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Challenges and opportunities for productive employment and decent work in the natural stone mining industry supply chain in Rajasthan

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ILO Country Office for India
and Sectoral Policies Department

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Preface

The International Labour Organization (ILO) is the United Nations (UN) specialized agency devoted to advancing opportunities for women and men to obtain decent and productive work in conditions of freedom, equity, security and human dignity.

The extraction of both major and minor minerals in Rajasthan, India, provides direct employment to some 7-800,000 people and indirect employment to more than 2.2 million men and women. The State is host to globally significant deposits of natural stone, including granite, sandstone, marble, and limestone. A leader in the exploration, mining, and processing of natural stone, the natural stone industry is a substantial local employer.

This report was prepared as an input for the formulation of a state-wide tripartite sectoral development strategy. It examines possibilities to build on Rajasthan's competitive advantages, advance productive employment and decent work across the natural stone value chain, and make the State a responsible destination for investors and buyers. It provides evidence and analysis of the current activities across the natural stone supply chain; highlights current challenges and emerging trends affecting both domestic and international markets; and identifies recommendations for action by the Government of Rajasthan, employers' and workers' organizations, and buyers and investors.

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Acknowledgements

The report is the result of the combined efforts of the ILO Decent Work Technical Support Team for South Asia and Country Office for India and the Sectoral Policies Department.

The ILO Decent Work Technical Support Team for South Asia and Country Office for India is a centre of technical excellence, which supports all countries in South Asia to realize decent work for inclusive growth and sustainable development.

The ILO's Sectoral Policies Department promotes decent work by supporting the Organization's tripartite constituents – governments, employers and workers – in seizing opportunities and addressing challenges in 22 different economic and social sectors, including mining.

The research on decent work challenges and opportunities in natural stone production in Rajasthan was carried out by Development Solutions. The report was written by Justin van Rhyn, Julia Baxter and Tom Mills (Two Oceans Strategy). They were supervised by Sudipta Bhadra, Camila Meireles and Casper Edmonds. Colleagues in the ILO Decent Work Technical Support Team for South Asia and Country Office for India as well as in ILO Headquarters provided valuable suggestions for improvements.

Valuable contributions were also received from the State Government of Rajasthan, in particular the Department of Industries, the Department of Labour, the Office of the Labour Commissioner, the Department of Social Justice and Empowerment, and others. We also thank our social partners in the State – the Central trade unions and their state wings along with the employers' organizations – whose inputs were incorporated into the design of the study and the findings of this report.

Finally, we would like to express our gratitude to the Government of Flanders for its generous and strategic financial support.

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Acronyms

CAGR	Compound Annual Growth Rate
CDOS	Centre for Development of Stones
CSOs	Civil Society Organizations
DGMS	Directorate General of Mines Safety
DMFT	District Mineral Foundation Trust
DMG	Department of Mines and Geology
ESG	Environmental, Social, Governance
FIMI	Federation of Indian Mineral Industries
GDP	Gross Domestic Product
GRAVIS	Gramin Vikas Vigyan Samiti
HEDCON	Health, Environment, and Development Consortium
IBM	Indian Bureau of Mines
ILO	International Labour Organization
MLPC	Mine Labour Protection Campaign
MMCR	Minor Mineral Concession Rules
MMDR	Mines and Minerals (Development and Regulation)
MoEFCC	Ministry of Environment, Forestry and Climate Change
MSME	Micro, Small and Medium Enterprises
NMP	National Mineral Policy
OSH	Occupational Safety and Health
PPE	Personal Protective Equipment

Executive summary

Executive summary

Rajasthan is host to substantial natural stone resources, with the natural stone extraction and processing sectors providing important sources of income and employment in the state. If risks are managed and the sector further developed responsibly, the mining, quarrying, and processing of natural stone could serve as a key driver of economic development, trade, increased state revenue, employment generation and social development. Mineral policies at both the national and state levels highlight the desire to increase economic output and competitiveness alongside decent work, skills development, and productivity.

This study into the challenges and opportunities for productive employment and decent work in the natural stone mining industry supply chain in Rajasthan has been commissioned by the International Labour Organization (ILO) and financed by the Government of Flanders. It is the product of three stages of research: a desk-based literature study; qualitative and quantitative field research in two production clusters in Rajasthan; and a synthesis of findings, providing international context and expanding on areas relevant to policy development. The study is intended to contribute to a wider state-level sector development strategy, which will serve as a roadmap for creating an enabling environment for employers and workers to further Rajasthan's position as a responsible destination for investors and buyers of natural stone.

While other natural stones comprise a large part of the sector, the report focuses on sandstone, granite, and marble, as Rajasthan is a lead producer of those three minerals.

Rajasthan is a potential global leader in the exploration, mining, and processing of natural stone

Rajasthan is the top producer of minor minerals in India, with an annual revenue contribution of INR 98.7 billion (US$ 1.35 billion)[1] and is the leading domestic producer of marble, sandstone, and limestone. The sector is a substantial employer in Rajasthan and contributes to the generation of jobs for about 12 million women and men who enter India's workforce each year. The natural stone value chain involves multiple actors across extraction, transportation, handling, trading, processing, refining, and sales to domestic and international markets. Demand for natural stone is linked to the growth of the construction sector, due to natural stone's principal uses in flooring, wall cladding and its use for decoration and monuments. A secondary market for natural stone includes inputs into building materials such as aggregates and cement. There are substantial differences in productivity per stone type, with granite generating the greatest economic value per worker and marble the largest revenue per lease.

The value chain is fragmented, relational, focused on reducing costs and characterized by limited vertical and horizontal coordination

There are two sides to the value chain for natural stone. The first comprises large and formal sector actors, including the largest quarries, integrated mining and processing firms and large wholesale traders and exporters. The second is a fragmented ecosystem of micro- and small-scale actors, many of which operate informally. Since these operate outside formal reporting structures, the exact size of the informal component is difficult to measure. This informality is largely a consequence of high start-up costs for formal production, complicated licensing, limited enforcement of legislation, and low levels of supply chain transparency.

The value chain itself can be classified as relational, with trade built around trust, and producers and processors relying on long-term business relationships with buyers. Formal, codified information exchange along the value chain (for example on prices, market dynamics, buyer preferences) appears to be relatively

1 UN exchange rate: USD 1.00 = INR 73.04

limited. The research team also observed limited evidence of horizontal coordination: respondents reported limited awareness of the work of trade associations, and there was limited evidence of active cooperatives or effective industry clusters. The research did not identify any widespread provision of embedded services or preferential financial arrangements between actors at different stages in the value chain.

Although mechanized production, processing and loading is increasing, manual labour is still used extensively. While mechanization has the potential to increase productivity, the transition must be just, with skills development and social protection, and a strategy in place to manage job replacement caused by mechanization.

While there were examples of some buyers investing in building inclusive and sustainable supply chains, this is still not reported as the norm. Furthermore, exporters highlighted that they did not usually receive premiums for ethical conduct with international buyers. Instead, incentives were focused on repeat business, large volume orders, timely payments, and the satisfaction of following ethical practices.

Lastly, there is limited centralized official data available on statistics such as employment, mine and quarry production, and prevalence of child and forced labour. This creates challenges for trend analysis, monitoring and enforcement, and for economic planning. The generation, updating and sharing of good quality, timely, and relevant data will be an important component in a future sector development strategy.

Although an extensive legislative framework exists there are challenges related to the cost–benefit of compliance

The institutional framework formally governing the sector is divided between a range of institutions at the district, state, and central levels. Due to natural stone's status as a minor mineral, its extraction is regulated at the state level. Health and safety of mine workers, however, is the responsibility of the central Directorate General of Mines Safety (DGMS). Challenges with regard to coordination and transfer of information between institutions, and between the state and central governments, have affected the overall governance of the sector.

A large proportion of the sector's operations are outside the legislative or institutional framework, due in part to low enforcement. This is a consequence of limited coordination between institutions, capacity constraints in the enforcing authorities, and unclear division of rules between major and minor minerals, resulting in limited inspection of sites. Another factor is the high cost and low benefit of compliance for mine and quarry owners. Respondents highlighted that the costs of compliance often outweighed the risk of detection and penalties of non-compliance. In response, the TruStone Initiative (International Responsible Business Conduct n.d.) and the Ethical Trade Initiative, among others, have developed voluntary standards and agreements to fill these governance gaps.

Workers typically operate in high risk environments with no access to social protection, a limited voice and low skills development

Despite a relatively comprehensive legal framework, most employment in the sector is informal, with research highlighting limited formal contracting, records of employment, and formal proof of salary. This informality, combined with low levels of awareness among workers, has limited uptake of social protection measures. For example, the research showed that only 21 per cent of survey respondents working in mines and 29 per cent of those working in processing units had access to the Provident Fund, a public savings and tax saving instrument, while 7 per cent of processing unit workers reported being provided with Employee State Insurance facilities.

Wages reported to the research team were generally on a par with, or higher than, state-level minimum wages, but lower than the centrally set minimums. Respondents also reported that state minimum wages fell short of a living wage (i.e. the minimum required to meet essential costs). Workers are generally paid on a transactional, low-commitment basis, with day-rate arrangements in cash being the most common.

Women reported being assigned to some of the lowest-paying jobs in the sector, and on average were paid less than men both in production and processing roles.

Natural stone workers face occupational safety and health (OSH) risks including lung diseases, such as silicosis, and personal injury. It is likely that cases of both are under-reported. Worker compensation was reported as difficult to claim. Employers are reported as facing few reprisals for OSH breaches since most processing units are in the informal economy and policy has traditionally focussed on victim compensation, rather than prevention. Developing a preventative OSH culture and introducing the principles of safety and health management systems are important steps towards improving OSH across the sector.

Skills development in the sector is limited, which has reinforced a low-wage, low-productivity cycle with limited mechanization of production methods. The research highlighted that there were no formal training or qualifications reported by those surveyed; appetite for skills development was low among workers and employers alike. There are few to no wage premiums for higher skills and greater experience, which disincentivizes investment in skills over time.

Bodies representing workers, for example trade unions, were reported to have relatively low membership: just 7.5 per cent of production and processing unit workers reported being members, and there was limited awareness of services reported among workers. The employers surveyed generally viewed unions with suspicion. These factors limit unions' ability to engage effectively both with employers and government counterparts. Workers generally reported being reluctant to complain directly to their employers for fear of repercussions.

While it is difficult to assess the scale of child labour, secondary sources indicate that it has been prevalent in the sector. Any future sector development strategy should specifically address this issue, from both the legal and human development perspectives, and because of the damage this practice can have on how the sector is perceived internationally.

The export market represents substantial opportunities for revenue growth

In the international market place natural stone is experiencing a threat from ceramic and engineered tiles and artificial stone which are produced at a lower cost. However, natural stone maintains a competitive edge at the upper end of the market due to its authenticity and uniqueness.

Over the past 10 years, countries that are not members of the Organisation for Economic Co-operation and Development (OECD) have constituted the largest growth market for natural stone, in particular Indonesia, Saudi Arabia and Viet Nam. However, the United States and Europe still account for over half of the market for natural stone. India is in competition with China for market share, with China providing 40 per cent of the exports of natural stone for the international market. While China's unit price has increased over the past 10 years, India's has declined. Purchase of natural stone by OECD Member countries has been at a higher unit price than non-Member countries. Viet Nam, a non-Member country, is India's largest growth market for natural stone.

The trade war between the United States and China presents a significant opportunity for India, particularly if it can meet expectations of public and private buyers in the United States and the European Union with regard to responsible business practices. At the same time, the impacts of the COVID-19 pandemic on the market for natural stone are likely to be far reaching, and will include potentially reduced international demand, restricted trade flows, and limits on the movement of people.

Sustainable production will be key to realizing export growth to the United States and European markets

The global focus on sustainable production and responsible purchasing and sourcing practices has gained increasing momentum over recent years. Consumer demand for transparency and assurances as to the

provenance of resources and materials is growing. Evidence is increasingly required by international purchasers to demonstrate that materials are sourced responsibly. The scope of various responsible sourcing practices ranges from information only (identify the origin of all goods), to adherence to standards on how goods should be sourced.

This study will inform an evidence-based strategy for the sustainable development of the natural stone mining industry, which will be key to creating an enabling environment for employers and workers to make Rajasthan a responsible destination for international investors and buyers of natural stone.

1 Introduction

1. Introduction

Chapter highlights

- Rajasthan is a leader in the exploration, mining, and processing of natural stone.
- Demand for natural stone is linked to the growth of the construction sector, due to its principal uses for flooring, wall cladding and its use for decoration and monuments. A secondary market for products exists, including inputs into the cement and aggregates industries.
- The sector has the potential to catalyse economic development and foster decent work. There are, however, significant social, economic, and environmental risks that need to be mitigated.
- The sector is a substantial employer in Rajasthan, which contributes towards providing employment for a large number of individuals entering the workforce each year.
- Production and employment data are limited, which poses challenges for trend analysis. There are substantial differences in productivity per stone type, with granite generating the greatest economic value per worker and marble the largest revenue per lease.

1.1 Project overview

The International Labour Organization (ILO), in partnership with the Government of Flanders, is supporting the formulation of an evidence-based, gender-responsive state-wide strategy to support the development of a globally competitive, sustainable, and responsible natural stone industry in Rajasthan.

This strategy is intended to respond to current and emerging trends and will focus on revitalizing and fostering inclusive growth and decent work in the industry, with a focus on export markets. The aim is to generate productive employment and decent work along the domestic and global supply chains. The strategy is intended to be a tool for engaging and aligning stakeholders around a vision, roadmap and interventions to create an enabling environment for employers and workers.

Rajasthan is host to globally competitive deposits of natural stone, including granite, sandstone, marble, and limestone. The extraction, processing, trading, and domestic and international sales of natural stone are an opportunity to catalyse broad-based economic development and foster decent work in the state, with the sector having the potential to generate substantial export revenues and provide jobs for a growing workforce. Realizing this opportunity will require strong governance and management of the significant social, environmental, and economic risks inherent in mineral extraction and processing.

An evidence-based strategy for the natural stone sector in Rajasthan will be a starting point for renewed efforts to advance decent work in the industry and make the state a responsible destination for investors and buyers of natural stone.

1.2 Study purpose and scope

This study has been conducted to contribute to the formulation of a wider sector development strategy. It provides evidence and analysis of current activity across Rajasthan's natural stone value chain. The study report highlights current constraints and, where possible, identifies recommendations for action by workers' organizations, employers' associations, buyers, investors, and the Government of Rajasthan.

The study report is divided into six chapters. Chapter 1, **Introduction** provides a snapshot of the structure of the natural stone industry in India and Rajasthan and key employment and production trends. It presents the demographic dimensions of the sector and gives an overview of the employment market.

This information sets the scene for an analysis of the market system of Rajasthan's natural stone industry, which is presented in Chapter 2, **Market system of the natural stone industry in India and Rajasthan**. Chapters 3, **Institutional and regulatory frameworks governing the natural stone industry in India and Rajasthan** and 4, **The state of decent work,** provide additional analysis on these key components of the system. Chapter 5, **Trends in international markets**, discusses international market drivers, current purchasing practices of buyers and the direction of travel of international purchasing of natural stone. Chapter 6, **Conclusion**, sets out the constraints and opportunities brought to light by the study.

1.3 Study methods

The research was carried out in three distinct phases:

i) **Desk research:** Available literature was gathered to provide a framework for the primary data collection process, including laws, sector data and market trends.

ii) **Field research:** A total of 43 mine and processing unit owners and 115 mine and processing unit workers were interviewed using both quantitative, closed-end questioning and broader qualitative, in-depth focus group discussions. These individuals were concentrated in two extraction and production clusters in Rajasthan: Kota-Bundi and Udaipur-Rajsamand (highlighted in Figure 1). Qualitative data was collected through in-depth interviews with government officials, trade unions, non-governmental organizations (NGOs) and international buyers and communities around mine sites.

▶ **Figure 1: Location of field research**

iii) **Research collation and development of policy implications:** The desk and field studies (referred to within the study as "the research"), conducted by a local research group, were synthesised, analysed and set in the global context by an international team. Policy implications were developed at this stage.

Notable limitations

The following limitations, data gaps, and caveats apply.

1. The study is based on primary research, which focused on production and processing and relied on a relatively small sample of respondents in a limited geographic area. The research did not assess pre-production, natural stone trading, or end markets in depth.
2. The research team reported challenges with regard to sourcing good quality commercial information from the market actors surveyed and interviewed. The report therefore relies on estimates and extrapolation of secondary sources to fill commercial data gaps, where possible.
3. The sector – particularly when it comes to the multitude small-scale and informal actors – is opaque, which poses significant challenges for accurately investigating trading norms, power structures, adherence to laws and regulations. Those interviewed were primarily members of the formal value chain. The informal element, which constitutes a significant proportion of the natural stone sector, was not included.
4. The research design combined several subsectors (granite, marble, and sandstone) under a single natural stone value chain and did not consider limestone. Where possible, if significant differences exist, distinctions have been made between subsectors.
5. Analysis of Rajasthan's international exports of natural stone was limited by the aggregation of data at the national level.

6. Employment data for the sector, even at an aggregate level, was limited, with significant differences between secondary source estimates. There was no reliable disaggregated employment data, such as by sex, age, function, trade or skill level. While estimates are provided, the generation of accessible and timely data on employment and decent work is recommended as an important area for follow-up.
7. Likewise, wage data was not consistent, with the primary research yielding higher estimates than the consensus from the secondary literature.

Despite these caveats, it is possible to draw meaningful conclusions from the work and to develop a set of workable recommendations for developing the sector.

1.4 Overview of the natural stone industry in India and Rajasthan

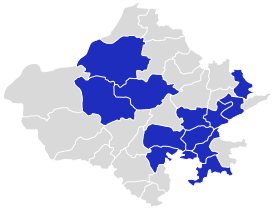
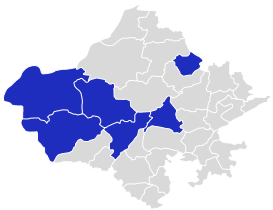
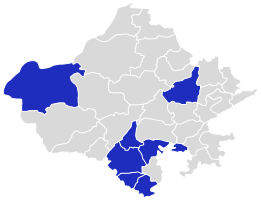
Natural stone is a mined (underground) or quarried (above-ground) material that includes common stones such as granite, limestone, marble, sandstone, slate and travertine, among others. Natural stone can vary in colour, size and physical and chemical composition and properties. Natural stone is classified as a minor mineral.

Natural stone is prized for its aesthetic beauty and comprehensive strength and durability. The end uses of natural stone are focused on construction, decoration (such as stone carvings) and monuments. Nearly 75 per cent of the production of natural stone is used for masonry stone.

Types of natural stone and uses

India is globally competitive in the exploration, mining, and processing of natural stone, with an estimated resource size of 1,690 million cubic meters and home to half of the globally traded natural stones varieties. Indian natural stone ranks third after China and Italy for exports (Agarwal and Gaharwar 2013, 362).

▶ **Table 1: Details of natural stone in Rajasthan**

Sandstone	Rajasthan sandstone is used extensively in construction, especially for laying pavements, due to the grip of the surfaces. It conforms to the highest international standards and has been used in well-known buildings all over the world. Most of Rajasthan's sandstone is produced for the domestic market.	**Sandstone mining districts** 
Granite	Granite has the greatest importance in terms of overseas demand. The natural stone is used extensively for monuments, flooring, wall, and surface cladding. Granite is India's main export stone.	**Granite mining districts** 
Marble	Rajasthan produces the highest quality Indian marble; India's marble industry is concentrated in the state. Marble is predominately used for housing construction, columns, flooring, steps, and cladding.	**Marble mining districts** 

Rajasthan is host to 79 varieties of minerals and produces 9 per cent of the country's total mineral production. Natural stone is a key component of Rajasthan's mining sector, with the state renowned for its deposits of granite, marble, sandstone and unique decorative stones (Table 1). These stones have been used in some of the world's most well-known architecture, including the Taj Mahal.

Rajasthan is the second most geologically prospective state in India after Odisha. In 2017–2018, Rajasthan was the top producer of minor minerals in India, with a revenue of INR 98.7 billion (US$ 1.35 billion)[2] and accounted for 18.3 per cent of the country's natural stone production (Government of India, Ministry of Mines 2019, 16). The state is the leading producer of marble, sandstone, and flaggy limestone (Kota stone) in India and is increasing its production of granite. Official records suggest that there are over 4,014 leases and 12,869 hectares mined for sandstone, marble, and granite in Rajasthan, which correspond to 0.04 per cent of the state's land (Government of Rajasthan 2018). Wall cladding and flooring represent a large part of the market for Rajasthan's natural stone.

Other states in India producing commercially viable natural stone include Andhra Pradesh, Bihar, Gujarat, Karnataka, Madhya Pradesh, Maharashtra, Orissa, Rajasthan, Tamil Nadu, Uttar Pradesh, and Telangana.

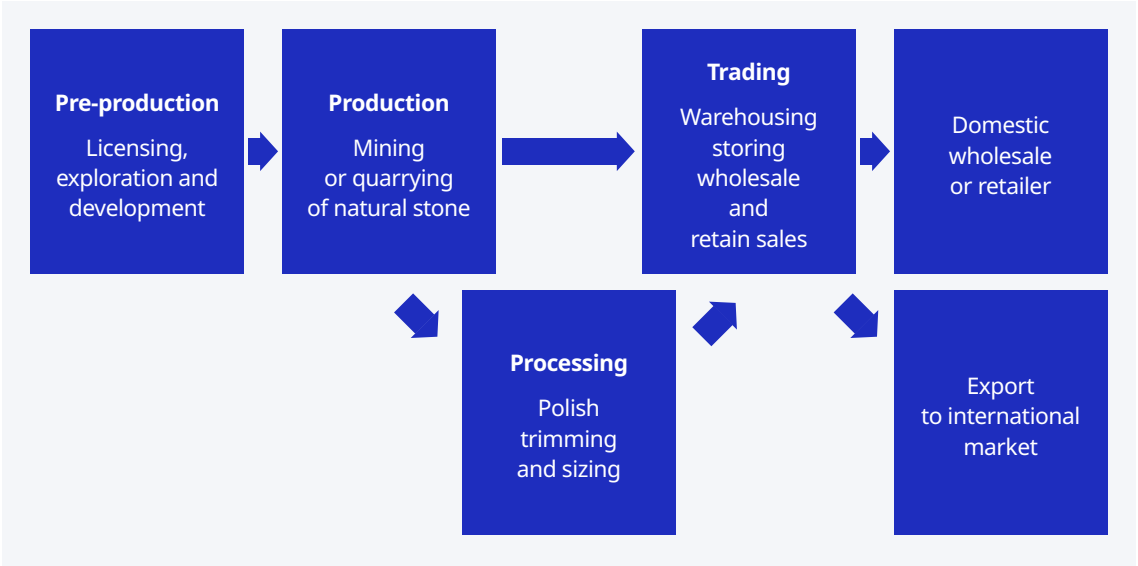
1.5 Value chain overview

The natural stone value chain involves multiple actors across the following activities: extraction, transport, handling, trading, processing, refining and sales to the domestic or international market (Figure 2).

The Government of Rajasthan conducts geological exploration to identify blocks of land that are geologically prospective and economically feasible. These blocks are licensed to private firms on a lease through auctions to extract the stone owned by the state. In return, private organizations pay the state a royalty, rent and taxes.

The sector is characterized by small producers of natural stone who sell to processing units for further value addition, or to traders for the domestic market. Many quarries operate outside formal governance structures (Siddiqui and Lahiri-Dutt 2015, 27). Mechanization is limited and extraction is often carried out by hand (Marshall, Taylor and Balaton-Chrimes 2016, 18).

▶ **Figure 2: Overview of the structure of the natural stone industry**



2 UN exchange rate: USD 1.00 = INR 73.04

Larger and more mechanized mines can access interstate or international export markets. Quarry and mine owners are generally not involved in retail activities, processing or exporting of natural stone. Sizing is important to buyers and quarried natural stone is roughly sized or trimmed to meet the specifications of particular buyers. Waste rock is processed into cobbles that are sold on to local traders or exporters. Unlike other more mutually interchangeable mined commodities, the quality of natural stone varies widely. The quality of the product and the value it can generate are determined by the underlying geology of the license and the processing methods used.

Buyers of natural stone tend to be traders with collection warehouses in towns and cities in Rajasthan, such as Kota, Jaipur, or New Delhi (Madhavan and Raj 2005, 5-10). Alternatively, some processing units process and polish the stone or develop it into decorative products for domestic and international markets.

Buyers sell the roughly cut product to domestic or international customers. Although there is a sizable export market, most natural stone is consumed domestically. International buyers, particularly in Europe and the United States, are especially concerned with the quality of the stone, its sizing, and ensuring responsible production. Exports have risen substantially over the past 10 years. China is a large competitor in the international marketplace.

This brief overview of the natural stone value chain is expanded in Chapter 2, and further analysis of the export market is provided in Chapter 5.

▶ Box 1: Potential impacts of COVID-19 on Rajasthan's natural stone sector

The desk and field research undertaken for this study was completed prior to COVID-19 being declared a global pandemic. It therefore does not include reference to the potential impacts of COVID-19 on Rajasthan's natural stone sector. The social, economic, and political implications of the pandemic, like for almost all other industries, are, however, likely to have far reaching consequences for Rajasthan's natural stone sector. Rajasthan is not a single market and therefore cannot be isolated from the global and external impacts of COVID-19.

Possible impacts on productivity, market and decent work in the sector are outlined below.

- **Domestic or international demand.** Demand may be influenced by recessionary impacts reducing construction and refurbishment activities due to the reduction in global economic growth. Urban spaces may also become less popular, impacting urbanization trends. This impact may be cushioned by substantial monetary and fiscal stimulus packages, focused on investment in infrastructure in some countries. Alternatively, hygienic stone products, which can be easily cleaned, may be in greater demand, with the potential for an increase in demand for monumental stone due to an increase in death rates.
- **Availability of labour** may be substantially impacted by the reverse migration being experienced from sites of industrial activity to rural homelands.
- **Increased protectionism** may increase non-tariff barriers and decrease the ease of flow of goods across countries.
- **Regulation of working conditions** to ensure safe working may also limit the productivity of operations.

