

Limestone has been used since ancient times for construction of houses, flooring and for various other building purposes. In recent times, the use of limestone has increased manifold mainly in interior flooring, cobble stones and for decorative purposes in combination with other stones because of its various colours and shades. Depending upon the place of origin of limestone and its colour, various types of nomenclatures have been used in the trade for limestone, such as, Cuddapah Stone, Shahabad Stone, Kota Stone with different shades and colours (Kota Blue, Kota Brown, etc.), Kutch Stone, Miliolitic Limestone, etc.

OCCURRENCES

The occurrences of dimensional limestone have been reported from various states, such as, Shahabad Stone of Bijapur, Gulbarga and Belgaum

districts in Karnataka; and 'Cuddapah Stone' of Kurnool, Anantpur and Guntur districts and 'Tandur Stone' of Cuddapah district, Andhra Pradesh, etc. Other coloured well-known limestones are from Betamacherla, Tadipatri, Macherla, Nereducherla and Muddimanikyam. 'Milliolitic Limestone' from Saurashtra region, 'Yellow Limestone' of Kachchh district of Gujarat, 'Kota Limestone' of Kota district and 'Yellow Limestone' of Jaisalmer district, Rajasthan are the other prime localities of dimensional limestone occurrences in India.

Rajasthan is endowed richly with the occurrence of greenish-grey 'Kota' limestone. The Kota stone has gained tremendous popularity and is widely used for flooring and cladding purposes. The important deposits of limestone are in Kota, Jhalawar, Chittorgarh and Jaisalmer districts, Rajasthan. Kota, Jhalawar, and Chittorgarh are the major producing districts of the dimensional limestone in the state. Extensive limestone deposits are found in the Upper Stage of the Lower Vindhya, represented by limestone which has a good potential as cement-grade limestone as well as flooring stone. Certain portions of the limestone having splittable form are used extensively as flooring stones. The limestone occurs in a north-south belt from Dalla-ka-Khera to Nimbahera and extends into Madhya Pradesh, covering a distance of about 70 km. It is fine-grained, thinly bedded and has a total thickness of about 150 m. At a few places, the major portion of the limestone deposit is suitable for cement making, but there are pockets containing splittable forms that can be used for building and flooring purposes directly.

Yellow limestone deposits of Jaisalmer:

The yellow limestone of Jaisalmer is of Jurassic age and is found at Jaisalmer, Bada Bag, Mool Sagar and Kanod villages. It contains 42 to 51% calcium oxide and has thickness of about 3 m.

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It is quarried in the form of blocks and can be sawed into slabs and tiles. It is also termed as yellow marble as it takes reasonably good polish.

Flaggy limestone deposits of Jhalawar and Ramganjmandi, Kota area: It belongs to Lower Vindhyan Group and is available in plenty at Sarola Kotri Chitawa and Khokhriya-Khurd. Extensive deposits are available near Ramganjmandi, Aroliya and Parolia areas. Ramganjmandi and Jhalawar Road are the main railway stations from where the splittable limestone produced is dispatched to various parts of the country. In the last few years, export market of this limestone which is popularly known as 'Kota Stone' has also been developed.

PRODUCTION

Data on value of production of limestone is furnished in Table-5.

MINING AND PROCESSING

Although, the mining methods as well as the processing of limestone have changed over the years, still there is a scope for improvement in mining techniques. Simultaneously, the handling of waste and utilisation of waste rock is equally essential.

The mining of Kota Stone is carried out by opencast manual methods or by semi-mechanised methods. The Kota Stone is found in the form of natural thickness ranging from 12 to 150 mm or even more. The mined out slabs are cut to size by using hammer and chisel. Diamond saws are used to cut the tiles in required thicknesses and measurements. Tiles of Kota Stone are available in various sizes and thicknesses to suit the requirement of various building projects.

This stone has a good market potential and its demand can be increased manifold by adopting proper mining, processing and marketing techniques.