These national and global trends may present both constraints and opportunities for Rajasthan's natural stone sector. The State Government of Rajasthan has set up a task force and developed a roadmap to restart the economy in the state following the state-wide lockdown (Government of Rajasthan 2020a).

It is currently too early to understand the full implications of the global pandemic and the myriad of additional impacts that will emerge. Further research should, however, be conducted at a suitable time to ensure that the policy implications highlighted in this study remain appropriate and future-proof.

1.6 Employment

There is currently no agency providing detailed employment data across the whole value chain. There have, however, been several estimates of natural stone-related employment in Rajasthan. In their study into mining and quarrying households, Siddiqui and Lahiri-Dutt's estimate that 184,000 households in Rajasthan earn their primary income from mining and quarrying activities, the majority in natural stone. These activities include miners, shot-firers, stone cutters and carvers, as well as mining and construction labourers, transport workers and freight handlers. This is estimated to represent 415,700 people based on average household size, with 1.5 per cent of households in Rajasthan earning their primary income from mining and quarrying (Siddiqui and Lahiri-Dutt 2015, 30).

Focusing only on mining activities, the Government of Rajasthan estimated that mining of both major and minor minerals provides direct employment to 700,000–800,000 people and indirect employment to more than 2.2 million people (Government of Rajasthan 2015, 8). There is no data on the number of individuals employed in natural stone processing units (Marshall, Taylor and Balaton-Chrimes 2016) or a breakdown of employment by occupation along the value chain.

▶ **Table 2: Overview of employment and productivity related to quarrying in Rajasthan, by stone type**

Natural Stone	2015–16	2016–17	2017–18	Average US$ produced per worker	Average production per worker (tonnes)	Proportion of workforce by stone type
Sandstone	68,322	48,397	49,762	2,150	285	54%
Granite	7,810	7,447	10,817	9,614	287	12%
Marble	32,944	17,469	31,570	6,937	418	34%

Source: Government of Rajasthan 2018, Research Team Analysis

Most workers are concentrated in the sandstone subsector, which accounts for more than double the number of people estimated to be employed on average in the marble subsector and more than six times the number for granite. Sandstone is estimated to generate the highest economic output per worker, despite production per worker being comparatively low (Table 2).

District-wide employment data highlights a geographical concentration of labour in natural stone mines and quarries. Bhilwara and Jodhpur districts contain a large concentration of sandstone mining in the state. Granite mining is heavily concentrated in Barmer and Jalore districts, which account for over 62 per cent of labour. Marble quarrying and mining employs nearly half the working population in Naguaur and almost a third in Rajsamand. There is no data available on the number of individuals employed in natural stone processing units (Marshall, Taylor and Balaton-Chrimes 2016, 18).

1.7 Production and trade

Mineral production is a key contributor to the economy of Rajasthan. Rajasthan accounts for 90 per cent of the country's total production; the state expanded the production of minor minerals almost one hundred times between the early 1960s and 2014 (Government of Rajasthan 2015, 8). To date, however, mining and the natural stone sector have only made minor contributions to Rajasthan's gross domestic product (GDP), with the entire formal mining sector contributing just 4.4 per cent to the state's GDP in 2015 (Singh 2007, 159). When combined with the informal economy, however, this proportion is likely to be significantly higher, since the informal economic contribution is not counted in GDP calculations.

▶ Table 3: Production of natural stone, 2015–2018 (million tonnes)

Natural Stone	2015–16	2016–17	2017–18
Sandstone	15.2	12.0	14.1
Granite	2.6	3.8	3.1
Marble	15.7	13.5	13.2

Source: Government of Rajasthan 2018

Under the Mineral Conservation and Development Rules, 2017, it is mandatory for all miners, traders, stockists, exporters, and end users of minerals to register and report on the production, trade and use of minerals to the state government and the Indian Bureau of Mines (IBM). Data gaps in the IBM's annual reports, however, show that this reporting often does not occur.

▶ Table 4: Overview of lease and production in Rajasthan, for 2017–2018, by stone type

Natural stone	No. of leases	Area under mining (in hectares)	Production (in million tonnes)	Sale Value (in US$ millions)	Numbers employed	Number of districts where quarrying occurs
Sandstone	1,167	6,838	14.1	107	49,762	14
Marble	1,754	3,110	13.2	219	31,570	20
Granite	1,093	2,921	3.1	104	10,817	17

Source: Government of Rajasthan 2018

Based on the above data, the average lease size is 3.2 hectares and each lease produces an average of 7,600 tonnes per year. This production volume is three times smaller than the average natural stone quarry size in the United Kingdom, which produces 23,809 tonnes per year.

As Table 4 illustrates, sandstone has the largest physical area of mining activity in Rajasthan, constituting 10 per cent of the global production and 70 per cent of India's sandstone production. Although most of this sandstone is sold in India, there is a large international market for Rajasthan sandstone, especially focused in the United Kingdom. This is described in greater detail in Chapter 5. In contrast to the concentration of sandstone in Rajasthan, 80 per cent of India's granite (20 per cent of global reserves) is located in other states. Rajasthan accounts for 63 per cent of India's marble reserves.

Although sandstone has the largest physical area of mining activity in Rajasthan (6,838 hectares) the value of its sale is half that of marble, which contributes around 30 per cent of the revenue from natural stone. As Table 2 illustrates, however, that the quarrying and processing of granite generates the greatest economic productivity: on average US$9,614 generated per worker per year. Further investigation would be useful to understand the reasons for the differences in productivity between the three subsectors.

▶ Table 5: Productivity per lease and employee

Natural Stone	Number of mining or quarrying leases (2017/18)	Average workers per lease	Average production per lease per year (tonnes)	Average revenue per lease per year (US$)
Sandstone	1,167	43	12,168	91,688
Marble	1,754	18	7,526	124,857
Granite	1,093	10	2,836	95,151

Source: Government of Rajasthan 2018

Sandstone leases are highlighted as producing the greatest quantity of stone per lease. Data suggests, however, that marble generates the highest revenue per lease. To develop a natural stone strategy for Rajasthan, the reasons for these differences in productivity per worker and lease need to be identified and understood. Building on this analysis, further information on trade and export is provided in Chapter 5.

2 The natural stone market system in Rajasthan

2. The natural stone market system in Rajasthan

Chapter highlights

- **Natural stone is a value chain of two halves.** It comprises, on the one hand, a large and fragmented ecosystem of micro- and small-scale actors, and on the other larger, formal sector actors, including the largest quarries, integrated mining and processing firms, and large wholesale traders and exporters.
- Actors compete at all stages of the value chain, **predominantly on price** (and to some extent quality), which in the informal economy in India creates incentives to push down overhead costs, sometimes to the detriment of workers and the environment.
- **For most labourers in the sector**, wages are low, employment is insecure, OSH risks are significant, and there are limited prospects for economic or social advancement. These issues are particularly acute for women and vulnerable groups.
- **There are limited incentives to operate ethically.** Exporters surveyed did not report receiving premium prices from top-market international buyers. The incentives they mentioned to keep working with these buyers were continued business, large volume orders, timely payments, and the satisfaction of following ethical practices.
- **Many mines and quarries operate informally** due to high start costs for formal production, slow and complicated licencing or registration, limited enforcement, and limited supply chain transparency.
- Natural stone is a **relational value chain** under the governance typologies developed by Gereffi, Humphrey & Sturgeon (2005). Trade is predominantly trust-based, with most producers and processors reporting that they rely on long-term business relationships with their respective buyers. Any sector development initiatives need to consider and navigate this network of deep-rooted relationships, recognise and leverage the power of lead firms, and put specific emphasis on behaviour change interventions.
- While the **use of technology**, such as mechanized production, processing, and loading, is increasing across the sector, there is still extensive use of manual labour. Increasing mechanization has the potential to boost labour productivity, cut production costs, and drive up product quality and consistency. This must be coupled with a sector skills development strategy and recognition that increased mechanization is likely to reduce aggregate employment.
- The primary research pointed to limited formal **horizontal coordination** in the natural stone sector, with high levels of fragmentation (thousands of micro- and small-scale mines and processers). Associations, where they exist, are generally reported to be under active. There were no examples of effective cooperatives identified, and the research found limited evidence of producers or processers clustering to share resources and information.
- **Vertical coordination** in the sector appears more developed where longstanding trading relationships exist, although the extent to which this drives value chain performance is uncertain. The prevailing attitude seems to be “don’t ask, don’t tell” when it comes to market actors understanding the activities of up and downstream partners. There were no embedded services or preferential financing arrangements identified.
- There is limited formal **exchange of information** along the value chain and between actors, for example relating to buyer preferences, price drivers, market conditions, and new business opportunities. There is also limited centralized, official data on key industry statistics, such as employment, mine and quarry operations, and child and forced labour.
- Despite a relatively complete **legal and regulatory framework**, compliance by sector actors is low.

2.1 Introduction

This chapter maps and analyses the natural stone market system in Rajasthan (Figure 3), with the aim of identifying binding constraints to inclusive and sustainable sector growth and decent work. Understanding these constraints and their root causes provides a solid foundation on which to develop lasting solutions. The analysis follows a market systems approach (see Box 2) that considers both the core value chain and a wider set of factors, including infrastructure, regulations, skills, and social norms, which influence the competitiveness of the sector, how it serves (or doesn't serve) the needs of its stakeholders – particularly the poor and marginalized – and how it impacts the natural environment.

Throughout the analysis, the aspects set out below have been kept in mind.

A tight focus on target groups. For this study, the primary target groups are poor and marginalized women and men, predominantly engaged as workers. The aim is to understand how effectively these target groups can participate in the natural stone market system, for example accessing opportunities for decent work, developing their skills, entering new markets, coordinating and collaborating, and responsibly generating commercial and societal value. There is also a need to understand the specific and additional challenges faced by women and other excluded groups.

The vital role of businesses of all sizes in the sector as employers, investors, and buyers. This includes supporting entrepreneurs in identifying and seizing new commercial opportunities, creating new, decent jobs, and investing in technology and their workforces to boost productivity and operate in a responsible and sustainable way.

A shared definition of market (under)performance. A key aspect of market system performance is how effectively it creates economic opportunities, full and productive employment and decent work, and how effectively target groups can access those opportunities. Market performance also includes other elements: the overall competitiveness of Rajasthan's natural stone sector on the domestic and international stage; how effectively the market system enables firms to innovate, invest and grow; and the impact of the sector on the environment. By developing a shared definition of market performance (and underperformance), stakeholders involved in developing Rajasthan's natural stone sector can focus their energy and resources on overcoming a shared set of challenges.

▶ Box 2: Value chains and market systems

A value chain "describes the full range of activities that are required to bring a product or service from conception, through the intermediary phases of production and delivery to final consumers, and final disposal after use" (Kaplinsky & Morris 2001, 4). Analysing the core value chain involves understanding the actors and the roles they play, determining value addition and financial flows, analysing linkages and relationships between value chain actors, and considering the role of target groups at each stage.

Value chains do not operate in isolation but are part of wider **market systems**. A market system is the interconnected network of actors and factors that interact to shape the outcomes of an economic exchange. These exchanges are governed by a variety of:

- **Supporting functions.** The context and sector-specific functions that inform, support, and shape the quality of exchange, such as information, skills, infrastructure, finance, and access to markets.
- **Rules and norms**. The legislative and regulatory environment, including policies, voluntary standards and social norms that guide day-to-day attitudes and conduct.

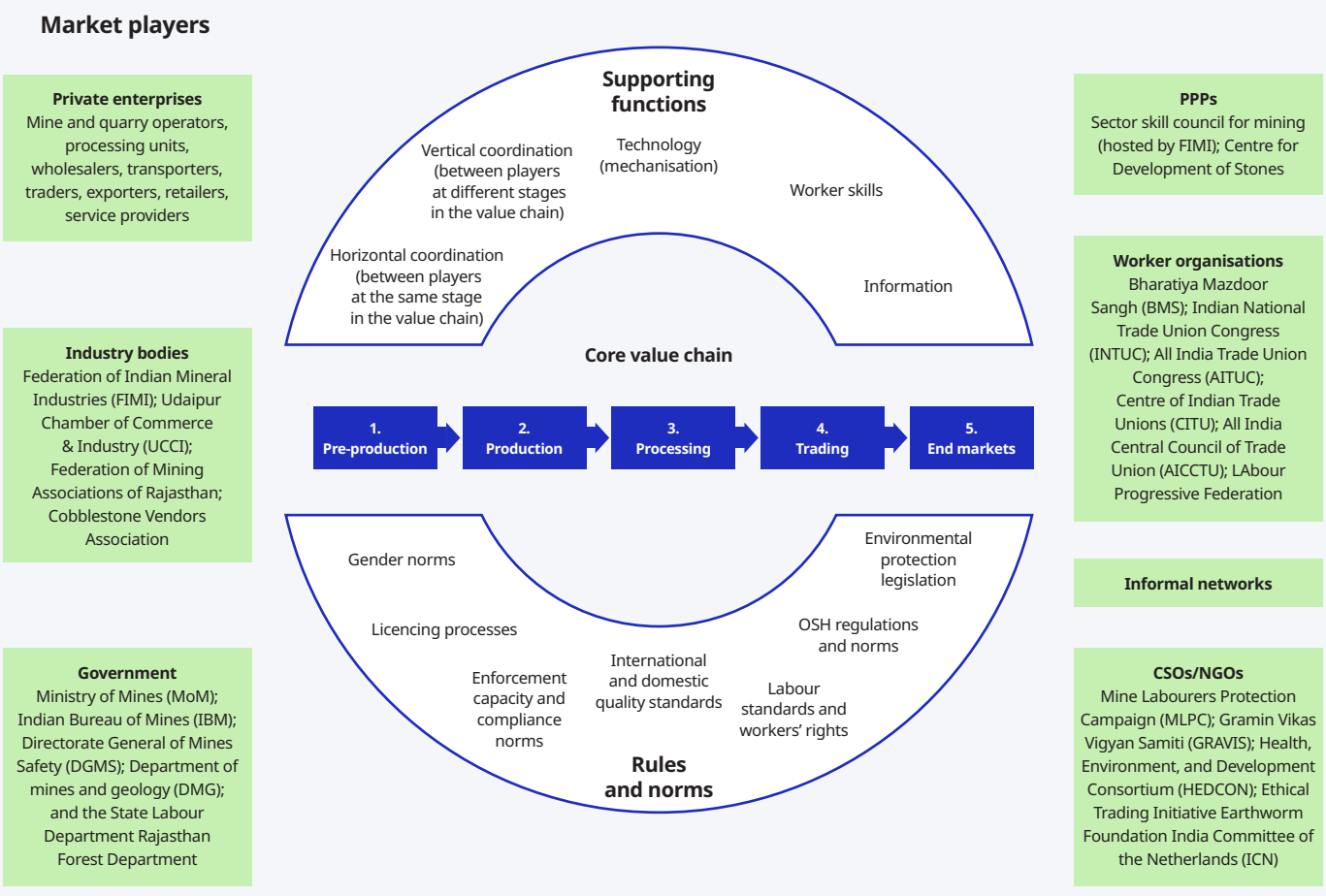
Supporting functions and rules are carried out by a wide range of **market actors**, from businesses to financial institutions, trade unions, trade associations, regulators, and government agencies. When certain rules or functions do not operate well, a market system constraint is

created, which reduces both the effectiveness of the system and the value captured by the people and market actors involved in the transaction.

Market systems development aims to create positive **systemic changes**. A systemic change takes place when there is a lasting improvement in one or more market system constraints, which leads to improved outcomes for target groups, whether they are workers suffering from poor safety and health conditions, or young people excluded from the labour force. This includes discovering why market actors have not addressed such constraints themselves, and then working on improving their incentive and capacity to perform new or improved roles.

A market system diagram for natural stone in Rajasthan is presented below. In the remainder of the chapter, the core value chain is reviewed, followed by important supporting functions, rules, and norms. Given the importance of **formal rules** (policies, laws and regulations), **labour** (particularly from a decent work perspective) and **end markets** to the natural stone market system, each is covered in-depth in chapters 3, 4 and 5 respectively.

▶ **Figure 3: The natural stone market system**

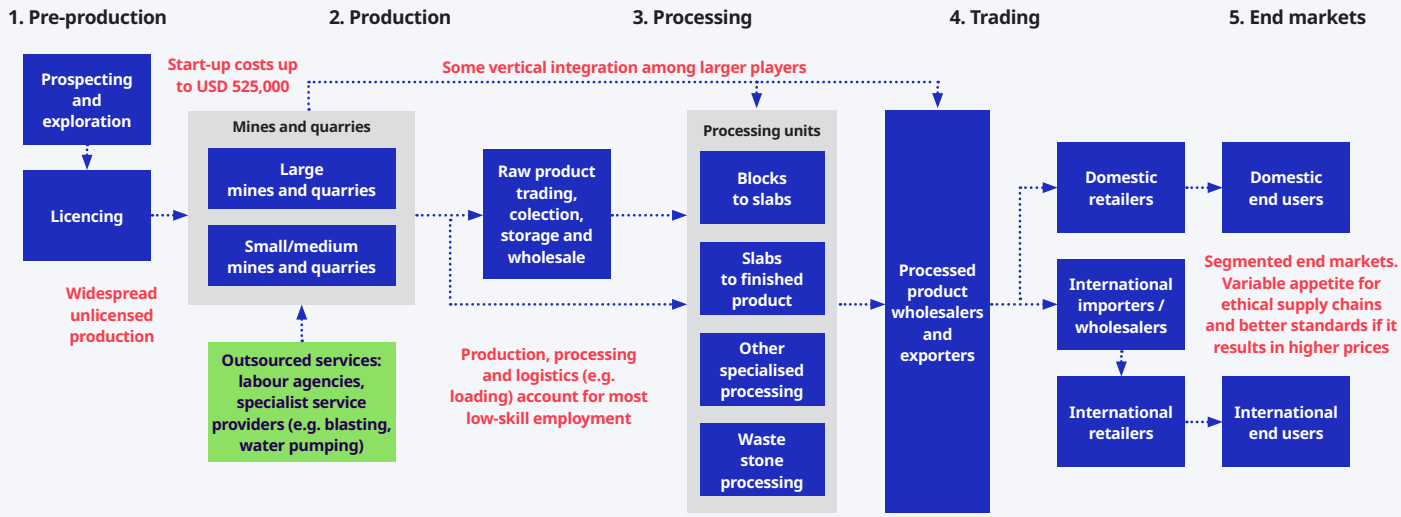


2.2 Core value chain structure

As mentioned in Chapter 1, according to the primary research, the natural stone value chain is an amalgam of several subsectors, notably marble, sandstone, and granite. While differences exist between these subsectors, there are enough similarities, both in terms of general value chain structure and supporting functions and rules and norms, to make meaningful analysis possible. Nevertheless, it is recommended that any future sector development strategies are validated to ensure that the specific needs of each subsector are taken into account. It is also important to consider that laws and regulations differ by value chain stage: minor mineral laws and regulations apply to mining sites, while processing units operating formally are covered by industrial law.

There are five main stages in the natural stone value chain (Figure 4). The **pre-production stage** includes prospecting and exploration as well as the award of mining and quarrying licences. At the **production stage**, raw product is extracted by a range of operators (large and small, formal, and informal) using a variety of techniques depending on the stone itself and sophistication of the mine or quarry operator. **Processing** is performed by another diverse set of actors, including a high number of smaller, specialist processing units. Processed product is **traded** domestically and finally sold on to **end users** in India or exported internationally. Each of these stages is covered below in more detail.

▶ Figure 4: Natural stone mining value chain map



The overall picture that emerges is a value chain of two halves.

On the one hand, there is a large and fragmented ecosystem of micro- and small-scale actors (comprising 90 per cent of the sector (Gunasekaran and Manicandan 2009, 32), which is reliant on manual labour and competing predominantly on price, often offering highly specialized services. There is a relatively low level of coordination horizontally (between these actors) and vertically (between these actors and up- and downstream counterparts). They are often reliant on buyers to set prices and specifications, operate on trust and long-term business relationships, and have little direct contact with end users of their products. Most actors on this side of the value chain are operating informally, with few incentives (or the ability) to invest and innovate.

The other side of the value chain comprises larger, formal actors: the largest quarries, integrated mining and processing firms, and large wholesale traders and exporters. These actors work in bulk, influence prices

and play an important role in transferring information about end market preferences throughout the value chain. Any sector development strategy needs to consider both sides of the value chain if it is to support positive change over the long term.

Stage 1: Pre-production

Exploration falls under the remit of the state government (principally the state Department of Mines & Geology (DMG)). The DMG has a team of 114 geoscientists, 146 mining engineers, and an assay laboratory staffed by nine scientists and a drilling team. This group is responsible for geological mapping and evaluation to build up the information required for tendering assets.

Since 1967, the DMG has surveyed and prospected 57 per cent of Rajasthan (200,000 km^2) under "mineral survey and prospecting activities", 22,000 km^2 of more intensive "regional geological mapping" and 4,500 km^2 of "detailed geological mapping". To date, 530,000m of drilling has taken place. Exploration activities are, however, split across major and minor mineral deposits and it is unclear how much of this prospecting activity is focused on natural stone. By international comparison, India has had limited exploration activity, spending US$17 per km^2, compared to US$1,202 in Chile or US$ 246 in Australia (McKinsey 2014, 33).

The DMG, in coordination with the IBM, plays an important role in considering which geographical areas are to be auctioned for quarrying or mining and when. Identifying the geography and sequencing of blocks of land to auction determines the type of natural stone to be mined, and its quality and the quantity. This influences the end market to be captured.

Since India's allocation mechanism focuses on tendering assets, the geological spend and collation of geological data is conducted by the state, not the private sector. A specialism in exploration and prospecting is therefore less relevant to this value chain than in some other countries, where the private sector identifies sites.

In general, interviewees viewed the licencing process as complicated and slow. Licences are awarded by the DMG, with mine owners either securing a licence to mine by auction or by transfer of rights (subletting). Initial licence terms were reported in the range of 2–20 years with potential to extend, in some cases up to 60 years. This contrasts with the 30-year period allowed for quarries in Rajasthan's Minor Mineral Concession Rules (2017). After securing a licence, operators were required to obtain a set of additional clearances (see Chapter 3) as well as a no-objection certificate, following consultations with bodies including the Ministry of Environment, Forest and Climate Change, the Office of the District Collector, the block Tehsildar and sometimes the relevant village councils.

These clearances, together with the lead time and costs of securing a licence, lease and machinery, result in significant start-up costs. One state government respondent estimated an initial outlay of INR30–40 million (US$394,000–525,000) for the average mine or quarry, with examples of approval times stretching to four years or more (against international benchmarks of under a year).

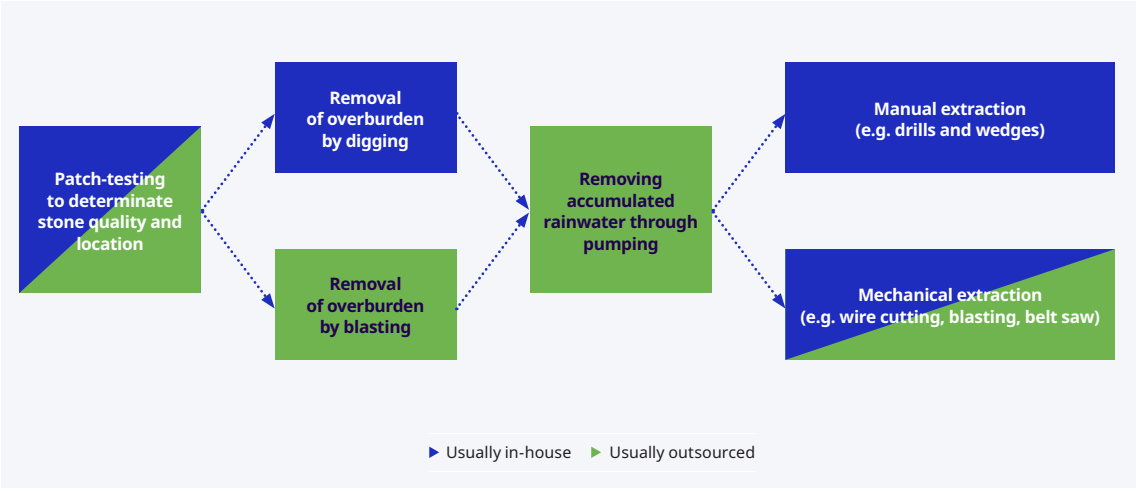
Respondents pointed to these conditions resulting in many producers operating informally, others finding loopholes to circumvent regulations, and numerous reports of large mine and quarry owners subletting portions of their concessions to smaller operators, generally on a short-term (annual) basis, with little oversight of mining operations or working practices.

Experience from other contexts shows that there is no single best practice for the award or transfer of mineral licenses (Natural Resource Governance Institute 2018). In India, allocation is generally competitive, for example through e-auction. Other countries use non-competitive processes, such as the awarding (and right to transfer) of exploration licenses to the private sector on a first-come first-served basis. Examples of international good practice in the awarding of licenses and contracts has been built on a systematic approach to transparency of decision makers, communication with stakeholders, management of geological information, clarity over the rules, and coordination across different levels of government. Good examples of decentralized allocation systems incorporating these elements can be found in Canada and Australia.

Stage 2: Production

The production stage comprises mining (referring to underground extraction) and quarrying (opencast extraction). Key steps include: patch testing to determine stone quality and location within the block allocated; removal of the soil overburden and rubble to expose the stone by digging or blasting; removal of accumulated water; and finally, extraction of the stone both manually (e.g. using drills and steel wedges) and mechanically (such as by controlled blasting, wire cutting, or diamond belt saw machines) (Figure 5). The mining season runs for 7–10 months of the year, approximately from October until June, pausing during monsoon season.

▶ **Figure 5: Production-stage activities**



A precise number of active mines and quarries is difficult to determine. As at 2015 there were 11,861 active minor mineral leases and 18,249 active quarry licenses in the state (Government of Rajasthan 2015, 8). While this gives an indication of the number of active operations, widespread subletting, and unlicensed production mean there are likely to be substantially more. One source estimates that informal quarry could constitute over 80 per cent of total sector output (Deb, Garima and Lahiri-Dutt 2008, 194).

Monthly production volumes among survey respondents are reported to be just over 1,700 tonnes of stone per mine. The mine size of those surveyed was approximately 20 per cent the size of the average global quarry (Table 6).

▶ **Table 6: Average saleable production per mine, per month (tonnes)**

Cluster	Mine		
	Average	Min.	Max.
Kota-Bundi	1,680	1,500	2,000
Udaipur-Rajsamand	1,760	1,500	2,000

The level of mechanization varies by stone type and sophistication of the operation. In general, marble extraction is more mechanized that sandstone and granite, while smaller mines and quarries are less mechanized than larger operations. Respondents pointed to increasing mechanization in production-side activities, and several mines cited a preference for loading machinery over manual (hamaal) labour. The size and scale of the machinery determines the size of the blocks that can be cut. This has an impact on

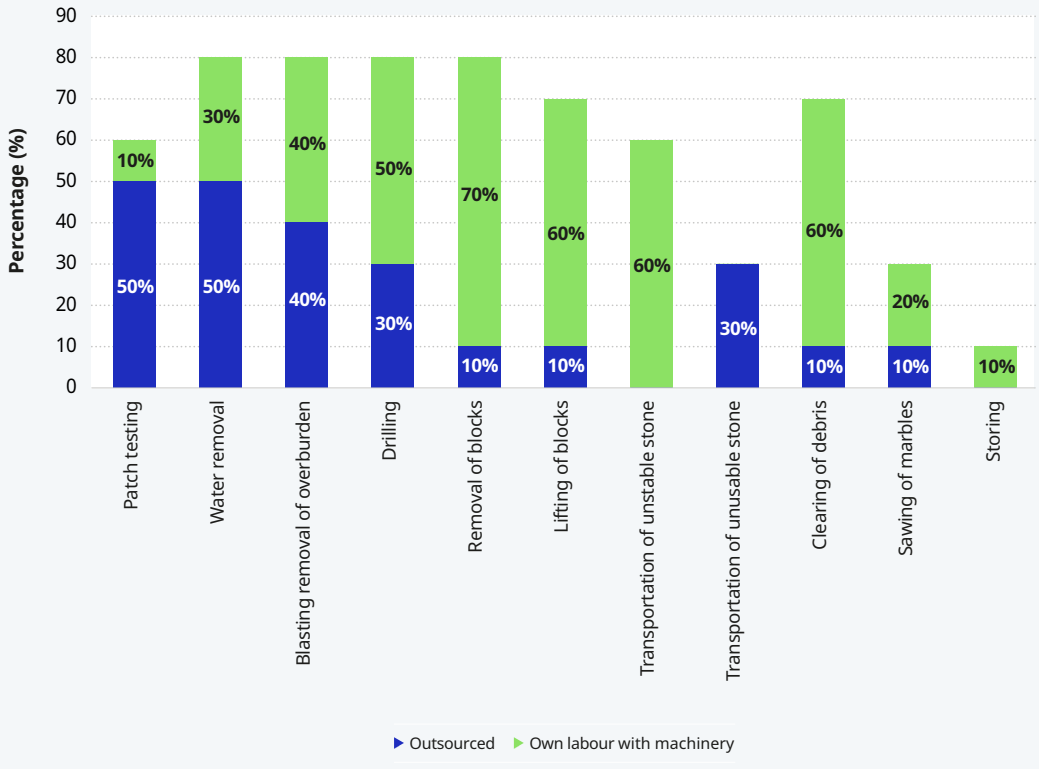
whether the natural stone produced will be of the quality required by the international market. This is explored further in Chapter 5. The level of mechanization also has implications for worker health and safety, explored further in Chapter 4.

▶ Box 3: Global advances in quarrying technology

Advances in technology are impacting the quarrying sector, both in the exploration and production phases. The use of robotics and automated production in OECD Member countries is increasingly shaping production and decreasing the margin costs of production. Drones, artificial intelligence, robotic automation and digital twin technologies are increasingly utilized by quarry operators to meet sustainability goals and manage and administer production levels.

Most mines conduct lower complexity, high volume activities (for example shaping, grading, and cutting) in-house. Where technical skills, special permissions or specialized heavy equipment are required, work is often outsourced. Examples of outsourced processes observed were patch testing, water removal, blasting and drilling (Figure 6). Some of the larger producers are vertically integrated, owning processing units and wholesale or export operations.

▶ Figure 6: In-house and outsourced functions



Net production costs range from INR900–1500 (US$11.70–19.50) per tonne, at an average of INR1085 (US$14.11). Key cost drivers are labour, outsourced services, machinery, maintenance, and fuel. Survey respondents cited rain and groundwater extraction at the start of each new mining season as both crucial and expensive, with many operators relying on hired machinery or specialist service providers (Table 7).

▶ **Table 7: Average cost of production of stone/slabs and products (in INR (and US$) per tonne)**

Cluster	Mine		
	Average	Min.	Max.
Kota-Bundi	940 (12.22)	900 (11.70)	1,000 (13.00)
Udaipur-Rajsamand	1230 (15.99)	950 (12.35)	1,500 (19.50)

Mines sell raw product on to processing facilities at INR1500–2200 (US$19.50–28.60) per tonne (average INR1850 (USD 24.05)) for an average margin of INR765 (US$9.95) per tonne (Table 8).

▶ **Table 8: Average sale price of stone/slabs and products (in INR (and US$), per tonne)**

Cluster	Mine		
	Average	Min	Max
Kota-Bundi	1560 (20.28)	1500 (19.50)	1600 (20.80)
Udaipur-Rajsamand	2140 (27.82)	2000 (26.00)	2200 (28.60)

Mine owners report production-side wastage to be a significant problem, with up to 50 per cent of the stone rendered unusable when extracted by blasting. To increase efficiency, wire cutting was cited as the preferred method of extraction, particularly for marble and other higher value stone. The primary research did not identify any secondary commercial usage for blast debris, which is usually dumped at the mine site or used to build retaining walls. There were examples of other forms of quarry waste, such as larger stone fragments, used in the production of cobblestone or construction aggregates.

Production-side labour can be divided into three main categories: manual labour (extraction of stone with hand tools, splitting blocks, basic machine operation, sorting, loading, and general labour); management and administration of the mines and quarries; and technical services (including blasting, water drainage, operating specialized machinery). Labourers constitute the largest group of workers at the production stage, with women, children, and those suffering with ill health the most vulnerable. For most labourers, wages are low, employment is insecure, OSH risks are significant, and the prospects for economic or social advancement are limited. Most child labourers in the sector are engaged on the production side. Further information on workers and working conditions is presented in Chapter 4.

Certain production practices can take a significant toll on the environment. Madhavan and Raj (2005, 24) note that 40 years of quarrying have eroded the water regime around Budhpura, compromising the water supply both for human and livestock consumption, as well as limiting the ability of local farmers to grow water-intensive crops. Furthermore, drilling and blasting have generated high levels of particulate matter, compromising air quality in the area.

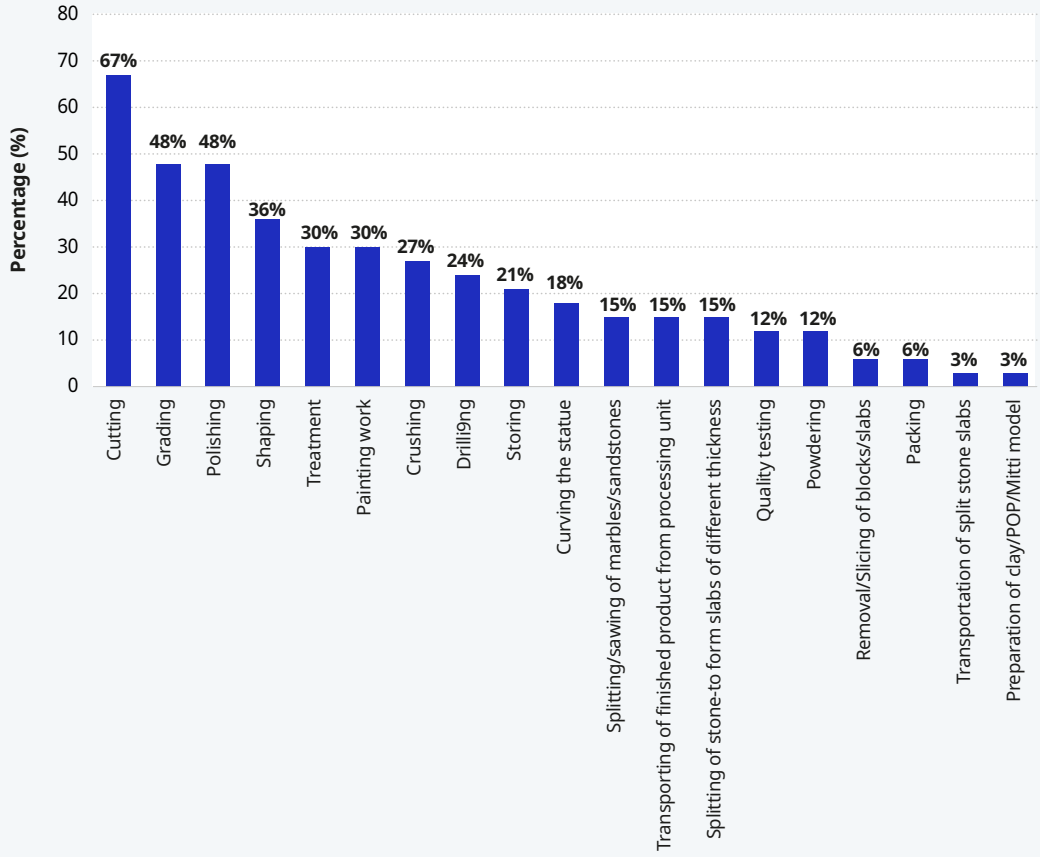
Stage 3: Processing

While some larger mine owners run integrated processing and marketing operations, most sell raw or semi-processed stone domestically to specialist processing units (Box 4). There is no “one size fits all” approach to processing. Each stone type requires a specific set of techniques and technologies depending on its intended use, resulting in a diverse ecosystem of 1,200–1,500 specialist processing units in the state, some carrying out just one highly specialised function. Unlike at the production stage, there was little outsourcing reported by survey respondents (Figure 7).

▶ Box 4: Example processing activities

Stone blocks purchased from the mines are usually cut into slabs using gang saw machines. The slabs that have defects or cracks are filled. Slabs are either polished or unpolished, depending on the buyer's requirements. Sandstone and limestone blocks are hand-cut and calibrated, followed by filling and finishing of the final stone slab. For the processing of limestone and sandstone, computer numeric controlled machines are sometimes used, with specialist operators contracted. Ornamental products (such as figurines and statues) made from marble are hand chiselled by artisans, usually at household level.

▶ Figure7: Activities undertaken by processing units surveyed



While the research did not specifically assess the interplay between actors at the processing stage, there was evidence that apart from some intermediate sandstone processing, most processing units are located away from production sites. The research team observed some clustering by processors, although the level and nature of coordination between those actors was not clear. There did not appear to be widespread, active participation in industry associations or cooperatives that could provide additional mechanisms for coordination.

Processors surveyed reported average raw material costs of just over INR1,500 (US$19.50) per tonne (range INR250–3500 (US$3.25–45.50)) (Table 9). Cost appears to be driven predominantly by raw material type, worker wages, business rates (including rent), utilities, and services (such as logistics).

▶ **Table 9: Average cost raw materials paid by processing units (in INR (and US$), per tonne)**

Cluster	Processing unit		
	Average	Min.	Max.
Kota-Bundi	1,729 (22.48)	250 (3.25)	5,000 (65.00)
Udaipur-Rajsamand	1,366 (17.76)	800 (10.40)	3,500 (45.50)

Processors reported average sale prices of nearly INR2,300 (US$29.90) per tonne (range INR300–4,700 (US$ 3.90–61.10)) (Table 10). Profit margins were reported at close to 100 per cent for processed granite, 68 per cent for marble, and 27 per cent for sandstone. There is an opportunity for future research to further explore this wide range of prices and margins, particularly the lower and upper ends of the range, to determine whether there are lessons on responsibly maximizing profit that can be applied across processors.

▶ **Table 10: Average sale price of processed products (in INR (and US$) per tonne)**

Cluster	Processing unit		
	Average	Min.	Max.
Kota-Bundi	2,191 (28.48)	300 (3.90)	5,600 (72.80)
Udaipur-Rajsamand	2,381 (30.95)	1,200 (15.60)	4,700 (61.10)

There appeared to be a preference among processors to negotiate sales prices with existing, long-term buyers rather than to sell into the open market. This might be due to real or perceived switching costs, the risk of damaging relationships with long-term buyers, limited knowledge of how to establish new buying relationships, or a lack of effective market-making mechanisms.

Waste sandstone from the quarries is often sold to agents and contractors, who sell larger fragments in bulk for cobblestone production, which is usually done by hand at household level. Marble and granite waste is processed into small tiles by specialist units. The remaining waste is sent to crushing units, which produce aggregate and powdered stone (*Bajri*) for use in construction.

Stage 4: Trading

Of the processors surveyed, 95 per cent reported selling their products domestically to wholesale traders, either directly or via a local trader. These wholesalers, usually based in or near commercial hubs, operating collection centres and warehousing facilities, in turn supply the domestic retail trade, as well as selling on to exporters and in some cases dealing with international customers directly. Five per cent of processors, generally the largest and most sophisticated, have direct trading relationships with international buyers. Not all traders are large or commercially successful. Yadav (2018, 1) points, for example, to local sandstone traders being severely compromised in the months after *notebandi* (demonetization), with many still struggling.

While there appears to be some interdependence between buyers and sellers, based on longstanding trading relationships and switching costs, 79 per cent of processing unit owners report that they can choose to whom they sell their products. Respondents also reported a general skewing of buying power towards larger buyers. The basic demands of buyers relate to price and stone quality, usually determined by visual inspection or assumed, based on longstanding trading relationships. There were mixed views from respondents on prices offered: 49 per cent report receiving and accepting a reasonable price from the buyer, while 47 per cent reported negotiating prices.

While specific elements related to pricing, such as local price setting mechanisms, were not explicitly covered by the research, there was evidence that the price of and demand for natural stone on the international market varies significantly by material. While some stones, including black granites, white crystalline marbles and beige limestones, sustain long-term demand, the demand for others – coloured granites and black marbles – fluctuates frequently, often by geographic location (Cosi 2015, 27). It is recommended that follow-up research should consider how effectively and efficiently market signals like these travel down the value chain, to understand the extent to which processing units make informed decisions about the stones and products they deal in.

Trade is predominantly trust-based, with most producers and processors reporting to rely on long-term business relationships with their respective buyers. New buyers are acquired through mutual contacts, with trust built over time. There is little evidence of formal contracting, which although not uncommon in the context, does pose challenges in terms of traceability, legal recourse, and the potential for power imbalances. These trust-based trading norms are likely to create barriers to processors accessing new markets, fracturing the wider market into smaller, closed markets.

Although there were some reports of actors participating in trade fairs and exhibitions, held both in and outside the country, to find new business opportunities, this was limited to higher-income producers, processors, and traders. Hence, business development overall appears to be limited among small and medium-sized enterprises due to prevailing trading arrangements.

Stage 5: End markets

As highlighted in Chapter 1, the end uses of natural and monumental stone are correlated with residential, commercial and infrastructure construction activity. This includes both green- and brownfield construction, and remodelling or renovating existing buildings or infrastructure. End markets can therefore vary widely from construction companies to governments building public infrastructure, to individuals buying stone to remodel their homes or monuments to decorate them.

End customers, both in India and internationally, play an important role in determining product specifications and setting the parameters for the rest of the value chain. Customer preferences regarding quality and specifications, their willingness to pay for premium products, and requirements on ethical supply chains, all have a major impact on the activities of upstream actors. End markets are briefly considered here, with further detail provided in Chapter 5.

From available trade data and survey responses, end customers can be grouped into three key segments, each with different preferences and requirements.

- **Domestic customers:** sensitive to price, less sensitive to product specifications and ethical supply chains.
- **Non-OECD/emerging market customers:** sensitive to price and product specifications, less sensitive to ethical supply chains, as illustrated by the declining unit prices for sales to Viet Nam in Chapter 5.
- **Europe and United States top-market customers:** sensitive to price, product specifications, and (to some extent) ethical supply chains.

The signals sent to producers and processors are clear: price is paramount, quality matters, but there is no clear commercial incentive to maintain high ethical standards unless a customer specifically requires this (and is willing to invest to achieve it).

Norms on product specifications were mixed. Respondents generally reported no standard, pre-set dimensions for raw products. For all but the most sophisticated producers, dimensions are usually determined by the machinery used for extraction and the mode of transportation. There do not appear to be rigorous quality standards in widespread use, although respondents did report quality as a factor considered by buyers.

Internationally, the demand for large, whole blocks of stone and slabs of rocks with a uniform quality is important to note (Heldal and Neeb, 2000, 16). At the processing stage, end customer preferences become more important, particularly for products destined for high-end domestic use and international markets.

International top-market buyers may perform audits to check working conditions, presence of child labour, OSH standards, and fair wages, or may expect suppliers to report on these areas against a specified standard. Usually, these buyers procure the product only from identified processing units and quarries, which generally maintain international standards and work in coordination with exporters. See Chapter 5 for further details on global responsible production practices and trends.

The exporters surveyed did not report receiving premium prices from top-market international buyers. The incentives mentioned to keep working with these buyers were continued business, large volume orders, timely payments, and the satisfaction of following ethical practices. Some respondents reported feeling resentful towards industry actors that did not adhere to the same set of standards.

▶ **Figure 8: Value added at each stage of the value chain (estimates in INR per tonne)**

Estimated approx. average prices (per tonnes)	Buy: INR: 1085 Sell: INR 1850 Margin: INR 765 (71%)	No data	Buy: INR: 1500 Sell: INR 2300 Margin: INR 800 (53%)	Buy: INR: 2300 Sell: INR 4000 Margin: INR 1700 (200%)	Buy: INR: 4000 Sell: INR 12,000 Margin: INR 8,000 (200%)	Buy: INR: 12,000 Sell: INR 36,000 Margin: INR 24,000 (200%)
Actor	Production (mine or quarry)	Collection / transport / wholesale	Processor	Wholesaler	Exporter	Retailer
Data source(s)	Primary research (note wide range of prices reported)	Note inconsistency between producer sell and processor buy prices	Primary research (note wide range of prices reported)	No data. Author estimate	Estimate based on granite (Small Industries Services Institute 2003)	Estimate based on granite (Small Industries Services Institute 2003)

2.3 Value chain governance

Value chain governance is defined as the networks, relationships and norms among value chain actors that determine how the value chain is structured and operates. It is important to understand value chain governance for several reasons. First, by understanding how prices and standards are set it becomes possible to support upstream actors (such as production and processing enterprises) to innovate to better meet those needs, for example by investing in technology and expertise that has the maximum impact on prices. Second, it gives scope for better coordination among value chain actors, for example, small processors grouping together to offer an integrated service to a new customer. Third, it can shed light on governance practices that undermine market performance, for example signals from buyers that price matters more than quality or working standards.

Governance should not be viewed in terms of government alone. While government is an important influencer of value chain governance on an institutional, legal, and regulatory basis, it is not the only actor involved.

Available evidence shows that the natural stone value chain is relational, and uses the governance typologies developed by Gereffi, Humphrey & Sturgeon (2005).This type of arrangement involves “mutual reliance regulated through reputation, social and spatial proximity, family and ethnic ties … (but) … despite mutual dependence, the lead firm still specifies what it needs, and controls the highest valued activity in the chain, thus having the ability to exert more control over the supplier” (Gereffi, Humphrey & Sturgeon 2005, 86).

Relational links take time and effort to build, which might explain why many actors are reluctant to switch between suppliers and buyers. It can also help to explain entrenched behaviours and norms around

coordination and information exchange (see below). Any sector development initiatives need to consider and navigate this network of deep-rooted relationships, and recognise and leverage the power of lead firms, and put specific emphasis on behaviour change interventions (market-based interventions alone are likely to have less impact than in other types of value chain).

2.4 Supporting functions

Supporting functions are the services, resources and infrastructure that help the core value chain to function, adapt and develop. The root causes of underperformance in the value chain (and the long-term solutions) can often be traced back to problematic supporting functions. Without viable supporting functions in place, it is difficult to achieve sustainable and inclusive value chain development. Extrapolating information from the research and secondary sources, key supporting functions for the natural stone sector are set out below.

2.4.1 Horizontal coordination

Coordination between actors (horizontal coordination) has the potential to: reduce transaction costs and build economies of scale (such as small operators pooling orders for raw materials); improve information exchange (such as on market prices); support intra-group borrowing; or facilitate sharing of resources (such as machinery). Horizontal linkages can be a powerful source of competitive advantage, improving product quality and driving down costs, as well as stimulating innovation and capturing a greater share of value added.

The research pointed to limited formal horizontal coordination in the natural stone sector, with high levels of fragmentation (including thousands of micro- and small-scale mines and processers). Associations – where they exist – are generally reported to be weak and under-active. There are no clear examples of effective cooperatives, and limited evidence of effective clustering. Assuming that the value chain follows a relational model, it is possible that there is a higher level of informal coordination between enterprises, but this was not apparent from interview and survey responses.

Both horizontal and vertical coordination in the sector need to be improved. It is recommended that future policy and strategy work should identify viable entry points for intervention, for example potential coordination mechanisms such as cooperatives and associations, and build the relevance of their offers to members, support formation and development of industry clusters, and leverage informal coordination mechanisms to provide greater added value to members.

2.4.2 Vertical coordination

Vertical coordination (between actors at different stages of the value chain) is also an important determinant of value chain performance. Effective vertical links support information exchange (such as transmitting buyer preferences to upstream actors), often incorporate embedded services like finance or training – particularly where larger actors engage with multiple smaller partners, and can provide powerful incentives to innovate, improve standards and adopt more ethical working practices along the value chain.

Vertical coordination in the sector seems to be slightly more developed where longstanding trading relationships exist, although the extent to which this drives value chain performance is uncertain. The prevailing attitude seems to be "don't ask, don't tell" when it comes to market actors understanding the activities of up- and downstream partners. Buyers rarely visit quarries or processing units, for example, and mine and quarry license holders seem to pay little attention to what is happening on leased land, especially if subcontracted.

There were no embedded services or preferential financing arrangements identified. Aside from the traceability requirements imposed by some international buyers, there appear to be few incentives for traders at all levels to pay attention to where product is coming from or going to.

There are opportunities to improve vertical coordination by improving enforcement of the legal and regulatory framework, working with lead firms to pilot better vertical coordination models (such as providing embedded services, proactive information exchange) and leveraging international supply chain standards to drive upstream behaviour change.

2.4.3 Technology

While the use of technology – for example mechanized production, processing, and loading – is increasing across the sector (particularly in marble and granite, less so in sandstone), there is still extensive use of manual labour. The reasons are clear: labour costs – the major driver of production costs – are low; Rajasthan has a large population; and high un- and underemployment rates mean that natural stone can be produced at a low price. For many smaller actors, the cost of new machinery is preventative or does not justify the potential benefits.

At a macro level, a meaningful increase in the use of technology is likely to reduce aggregate employment in the sector, as well as shifting demand from manual labour to machine operation, with important implications in areas like skills development. There are also considerations for guarding against greater inequality as poor and vulnerable groups stand to lose out. The trade-off between employment and technology is well documented (including by Kapoor 2020) and presents important policy questions to the state government.

Keeping these points in mind, a lack of mechanization is an important constraint to inclusive growth in the sector. Increasing the use of mechanization has the potential to increase labour productivity, cut production costs, and drive up product quality and consistency. Run in parallel with worker upskilling – ideally conforming to national standards – there is also potential to upskill workers and provide a path to higher wages.

It is recommended that options for lowering the costs of accessing machinery should be explored, for example through leasing or shared ownership models, which would be made easier with better horizontal coordination as described above. Machinery providers could be engaged to offer embedded services, such as worker re-training and financing for new equipment.

The state government has an important role to play in incentivising actors to adopt safer, more environmentally friendly technologies. India's thriving start-up and engineering sectors could be tapped to develop low-cost technologies specifically for the natural stone sector.

2.4.4 Information

The research identified two subsets of information that compromise value chain performance.

The first is the exchange of information along the value chain and between actors, for example relating to buyer preferences, price drivers, market conditions, and new business opportunities. Without a sustained, two-way flow of this information, firms in the sector will struggle to adapt, innovate, and grow. The research identified limited formal information flows for example via industry groups, market-making platforms, or bilaterally between actors (such as specifics on buyer quality requirements). It is assumed that tacit information is exchanged "behind the scenes", particularly within longstanding trading relationships, but the question remains whether this always benefits both parties when power is asymmetrical. This system also favours larger actors (some vertically integrated), which control all or most of the information chain, and disadvantages smaller or new actors that only have access to a small part.

Recommendations for improving information flows align with those for boosting coordination: building up bodies with the mandate to broker information flows; leveraging informal groups to improve how they share relevant information; and working with lead firms, particularly ethical end buyers, to consider information as an essential embedded service. There are also opportunities to promote technology-based information exchange, and to engage local media, for example through trade associations, to highlight important issues impacting the sector.

In addition to weak information exchange between actors, there is limited centralized, official data on key industry statistics, employment, mine and quarry operations, child and forced labour, and so on. Without accurate data it is difficult to enforce regulations, identify areas of good practice (to amplify) and bad practice (to mitigate), and determine where to allocate finite public resources. Further details are presented in Chapter 3.

2.4.5 Skills

The sector is going through a challenging partial transition to mechanized processing and production, simultaneously facing a shortage of skilled and semi-skilled labour and an abundance of low-skilled workers. Without action, it is likely that the sector will start to fall behind both high-skilled/high-productivity and low-skilled/low-cost competitors.

There was little emphasis placed on skills by research respondents: workers feared high opportunity costs, while employers did not see enough benefit to justify the investment. Respondents did not report needing any specific qualifications to secure work; wages among labourers did not seem to be linked to skills and experience, except for some specific, highly skilled trades. Despite skills development being a priority for the state government, the team identified few examples of skills development initiatives being delivered at scale.

Recommendations for improving skills in the sector include: developing a realistic sector skills strategy, based on skills needed now and in future; reviewing and strengthening functions like sector skills councils, ensuring cross-cutting representation from worker representatives, particularly people from vulnerable and excluded groups; strengthening links between wages and experience; and adapting vocational standards and qualifications to the realities faced by workers in the sector. Issues relating to skills development are covered in more depth in Chapter 4.

2.5 Laws, regulation and policies

Laws, regulation and policies play a crucial role in the sector's performance and as such the following chapter presents a deep dive analysis of the legislative and institutional framework and its enforcement. The key issues are summarized below.

- **Licensing:** The quality of the geology of a license is a key variable in the quality of the good which may be produced. The Government of Rajasthan is the responsible party for presenting blocks to be tendered and the award through auction. Licensing may also occur by transfer between license holders.
- **Revenues, taxes and charges:** In exchange for extracting a finite state-owned asset, the quarry owner must pay a royalty and rent to the state government. The royalties vary by state but in Rajasthan are dependent on the volume of stone produced, the location of its production and the type and processing of the stone. The extent of the royalties and fiscal instruments are discussed in greater detail in Chapter 3.
- **Labour laws:** Many labour laws are relevant to the production of natural stone, and will be detailed in Chapter 3. These laws are comprehensive and have been updated and amended to reflect increased worker protections. Responsibility implementing labour laws, from the perspective of labour law enforcement, lies with the central government. Lack of registration of workers and challenges to enforcement limit the implementation of labour laws.
- **Minor mineral status:** Natural stone is classified as a minor mineral, which shifts the weight of policy and enforcement for its extraction to the state level.
- **Providing an enabling environment for sustainable enterprises:** The examples below are measures that the state government could take to accelerate development of sustainable enterprises in the sector.
  - Providing targeted capacity-building support to enterprises looking to adopt more sustainable practices, for example through adopting international standards, investing in green technologies, or improving working conditions. There is also scope to provide a platform to connect these

"future-ready" enterprises both to each other (for example to promote knowledge sharing and collaboration) and to new buyers, suppliers, and supporting services.

- Giving enterprise owners, managers, and workers access to training to improve productivity, workplace safety, and employer–worker relations.
- Granting access to both start-up and growth capital for enterprises, either directly or in collaboration with financial services providers in the state. This could include developing specialized products for producers and processors operating sustainably. There is also scope to improve financial services for workers, which could, for example, reduce reliance on employers to provide advances to cover the off-season.
- Improving the sector's supporting infrastructure, including roads, aggregation points, physical markets, industry clusters, and worker housing.

- **Voluntary standards:** Voluntary standards have been developed by a range of NGOs, providing reassurance to buyers (typically international buyers) that the standards they require are being met. This suggests a lack of faith by some groups in the implementation and enforcement of the legislative framework by the relevant institutions.

2.6 Informal norms

Informal norms, some intangible and many difficult to quantify, are often built up over generations and have a major impact on the way the sector functions. By the same token, changing informal norms is usually one of the most difficult – and most important – elements in any sector development work. The following are examples of informal norms in the natural stone sector.

- **Trading norms:** Although respondents reported being able to change between buyers, in practice it appears that trading relationships are longstanding, with high switching costs (particularly in terms of building trust from scratch perceptions of an actor's loyalty). This is coupled with asymmetrical buying power to create trading norms that discourage new business development and innovation around sales and marketing.
- **Treatment of workers:** Low wages, low investment in workers, mutual distrust, limited mitigation of OSH risks, and a host of other decent work violations are the norm on the informal side of the sector. This is likely to stem from: pressure to drive down overheads, combined with opaque supply chains; limited enforcement of the legal framework (and few repercussions for employers in breach); and little demand for change from end buyers. As well as breaching labour laws and violating human rights, these norms lower labour productivity and limit overall development of the sector. This is covered in more depth in Chapter 4.
- **The role of women:** Societal norms about the role of women in India are likely to be influencing the extent to which women are present in the mining value chain. Addressing some of these norms can unlock opportunities for women to benefit economically from the sector, and will have positive implications for the sustainability and inclusivity of the industry. See Chapter 4 for more information on gender issues in the natural stone sector, and Chapter 5 for gender diversity and equality in the supply chain as key considerations of most responsible purchasing approaches.
- **Environmental sustainability:** There is little emphasis on the environmental impact of operations in the sector, particularly on the production side of the value chain. There are entrenched norms on acceptable ways to dispose of waste (which include illegal dumping), water drainage (which compromise water resources) and air pollution (harmful to the environment as well as human health). As with workers' rights, the legal framework exists to manage environmental damage, but compliance is low.

3 The institutional and regulatory framework

3. The institutional and regulatory framework

Chapter highlights

- **Mineral policies at both the national and state levels highlight an ambition to increase mineral production and enforcement of the legislative framework.** The policies show a desire to increase economic output and competitiveness alongside decent work, skills development and productivity. There is no policy specific to the entire natural stone sector.
- **The institutional framework governing the sector is split between a diverse range of institutions at the central, state and district levels.** Natural stone is classed as a minor mineral, with the centre empowering state governments to frame policy and regulate extraction. The health and safety of mine workers, however, is the responsibility of the DGMS. Limitations in coordination and transfer of information between institutions and between the state and centre levels has challenged good sector governance.
- **Enforcement of the legislative framework in the sector is low.** A large proportion of the sector's operations are informal and are therefore outside the legislative framework. In part, this is a consequence of challenges in coordination between institutions, and capacity constraints in the enforcing authorities, which result in limited auditing of sites and unclear division of rules between the major and minor minerals.
- **Owners highlight the high cost and low benefit of compliance.** Owners did not consider the risk of being caught and the penalties of non-compliance to outweigh the cost of compliance. Compliance does not currently result in a price premium, although this may change.
- **Limited worker representation in policymaking** due to low penetration of trade unions and limited agency in policy formation circles.
- **International organizations have developed principles and guidance to provide governance outside formal systems.** These provide a governance framework for international buyers outside the legislative framework.

3.1 Introduction

As highlighted in Chapter 1, Rajasthan's endowment of natural stone could provide substantial revenue to support a growing population and be a catalyst for greater prosperity. A robust legislative and policy framework, institutional effectiveness and wide stakeholder representation in policymaking are required if the benefits are to be realized and the risks managed (Natural Resource Governance Institute 2017, 23).

This chapter provides a detailed examination of the rules governing the natural stone sector in Rajasthan. In addition to identifying and analysing the legislative framework, it provides a detailed overview of the institutional responsibilities for development and enforcement of this framework. While the minerals and mining policies, legislation and regulations extend to mineral extraction activities, they do not cover the activities of processing units; processing is legislated under the wider industrial legislative framework, with no specific legislation. Since processing units are covered by the overarching industrial legislative framework, this section will focus predominantly on legislation related to the extraction of natural stone. The chapter will also discuss the organizations representing and coordinating workers and employees, and will examine their agency in policy formation and legislative enforcement.

3.2 Legislative and regulatory framework

The framework of rules for natural stone is organized according to three aspects: policy, legislation, and regulation. In India, responsibilities for framework development and implementation are split between the national and state governments. Under Articles 294 and 295 of the Constitution of India, state governments own onshore minerals (although there are some exceptions). Minerals are classified into major and minor minerals: minor minerals include building stones, clay, and sand (encompassing natural stone), while all other minerals are classified as major minerals, under Section 3 of the Mines and Minerals (Development and Regulation) Act, 1957 (MMDR). Under Section 15 of this Act, state governments are empowered to frame policy and regulate the exploration, extraction, and processing of all minor minerals.

3.2.1 Policies

India recently developed a new **National Minerals Policy 2019**, against the backdrop of a trade deficit for minerals, concerns around illegal and unscientific mining, environmental and statutory process violations, increased cases of mining fatalities and limited investment in the sector. The policy highlights an ambition to double the contribution of mining to India's GDP over seven years, and to strengthen the resource base. There has been some concern that the policy has not gone far enough in its ambitions for technological advancement and sector value addition (Chatterjee and Roy 2019).

At the state level, the **Rajasthan Mining Policy 2015** highlights the ambition of the state to significantly raise the sector's contribution to the state economy. The policy highlights an intention to increase land under mining from 0.54 per cent to 1.5 per cent and generate gainful and secure employment to provide alternative sources of income for the rural population. Decent work and skills development are at the heart of this policy. Systematic, scientific, and sustainable mining and the increased use of technology are intended to increase productivity. The policy also highlights an intention to strengthen enforcement of standards. Other key features include actions to limit silicosis, and the use of district minerals funds. In 2019, the Government of Rajasthan launched a policy n to support mine workers suffering from silicosis.

3.2.2 Legislation

The **MMDR** and its **Amendments 2015 and 2016** are the principal pieces of legislation governing the mining sector in India, and are determined by the centre.

Through the 2015 Amendments, a transparent and non-discretionary fiscal regime was established to make doing business easier. A notable change was the introduction of e-auctions, and the formation of the District Mineral Foundation Trust. The Act was further amended in 2016 to allow the transfer of mining leases granted by means other than auction and used for captive consumption purposes. The Act sets out the definitions of minor and major minerals and outlines the delegation of powers from the centre to the states (Government of India, Ministry of Mines 2019, 21).

The **Mines Act, 1952** provides requirements for labour and safety and working conditions in mines. It contains provisions on the management and conduct of mining operations. It defines the duties of the owner to manage mines and mining operations, health and safety, and stipulates which activities may be undertaken by women.

The **Mineral Conservation and Development Rules, 2017** (Amendment) highlights the requirements for exploration to replenish depleting reserves as they are mined out. Under the auction system, as opposed to first come first served, the Government of Rajasthan, rather than the private sector, is responsible for identifying new geological deposits and putting them up for auction.

In addition to the above, the MMDR specifies rules for the conservation and development of granite and marble resources in the country, which are set out in the **Marble Development and Conservation Rules, 2002** and the **Granite Conservation and Development Rules, 1999**. These rules set the area for mines at between 4 and 50 hectares.

Rajasthan has developed its own rules relating to the governance of the mineral sector, with the responsibility shared between central and state governments. The **Minor Mineral Concession Rules (MMCR)**, developed in 2017, state that quarries can be no less than 0.18 hectares, which seems to contrast with the Marble and Granite Conservation Rules, and that licenses must be awarded through e-auction or transfer. The Rules also highlight the requirement to maintain a register of individuals working in mines and quarries, ensure the use of dust extractors and safety equipment, and provide insurance cover for all mine workers.

▶ Table 11: Legislation related to natural stone extraction

Award of contracts and licenses	Mine owners either gain the rights to mine or quarry by the transfer of rights from a current licensee or through e-auction, as outlined in the Rajasthan Minor Mineral Concession Rules, 2017. Until 2012, small mines of fewer than 5 hectares were exempt from environmental clearance. This exemption was repealed by a court judgement, however, and the requirement for clearance must be obtained from the Ministry of Environment, Forestry and Climate Change. All mines, irrespective of size, need an environmental impact assessment in line with Environmental Impact Assessment Notification 2006; pursuant to the Environmental Protection Act 1986, mines must obtain environmental clearance from the Ministry of Environment, Forestry and Climate Change. Mines without such clearance are illegal. If the mine is on lands deemed to be forest, forest clearance must be obtained under the Forest Conservation Act, 1980. Other clearances required include wildlife and pollution clearance, in line with the legislation listed below. ▶ Water (Prevention and Control of Pollution) Act, 1974 ▶ Air (Prevention and Control of Pollution) Act, 1981 ▶ Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016 ▶ Solid Waste Management Rules, 2016 ▶ Noise Pollution (Regulation and Control) Rules, 2000 ▶ Construction and Demolition Waste Management Rules, 2016
Fiscal Framework	The Mineral Conservation and Development Rules, 2017 require companies to report on the extraction and disposal of mined materials. Rule 45 facilitates end-to-end national scale accounting of all minerals produced in the country, from the pit head to end use. The Income Tax Act, 1961 specifies corporate income tax at 30 per cent, or a minimum alternative tax at 18.5 per cent, if higher. This is applicable to entities either incorporated in India or with their management and control in India. Companies can claim a deduction of 10 per cent revenue expenditure incurred in the year of commencement of commercial production and for four years prior to the commencement of operations related to extraction or prospecting. That deduction can be claimed for a period of 10 years. Indirect taxes include customs duty, export duty, service tax, and goods services tax. MMDR Schedule 2: Royalties and contribution to the National Mineral Exploration Trust sets out 2 per cent royalties for funding regional exploration activities. The Rajasthan Minor Minerals Concession Rules (MMCR) specifies a schedule of royalties ranging from INR23 (US$0.30) per tonne to INR430 (US$5.59) per tonne, depending on the type of stone, its location, and the level of processing. It also specifies the level of dead rent, which varies by stone type, location, and level of processing. This ranges from INR60 (US$0.78) to INR100 (US$1.3) per $10m^2$ for dimensional or block stone. The Rajasthan Minor Minerals Framework, 2017 specifies an annual license fee for quarries (not to be enhanced more than once during any three-year period).
Labour legislation specific to mining and quarrying	The Government of India drafted the Code on Occupational Safety, Health, and Working Conditions in 2018 by amalgamating 13 labour laws relating to safety and health standards, health and working conditions, welfare provisions for employees, and leave and hours of work. The Mines Act, 1952 is one of the acts amalgamated. The MMCR specifies the need to maintain registers of individuals working in mines, the use of dust extractors, safety equipment, provision of health camps for workers and insurance cover for all workers in mines. The Limestone and Dolomite Mines Labour Welfare Fund Act,1972, effective 1977 focuses on the welfare of non-coal mine workers. It provides health, education, housing, recreation, and social security benefits to mine workers. These measures are financed by the proceeds from a levy under the Act and executed by welfare commissioners across the country.
Nationwide labour legislation related to any industry	Every employee has the right to certain social benefits while working in any industry. This is defined in several labour regulations, including the Unorganised Workers' Social Security Act, 2008, and the Inter-State Migrant Workmen Act, 1979. The Minimum Wages Act, 1948 guarantees payment of minimum wages to workers in various sectors, including the mining sector. The Contract Labour Regulation and Abolition Act, 1970 protects contract labourers. The act makes several provisions for the welfare of contract workers including payment of the minimum wage, social security benefits and others. The Government can also decide to prohibit the use of contract labour to perform the core perennial activities of the enterprise. The Industrial Establishment Act, 1963 requires businesses employing 10 or more workers at any time to provide formal employment contracts. The Inter-State Migrant Workmen Act, 1979 requires companies to obtain government documentation and approval to employ migrant workers. The Act allows for payment of travel or suitable residential accommodation for migrant workers.

	The Workmen's Compensation Act, 1923 aims to provide workers and their dependents some relief in the event of accidents arising out of and in the course of employment, and causing either death or disability of the worker. Workers covered under Employees State Insurance Act, 1948 are not entitled to compensation under the Workmen's Compensation Act. The Bonded Labour Abolition Act, 1976 prohibits the practice of bonded labour. The Act purports to abolish all debt agreements and obligations arising out of India's longstanding bonded labour system. It frees all bonded labourers, cancels any outstanding debts against them, prohibits the creation of new bondage agreements, and orders the economic rehabilitation of freed bonded labourers by the state. The Child Labour (prohibition and regulation) Act, 1963 prohibits the engagement of children and adolescents in mines and mining related activities, as does the Mines Act, 1952. The Child Labour Amendment Act, 2016, prohibits the employment of children under 18 years of age in mining operations.
Legislation specific to gender equality	The Equal Remuneration Act, 1976 provides for the payment of equal remuneration for men and women workers and for the prevention of discrimination against women on grounds of sex, in the matter of employment and for matters connected therewith or incidental thereto. A Central Advisory Committee was set up by the central government to advise on how to increase employment opportunities for women and generally review the steps taken to ensure effective implementation of the Act. The Sexual Harassment of Women at Workplace (Prevention, Prohibition, and Redressal) Act, 2013 aspires to ensure women's rights to workplace equality, free from sexual harassment. The Maternity Benefit (Mines and Circus) Rules, 1963 aims to regulate the employment of women in certain establishments for certain periods before and after childbirth to provide for maternity benefits including maternity leave, bonuses, nursing breaks. It is applicable to every factory and mine irrespective of the number of employees. An amendment in 2017 proposed a draft rule to mandate setting up a crêche in establishments with 50 or more employees, to be located within 500m of the establishment's main entrance.
International labour standards	India has ratified six out of the eight core ILO Conventions. These include: ▶ The Forced Labour Convention, 1930 (No. 29) ▶ The Abolition of Forced Labour Convention, 1957 (No. 105) ▶ Equal Remuneration Convention, 1951 (No. 100) ▶ Discrimination (Employment and Occupation) Convention, 1958 (No. 111) ▶ Minimum Age Convention, 1973 (No. 138) ▶ Worst Forms of Child Labour Convention, 1999 (No. 182) Discussions are ongoing with regards to the ratification of the Freedom of Association and Protection of the Right to Organise Convention, 1948 (No. 87) and the Right to Organise and Collective Bargaining Convention, 1949 (No.98).

Legislation specifically related to labour in processing units in Rajasthan is split between the Rajasthan Shops and Commercial Establishments Act for processing units with fewer than 10 employees and the Factory Act, which is applicable to units with a greater number of employees.

3.3 Institutions involved in the governance of the natural stone sector

Although states own their mineral assets, the mining industry falls under the control of both the central and state governments, requiring significant coordination. While states are responsible for the award of licenses, workers well-being and safety is the responsibility of the central government. Once the mines are leased, the leaseholder is expected to inform the Department of Mines and Safety of the Government of India. The research suggests that this rarely occurs, and in the absence of any information, the central agency is unaware of the requirement to execute its responsibility.

3.3.1 Central institutions

The below institutions are part of the institutional framework governing the mining of natural stone at the central level, with a focus on coordination, policy development, oversight, and inspection-related responsibilities.

The Ministry of Mines of the Government of India is ultimately responsible for the administration of the MMDR 1957 with respect to all minerals. It is responsible for national policy formation, legislation and administration of mines and minerals in India (Raza et al 2019).

The **Indian Bureau of Mines** is an organization under the Ministry of Mines, which promotes the conservation of mineral resources and the approval of mine plans and schemes. It acts as a national regulator for all mining activities, maintains the National Mineral Inventory and coordinates and publishes data related to the mining sector in India.

The **Ministry of Labour and Employment** is responsible for safeguarding and protecting the interests of workers, and ensuring a safe and healthy work environment, especially for the poor and disadvantaged. These objectives are sought to be achieved through enactment and implementation of various labour laws, which regulate the terms and conditions of service of workers.

The **Directorate General of Mines Safety (DGMS)**, part of the Ministry of Labour and Employment, oversees the safety and welfare of workers on mining projects, for both minor and major minerals. Although the mine owner, who is required to appoint a qualified manager, is responsible for the safety and well-being of the workforce in accordance with the legislation presented above, the DGMS monitors and inspects compliance with the legislative framework for labour. The DGMS also determines the equipment that may be used on mine sites, and develops training and awareness on health and safety for workers.

For mine sites, the enforcement of worker's health and safety is not delegated to state level authorities, and inspections and investigations of mines and quarries in the state's territories are conducted by the DGMS.

The **Ministry of Environment, Forestry and Climate Change** (MoEFCC) is the central body responsible for the conservation of India's environment and the management of environmental risks from the mining and processing sectors. It has a significant role in the approval of environmental certificates and permits related to prior to the commencement of mining operations. For natural stone mining and quarrying operations under a certain size (150 hectares), MoEFCC delegates the authority to grant environmental certificates to state level institutions.

Under the MoEFCC, the **Central Pollution Control Board** is responsible for preventing air and water pollution. It coordinates the activities of the state pollution control boards.

The **Department of Revenue** is responsible for the levy and collection of taxes and is involved in providing land title clearances prior to mining operations.

The **National Human Rights Commission of India** is a statutory public body responsible for the protection and promotion of human rights. It is empowered to investigate proactive or reactive violations of human rights by the Government of India, or negligence of such violations by public servants.

3.3.2 State Government

In conjunction and coordination with the central institutions, laws, and regulations, state governments have set-up dedicated departments for controlling and regulating the mineral sector in the territory under their jurisdiction. These institutions administer and enact powers delegated from the central organizations, in line with the relevant legislation. Pursuant to the Rajasthan Mineral Policy (Government of Rajasthan 2015, 13) the state of Rajasthan is striving for "minimum government, maximum governance".

The **Department of Mines and Geology** is responsible for the discovery, development, and administration of mineral resources in Rajasthan. These responsibilities include surveying, prospecting for new mineral deposits, mineral administration, extraction, and investment promotion. The department plays a key role in the auctioning and licensing of natural stone mines in Rajasthan. It also frames policies at the state level, based on the framework set by the Government of India. The Department is also responsible for collecting royalties and other revenue from quarries and mines.

The **Rajasthan State Pollution Control Board**, in coordination with the central Pollution Control Board is entrusted with ensuring mineral operations comply with the rules and regulations for water and air pollution and prevention, control and abatement of air pollution (Air (Prevention and Control of Pollution) Act 1981).

The **Rajasthan Forest Department** is responsible for regulating forest clearances at the state level if land intended for mining or quarrying activity abuts or includes designated forest land.

The **Social Justice and Empowerment Department** is responsible for framing policy on pneumoconiosis, setting up a system for detection, certification and treatment of pneumoconiosis, ensuring screening and treatment facilities, and administering the direct monetary benefits.

3.3.3 District government

Some of the institutional responsibilities are delegated by the state to the district level. This is the case if a mining lease is fewer than five hectares.

The **District Mineral Foundation Trust (DMFT)** is a non-profit body responsible for the distribution of funds provided as compensation by mining companies for sustainable development and welfare in areas affected by mining. By July 2020, 17,014 projects had been approved for this purpose under the DMFT, with a contribution of over INR3,487 crore (US$450 million) (Government of Rajasthan 2020b). The DMFT in Rajasthan was a major contributor to the Rajasthan Silicosis Policy, which was issued in 2019.

3.3.4 Institutions responsible for processing units

Processing units are governed by various institutions, depending on their size, with authority delegated by the State Labour Department. Units with fewer than 10 employees are awarded licenses by municipal corporations. The health and safety of the workers is the responsibility of the district assistant labour officer. For processing units over ten workers the Factories and Boilers Inspection Department is responsible for the health and safety of workers.

4.4 Role of other organizations in the governance and policy formation in the natural stone value chain

There are several organizations outside formal government that are working to ensure the rights and voices of different stakeholder groups are heard. This section will examine the agency and efficacy of these organizations in the governance and policy formation process.

3.4.1 Worker organizations

There are 12 central trade union organizations recognised by the Ministry of Labour in India. Trade unions are important to preserve and protect the rights of workers in the mines and processing units in Rajasthan. These trade unions are B**haratiya Mazdoor Sangh**, **Indian National Trade Union Congress**, **Hind Mazdoor Sabha**, **All India Trade Union Congress**, **Centre of Indian Trade Unions**, **All India Central Council of Trade Union**, **Labour Progressive Federation** and the **National Front of Indian Trade Unions**. The research identified eight trade unions engaged in workers' issues in mines and processing units. Four of these mineworker trade unions have been established through facilitation by **Gramin Vikas Vigyan Samiti (GRAVIS)**, in association with the **Health, Environment, and Development Consortium (HEDCON)**. These trade unions have been established in Barmer, Bikaner, Jodhpur and Makrana.

IndustriALL Global Union represents 50 million workers in 140 countries in the mining, energy and manufacturing sectors. Its office in India strives to build trade union power and strengthen trade unions in the mining sector. In 2016, together with the ILO, IndustriALL released the handbook "Safety and health for sandstone mine workers" that aims to support local trade unions and bring awareness to issues of safety and health in the sector.

There has been limited worker uptake of trade union membership. Workers interviewed during the research were predominately unorganized and not part of any union and therefore had limited influence and agency in policy formation. This is discussed further in Chapter 4.

3.4.2 Employer organizations

There represent mine owners at both the national and state levels through industry bodies. The most relevant institutions are listed below:

The **Federation of Indian Mineral Industries (FIMI)** is the apex industry body which promotes the interests of all mining and mineral processing units in the country and attends to all problems of the mining industry including lease grants, tenures, production, taxation, trade, exports, H&S, labour, sustainability, etc. Representation comprises of large as well as MSME companies in the formal sector as well as regional mining associations. FIMI has also promoted the Skill Council for Mining Sector, with support of Ministry of Mines and Ministry of Skill Development and Entrepreneurship.

The **Federation of Mining Associations of Rajasthan (FMAR)** provides access to the Government of India, the Rajasthan state government, and several international organizations. It is dedicated to solving problems faced by mine owners. It takes up the various issues that arise on account of the enforcement of rules and regulations applicable to the working of mines and the operations of mineral-based industries. It coordinates with the Forest Department and the State Pollution Control Board, raising issues on behalf of mine owners.

The **Employers Association of Rajasthan** is a non-sector-specific platform for employers to engage with relevant authorities in a coordinated manner, and which updates its members on developments that may affect their operations. The organization has a wide scope, but specializes in industrial relations. Employers Association of Rajasthan is affiliated to the All India Organisation of Employers' (AIOE). AIOE, an allied body of the Federation of Indian Chambers of Commerce and Industry (FICCI), is the oldest and apex national employers' organisation of India. It is the platform for Indian Employers to raise their voice in formulating labour and social policies to promote business, trade and economy in the country.

The **Udaipur Chamber of Commerce and Industry** is a multi-district apex body of trade, industry, mining and tourism, which acts as an interface between government and industry in southern Rajasthan.

The **Cobblestone Vendors Association** in Budhpura, is a local union which governs the cobblestone value chain. Only members of the Association can produce and market cobblestones. The group regulates wages to be paid to workers, supports dispute resolution, and address any issues that vendors face with exporters.

3.4.3 Civil society organizations

Civil society organizations (CSOs) have been actively involved in enforcing rules, setting standards, and advocating for workers. There are five CSOs working for the welfare of mineworkers in Rajasthan. These organizations have focused on health issues faced by workers, education for their children, skills training, and basic amenities for women in their workplaces. Detail of some of these organizations is included below.

The **Mine Labourers Protection Campaign (MLPC)** is an NGO working on protecting labour rights in mining and promoting environmentally sustainable mining in Rajasthan, with government and businesses that own most of the mines and quarries in Rajasthan. The MLPC has helped to establish crêches and organize health camps with government support. **GRAVIS**, a voluntary organization founded in 1983, has been working with mining communities in Jodhpur and Makrana for the past 10 years, from a human rights perspective. It also educates mine workers on rights, health, and safety, and focuses on alternatives to mining for women and children. GRAVIS, in association with **HEDCON** – a consortium formed by it – has been undertaking the Mine Labourers Welfare Project in Western Rajasthan. As a part of this initiative, it has facilitated the establishment of mineworkers' trade unions in Barmer. Bikaner, Jodhpur and Makrana.

Non-governmental groups have also been responsible for developing standards outside the formal governance mechanism, such as the Base Code developed by the **Ethical Trading Initiative** (Ethical Trading Initiative 2018). The role and efficacy of standards outside of the legislative framework will be discussed further in Chapter 5, which illustrates that although standards are not legally binding unless stipulated in legislation, they influence purchasing decisions and therefore working practices.

Other international bodies working with the natural stone value chain in Rajasthan include the **Earthworm Foundation**, a non-profit organization that supports the private sector transform supply chains with a focus on working conditions and nature. The organization has developed standards through the Responsible Stone Programme, which started in 2007, which member companies are expected to work towards implementing (TFT 2020).

Advocating Rights in South Asia, previously the India Committee of the Netherlands, and the **Indo-German Export Promotion Project** have also been involved in ensuring responsible natural stone supply chains from Rajasthan that adhere to the standards they develop and promote.

3.5 Compliance and enforcement

Enforcing health and safety of workers in mines and quarries is the responsibility of the DGMS, a central level organization. Inspecting officers from the DGMS are responsible for monitoring and inspecting these sites during general inspections of mines and quarries. Any violations are followed up in subsequent inspections. In the case of non-compliance, improvement notices and prohibition orders are issued until the non-compliance is resolved.

Research suggests, however, that the central government is rarely informed when a mine has been leased and therefore does not know to check on it. The research highlights that many enforcement issues therefore fall through the cracks. In processing units, responsibility for enforcement of OSH in the workplace lies with the Chief Inspector of Factories at the state level.

For cases of illegal mining, a Vigilance Wing, headed by an Additional Director, Mines (ADM) from the Rajasthan Government's Ministry of Mines and Petroleum, focuses on the prevention of illegal excavation and dispatch of minerals. Penalties for non-compliance or illegal mining activities are provided in the MMDR Amendment and have increased in stringency to include jail terms and large financial penalties. Special courts may fast track trials related to illegal mining.

▶ Box 5: Non-compliance with rules and regulations

The research suggested there was non-compliance with much of the regulation related to natural stone exploitation and processing. This is emphasised by a report by the Indian Comptroller and Auditor General (Government of Rajasthan 2017, 55), which estimates that 9.89 million tonnes of minerals were found to have been illegally extracted in five regions of Rajasthan between 2011–12 and 2016–17. This illegal activity was estimated to be worth INR2,307 crore (US$300 million).

The Auditor General identified that Mines were operating without consent and without having obtained the required environmental clearances. Additionally, the audit identified that an excess evacuation of minerals by leaseholders in violation of the conditions of the consent to operate. They identified a "slackness" in the implementation of policy measures for curbing illegal mining. Delays in issuing notices for raising demands and recovery of the penalty amount from illegal miners were identified as limiting deterrence. Out of the sample size of 136 mines investigated, only 36 per cent had been inspected in the past year, and 78 per cent had not submitted the required annual environmental statement.

Other investigations outside this research have provided evidence of limited compliance with the legislative framework, with concerns around human rights violations, health and safety of workers, child labour (HAQ Centre for Child Rights 2010, 82), bonded labour, inadequate wages (Marshall, Taylor and Balaton-Chrimes 2016, 31) and oppressive employment terms and gender discrimination (Upadhyaya 2008, 4), as well as environmental degradation (Madhavan and Raj 2005, 24). This is discussed in greater detail in Chapter 4.

The research indicated that enforcement varies between districts. Although initiatives have been set up by the Government of India (Ministry of Mines 2019, 25–26), such as the task forces for illegal mining and the use of satellite technology under the Sudoor Drushti project, illegal mining and violations of the legal framework are apparently widespread in the mining and processing sectors. The research, combined with the recent audit of Rajasthan's mining sector by the Auditor General, indicates challenges with regard to enforcement.

In addition to limited compliance with the regulations, judicial process claims between workers and employers are predominately resolved outside formal mechanisms. This is evident in the case of any fatal accident or death of a worker, which would typically be settled by workers striking and trying to resolve the issue through a third party, such as Gram Panchayat's Sarpanch.

Although detailed statistics on the proportion of processing units outside the formal system are not available, it is estimated that a large proportion are not included in the formal system of governance and operate in the informal economy. As highlighted below, owners are resistant to formalization. Limited compliance and large numbers of mines and processing units in the informal economy represent a lost opportunity for workers and employers.

Constraints to compliance and enforcement

There are several constraints to compliance and enforcement:

First, **lack of capacity of the enforcing authorities**, with limited staff covering large areas and thousands of small mining operations. The small scale and large number of natural stone mines and processing units makes identifying and visiting all activities is a large undertaking. Due to the lack of capacity in the Ministry of Labour, the DGMS is not able to regularly visit mine sites even when it is aware of them. Instead, it relies on specific complaints before initiating an inspection. Significant informality in the sector means that most issues are not raised for inspection. A lack of equipment also hampers the assessment of compliance, such as the lack of equipment for screening workers for health conditions during visits. A large proportion of processing units are small scale, not registered, and operate in the informal economy. They are therefore outside the governance framework and are likely to be unknown to the authorities responsible for ensuring compliance.

Second, there are o**verlapping rules governing major and minor minerals**, with many of the mining operations governed by the major mineral rules, despite natural stone being classed as a minor mineral. The rules are also changeable across states, which poses a challenge to the central government when it comes to conducting inspections and ensuring compliance. The processing units operate outside the mining legislative framework. There may also be some conflicts between environmental legislation at the state and central levels, which may create some confusion.

Third, there **compliance appears to be of high cost and low benefit** to mine owners. To increase compliance would incur costs that were not matched either by the risk of penalty for non-compliance or the reward of an increase in price or access to new markets. Further, the time taken to ensure compliance was identified as a cost factor, with formal processes taking a significant amount of time to complete. Examples include the fact that obtaining environmental and forest clearances dramatically delays licensing, with 40 infrastructure projects stalled due to a lack of environmental clearances in the mining sector in India (Government of India 2014a, 192). This is also evident in the complaints made by the Federation of Mining Associations of Rajasthan.

The research suggests that the complexity of documentation, especially since the introduction of new goods and services tax rules, present a large investment of time and effort by small mines and processing units. Owners highlighted that the paperwork to ensure compliance is overwhelming and detracts from economically productive work.

Fourth, the domestic market for natural stone, which accounts for a large proportion of the natural stone market, **does not demand evidence of compliance with the formal rules of standards**. There is therefore limited financial reward for demonstrating compliance.

4 Decent work challenges and opportunities

4. Decent work challenges and opportunities

Chapter highlights

- **Accurate, up-to-date data on employment in the sector is limited.** This is compounded by widespread informal mining. Without accurate employment data – disaggregated by sex, age, location, activity – it is difficult to assess the scale of the decent work deficit and develop targeted solutions.
- **Pressure to maintain price competitiveness** results in low wages with payment terms that transfer financial risks onto workers. Day-rate arrangements paid in cash were the most common payment modality.
- **Most employment in the sector is informal**, with no contracts, records of employment, or formal proof of salary. The knock-on effects include difficulties opening bank accounts and accessing social protection mechanisms.
- **Workers are entitled by law to a range of social protection measures, however few workers report using these measures due to a lack of awareness and understanding**, and widespread informal working arrangements (no contracts or employment records).
- **Workers face OSH risks**, notably lung diseases like silicosis, and personal injury. It is likely that the extent of these problems is being under-reported. Worker compensation was reported as limited and difficult to claim, employers face few repercussions for OSH breaches, and government policy has traditionally focused on compensation over prevention. Driving improved OSH in the sector starts with a clear commitment and policy for OSH management, followed by introducing OSH management systems, assessing OSH hazards and risks, and implementing measures to control these.
- **Skills development in the sector is limited**, reinforcing a low-wage, low-productivity cycle. There were no formal training or qualifications reported by respondents, and appetite for skills development was low among workers and employers alike. There are limited wage premiums for skill and length of experience, which can disincentivize the building of workers' skills over time.
- **Workers' voices are often not heard**. Workers operating informally or in precarious employment often fear repercussions from their employers if they speak up. Trade unions, where they exist, were not reported as highly active among workers, and most employers reported viewing unions with scepticism. Any initiative to build union membership and capacity must also focus on building awareness and trust among employers.
- **Bonded labour and child labour are still used**. Conditions for underage workers are particularly difficult, with lower pay, greater risks of exploitation and harassment, and even more serious health risks than adult workers.

4.1 Introduction

The natural stone sector is a major source of employment in Rajasthan. While there are limited accurate or up-to-date official records,[3] there appear to be around half a million people directly employed in the sector and a larger number working indirectly (see Chapter 1). The sector is predominately labour intensive and located in rural and peri-urban areas where wages are relatively low. While there was no disaggregated data available on employment by value chain activity, the research indicates that the majority of workers are engaged in lower-skill production and processing, which are also where the greatest decent work deficits are found.

3 Encompassing all workers active in the sector, including formal and informal or illegal employment, and disaggregated by sex, age, district, employment type, etc.

▶ Box 6: What is decent work and why is it important?

The ILO defines decent work as "productive work for women and men in conditions of freedom, equity, security, and human dignity" (ILO, 1999). It refers to opportunities for work that are productive and deliver a fair income; provide security in the workplace and social protection for workers and their families, offer better prospects for personal development and encourage social integration, give people the freedom to express their concerns, to organize and to participate in decisions that affect their lives, and guarantee equal opportunities and equal treatment for all. The ILO Declaration on Fundamental Principles and Rights at Work (1998) states that four fundamental principles and rights at work are universal, and commits Member States – including India – to respect and promote these principles and rights as follows:

- Freedom of association and the effective recognition of the right to collective bargaining.
- The elimination of forced or compulsory labour.
- The abolition of child labour.
- The elimination of discrimination in respect of employment and occupation.

Decent work is important not only because it is the right thing to do, but because it impacts the whole economy (by reducing poverty), boosts worker productivity and improves labour relations. As well as being a key component of the 2030 Agenda for Sustainable Development, it can also improve how a country is perceived on the international stage, boost trade, improve diplomatic relations, and increase development assistance.

Despite a relatively comprehensive legal framework for workers' rights (see box 7 below), the reality on the ground is that many natural stone sector workers survive in precarious living conditions due to non-standard forms of employment, low wages, lack of social protection, and widespread informality. Workers face OSH risks, particularly for personal injury and lung disease (over 50 per cent of mine workers may be affected (Marshall, Taylor and Balaton-Chrimes 2016, 6)). Informal workers, women and children, and people with health conditions are among the most vulnerable.

▶ Box 7: Legal framework for workers' rights

Laws that govern workers' rights and working conditions in Rajasthan's natural stone sector include: The Trade Union Act, 1926; The Bonded Labour System (Abolition) Act, 1976; The Payment of Wages Act, 1936; The Minimum Wages Act, 1948; Child Labour (Prohibition and Regulation) Act, 1986; The Equal Remuneration Act, 1976; Inter-State Migrant Workmen Act, 1979; The Dangerous Machines (Regulation) Act, 1983; The Trade Unions Act, 1926; Contract Labour (Regulation and Abolition) Act, 1970; and Maternity Benefits Act, 1961. Enforcement of this legal framework is generally weak, with protections for most workers falling far short of required standards.

There are several interlinking factors influencing working conditions in the sector. The fieldwork and the literature highlighted that a large proportion of the natural stone sector in Rajasthan operates in the informal sector where it operates outside the coverage of the country's legislative or regulatory framework.

Informality and cascades of subcontracting arrangements have created opaque supply chains in which poor working conditions are difficult and costly to identify and improve. Some employers have used legal loopholes to circumvent labour laws. While some end buyers have invested to improve standards and transparency in their supply chains, many have not. To pave the way for a more sustainable and productive natural stone industry in Rajasthan it will be important to accelerate the transition to the informal economy and create a level playing field for all enterprises with incentives for those that operate responsibly and comply with laws and regulation.

However, the complicated interplay between the central and state governments has sometimes resulted in policy and enforcement gaps, especially in the processing units, compounded by limited labour inspection and monitoring capacity. The fieldwork study found that the cost of compliance in terms of potential enforcement, the penalties in terms of non-compliance and the benefits of compliance were limited.

As a predominately fungible, or interchangeable product, the minerals industry in India competes predominantly on costs. In the absence of a strong regulatory framework and enforcement, price competition may result in pressures to reduce costs to the detriment of labour and the environment. High levels of surplus labour and limited alternative livelihoods mean that workers often have limited choice regarding where they work. Workers often have limited negotiating power with few active labour unions, especially in the processing units across the value chain, limited knowledge of their rights, and the fear of reprisals from their employers.

Although the scale of these challenges is significant, there is also an opportunity for responsible actors to lead meaningful change in the sector. This is not just the right thing to do, it is also good business sense. Better working conditions and investment in the workforce will boost labour productivity, improve worker–employer relations, and can serve as a key differentiator for local operators targeting ethical buyers.

In this chapter, findings from the research and secondary sources are reviewed to:

- build a picture of working conditions in the natural stone sector, focusing on workers in production and processing roles;
- assess OSH practices;
- compare the reality on the ground with the ILO's fundamental principles and rights at work; and
- consider gender dimensions in the natural stone supply chain.

The aim is to identify key constraints to decent work in the sector, as well as opportunities for long-term improvements.

4.2 Profile of worker respondents

The primary research included interviews with 115 workers (80 per cent male, 20 per cent female) in the two clusters of Udaipur-Rajsamand and Kota-Bundi. Respondents reported an average of 11 years of work experience. Thirty-four per cent of the respondents were from "scheduled castes", 30 per cent each were from "scheduled tribes" and "other backward classes", and 5 per cent were from the "general" category. Levels of education ranged from primary to middle school, with 40 per cent of all respondents identifying as illiterate, the illiteracy rate among women being significantly higher at 74 per cent. While most workers carried forms of identification (98 per cent reported having an Aadhar card, 63 per cent had ration cards, 55 per cent had voter cards), a minority reported being part of the formal financial system (30 per cent had a bank account and 4 per cent had a Permanent Account Number card). Low levels of labour migration were reported, with 92 per cent of respondents living in the same district as their place of work.

4.3 Worker skills

Worker skills are an important driver of labour productivity and an essential component in developing the natural stone sector more broadly. Without a clear skills development policy and a deliberate and sustained drive to upgrade worker skills, coordinated with wider technological upgrading, the sector is likely to remain stuck in a cycle of low wages, low investment in workers, and low productivity. Understanding of the importance of skills is lacking among all actors. Government-driven skills development initiatives, where they exist, are modest, both in scope and ambition. Under these conditions there are few incentives for workers to proactively build their skills, or for employers to recognise, and pay for, higher-skilled workers.

Provision of training was low overall. Just over 20 per cent of workers surveyed had received some form of training, with unit owners delivering 96 per cent of this. Training was more prevalent at mines and quarries (32 per cent of workers) than at processing units (18 per cent of workers), and more widespread

in the Udaipur cluster (43 per cent of workers) than in Kota (3 per cent of workers). The training provided seems to have been relatively rudimentary and all delivered on-the-job. None of the training was obviously aligned with any recognised occupational standards or curricula. It was not formally recorded (and thus not demonstrable or portable) and it did not result in any form of qualification. There was no mention among respondents of recognition of prior learning as a potential route to achieving formal qualifications.

Appetite for training appears to be low among workers and employers alike. Only 26 per cent of workers expressed an interest in training, with the remainder citing concerns that training would not be compensated and would result in loss of earnings (it carried a high opportunity cost). Of the positive responses, the most common areas of training suggested by workers in mines were splitting and chiselling, grading and machine operating. No mine owners and only 18 per cent of processing unit owners reported that they would like to provide training to their workers.

Although there is some focus on skills development at policy level, evidence of effective delivery at scale is limited. The Rajasthan Mineral Policy, 2015, for example, identifies skills development as one of the key focus areas of the mining sector in the state, with aims including the launch of technical and vocational training courses and development of new training infrastructure. According to officials from the DGMS and Centre for Development of Stones (CDOS), workshops and seminars are organized by the DGMS and CDOS, for workers and owners, on environmentally friendly mining and safety of mining workers. The reach and efficacy of this training is unknown. Although skills development is also designated as a high priority area under the District Mineral Fund Trust, the research only identified one active project, for which no further information was available. Beyond this, the research team found no evidence of other public or private initiatives in practice.

4.4 Working conditions

Despite a relatively comprehensive legal framework, working conditions in the natural stone sector are in general quite poor. Under pressure to keep overheads to a bare minimum, some employers push down wages, limit commitments to workers by offering non-standard forms of employment, minimize outlays on social protection, and offer few facilities to workers. Employers who breach laws on working conditions have traditionally faced few repercussions, for example due to limited inspection and enforcement capacity by regulators.

4.4.1 Wages

Male mine and quarry workers surveyed earned an average of INR395 (US$5.14) per day (range INR200–500 or US$2.60–6.50), while women earned on average INR256 (US$3.33) per day (range INR200–300 or US$2.60–3.90). Male workers at the processing stage reported daily earnings of INR465 (US$6.05) with a range of INR250–800 (US$3.25–10.40), while women earned an average of INR314 (US$4.08) with a range of INR300–400 (US$3.90–5.20) (Table 12). While the research did not consider in detail how rates are determined, the consensus is that physically stronger workers (such as young males) have the greatest earning capacity, while older workers, women and those with health conditions earn significantly less. An important area for future research would be to understand wage-setting mechanisms in more detail.

▶ **Table 12: Average daily wages in mines and processing units (in INR)**

Mine/processing Unit	Cluster	Male	Female
Mine	Kota	367	256
	Udaipur	423	-
Processing Unit	Kota	443	314
	Udaipur	487	-

Minimum wage law was reported as being complicated, with multiple official central and state-level rates depending on sector, job classification and skill level. It appears that many workers in the natural stone sector do not know which minimum wage applies to them, and that employers often have little incentive to provide clarity. Nevertheless, 53 per cent of workers reported that they earned a minimum wage in the quarries. However, workers also reported that the minimum wage rate itself was too low to cover essential costs like rent, electricity, and school fees (Yadav 2018, 10). Table 13 presents central minimum wage rates (Government of India, Ministry of Labour and Employment 2019) and state-level rates (Government of Rajasthan 2018). According to this notification, mining operations can be classified as work below the ground or work above ground. In most cases, granite, marble, sandstone, and limestone quarrying are considered as work above ground.

▶ Table 13: Comparison of central/state-level minimum wages and actual wages reported by respondents

Central/state	Skill Level	Minimum daily wage rate (INR)	Actual average wage reported (INR)	Difference (INR)
Central	Unskilled (above ground)	373	Men: 395 Women: 256	Men: +22 Women: –117
Central	Semi-skilled (above ground)	466	N/A	N/A
State	Unskilled (mines)	213	Men: 395 Women: 256	Men: +182 Women: +43
State	Semi-skilled (mines)	233	N/A	N/A
State	Unskilled (processing units)	225	Men: 465 Women: 314	Men: +240 Women: +89
State	Semi-skilled (processing units)	237	N/A	N/A

In terms of wage arrangements, 86 per cent of workers surveyed reported working for a daily wage, with 14 per cent on piece-rate arrangements (Table 14). None of the workers surveyed reported working on a contracted basis. The secondary literature paints a similar picture. Yadav (2018, 10) identifies that less than 25 per cent of workers earn a fixed monthly salary, with the remainder on piece-rate or daily wage rates. These arrangements transfer financial risk from the employer to the employee (employers can up- and down-size workforces depending on demand) and make work more precarious, particularly for the lowest-skilled and most vulnerable workers.

▶ Table 14: Type of worker engagement (per cent)

		Daily wage labour			Piece rate basis		
Mine/processing unit	Cluster	Male	Female	Total	Male	Female	Total
Mine	Udaipur-Rajsamand	100	0	100	0	0	0
	Kota-Bundi	40	60	100	0	0	0
Processing unit	Udaipur-Rajsamand	100	0	100	0	0	0
	Kota-Bundi	37	28	65	33	2	35

According to state laws, minimum wages increase by skill level. For example, a "stone dresser" should qualify as a skilled worker after three years on the job, and highly skilled after five years. There are two challenges to translating this system into reality. First, the absence of formal employment records means it is difficult to prove length of experience. There was no evidence of any formal or semi-formal on-the-job learning (such as apprenticeships) or other ways to record and track skills and experience. Second, even if it were possible to prove length of experience, it is not certain that employers would be willing to pay a premium. Without a clear signal from employers – in the form of higher wages – there is little incentive for workers to track their experience or formally develop their skills. Labour market dynamics, including wage setting, are important areas for follow-up research.

In the mines, all the workers reported that the wages are paid in cash, with 86 per cent of respondents reporting payment monthly. Respondents also highlighted that pay was often linked to the final output of a saleable product, leading to a lag of 10–15 days before being paid for work completed. Again, this transfers financial risk onto the employees, and as a result, 42 per cent of worker respondents said that they take advances from their employer (see section on bonded labour, below). Female focus group participants noted that these practices can create tensions between workers and employers, with reports of mine owners becoming abusive towards workers who have taken additional, temporary work in other stockyards to meet financial needs.

Workers have limited recourse to negotiating wages or payment terms. The primary research did not find any evidence of widespread, formal systems of worker representation or collective bargaining. The trade unions that do exist were reported to be under-active, with limited participation from workers (see Section 4.12 below for further details).

Most workers are not organized, with only 7.5 per cent of worker respondents reporting being part of a labour union. The research did not identify widespread formal systems of representation or collective bargaining. Marshall, Taylor and Balaton-Chrimes (2016, 31) report that "the vast majority of quarry workers never raise claims regarding the payment of minimum wages, as they are unaware of their rights and reticent to stand up to quarry owners. While employees are technically entitled to raise complaints regarding the non-payment of minimum wage with the central Labour Department, the mechanism is rarely used in practice".

4.4.2 Types of employment

All worker respondents reported being employed directly by the unit they work for; none claimed to have a formal written contract of employment. Workers reported the average duration of employment with the same mine or processing unit at around 3.5 years, with no clear trends between duration of employment for different types of work (Table 15). This conflicted with the information given by employers, who generally reported workers staying for around 9–12 months and changing jobs frequently. Owners also reported retaining a small core group of permanent employees and relying on contract or casual labour for most operations. Employment relationships appear highly transactional, with 96 per cent of workers reporting being able to leave their current employer easily to find other work.

▶ **Table 15: Average duration of work reported by workers in mines and processing units (in months)**

Cluster	Mines	Processing Units
Udaipur-Rajsamand	60.15	30.27
Kota-Bundi	27.93	55.96
Average	42.89	43.85

One trade union member mentioned that some mine owners do not record workers engaged on a daily wage and piece-rate basis, to avoid having to contribute to their social security. Having no formal contract severely limits options for recourse, for example in the case that wages are not paid in full or at all. The most common recruitment practices used by employers were informal, for example tapping their own connections, followed by workers approaching them directly.

4.4.3 Working periods

Male mine and quarry workers reported working an average of 10 months per year, in line with the mining season, while women reported an average of 4.5 months. At the processing stage, male respondents again reported a 10-month working year, while women reported working 8.5 months. The intensity of the work fluctuates over the year, with production and processing workers reporting working 27 days per month in the busiest months. Quarry owners reported workers returning to their villages to take up alternative work – for example in agriculture – when the quarries were flooded during the rainy season. Reported working hours were 7–12 hours per day, with a typical working day of 09:00–17:00. Five per cent of workers reported working paid overtime. There was little evidence of shift work.

4.4.4 Leave

Fifty-seven per cent of mine workers and 42 per cent of processing unit workers reported taking a weekly day off. Of those who did not take any leave during the week, 53 per cent reported this as voluntary and 45 per cent said that their employer did not permit them to do so. There were conflicting accounts of whether time off was paid, with 91 per cent of owners claiming to pay workers on leave days, while workers generally reported receiving no pay. Thirty-five per cent of respondents reported paid sick leave arrangements at their places of work; 48 per cent of women workers interviewed reported provision of paid maternity leave.

4.4.5 Workplace facilities

All employers in India are legally required to provide basic facilities for workers, including drinking water, toilets, first aid boxes, and eating facilities. The research findings on the availability of those facilities in practice were mixed. The most limited workplace facilities were found in the mines of the Kota cluster, with 20 per cent of worker respondents reporting availability of drinking water at their place of work and just 13 per cent reporting access to available toilet facilities. This compares to 100 per cent of worker respondents in Udaipur reporting access to drinking water, toilets, first aid boxes and dining facilities. In practice, the research team observed no dedicated drinking water facility at most of the quarries visited, with workers using nearby natural sources, such as ponds, rivers. There were no toilet facilities available for male workers, and where separate facilities existed for women, most were in unhygienic conditions.

Facilities in processing units appear to be of a higher standard than at the mines, as presented in Table 16 below. None of the mines and only 6 per cent of the processing units offered crêche facilities, now required for operations employing more than 10 people (effective from July 2017 following amendments made to the Maternity Benefit Act (1961)).

▶ **Table 16: Workers reporting availability of facilities in workplace units (in per cent)**

Mine/ Processing Unit	Cluster	Drinking water	Toilet facilities	First aid box	Dining facilities
Mine	Kota-Bundi	20	13	93	80
	Udaipur-Rajsamand	100	100	100	100
Processing Unit	Kota-Bundi	91	67	91	74
	Udaipur-Rajsamand	100	98	61	34

Migrant workers are either provided with accommodation near the mine or quarry by their employer, or they are required to rent accommodation or make their own accommodation in a demarcated area. Such accommodation is usually temporary and unplanned, often crowded, and generally lacking water and sanitation facilities. Only 20 per cent of mine workers and 12 per cent of processing unit workers reported receiving food from their employers.

4.5 Occupational safety and health

OSH management starts with a clear commitment and policy, the introduction of OSH management systems, an assessment of hazards and risks, and the implementation of measures to control these. The research did not find such measures to have been widely adopted, with poor OSH practices observed in many of the workplaces visited. Workers throughout the sector, but particularly those in manual production and processing activities, face significant OSH risks, notably lung disease (including silicosis – see below) and personal injury. Of the workers who had visited a health facility in the past 12 months, over 90 per cent reported the reason as having been linked to their occupation. In mines, stones and flying debris were cited as a health and safety issue by 86 per cent of respondents; 64 per cent reported significant levels of dust; 57 per cent of workers were exposed to fumes and other potentially toxic substances; while 54 per cent worked close to open electrical wiring. OSH conditions were also poor at the processing stage: 62 per cent of respondents reported being exposed to sharp tools and materials; 51 per cent faced loud noise and vibrations; and 37 per cent worked with heavy machinery.

Employers appear to put little emphasis on OSH and face few repercussions for OSH violations. None of the mines in either cluster reported having a safety committee. 13 per cent of the processing units in the Udaipur cluster and 18 per cent in the Kota cluster said that they have safety committees. In focus group discussions, workers mentioned limited ability to hold employers responsible for accidents due to the informal nature of their work; many were operating without proof of employment, social security coverage, or recourse to an alternative livelihood.

OSH monitoring and enforcement have proven challenging. The sheer number of operations (12,000 mines in Jodhpur district alone) has presented logistical difficulties for regulators like DGMS, the capacity of which is already stretched. Many mine owners operate informally, further exacerbating monitoring challenges, or circumvent the law, such as by under-reporting employee numbers, mine size, or certain activities like blasting, to avoid submitting records to the authorities.

The research team reported seeing no personal protective equipment (PPE) in use, with limited effort made by employers to provide PPE or enforce use. During group discussions, workers generally confirmed limited use of PPE, with some workers (such as block cutters) occasionally provided with low quality helmets during visits by buyers, CSOs or government. Some processing unit workers reported being provided with masks and safety boots, but this was not routine.

▶ Box 8: OSH laws and regulations

Four main laws cover OSH at the workplace:

- The Factories Act, 1948;
- The Mines Act, 1952 and Mines Rules, 1955;
- The Dock Workers (Safety, Health and Welfare) Act, 1986, followed by notification of the Dock Workers (Safety, Health and Welfare) Regulations, 1990; and
- The Building & Other Construction Workers (Regulations of Employment and Conditions of Service) Act, 1996.

In 2018, the Government of India drafted the Occupational Safety, Health and Working Conditions Code by amalgamating 13 labour laws relating to safety and health standards, health and working conditions, welfare provisions for employees, and leave and hours of work, including the Mines Act, 1952.

Health screening appears to be limited, with no routine medical check-ups reported. Some respondents pointed to ad-hoc check-ups performed by CSOs operating in the region. A DGMS official reported organizing check-ups with a handful of large mine owners but noted that a lack of the correct medical equipment made accurate diagnoses difficult, particularly for lung disease (see Box 8).

4.5.1 Lung diseases

Lung diseases are a major problem in the natural stone sector. Silicosis, one of the most commonly cited conditions, is an incurable lung disease caused by inhalation of dust containing free crystalline silica, found in quartz, sandstone, flint, slate, various mineral ores, and many common building materials, including clay bricks, concrete, mortar, and tiles. Workers breathe in tiny silica particles released into the air with the dust created by cutting, crushing, chipping, grinding, drilling, blasting, or mining, and in the process develop silicosis. Silicosis has no symptoms in its early stages. Silicotuberculosis and lung cancer are frequent causes of death in people with silicosis. Owing to a lack of awareness, even among medical professionals, silicosis is often confused with other respiratory ailments such as tuberculosis.

Between 2013 and 2017, the government of Rajasthan officially certified 9,278 individuals, predominantly miners and stone carvers working with dimensional stones, as living with silicosis, more than 700 of whom to have since been reported to have died. These official statistics likely to significantly under-report the scale of the problem. A report by Marshall, Taylor and Balaton-Chrimes (2016, 6) cited investigations conducted by the Indian Council of Medical Research, estimating that 56 per cent of mine workers in Rajasthan are affected with silicosis or silicotuberculosis, which could amount to over a million people.

While the existing legal and policy framework in India does provide the opportunity to enforce measures to mitigate lung disease, enforcement is some segments of the supply chain is lax and some employers may be unwilling to implement them. Measures such as wet drilling and more widespread use of PPE could have an immediate and tangible positive impact on worker health, but the research showed that mine owners either believed that such measures were not necessary or were reluctant to invest in the required equipment. The prevailing poor standards lead, in turn, to artificially low production costs, which further undermine working conditions.

These challenges are exacerbated by a complicated institutional arrangement governing OSH. While the primary responsibility for enforcing OSH provisions for mineworkers lies with the DGMS, detection and treatment of silicosis and rehabilitation of affected workers is the responsibility of the Rajasthan state government.

Labour activists say that although the state is taking some responsibility for relief to victims, it is failing to enforce the norms of compensation on employers. For example, not a single case has been registered in Rajasthan's courts under the Employers Compensation Act in the past 12 years and not a single employer had been penalised for a worker having contacted silicosis working in the quarries (Yadav, 2018, 19–21). Furthermore, research respondents identified significant challenges in accessing compensation – for example needing to provide proof of employment with the specific mine where they contracted the disease. Local authorities, wishing to avoid scrutiny, are reluctant to record cases, preferring to settle the issue when a person dies rather than register a patient for silicosis. There is also a significant time-lag between reporting a case and receiving compensation.

Despite these challenges, awareness of the issue is growing and there have been recent government initiatives to address silicosis. In September 2019, for example, the government of Rajasthan framed a policy on pneumoconiosis, including silicosis detection, prevention, control, and rehabilitation. The policy recognises that while efforts are being made to provide relief for affected workers, there is no attempt at prevention. The policy therefore seeks to cover anyone exposed to the threat of or anyone suffering from diseases caused by dust, irrespective of the nature of their employment.

4.6 Social protection

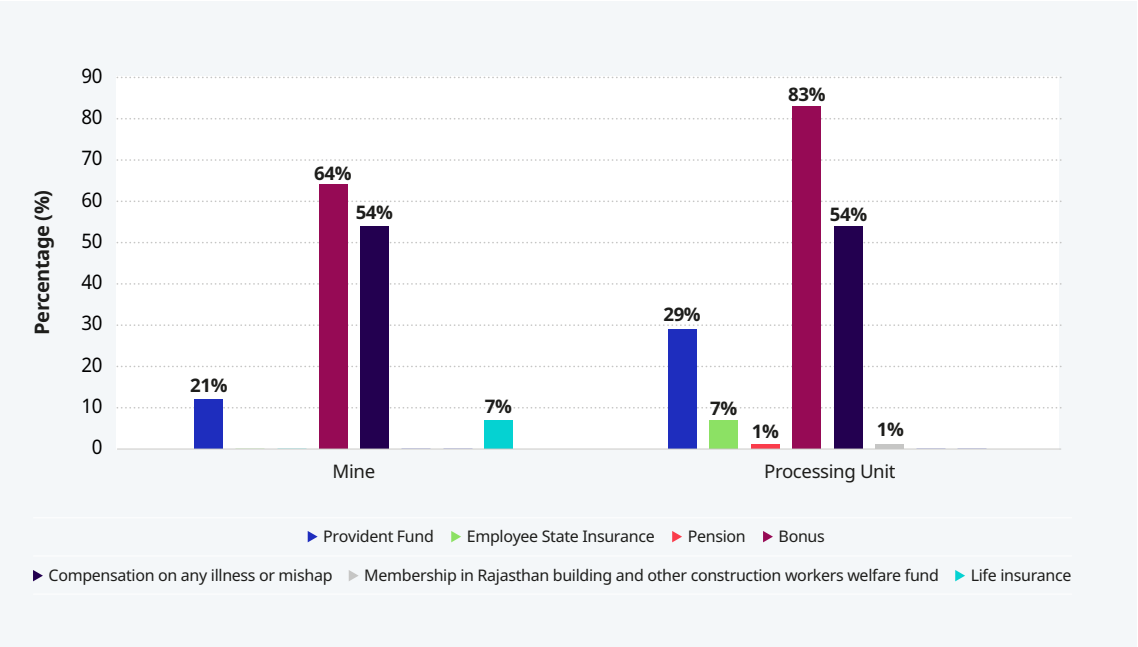
Social protection, which includes life and disability compensation, health and maternity benefits, and income support for older people (pension cover), is an important aspect of decent work. Indian legislation makes provision for social protection for both organized and unorganized workers in the natural stone sector, for example through the Unorganised Workers' Social Security Act, 2008, the Maternity Benefit (Amendment) Act, 2017 The Inter-State Migrant Workmen Act, 1979, The Mines Act, 1952 and the Employees' Provident Funds and Miscellaneous Provisions Act,1952. Examples of the protection provided for in that legislation are listed below.

- Natural stone mine workers earning less than INR15,000 per month have access to a Provident Fund through which employers contribute to their pension funds.
- Employee state insurance facilities provide medical cover, maternity benefits and compensation in the event of injury, death or disability.
- Mineworkers in sandstone mines have the right to register with the Rajasthan Building and Other Construction Workers Welfare Fund. This entitles them to additional compensation in the event of death or injury.

Both the research and secondary literature pointed to little uptake or enforcement of social protection measures in the natural stone sector. Twenty-one per cent of survey respondents working in mines and 29 per cent of those working in processing units reported having access to the Provident Fund. Seven per cent of processing unit respondents reported being provided with employee state insurance facilities. Only one out of 30 workers surveyed held a Building Workers Card. In the group discussions, most respondents reported receiving no social benefits. Only one female respondent (in a group discussion in Bundi) reported having recently been covered under employee state insurance by her employer.

The main benefits workers reported were bonuses (64 per cent of mine worker respondents and 83 per cent of processing unit respondents) and compensation for illness and injury (54 per cent at both types of facility) (Figure 9). While the widespread use of compensation may appear positive at first glance, it potentially indicates that employers are failing to address the root causes of illness and injury, preferring to pay out relatively modest sums to settle individual cases.

▶ Figure 9: Receipt of benefits as reported by workers (in per cent, n=115)



4.7 Fundamental principles and rights at work

The ILO Declaration on Fundamental Principles and Rights at Work, 1998 stipulates that the following four fundamental principles and rights at work are universal, and commits member States to respecting and promoting them:

1. freedom of association and the effective recognition of the right to collective bargaining;
2. the elimination of forced or compulsory labour;
3. the abolition of child labour; and
4. the elimination of discrimination in respect of employment and occupation.

The research identified gaps in respect for all four principles, as described hereafter.

4.7.1 Freedom of association and right to collective bargaining

The ILO highlights the importance of strong and independent workers' organizations, and the recognition of their right to engage in collective bargaining, as major tools for effective labour market governance (ILO 2008, 5). Collective bargaining is an important coordination mechanism between workers and employers and has the potential to resolve conflict, build trust, and give workers a peaceful and inclusive route to influencing the conditions under which they work. This in turn has the potential to raise productivity, reduce the time and energy spent managing labour issues, and lower transaction costs for employers (including through better worker retention).

Despite the potential benefits, workers in the mines and processing units in Rajasthan are generally unorganized with limited trade union activity reported. Fewer than 3 per cent of mineworkers from the Udaipur cluster reported being union members; none of the women respondents reported being members. No mine or processing unit owners reported long-term agreements with trade unions or having any union activity in their premises.

The research team identified at least eight labour unions working in the state. Responses from union representatives confirmed that workers can face negative repercussions from employers for joining a union, and thus appetite and interest from workers is limited. One union official reported that "we want to help, we are here, but unless they [workers] want to help themselves, we can't do much about it."

The problem of low membership is made worse by limited awareness among workers of unions and their services. 53 per cent reported that they are not aware of any trade union, and where unions were more active 32 per cent reported not being informed about union meetings. Union representatives in turn reported that they intended to hold monthly meetings, but mobilizing enough workers was challenging.

In the absence of union activity, there appears to be some informal coordination between workers. In Kota and Udaipur 8 per cent and 41 per cent of workers respectively reported organizing informally. Women who participated in focus group discussions in the Kota cluster reported that they are part of a self-help group but that the scope of support was generally only financial (intra-group lending). There was limited evidence of any availability of other dispute resolution mechanisms. Only 20 per cent of workers reported a workers' council at their place of work; none of the women surveyed knew whether there was a workers' council active. Trade union representatives pointed to fatal accidents as a major source of worker–employer disputes, generally resolved with the help of a village council (gram panchayat) or a local arbiter.

While there is potential to improve worker representation and build a more productive worker–employer relationship, there are deep-rooted barriers to overcome. Any efforts to build union capacity and increase awareness among workers should be coupled with a strategy to improve perceptions of and relations with employers.

4.7.2 Forced or compulsory labour

According to the ILO Forced Labour Convention, 1930 (No. 29), forced or compulsory labour is "all work or service which is exacted from any person under the threat of a penalty and for which the person has not offered himself or herself voluntarily."

The primary research revealed relatively high levels of indebtedness among workers, with some becoming bonded to their employers on account of their inability to pay off loans taken on occasion of crop loss, marriage or family health problems. Respondents pointed to many labourers taking advances of INR10,000–15,000 while the mines and quarries are closed during the rainy season. These loans carry interest and must be repaid within a short period. Such loans in themselves do not constitute bonded labour. However, some workers often struggle to meet these repayment obligations, with debts accumulating as a result. Gradually, the cycle of debt can turn a worker into a bonded labourer. There have been reports that the children of indebted workers are forced to take over the debts of their parents and are forced, in turn, into the bonded labour system.

Madhavan and Raj (2005) report forms of recruitment in the sector that lead to bonded labour. Agents in the villages of Madhya Pradesh, Uttar Pradesh, Orissa, and Bihar sponsor villagers to take excursions to Rajasthan, especially to Bundi and Kota, after which they demand large amounts of money in repayment. Unable to return this money, people are forced to work as bonded labourers in quarries in Bundi and Kota.

4.7.3 Child labour

Although no child labour was reported to the research team, other sources suggest it is still a relatively widespread practice. Like general employment data, data on the number of underage workers is limited. According to the 2011 Census, there were 252,338 child labourers in Rajasthan across all economic sectors. This gives an indication of the scale of the issue. Girls face even more serious forms of abuse and exploitation than boys. Marshall, Taylor and Balaton-Chrimes (2016, 30) also note that some children are forced to work as a result of inheriting debt following the death of a parent.

4.8 Gender dimensions in the supply chain

4.8.1 The current role of women in the natural stone supply chain

The research indicated that there is no conclusive data available on the employment of women in India's natural stone supply chain. Interviews undertaken with workers, of whom 20 per cent were women, signalled that women are primarily engaged in tasks related to removing overburden and cutting cobblestone in the sandstone stockyard and processing tasks including making figurines, storing, and packing. As discussed in Section 4.4, Wages above, and confirmed by secondary research, women are systematically relegated to the lowest-paying jobs (Marshall, Taylor and Balaton-Chrimes 2016, 32) including handpicking, loading and crushing stone, as well as housekeeping activities including cooking and cleaning (Glocal Research, India Committee of the Netherlands and Stop Child Labour 2017, 24). The research did not identify any female mine owners.

▶ Box 9: Notable interview findings

- Of the respondents, only 20 per cent (23 persons) were women.
- 74 per cent of all women respondents (15 persons) said that they were illiterate.
- All women respondents reported that they were from the state in which they were working.
- There were no women respondents in the marble mines visited.
- Average work experience of women respondents was 8 years
- The earliest age at which women respondents reported to have started working was 17 years.

These jobs, which are traditionally considered to be within the category of "unskilled labour", typically command a daily wage of INR45–55 (US$0.94–1.14), compared with male-dominated jobs, which pay INR70–120 (US$1.46–2.50) per day (Marshall, Taylor and Balaton-Chrimes 2016 31). Furthermore, all women interviewed in the research study confirmed that they are paid as daily-wage workers, with little or no employment security. On average, women workers work fewer months per year than men; male workers reported an average of 10 months' work per year, while female workers reported an average of 4.5 months in mines and 8.5 months r in processing units. These differences, both in pay and duration of employment, both result from and contribute to entrenched patterns of gender inequality and exploitation across the industry.

The research yielded some interesting findings: most workers reported not knowing whether men and women were paid the same for similar work, with most also reporting that pay should be lower for lighter work regardless of who performed it and that pay scales should be equal for men and women.

Until recently, sector legislation has also been a key contributor to current gender dimensions in the sector. The Mines Act, 1952 restricted the employment of women in all mining operations between the hours of 19.00 and 06.00 (IAS Gateway 2019). Further, where women have been deployed on operations, they were required to be in a group of no less than three. While one may assert that these legal provisions were in response to important health and safety factors, they have likely contributed to the limited number of women engaged in the sector to date. It is possible, however, that new rules permitting women to work in opencast mines between the hours of 19:00 and 06:00, issued by the Ministry of Labour in early 2019, will start to positively impact the number of women working in the sector. The rule of a group of no less than three continues to stand.

4.8.2 Working conditions of women

Research suggests that women in Rajasthan's stone quarries face serious forms of exploitation (Marshall, Taylor and Balaton-Chrimes 2016, 33). They often have no access to benefits, including health care or maternity leave which results in a return to work immediately after childbirth. This is particularly the case for bonded labourers. While the survey did not come across any reported cases of sexual harassment or violence, secondary sources indicate that sexual harassment and assault are common risks for women working in the sector. Some female participants in focus group discussions reported being harassed by employers, for example for not repaying loans.

Based on interviews with women working in the sandstone cobble stockyard, the research concluded that they experience hazardous working conditions but continue to work due to a lack of alternative options. The research indicated that a larger proportion of women than men report injuries; of the 14 workers who had reported injuries over a given 12-month period, 35.7 per cent were female.

Trade union membership is often a mechanism for ensuring that women are aware of the rights and benefits to which they are entitled; there are seven active trade unions in Rajasthan. Of all the women interviewed in the study, none reported belonging to a trade union or workers' council.

5 Trends in the international marketplace

5. Trends in the international marketplace

Chapter highlights

- **Natural stone is experiencing a threat** from ceramic and engineered tiles and artificial stone which are produced at a lower cost. It maintains a competitive edge at the upper end of the marketplace, however, due to its authenticity and uniqueness.
- **Non-OECD countries have been the largest growth market** for natural stone, especially Indonesia, Saudi Arabia and Viet Nam. The United States and Europe, however, still account for over half of the market for natural stone.
- **India is in competition with China for market share**, with China providing 40 per cent of the exports of natural stone for the international market. While China's unit price has increased over the past 10 years, India's has declined.
- **OECD Member countries provide higher unit prices than non-OECD countries**, double the unit price of Viet Nam, India's largest growth market.
- **The trade war between the United States and China presents a substantial opportunity** for India to take market share from China.
- The **global focus on sustainable production**, responsible purchasing practices and responsible sourcing has gained increasing momentum over recent years.
- **Consumer demand for transparency and assurances as to the provenance of resources and materials is increasing**, requiring evidence that materials are sourced using best practices and responsible standards.
- There has been a **proliferation of global, regional, national, and local standards of responsible sourcing**, which can cover particular resources or groups of resources, as well as all or only some parts of the value chain.
- **Standards cover a spectrum of responsible production concerns:** human and labour rights, health and safety, environmental and best governance.
- **The scope of various responsible sourcing responses ranges from identification of the origin of all goods to adherence to standards.** Directing how goods should be sourced is wide-ranging.
- The broader **mining industry is at the forefront of the global responsible sourcing debate**.

5.1 Introduction

The previous chapters have provided an overview of the value chain for natural stone in Rajasthan, the institutional and regulatory structures, and on decent work challenges and opportunities. This chapter deepens the analysis of the value chain by linking the production and processing of natural stone in Rajasthan to the international marketplace. While the present study covers the entire natural stone industry that predominantly produces for the domestic market, this chapter thus focuses on the export segment and on developments in the global natural stone market as entry points to drive up standards across the sector.

What follows is an assessment of India's position in the context of competitive global supply and demand, an examination of the trends that impact Rajasthan's export of natural stone, and an overview of the trends and practices of responsible production and sustainable purchasing in the mining industry, with a focus on natural stone. The analysis in this chapter will be primarily concerned with the top five global producers of natural and monumental stone by value: China, Italy, India, Turkey, and Brazil. Although other producers such as Spain, Portugal, Greece, Canada, and Viet Nam have natural stone industries, their exports amount

to less than half that of Turkey. The data available for analysing exports is limited to the country level and is difficult to disaggregate to the state level.

The chapter illustrates that Rajasthan's natural stone sector is at a crossroads: it can continue to focus on low-cost, high-employment and low-mechanization production with a limited focus on standards, and for non-OECD markets, or the industry can capture greater market shares in the United States and Europe by investing in productivity and working conditions, strengthening an enabling environment for sustainable enterprise, and addressing decent work deficits.

Research has suggested that natural stone is often finished and polished in the country where it will be utilized, due to the potential for finished products to be damaged during transit. This is reflected in India, where research suggests that builders and architects prefer to use imported blocks over domestic blocks. The reasons stated for this preference were that international blocks are packaged better and are less likely to be damaged in transit due to higher quality infrastructure. Imported stone is thus less likely to require remedial work, such as further polishing or cutting, which results in extra labour costs and loss of material. Additionally, respondents highlighted that the best quality stone from India is exported and therefore the remaining domestic stone is often considered to be of lower quality.

Consideration may be given to shifting from importing finished products to importing dimensional stones, to encourage value addition and technology transfer in the field of dimensional stones in the country, which will contribute to enterprise creation, employment generation and foreign exchange earnings for GDP growth. Focusing on improving packaging materials and technique may increase the preference for domestic over imported stone.

As this chapter will illustrate, part of the strategy could include an assessment of the direction of travel of the large and growing markets to understand how Indian stone could fit, and examine how natural stone substitutes are currently affecting these markets and are likely to impact these markets in the future.

5.2 Drivers of demand in the international marketplace

As highlighted in Chapter 1, the key end demand for natural stone is in the construction and decorative or monumental stone sectors. Wall cladding and flooring are the key construction uses, with demand for natural stone highly correlated to the size and growth of the construction industry.

The global scale of the construction industry, including residential, commercial and infrastructure projects, is heavily influenced by the pace of urbanization and the growth of the middle class in emerging economies. Infrastructure spending by governments for public projects, such as bridges, roads, and airports, is also a large driver of demand.

Evolving tastes, lifestyles and fashions also impact the demand for natural stone. Trends in building renovation and remodelling and a fashion for larger kitchens and bathrooms, major areas of natural stone usage for flooring and wall cladding, have resulted in an increased demand. The trend for outdoor entertainment space, with greater patio and porch space to fit with changing lifestyles is also contributing to increasing demand.

While the above trends highlight the influences driving demand, there is also increasing threat from the substitution of natural stone with ceramic and engineered tiles, or artificial natural stone taking market share. These substitutions provide a similar look and feel at a lower cost, and are therefore attractive to some buyers. Natural stone, however, maintains a cache among premium buyers who can identify its authenticity and uniqueness. Artificial stone is also considered to be inferior for structural work requiring the strength properties of natural stone.

Although threats of substitution to natural stone exist, the Government of India anticipates a 15 per cent compound annual growth rate (CAGR) of natural stone demand, both in the domestic and export arenas, which highlights a faith in the continuing growth of demand for this product (Government of India 2014b, 13).

5.3 International demand centres

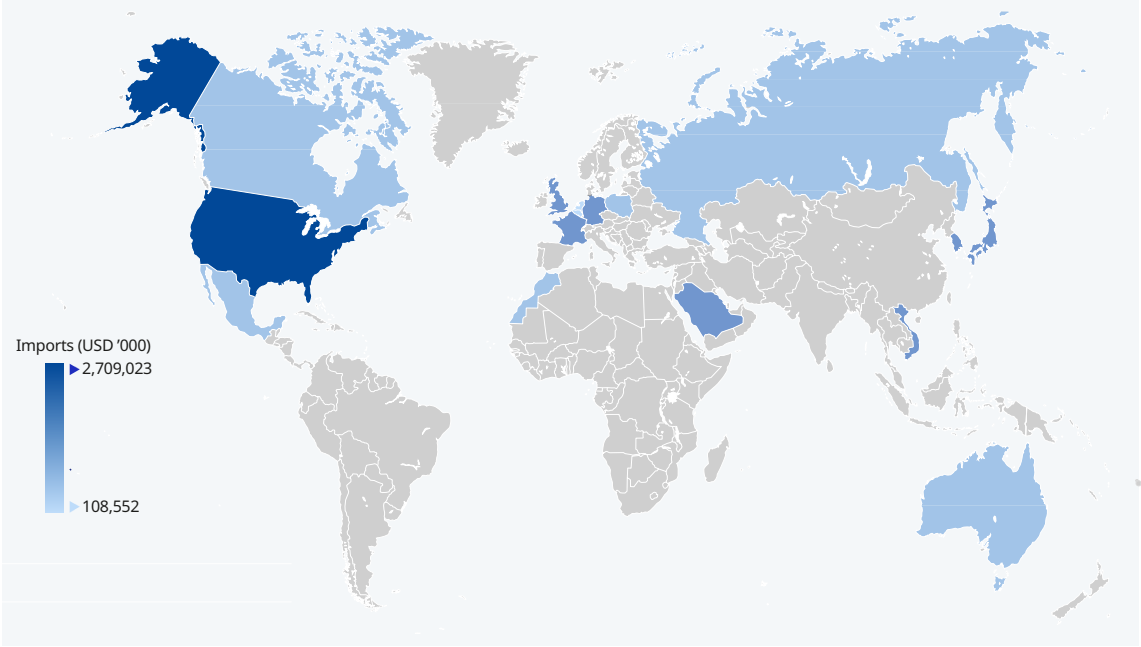
The largest global pole for international demand of natural and monumental stone is the United States, accounting for over a quarter of global imports. As illustrated in Figure 10, the Republic of Korea, Japan, Viet Nam, and Germany are also large importers of natural stone.

Over the past ten years Viet Nam, Saudi Arabia and Indonesia have experienced dramatic growth in imports, 26 per cent, 25 per cent and 16 per cent CAGR respectively (International Trade Centre 2020). These growth rates suggest that urbanization and a growing middle class in emerging markets will be key drivers of growth in global demand for natural and monumental stone.

Although some markets are growing rapidly, the United States still imports more natural and monumental stone than the next six largest global importers combined. This highlights the dominance of the United States as a buyer of natural stone in the short to medium term.

As highlighted in the following sections, purchasing trends are increasingly influenced by concerns unrelated to quality or cost. These responsible sourcing trends are deepening in importance in the United States and Europe.

▶ **Figure 10: Twenty largest natural and monumental stone importers by value, 2019**



Source: ITN calculations based on UN COMTRADE 2020

European imports of natural and monument stone

The growth of the construction sector in Eastern Europe is a key factor driving the growth of the natural stone marketplace in Europe. Alongside this is the increasing trend for renovation and remodelling of residential and commercial buildings. Outdoor entertainment is heightening the demand for wall cladding and flooring. In 2019, Europe accounted for 23 per cent of global natural stone imports (International Trade Centre 2020). Although the proportion of global imports in Europe is still substantially smaller than the United States, which represents 27 per cent of global imports, together they account for approximately half of all-natural stone imports (International Trade Centre 2020). As illustrated in Figure 11, the European import market for natural stone experienced a decline in 2010–2019, with a steep drop in imports between 2011 and 2016.

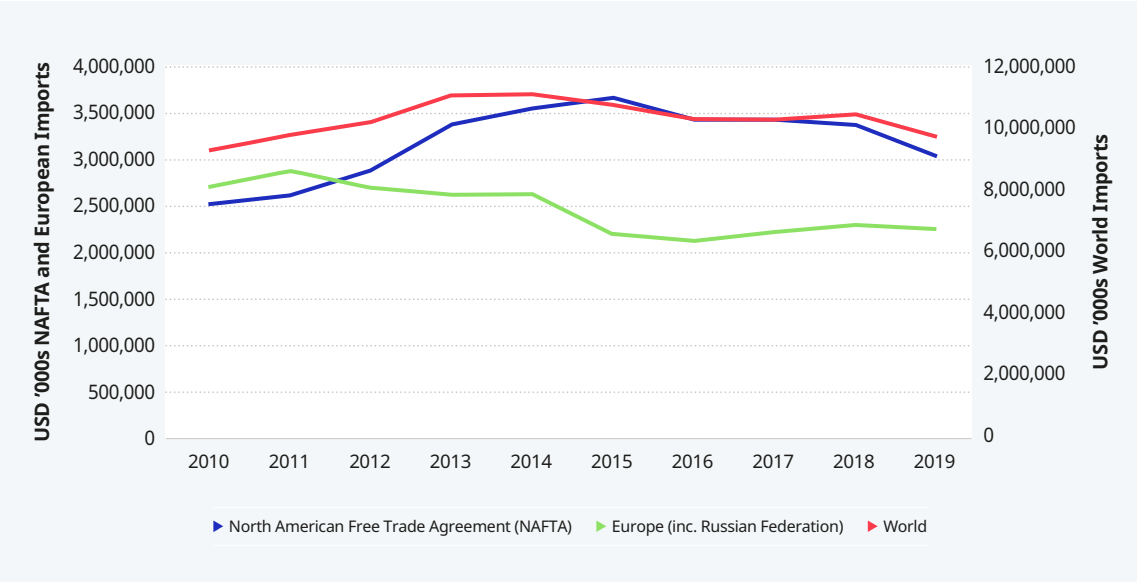
As Table 17 shows, the largest importers of natural stone in Europe are Germany, France, and the United Kingdom. Over the past 10 years, demand from the top 10 importing countries has remained relatively stable. Yet, while imports into the United States have grown, imports into Europe have declined.

▶ Table 17: Comparison of imports of natural and monumental stone in Europe by value and CAGR for 2010 –2019

Region/country	Imports 2019 (US$ thousands)	CAGR 2010–2019
World	9,805,348	0.5%
North American Free Trade Agreement (NAFTA) Aggregation	3,058,010	1.8%
Europe Aggregation	2,274,132	–1.8%
Germany	323,569	–3.5%
France	248,991	0.6%
United Kingdom	201,322	–2.4%
Switzerland	182,284	–0.8%
Russian Federation	137276	–3.5%
Netherlands	130,619	1.3%
Belgium	124,932	–6.5%
Poland	108,552	–1.4%
Austria	101,361	–1.6%
Italy	96,563	–3.9%
Spain	71,549	–4.3%

Source: ITN calculations based on UN COMTRADE 2020, research analysis

▶ Figure 11: Comparison of the change in natural stone imports from NAFTA and Europe, compared to global trends for 2010–2019



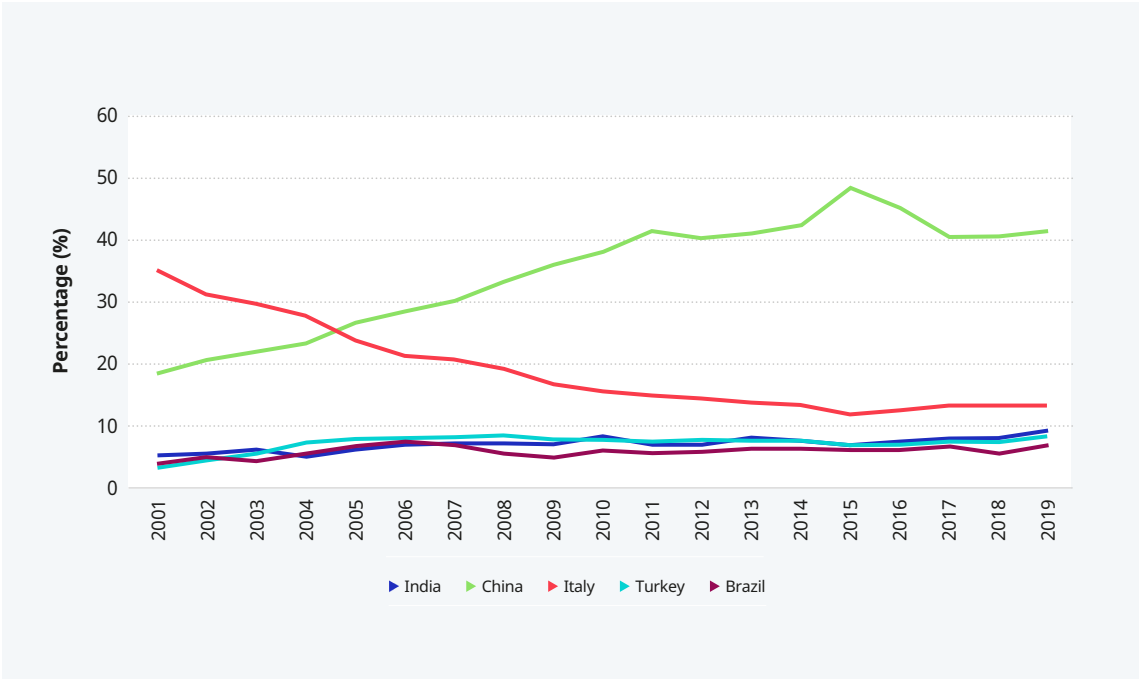
Source: ITC calculations and UN COMTRADE Statistics

India is the third largest exporter of natural stone to Europe, behind only China and Italy. From 2010 to 2019 Chinese dominance of the natural stone market in Europe decreased by a year on year average decline in imports from China of over 3 per cent.

5.4 India's Position in the international marketplace

The global export market for monumental or building natural stone is worth over INR82,400 crore (US$ 11 billion), of which India contributes 9.2 per cent, with exports of over INR7,400 crore (US$1 billion) of natural and monumental stone (International Trade Centre 2020). China is responsible for most global exports, providing 40 per cent of natural stone for the international market. China's export of natural stone has increased rapidly since the early 2000s, with a dramatic increase in exports from 2001 to 2010 (International Trade Centre 2020). In contrast, Italy – the previous export leader – has dramatically conceded market share to China (Figure 12).

▶ **Figure 12: Proportion of the value of global natural stone exports by country 2001–2019**

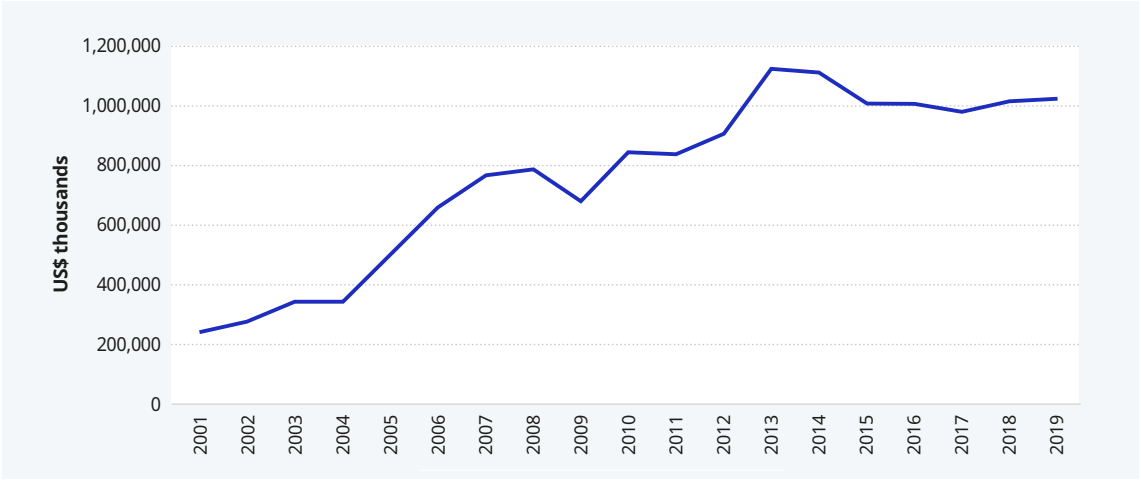


Source: ITC calculations based on UN COMTRADE DATA, researcher analysis

Over the past 20 years, India has increased its contribution to global natural stone exports from only 5.4 per cent in 2001 to over 9 per cent in 2019, and has almost quadrupled its export revenue with a CAGR of exports of 7.76 per cent from 2001 to 2019 (International Trade Centre 2020) (Figure 13). India, has therefore, taken substantial market share over this period. Although it is not achieving the 15 per cent CAGR in export highlighted in the IBM Indian Minerals Yearbook 2019 (Government of India 2020, 7), it is clear India is a rising power in natural stone exports.

Alongside India, Turkey and Brazil have increased their share of the global export market for natural and monumental stone. They represent competitors in the global export marketplace, with the CAGR of Turkey's export value outstripping India's at almost 10 per cent CAGR per year, compared to India's average of 7.75 per cent CAGR in 2001–2019 (International Trade Centre 2020).

▶ **Figure 13: Indian export of monumental and natural stone 2001–2019 (US$ thousands).**

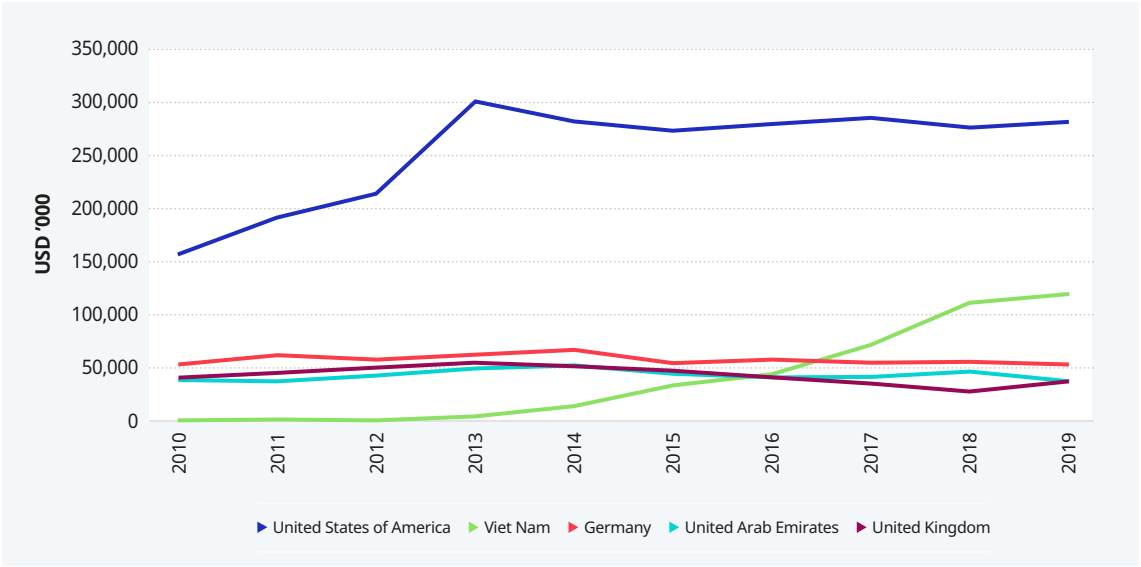


Source: ITC Calculations based on UNCOMTRADE statistics

5.4.1 Indian export market

India's current exports are dominated by the United States market, which accounts for 28 per cent of the country's total natural stone exports. Exports of natural stone to Viet Nam have increased dramatically, with a CAGR of 62 per cent from 2010 to 2019, while exports to European countries have remained relatively stable. Of note, the value per tonne of natural and monumental stone exported to Viet Nam is almost half that of the unit value exported to the United States and Germany (International Trade Centre 2020) (Figure 14). This suggests that the large increase in exports to Viet Nam has been built on lower priced natural stone. The lower value of Indian natural stone also suggests that these exports may be semi-finished products, rather than polished stones that command a greater price. This high proportion of lower value exports is in line with the working practices and limited use of modern technology and production methods highlighted in Chapter 2.

▶ **Figure 14: Trends in exports of Indian natural stone to key export markets by country, 2010–2019**



Source: ITC Calculation from UN COMTRADE Statistics

Germany, the United Arab Emirates and the United Kingdom have been key export markets for India, as highlighted in Figure 14. There is strong competition from Brazil, China, Italy and Turkey for a share of the key export markets of Europe and the United States.

5.4.2 Market for individual natural stone products

The export of simply cut or sawn granite has dominated India's natural stone international export market. As highlighted in Chapter 1, granite, according to the data available, represents the highest economic value per worker of the natural stones researched. India accounts for 15 per cent of global granite production, with a peak of 10 million tonnes of granite exported in 2018–19. Industry experts estimate that approximately half of the granite produced in India is exported. Demand for Indian granite has been driven by its unique qualities, the look of the stone and its reputation. There are nearly 300 varieties of granite on the world market, of which India supplies approximately 200.

▶ **Table 18: Import and export figures for marble, granite and sandstone in 2017/18 and 2018/19 by value (US$ millions)**

HS Code	Commodity Description	Import 2017/18	Import 2018/19	Export 2017/18	Export 2018/19	Trade balance 2017/18	Trade balance 2018/19
2515	Marble monumental/ natural stone (and other minerals in HS 2515)	253.66	209.36	42.49	39.85	–211.17	–169.51
2516 (excluding 25162000)	Granite monumental/ natural stone (and other minerals 2516, excluding sandstone)	16.32	42.40	644.1	614.93	627.78	572.53
25161200	Sandstone	0.06	0.01	191.41	194.61	191.35	194.60

Source: ITC and UN COMTRADE Data

▶ **Table 19: Import and export figures for marble, granite and sandstone in 2017/18 and 2018/19 by volume (thousand tonnes)**

HS Code	Commodity Description	Import 2017/18	Import 2018/19	Export 2017/18	Export 2018/19	Trade balance 2017/18	Trade balance 2018/19
2515	Marble monumental/ natural stone (and other minerals in HS 2515)	1,047	905	256	241	–791	–665
2516 (excluding 25162000)	Granite monumental/ natural stone (and other minerals 2516, excluding sandstone)	54	55	8,948	9,864	8,894	9,809
251620	Sandstone	0.178	0.032	881	1,023	881	1,023

Source: ITC and UN COMTRADE

In contrast to granite, India's marble exports are limited; the country is a large net importer of marble, especially marble blocks. The increase in marble imports may be a consequence of the Indian Government

having introduced a new policy for the import of marble blocks in 2016 (the Export–Import Policy, 2015–20 and the Foreign Trade Policy). The liberalized policy, while still maintaining high import duties, has made it easy for anyone setting up a factory to import marble blocks. The policy was brought under an open general licence category, which has been requested by many stone companies wishing to set up processing facilities. It was proposed that this could increase imported marble from 800,000 tonnes to 5 million tonnes per year over a period of five years from 2016. The 2019 budget announced an increase in taxes on imports of marble slabs, which could limit imported marble in favour of domestic marble.

The policy may have resulted Rajasthan and wider Indian marble being substituted by imported marble blocks. Further, investigation into the impact of this import policy should examine marble products traded under HS 680221 and 68022190 to which this policy also applies. In 2019, Turkey was the largest supplier of raw blocks of marble and related natural stone to India under HS 251512, exporting marble worth INR16 billion (US$210 million) to India. Italy is the other major supplier.

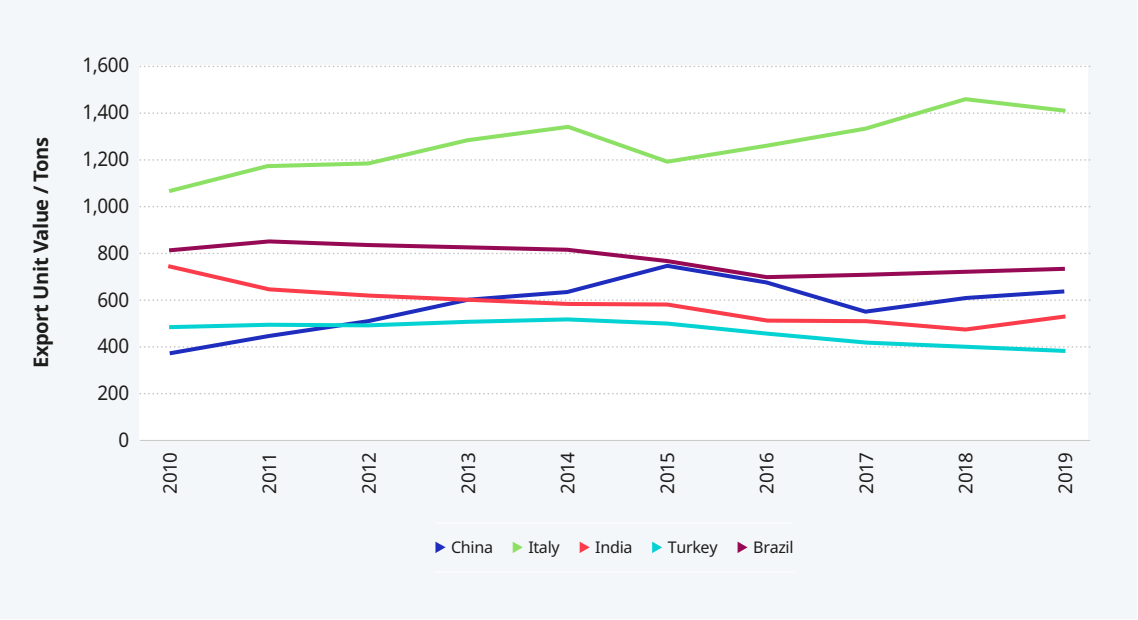
Table 19 also illustrates that for sandstone, imports into India are negligible, while exports are significant. The export market for sandstone specifically comprises almost entirely the United Kingdom and the United States. Secondary markets for sandstone include France, Belgium, and Canada. The research illustrates that approximately 95 per cent of sandstone production is sold domestically.

5.5 Trends in Indian exports

5.5.1 Declining unit value

The data presented in tables 18 and 19 above show the decline in unit values of Indian exports. This contrasts with trends in China and Italy, which have increased the unit value of their exports over the same period. These trends suggest that for the same quality of mined and quarried stone, India is receiving a lower price than it did in 2001. Although other exporters, such as Turkey and Brazil, have experienced unit price decreases, these have not been as pronounced as those experienced by India. This may suggest that India is increasing its exports value and volume by including lower quality or less processed natural stone. Further analysis of this would help to understand this trend.

▶ **Figure 15: Unit value of exports from 2001 to 2019 for the top five exporters**



Source: ITC Calculations and UN COMTRADE Data

5.6 International buying practices

The research illustrates that international buyers want correct sizing of the goods for export. Consistent width and depth are essential. Product characteristics, product design, presentation and packaging must be clearly identifiable before the sale. Minimum volumes for natural stone blocks determined for export are around 1–6m3 (Mosch, Nikolayew, Ewiak & Sieesmund 2011, 1921). This sizing requires mechanized processes and investment in equipment. The research has shown that across the spectrum of international buyers there are some who come to inspect the mine and processing sites, while others have a tighter focus on cost and quality. The research suggests that international buyers typically engage with large quarry owners or exporters and stockists who receive their stocks both from both large and small quarry owners.

Granite experienced one of the highest tariffs in the United States–China trade war, with marble a close second. The trade war presents an opportunity for India to take United States market share from China. Realizing this opportunity will require a higher quality of stone, as illustrated by the higher unit price of exports to the United States, than developing markets. Grasping this opportunity will also require meeting the standards of decent work and environmental management expected by United States retailers.

The geology in Rajasthan varies and impacts the quality of the stone to be sold. Newer rock may be of lower quality, with higher prices for high-quality blocks generated through export.

5.6.1 Buyers in OECD countries

As highlighted above, buyers in Europe and the United States constitute around half of the global marketplace. The research illustrated that buyers in developed country markets are not so much driven by prices as by the quality of the products, their uniqueness and ability to deliver in a hassle-free manner.

Indian granites and sandstone have built a reputation in Europe and the United States due to their unique qualities. However, buyers in these countries are told by retailers to be aware of lower quality stone from India which may be quarried in areas where the stone is geologically newer and is softer and more porous (Marshalls 2020). This could be a consideration for sector development planning by the state-level and central governments.

5.6.2 Clarification of import and export guidelines

The research highlighted that there was limited clarity among traders and natural stone producers regarding guidelines on exports. Additionally, the IBM has argued that the natural stone sector should be given the status of an industry, so that it can qualify for the fiscal benefits required to develop its export market. The research has suggested that the import policy for marble and travertine blocks, and marble and granite slabs, is taking market share from marble mines in Rajasthan. This is an area that could benefit from further investigation.

5.7 Global practice in sustainable production and responsible purchasing

5.7.1 The scope of responsible sourcing of minerals and metals

Sustainability risks in global mineral supply chains have dominated the attention of policymakers, companies, consumers, and most recently investors, with increasing pace over the past decade. Approaches that have emerged to manage these risks are broadly referred to as “responsible sourcing”, most often demonstrated through an organization’s procurement policy, influencing its purchasing practices and decisions.

The concept of responsible sourcing means ensuring that products are procured ethically and sustainably. Its scope typically covers environmental, social and economic aspects. There is a plethora of principles and

standards governing responsible mining, some of which are focussed on a particular commodity or part of the value chain. These cover a spectrum of concerns including, with varying detail and prescription:

- human rights
- conflict minerals
- child labour
- health and safety
- gender equality
- labour rights (debt bondage, practices of third-party recruitment and contractors, wages, and overtime)
- biodiversity
- pollution and waste.

To date, one of the major challenges to work in this field has been the variation in definitions of the term "responsible sourcing": there is currently no common definition. The Sustainable Purchasing Leadership Council defines sustainable purchasing as "purchasing that builds healthy communities, economies, and environments all along local and global supply chains" (The Sustainable Purchasing Leadership Council, n.d.). The British Standards Institution definition of responsible sourcing, developed for construction products, is "the management of sustainable development in the provision or procurement of a product" (BRE Global 2016). This definition has recently been adopted by the International Council on Minerals and Metals (International Council on Mining and Metals 2015). The absence of an internationally accepted definition across the industry could, however, continue to be a barrier to implementation of the concept by procurement managers and organizations more broadly (Van den Brink, Kleijn, Tukker and Huisman 2019, 390).

5.7.2 Global market drivers for responsible sourcing

Guiding principles for responsible business

The United Nations Guiding Principles on Business and Human Rights, adopted in 2011, focus on preventing and redressing adverse human rights impacts that may involve businesses either through their own activities or through their business relationships. The Guiding Principles were endorsed by the United Nations Human Rights Council and are founded on three pillars: (i) the State duty to protect human rights, (ii) the corporate responsibility to respect human rights; and (iii) access to remedy for victims of business-related human rights abuses. They apply to all enterprises – large and small, multinational and domestic – and are increasingly used and referred to by all actors in the mining and quarrying industries.

The ILO Tripartite Declaration of Principles concerning Multinational Enterprises and Social Policy (MNE Declaration) provides direct guidance to enterprises on social policy and inclusive, responsible and sustainable workplace practices. Its principles are addressed to multinational enterprises, governments of home and host countries, and employers' and workers' organizations. They cover areas such as employment, training, conditions of work and life, and industrial relations, as well as general policies. The MNE Declaration was adopted at the same time as the OECD Guidelines for Multinational Enterprises, which are recommendations from governments to businesses on responsible conduct of business. The Guidelines also include topics such as the environment, information disclosure, bribery, consumer interests, science and technology, competition, and taxation, thereby addressing all major sustainability risks that can occur through supply chains. The Guidelines set out principles and standards of responsible business conduct that all businesses, regardless of their legal status, size, ownership or sector, should contribute to sustainable development, while avoiding and addressing adverse impacts of their operations, including throughout their supply chains and business relationships.

Increasing consumer expectations

There are increasing expectations of consumer-facing companies to produce responsibly sourced products as a mainstreamed way of operating, at no extra cost to the consumer. While convenience, price, and quality still largely drive consumer purchasing decisions, consumer-facing companies are recognising that no consumer wants to "buy a problem", meaning that currently there is no price premium for behaving responsibly, but there certainly is a penalty – reputational and economic – for doing, or being perceived to be doing, the wrong thing.

Evolving market dynamics: sustainability as an economic imperative

Leading organizations on issues of sustainability are accelerating the responsible sourcing agenda to not only maximize their contribution to society but also to differentiate themselves on the market. The adoption of holistic strategies that consider profit outcomes and socio-environmental outcomes as mutually dependent is causing a paradigm shift from short-term risk mitigation to longer-term value creation, measured by societal contribution, minimal environmental impact and brand reputation.

The environmental, social and governance (ESG) investment agenda

A catalyst for this above-mentioned paradigm shift is the rising global ESG investment agenda. Improved access to data and metrics supports the view that ESG criteria will soon be applied in some way to almost all choices made about deploying capital (Verstringhe 2020). This will continue to put pressure on all companies that rely on investment to demonstrate their commitment to a responsible supply chain; pressure which will inevitably be passed down the supply chain.

▶ Box 10: The impact of COVID-19 on global ESG drivers and mining

The impacts of COVID-19 on the mining industry continue to evolve. Across the value chain, organizations are facing restrictions on transportation, shortages of materials, and production challenges due to national lockdowns and shortage of labour.

The implications vary across commodities. The industrial collapse has caused price and production declines for copper, zinc, iron ore and nickel (Mining Technology 2020). Coal, as an energy commodity, has been less affected due to its exemption from national lockdown rules. Gold has responded positively, with price increases and a steady flow of production.

Analysis of the top 40 global miners suggests that most, for now, are "unscathed" and that the industry overall is demonstrating greater resilience than many other sectors (PwC 2020). The forecast for 2020 is a moderate decline of approximately 6 per cent of earnings before interest, taxes, depreciation, and amortization with future opportunities focused on local acquisitions instead of major deals (PwC 2020). This is likely to mean an increased localization of supply chains, in response to the need to de-risk critical supply chains.

Longer-term impacts on ESG investment are still unknown. There is some speculation, however, that the pandemic could in fact be a turning point for ESG issues across all sectors, and there has been some pressure on governments to leverage the opportunity to build back better and more responsibly. For example, using the SDGs as a frame of reference for any response. Furthermore, the speed of collaboration and innovation demonstrated by many large and small corporations across all industries, for example, to find a vaccine, produce PPE, and support the capacity of healthcare facilities has been unprecedented.

The crisis has undoubtedly created financial stress in all corners, so the temptation to cut costs exists, including across ESG-related areas. There is, however, anecdotal evidence to suggest that companies that have stepped up their responsibilities during this crisis will be valued positively by the market.

In mining, the focus of value chain actors on the responsible sourcing of minerals and metals is expected to be maintained and to increase over time, with investor and customer expectations acting as the pressure points for growing demand for credible assurance processes and standards.

In mining, ESG investors are speculated to be the new marginal investors. All sources of financing for miners – equity, bond and credit facilities and project financing – are under increasing ESG scrutiny (Urda Kassis, Massih and Pratt 2020). Examples include:

- exclusion criteria for equity indices
- the Sustainable Development Goals (SDG), ESG, green or energy transition bonds
- International Finance Corporation Environmental and Social Performance Standards and Equator Principles for project financing.

There is, however, currently an apparent disconnect between traditional non-sector specific ESG indicators and the way mining's contribution to society can be captured. It also remains difficult for financiers to understand what is happening at project level, often relying on secondary sources and company reporting. These two challenges will likely drive efforts to create new mining-specific criteria, tools and products in the near term, creating an investment environment that prioritizes responsible mining and a shift from zero-harm (risk mitigation) to net-positive (long-term value creation). The alternative to this is to reduce available finance for the mining sector, which is a scenario that would have deep implications. This context will almost certainly place even greater emphasis on responsible sourcing throughout the supply chain.

5.8 Responsible sourcing management approaches

Multiple approaches are available to companies and governments to implement the responsible sourcing of minerals and metals. Commonly, good practice consists of two key elements: supply chain due diligence and adoption, and adherence to the relevant sustainability initiatives, principles, and standards.

5.8.1 Supply chain due diligence

To respond to the inherent and complex risks in the mineral supply chain, in 2016, OECD issued its Due Diligence Guidance for Responsible Supply Chains of Minerals from Conflict-Affected and High-Risk Areas (OECD 2016). It describes due diligence as "an ongoing, proactive and reactive process through which companies can ensure that they respect human rights and do not contribute to conflict". Its five-step process is intended to support all actors in the mineral supply chain to identify risks and mitigate them.

Purchasing companies, which often work with multiple suppliers, are increasingly asking suppliers to evaluate their own risks and report on them as a way of collecting information on their upstream supply chain. Where high risk suppliers are identified, companies are either working with them to improve performance or, where this is not possible, are seeking alternative suppliers. Furthermore, expectations related to responsible sourcing are increasingly integrated into supplier contracts. This practice signals an urgency for suppliers to stay abreast of current and likely future expectations, and to anticipate a future shift in requirements.

5.8.2 Responsible sourcing initiatives, principles and standards applicable to the natural stone sector

Standard-setting and adherence are increasingly becoming a mining industry norm, for large-, medium-, and small-scale operators. Standards related to the responsible sourcing of minerals and metals provide a certain code of conduct for the production and trading of mineral commodities, often with product-specific guidance. While some standards are mandatory for subscribers, most remain voluntary. These standards are at the core of global good practice in responsible production and sustainable purchasing, and are expected to increasingly influence decision-making and create distinction between responsible companies and others. Some of the key standards relevant to the sector are presented here.

Initiative	Purpose	Scope
Umbrella guidance		
United Nations Guiding Principles on Business and Human Rights	Endorsed in 2011, the Principles seek to provide guidance for companies to prevent and address abuse of human rights as a result of business activity.	All sectors. Global; voluntary
OECD Guidelines for Multinational Enterprises	Recommendations addressed by governments to multinational enterprises operating in or from adhering countries. They provide non-binding principles and standards for responsible business conduct in a global context consistent with applicable laws and internationally recognised standards.	All sectors. Global; voluntary
ILO Tripartite Declaration of Principles concerning Multinational Enterprises and Social Policy	Provides direct guidance to enterprises (multinational and national) on social policy and inclusive, responsible and sustainable workplace practices.	All sectors. Global; voluntary
OECD Due Diligence Guidance	Detailed guidance on implementation of responsible supply chains of minerals. Different treatment depending on mineral sources and position of company in the supply chain. Guidance has influenced most other responsible sourcing guidance that has followed.	All mineral commodities with specific guidance for tin, tungsten, tantalum, gold. Global; voluntary
International Council on Mining and Metals (ICMM) Mining Principles	Corporate-level (ICMM member) commitments to promoting best practices across 10 sustainable development principles (social, environmental, responsible business).	All mineral commodities. Global; mandatory for ICMM members.
United Nations Women's Empowerment Principles (WEPs)	A set of Principles offering guidance to business on how to promote gender equality and women's empowerment in the workplace, marketplace and community. Established by United Nations Global Compact and UN Women, the WEPs are informed by international labour and human rights standards.	All sectors. Global; voluntary
Financial market influencers		
United Nations Principles for Responsible Investment	A set of six principles that provide a global standard for responsible investing as it relates to environmental, social and corporate governance factors. Organizations follow these principles to meet commitments to beneficiaries while aligning investment activities with the broader interests of society.	Signatories can be asset owners, investment managers or service providers in any sector. Global; voluntary
Equator Principles and IFC Performance Standards	Social and environmental principles as conditions of lending, adopted by financial institutions. The Equator Principles refer directly to the eight IFC Performance Standards, which aim to strengthen social and environmental policy and practice.	All sectors. Global; mandatory for borrowers.
Responsible Mining Index, Responsible Mining Foundation	The Index measures the extent to which companies can demonstrate that they have established responsible policies and practices.	All mineral commodities. Global
Large-scale mining		
Chinese Due Diligence Guidelines for Responsible Mineral Supply Chains	To provide guidance to companies undertaking outbound mining investment, cooperation and trade to identify, prevent and mitigate their risks of contributing to conflict, serious human rights abuses and risks of serious misconduct.	All mineral commodities. Global; mandatory for all Chinese mining companies
Initiative for Responsible Mining Assurance	Aims to establish a third-party independent assurance system and develop standards that improve the social and environmental performance of industrial mining operations. It provides the list of expectations that independent auditors will use as the benchmark for responsible mines.	All mineral commodities except coal. Global; voluntary
Towards Sustainable Mining, Mining Association of Canada (MAC)	To enable mining companies at mine-site level report on responsible mining performance. Founded by civil society and the private sector.	All commodities. Global; mandatory for MAC members
Natural Stone Sector		

Initiative	Purpose	Scope
TruStone Initiative	A Flemish-Dutch initiative, in which government bodies, trade unions, NGOs and the natural stone sector have partnered to ensure more responsible production and purchasing of natural stone.	Natural stone. Global, with a focus on high risk countries. Piloting in India (Telangana). Recommendations for next steps due in mid-2020.
Natural Stone Exchange, Globe Stone Initiative *Unclear if this is still an active initiative*	A global natural stone procurement platform that specialises in developing countries. The objective of the Initiative is to promote good labour and employment practices in global supply chains in the natural stone industry. It has local offices and a network of partners in each country. It supplies stone products to North American and European Union buyers.	Natural stone. Developing countries, including India.
Fair Stone, social and environmental standard	Fair Stone, established in 2007, is a standard and certification scheme for natural stone importers, focusing on labour conditions and environmental issues. The standard focuses on ILO Conventions as well as labour conditions and environmental issues. Its objective is to improve the working conditions in quarries and factories for natural stones in emerging economies.	Natural stone. China, Viet Nam and India.
The Forest Trust, Responsible Stone Programme	A not-for-profit organization that supports companies to source their products responsibly. The Forest Trust works on the ground with factories and quarries to address issues within the supply chain. The Trust's membership consists of 86 large global retailers and manufacturers. Compliance is audit-based, on an annual progressive basis.	Natural stone. Global (14 countries)
Xertifix	German not-for-profit-organization that provides stone certification on stones produced by companies complying with the Xertifix Standard. The Standard is based on the ILO core labour conventions, including the prohibition of child labour and slavery, better health and safety protection of adult workers, fair wages and working hours, environmental protection and legality. Performance is monitored by audit.	Natural stone. Asia (India, China, Vietnam); Mandatory for Xertifix subscribing organizations.
Natural Stone Council (United States), The Natural Stone Sustainability Standard	The Natural Stone Sustainability Standard examines and verifies (through a third party) numerous areas from stone production to the environmental performance of natural stone.	Natural stone. United States
Other – active in India		
Ethical Trade Initiative Base Code	An alliance of companies, trade unions and NGOs that promotes respect for workers' rights globally. Members include more than 80 global companies. The Ethical Trade Initiative Base Code contains nine clauses mandatory for members. Companies report annually on site-level performance.	All sectors. Focused specifically on workers' rights and does not include other social and environmental considerations. Global; mandatory for Ethical Trade Initiative members. Rajasthan sandstone project: Working Group established in 2012. Marshalls, a UK building materials company sourcing from Rajasthan, is an Ethical Trade Initiative member and has adopted its Base Code.
National Action Plan of Business and Human Rights (Draft)	A national business and human rights framework, under development by the Ministry of Corporate Affairs. An effort to formalize a set of national voluntary guidelines which adhere to the UNGPs. Intended to enable the government and businesses to agree on expectations of what a responsible business should look like.	All sectors. India; voluntary
FIMI Sustainable Mining Initiative (SMI)	Industry-led sustainability initiative. Aim is to mainstream sustainability in the Indian mining industry. Code of Conduct, comprising of 10 sustainability principles, adopted by 33 mining	All minerals. India. Mandatory annual reporting by SMI members.

5.9 Responsible sourcing and micro-, small and medium enterprises (MSMEs)

While much of the focus of management approaches to responsible sourcing has been on large-scale industry, there is recognition that MSMEs and artisanal miners make up a part of the value chain in a number of countries, the percentage of which depends on the sector and country or region. For example, in Rajasthan's stone quarries, thousands of small, often individually owned mines are thought to be operating, often unlicensed and informally employing men, women and children to hand-mine the stone (Marshall, Taylor and Balaton-Chrimes 2016, 5). Globally, the MSME mineral sector is often associated with low levels of compliance with safety measures, provision of healthcare or environmental protection.

The growing interest in the environmental and social impacts of mineral extraction through MSMEs is likely to be a long-term trend, anchored in the context of greater awareness of climate change risks. As downstream actors become more engaged in their responsibilities to ensure ethical supply chains, it is expected that collaboration with MSMEs will be needed to raise performance. Furthermore, it will be important to ensure that the costs and resources required to adhere to responsible practice are not passed down the value chain, becoming a burden to MSMEs and the communities.

While MSME guidance, standards and tools for specific mineral sub-sectors exist, including the Better Gold Initiative (Better Gold Initiative, n.d.) and Fairmined (Fairmined, n.d.), these mostly focus on responsible sourcing of gold, silver and diamonds. The CRAFT Code (CRAFT n.d.) is growing in importance as a multi-mineral tool to assist MSMEs in formalizing operations and in turn delivering on responsible production expectations.

5.9.1 Formalization of the informal economy: artisanal and small-scale operators

To protect informal small-scale operators and their workers from poor working conditions and marginalization and to ensure that they can play an active and integrated role in global and responsible supply chains, working towards the formalization of their role is recommended. Formalization, a policy and legislative process that will require the Government to be the active driver, will bring many currently informal workers into the formal economy, delivering potentially significant fiscal benefits to the state of Rajasthan. The ILO Transition from the Informal to the Formal Economy Recommendation, 2015 (No. 204), calls on its member States to:

- facilitate the transition of workers and economic units from the informal to the formal economy, while respecting workers' fundamental rights and ensuring opportunities for income security, livelihoods and entrepreneurship; and
- promote the creation, preservation and sustainability of enterprises and decent jobs in the formal economy and the coherence of macroeconomic, employment, social protection and other social policies.

6 Conclusion

6. Conclusion

Rajasthan has an opportunity to develop a competitive natural stone sector, domestically and internationally, and to leverage this development to catalyse state-wide socio-economic development. Throughout the chapters in this study the relevant context, constraints and opportunities for sustainable development of the sector have been discussed. Where possible, policy recommendations have been made to advance productive employment and decent work in natural stone production and its supply chains.

The study references the COVID-19 crisis and its potential implications for the mining sector globally. The research on which the study is based, however, was undertaken before a global pandemic was declared. It is therefore important to note that any recommendations must be reviewed once the full implications of COVID-19 for Rajasthan's natural stone sector have been identified.

6.1 Summary of key findings

The natural stone sector in Rajasthan is a value chain of two halves. On the one hand, it comprises a large and fragmented ecosystem of micro- and small-scale actors reliant on manual labour and competing predominantly on price, often offering highly specialized services. There is a relatively low level of coordination horizontally and vertically. Many actors on this side of the value chain are operating informally.

The other side of the value chain comprises larger, formal-sector actors: the largest quarries, integrated mining and processing firms, and large wholesale traders and exporters. These actors work in bulk, influence prices and play an important role in transferring information about end market preferences throughout the value chain.

Despite a relatively comprehensive legal framework to protect workers' rights, the reality on the ground is that many natural stone sector workers survive in precarious and vulnerable living conditions, due to non-standard forms of employment, low wages, lack of social protection, and widespread informality. Workers face OSH risks, particularly lung disease and personal injury, due to the nature of the occupation and the handling of materials that generate dust. Informal workers, women and children, and people with health conditions are among the most vulnerable.

Globally, the largest pole for international demand of natural and monumental stone is the United States, accounting for over a quarter of global imports. International buyers want correct sizing of the goods for export and are progressively less driven by price than by the quality of the products, their uniqueness, and the ability of the exporter to deliver in a hassle-free manner.

Sustainability risks in global mineral supply chains have drawn the attention of policymakers, companies, consumers, and most recently investors, with increasing pace over the past decade. Approaches that have emerged to manage these risks are broadly referred to as "responsible sourcing", most often demonstrated by an organization's procurement policy, influencing its purchasing practices and decisions. Responses to global expectations, which are particularly difficult for the smaller enterprises involved in the supply chains of larger enterprises, will need to be carefully considered as part of the future development of Rajasthan's natural stone industry.

6.2 Notable policy challenges

The study highlighted some key challenges, detailed below:

- **Inconsistent available data for evidenced based policy making**

  Data gaps and inconsistent data reporting will continue to create challenges for assessing the full potential of the natural stone sector in Rajasthan. Specifically, meaningful data on production, revenue, employment (formal and informal) and wages are crucial to the development of a sector strategy.

Identifying and understanding the real market drivers and constraints to growth and decent work is imperative to propose adequate solutions. Much of the informal economy, which accounts for a significant percentage of the state's natural stone sector, is not captured in current research and data. Without accurate employment data disaggregated by sex, age, location and activity, among others, it is difficult to assess the scale and severity of the decent work problem and to develop targeted solutions.

- **Weak enforcement of rules and regulations**

  The complicated interplay between central and state governments results in policy and enforcement gaps, compounded by limited monitoring capacity. Employers who breach laws on working conditions currently face few repercussions due to limited inspection and enforcement capacity by regulators.

  Specific issues to tackle include:

  - **Limited coordination** between agencies responsible for the governance of the value chain from environmental approvals and monitoring to the processing of natural stone under industrial legislation. Furthermore, a significant number of unregistered entities will be outside the governance framework and unknown to the agencies responsible for compliance and will not be able to access any governmental support.
  - **Low capacity** of the enforcing authorities, with limited staff covering large areas and thousands of small mining operations. Due to the level of informality in the sector a significant proportion of issues are not raised for inspection, for example.
  - **Overlap between rules** governing major and minor minerals has created confusion, with many of the mining operations governed by the major mineral rules, despite natural stone being classed as a minor mineral. The rules are also changeable across states, which poses a challenge to the central government to inspect and ensure compliance. Processing units are subject to the industrial legislative framework and are not covered by mining legislation.

- **High cost and low benefit of compliance**

  To increase compliance with current rules and regulations would incur an ongoing cost for value chain enterprises. The incentive to comply, however, is currently low, and is not matched either by the risk of penalty for non-compliance or the reward from an increased price or access to new markets.

  Furthermore, the administrative effort required to ensure compliance with formal processes and the complexity of documentation detracts from economically productive work.

  The domestic market for natural stone, which constitutes a large proportion of the natural stone market, currently does not demand evidence of compliance with the formal rules or standards, which poses a further barrier to enterprise compliance. While the international market is not yet paying a premium for compliance, as investors continue to demand greater assurance of responsible sourcing, compliance expectations of upstream actors will likely increase. The risk of not proactively responding to this trend is that, in time, international buyers may begin to source from more compliant producers.

- **A significant percentage of the sector is informal**

  The natural stone sector in the state is largely comprised of a fragmented ecosystem of micro- and small-scale actors, reliant on manual labour and competing predominantly on price, often offering highly specialized services. These actors are mostly located in peri-urban areas. There is a relatively low level of coordination horizontally (i.e. between these actors) and vertically (i.e. between these actors and up- and downstream counterparts).

  They are often reliant on buyers to set prices and specifications, operate on trust and long-term business relationships, and have little direct contact with end users of their products. Many actors on this side of the value chain are operating informally, with few incentives (or the ability) to invest and innovate.

  Addressing formality through a balanced, comprehensive and coherent policy approach that includes the promotion of and respect for social and labour rights is key to creating a more sustainable and responsible sector (see section 6.3).

- **Low mechanization across the sector**

  While the use of technology, such as mechanized production, processing, and loading, is increasing across the sector, there is still extensive use of manual labour. Increasing the use of mechanization has the potential to increase labour productivity, cut production costs, and drive up product quality and consistency.

- **Shortage of skilled and semi-skilled labour**

  The sector is going through a challenging partial transition to mechanized processing and production, simultaneously facing a shortage of skilled and semi-skilled labour and an abundance of low-skilled workers. Without action, it is likely that the sector will start to fall behind both high-skill/high-productivity and low-skill/ low-cost competitors.

  Within an integrated approach encompassing business training, credit and post training supports, as well as a legal and regulatory framework supportive of private sector development, skills training can support medium term strategies for integration with the mainstream economy while also offering a range of immediate benefits to informal economy entrepreneurs and workers.

- **Low awareness of rules and rights among workers and smaller employers**

  Widespread informality and cascades of subcontracting arrangements create opaque supply chains, in which poor working conditions are difficult and costly to identify and prove. Awareness of workers' rights and key regulations among workers is limited: although workers are entitled by law to a range of social protection measures, few workers access these measures due to a lack of awareness and understanding, and widespread informal working arrangements (no contracts or employment records). Low registration of workers means many operate outside of the formal system.

- **Workers' voices are not being heard; low trade union membership and collective bargaining**

  Workers in Rajasthan's mines and processing units are generally unorganized with limited trade union activity reported. These representative bodies are typically weak, with low membership and low awareness of services among workers. Many workers operating informally or in precarious employment fear reprisals from their employers if they speak up. Most employers reported viewing unions with scepticism and distrust.

- **Women are typically relegated to the lowest-paying jobs**

  Women are primarily engaged in tasks related to removing overburden and cutting cobblestone in the sandstone stockyard and processing tasks, including making figurines, storing and packing (Marshall, Taylor and Balaton-Chrimes 2016, 32), as well as in housekeeping activities, including cooking and cleaning (Glocal Research, India Committee of the Netherlands and Stop Child Labour 2017, 24).

  They often have no access to benefits, including healthcare or maternity leave, which results in their return to work immediately after childbirth. This is particularly noted in the case of bonded labourers. Sexual harassment and sexual assault are common risks for women working in the sector.

- **Significant OSH risks**

  Workers throughout the sector, but particularly those engaged in manual production and processing activities, face significant OSH risks, notably lung disease – tuberculosis and silicosis – and personal injury. It is likely that the extent of these problems is being under-reported. Worker compensation is limited and difficult to claim, and employers face few repercussions for OSH breaches. The prevailing poor standards lead, in turn, to artificially low production costs, which further undermine working conditions.

- **Highly variable profit margins across the sector**

  Profit margins declared by processers span a wide range, depending on type of stone. Margins were reported at close to 100 per cent for processed granite, 68 per cent for marble, and 27 per cent for sandstone, signalling an area that is ripe for further enquiry.

In addition to the above policy challenges, there are significant global drivers pushing for more sustainable enterprises and a more sustainable, competitive sector. These are set out below. They are likely to be compounded by the current environment of COVID-19 and post-COVID-19 recovery responses.

- An increasing global public awareness for labour standards throughout the value chain and examples of good practices are driving companies to establish improved supply chain due diligence processes and increase expectations of suppliers in relation to conditions of work and human resource development.
- The adoption of more holistic strategies that consider profit outcomes and socio-environmental outcomes to be mutually dependent is causing a paradigm shift from short-term risk mitigation to longer-term value creation measured by societal contribution, minimal environmental impact, and brand reputation. This structural and cultural change relates to how companies increasingly gain and maintain their competitive advantage.
- Standard-setting and adherence are increasingly becoming a mining industry norm for large-, medium- and small-scale operators. Standards related to the responsible production of minerals and metals provide a certain code of conduct for the production and trading of mineral commodities, often with product-specific guidance. These standards are at the core of global good practice in responsible production and sustainable purchasing, and are expected to increasingly influence decision-making and create a distinction between responsible companies and others.
- Pressure is increasing from major lending institutions and investors, which are adopting performance standards on environmental and social issues.

6.3 Suggested policy interventions

The following list of interventions is not exhaustive.

#	Intervention	Lead stakeholder group(s)	Expected impact
1	Review how data related to the natural stone sector needs to be collected and synthesized to ensure consistency and completeness	Government	Medium
2	Build capacity and political will to enforce already existing labour laws and welfare schemes	Government	High
3	Reduce administrative complexity for enterprise compliance	Government	Medium
4	Begin a process of formalizing the informal economy: artisanal and small-scale operators	Government, industry groups, buyers	High
5	Explore options for lowering the costs of access to machinery	Government, industry groups	High
6	Develop the capacity of enterprises in the value chain	Government, industry groups	High
7	Develop mining and processing clusters for small-scale operators	Government, industry groups, investors, small-scale operators	Medium
8	Undertake scenario planning to address future mechanization and implications for employment	Government	Medium
9	Introduce formal and credible collective bargaining mechanisms, including bipartite social dialogue, and workplace cooperation.	Government, employers, unions	High
10	Overcome real and perceived barriers to gender equality and inclusion in the supply chain.	Government, employers	High
11	Introduce and implement preventative OSH measures	Government, employers	High
12	Develop a realistic skills strategy for the sector	Government, employers, workers	Medium
13	Break down barriers between suppliers and buyers	Government, enterprises, buyers	High
14	Establish a Natural Stone Council/Ethical Stone Sourcing Register	Government, enterprises, buyers	Medium
15	Explore the wide range of prices and profit margins across granite, marble, and sandstone	Government, industry groups, investors, buyers	Medium
16	Take policy and regulatory measures to address anti-union discrimination	Government, employers, unions	Medium

6.4 Strategic questions

Ahead of developing a sustainable development strategy for Rajasthan's natural stone sector, there may be some key strategic questions to tackle. These could include:

1. What is India's (and Rajasthan's) desired future role in the international natural stone market? How are natural stone substitutes impacting these markets now and how are they likely to impact them in the future? What are steps for preparedness need to be taken now?
2. Are there any expected trade-offs between job generation, revenue, production, and international reputation? If so, what are they?

   For example, if the strategy is to capture the growing market in non-OECD countries there could be focus on low cost high employment, low mechanization, and limited focus on standards to match the low unit price of the marketplace. In contrast if the objective is to capture market share in the US and Europe higher costs will be required for mechanization to produce the quality and sizing of the products required, decrease in jobs and an increase in revenue.
3. What is the appropriate response to global responsible production trends given Q1?
4. What are the objectives for value addition? What are the impacts of greater value addition on cost, employment and foreign exchange earnings?

Bibliography

Bibliography

Agarwal, Kalpana, and Gaharwar, Parupriya, P. 2013. "A Study of the Trend of Export of Natural Stones from India to Various Countries" *International Journal of Advancement in Research and Technology*, 2 (7) July 2013.

Better Gold Initiative. n.d. https://bettergold.org/about-bgi/context/.

BRE Global. 2016. "BRE Environmental and Sustainability Standard." https://www.greenbooklive.com/filelibrary/responsible_sourcing/BES-6001--Issue-3.1.pdf.

Chatterjee, Biplob and Aparna Roy. 2015. "National Mineral Policy 2019: A Lost Opportunity" Observer Research Foundation: Delhi https://www.orfonline.org/expert-speak/national-mineral-policy-2019-a-lost-opportunity-53024/.

Cosi, Marco. 2015. "The dimension stone sector: new perspectives on the global market and on the reporting of international mining standards." *European Geologist* (39), 24-30.

CRAFT. n.d. "What is CRAFT?" https://www.craftmines.org/en/what-is-craft/.

Dhaatri Resource Centre for Women and Children-Samata, Visakhapatnam and HAQ: Centre for Child Rights, New Delhi. 2010. "India's Childhood in the "pits": A Report on the Impacts of Mining on Children in India".

Deb, Mihir, Tiwari, Garima and