**Table – 5: Value of Production of Limestone*
2008-09 to 2010-11
(By States)**

(In ₹'000)

State	2008-09	2009-10	2010-11(P)
India	7658805	7900950	10546867
Andhra Pradesh	22940	11985	9899
Chhattisgarh	1138863	1728827	1815068
Gujarat	519271	994178	981103
Himachal Pradesh	-	-	16598
Jammu & Kashmir	898	967	429
Karnataka	95	115	-
Madhya Pradesh	36094	4660	1157
Rajasthan	5493273	4588201	7150596
Uttarakhand	447371	572017	572017

Source: State Governments

** Used in kilns for manufacture of lime to be used as building material.*

EXPLORATION & DEVELOPMENT

No exploration activities were reported for dimensional limestone during 2011-12.

USES & SPECIFICATIONS

Application of Kota Stone ranges from interior flooring, wall cladding to exterior use in paving and facades for building of all kinds and types.

The Kota Stone has a natural split non-slip surface. Massive, dense and fine-grained varieties are generally durable as these are not porous. These are tough and have a crushing strength of 17.8 kg/mm² and a high compressive strength of over 2189 kg/cm². Abrasion value of Kota Stone is 18.12 to 18.32 and has a high resistance to

delamination and failure under freezing and thawing conditions.

Bureau of Indian Standards has adopted Specification for Limestone (Slab & Tiles) as IS : 1128 - 1974 (First Revision, reaffirmed 2008).

4. Other Dimensional Stones

In addition to the dimension stones already described, other dimension stones are being quarried and used for the construction of houses and other building purposes.

In Odisha, Karnataka, Goa and in parts of coastal states, laterite is quarried in huge quantities. It is utilised as bricks in the construction of houses and pavements.

Huge deposits of basalt in Maharashtra, Karnataka and Gujarat are used as building stones since ancient times. Quartzite bands occurring along with phyllite schists are also utilised for building purposes.

In addition, stone aggregates, such as broken and sized pieces of limestone, dolomite, quartzite and sandstone are mixed either with cement for building and road-making purposes or with asphalt for mending road. To utilise the huge waste generated during mining and processing, a new variety of man-made stone "Terrazo" has been developed, which is composed of stone chips set in cement, epoxy or polyacrylate and then polished. The Terrazo is an economical alternative to solid marble slabs or tiles.

5. Felsite

Felsite is a fine, evenly grained acid or intermediate igneous rock, usually occurring as dykes and veins in country rocks and in the parent

plutonic mass. BIS has prescribed the specification IS:10874-1983 (reaffirmed 2010) for felsite grinding media and liner stones.

The production of felsite at 1,018 tonnes in 2011-12 decreased by 39% as compared to that in the previous year due to lack of demand. There were three reporting mines in current year whereas there were six reporting mines in previous year. Two producers operating three mines accounted for the entire production of felsite during the year. All the mines are located in Mandya and Mysore districts of Karnataka (Tables - 6 to 8).

The mine-head stock of felsite at the end of the year 2011-12 was 4,547 tonnes as against 6,404 tonnes at the beginning of the year (Table-9).

The average daily employment of labour was 15 in 2011-12 as against 30 in the previous year.

Table – 6 : Producers of Felsite, 2011-12

Name and address of producer	Location of mine	
	State	District
Smt. S. Rajee V. Raman, Flat No. G-2, "Srivara Krishan", 3 rd Main Road, V.V. Mohalla, Distt. Mysore, Karnataka.	Karnataka	Mysore/ Mandya
Brindavan Mining Enterprises, Shri J. Madhu No. 165, K.R.S Road, Manti (Mogarahalli), S. R. Patna, Dist. Mandya, Karnataka.	Karnataka	Mandya

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**Table – 7 : Production of Felsite, 2009-10 to 2011-12
(By State)**

(Qty in tonnes; value in ₹'000)

State	2009-10		2010-11		2011-12 (P)	
	Quantity	Value	Quantity	Value	Quantity	Value
India	3049	2464	1670	2420	1018	1854
Karnataka	3049	2464	1670	2420	1018	1854

**Table – 8 : Production of Felsite, 2010-11 & 2011-12
(By Sector/State/Districts)**

(Qty in tonnes; value in ₹'000)

State/District	2010-11			2011-12 (P)		
	No. of mines	Quantity	Value	No. of mines	Quantity	Value
India	6	1670	2420	3	1018	1854
Private sector	6	1670	2420	3	1018	1854
Karnataka	6	1670	2420	3	1018	1854
Mandya	2	722	1493	2	437	1521
Mysore	4	948	927	1	581	333

**Table – 9 : Mine-head Stocks of Felsite, 2011-12 (P)
(By State)**

(In tonnes)

State	At the beginning of the year	At the end of the year
India	6404	4547
Karnataka	6404	4547

TRADE POLICY

As per the export-import policy announced for the period 2009-14; and the Foreign Trade Policy as amended, the imports of slate blocks or slabs whether or not roughly trimmed or merely cut are restricted under heading no. 2514. On the other hand, worked slate and articles thereof or of agglomerated slate can be imported freely under heading no. 6803.

Import of crude or roughly trimmed/cut blocks or slabs of sandstone and other monumental or building stones; viz, Pakur Stone, stone boulders, and others, are restricted under heading no. 2516. However, sets of curbstones and flagstones of natural stone

(except slate) under heading no. 6801 and worked monumental building stone (excluding slate), tiles, cubes and similar articles of natural stone including slate, under heading no. 6802 can be imported freely. Worked slate and articles of slate or of agglomerated slate under sub-heading 6803 can also be imported freely. Exports of stone aggregates which are restricted under Chapter 25, are permitted to be exported to Maldives subject to ceiling limits. The limits are 5 lakh tonnes, 5.5 lakh tonnes and 6 lakh tonnes for the years 2011-12, 2012-13 and 2013-14, respectively. The annual ceilings are monitored by CAPEXIL subject to exporters obtaining appropriate clearances.

WORLD REVIEW

Reserves of slate and other dimension stones are substantial in the world. Spain was the major exporting country for dimension stones in the world. Other important exporters of slate were China, Italy, India and Brazil. Major importers of slate were Germany, UK, USA and France.

FOREIGN TRADE

Exports

Exports of building and monumental stones (NES) increased considerably to 1.63 million tonnes in 2011-12 from 1.27 million tonnes in 2010-11. Quantity-wise, Maldives was the leading buyer sharing 38% in the total exports, followed by Bangladesh (29%) and UK (9%). Value-wise, UK was the leading buyer, contributing 23% to total value of exports, followed by Belgium (13%) and China (11%) (Table - 10).

In 2011-12, the total exports of slate decreased to 113 thousand tonnes from 118 thousand tonnes in 2010-11. Out of the total exports of slate during

2011-12, 20,116 tonnes was of slate (worked), while the bulk of the exports i.e. 93,141 tonnes was of slate (others). The USA was the leading buyer, accounting for over 49% value of the total slate exported followed by UK (10%) and Canada (7%) (Tables - 11 to 13) .

In 2011-12, the exports of sandstone increased to 0.37 million tonnes from 0.3 million tonnes in the previous year. The UK was the leading buyer in 2011-12 with 47% of the total value of sandstone exported followed by Australia with 6% (Table - 14).

Imports

During 2011-12, imports of building & monumental stones (NES) increased to 1.14 million tonnes from 0.91 million tonnes imported in the previous year. Bangladesh was the leading supplier contributing 41% to the total value of imports followed by Nepal (29%).

Imports of slate during 2011-12 were 201 tonnes compared to 89 tonnes in 2010-11. Imports of sandstone in 2011-12 were not reported (Tables - 15 to 16).

Table – 10: Exports of Building and Monumental Stones, NES (By Countries)

Country	2010-11		2011-12	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	1270142	4364630	1630292	6311353
UK	129255	1099719	143719	1451755
Belgium	86071	529666	130243	803851
China	5228	32724	26092	669300
Maldives	407489	421756	617487	570189
USA	10202	338016	37093	488858
Italy	31600	274115	30240	282636
Bangladesh	313104	134780	464667	226029
Germany	18147	148939	27013	220317
France	24550	149707	30908	216019
Canada	4388	70755	7553	156938
Other countries	240108	1164453	115277	1225461

Table – 11 : Exports of Slate (By Countries)

Country	2010-11		2011-12	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	117644	1530571	113257	1534802
USA	42577	712479	48058	748477
UK	20828	164943	16387	147155
Canada	9029	125679	7404	101543
Australia	6727	90963	5358	61954
Germany	967	10832	2838	52072
Italy	2755	26130	3212	49659
Belgium	3270	34013	3042	41321
Netherlands	3948	31420	1734	20003
Mexico	1759	23387	1829	19533
Malaysia	2016	17621	1815	18771
Other countries	23768	293104	21580	274314

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**Table – 12 : Exports of Slate (Others)
(By Countries)**

Country	2010-11		2011-12	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	98581	1110282	93141	1115007
USA	31245	446060	35167	507951
UK	20480	157672	15112	129280
Canada	6943	89225	6275	77270
Australia	5498	67924	4542	44905
Italy	2658	23840	2696	33951
Belgium	2691	25293	2705	26523
Germany	948	9988	2399	21666
Netherlands	3775	29123	1598	18023
Malaysia	1966	16783	1728	16954
Mauritius	1463	21452	1126	16751
Other countries	20914	222922	19793	221733

**Table – 13 : Exports of Slate (Worked)
(By Countries)**

Country	2010-11		2011-12	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	19063	420289	20116	419795
USA	11332	266419	12891	240526
Germany	19	844	439	30406
Canada	2086	36454	1129	24273
UK	348	7271	1275	17874
Australia	1229	23039	816	17049
Italy	97	2290	516	15708
Belgium	579	8720	337	14799
Turkey	153	3377	356	8035
Chinese Taipei/ Taiwan	66	2603	160	4787
Russia	109	2966	120	2996
Other countries	3045	66306	2077	43342

**Table – 14 : Exports of Sandstone
(By Countries)**

Country	2010-11		2011-12	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	304138	3212985	370238	3865872
UK	102433	1368988	166508	1828772
Australia	9790	152895	14061	236903
Belgium	22776	155132	26500	183277
Italy	14974	146110	19193	174311
Canada	10518	125035	10287	158532
Germany	13567	139289	13255	144540
France	17304	106655	22678	127452
USA	8704	93054	8628	113973
UAE	11530	111778	10900	109829
Korea, Rep. of	9764	95733	10263	105955
Other countries	82778	718316	67965	682328

SLATE, SANDSTONE & OTHER DIMENSION STONES

**Table – 15: Imports of Building and Monumental Stones, NES
(By Countries)**

Country	2010-11		2011-12	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	909936	1527459	1137648	1315295
Bangladesh	415090	448431	437409	540816
Nepal	483186	332737	890212	375437
Sri Lanka	30	3020	1806	133743
China	3071	170869	2360	91179
Italy	481	32032	943	35287
Oman	87	3351	989	14568
Germany	32	1627	465	13116
Madagascar	452	7328	249	10842
USA	28	1401	319	10674
Hong Kong	30	1230	198	10423
Other countries	7449	525433	2698	79210

**Table – 16: Imports of Slate
(By Countries)**

Country	2010-11		2011-12	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	89	3678	201	9426
China	72	2578	147	7185
Germany	8	343	7	605
Denmark	-	-	3	583
Japan	-	-	5	429
USA	++	16	2	249
UK	-	-	36	230
Thailand	-	-	1	83
Singapore	1	205	++	35
Hong Kong	++	22	++	19
Turkey	-	-	++	8
Other countries	8	514	-	-

FUTURE OUTLOOK

Slate is mostly used as roofing material, but other uses like cladding and flooring tiles are also gaining momentum. Slates occur widespread in the country and detailed study is required to be conducted to quantify the resources. About 80% production of slate in the country was exported, whereas remaining 20% is consumed in the domestic market. The demand for dimension stones including sandstone & others and stone products is anticipated to grow at around 15% CAGR. A similar growth is also expected in exports.

The demand for artifacts especially carved work is on the rise in all over the world. India with its rich tradition of craftsmanship and trained artisans can embark upon the world scene.

Improved quarrying, finishing and hauling technology, availability of greater variety of stones and the rising cost of alternative construction materials are among the factors that suggest a consistent increase in demand for dimension stones in future.

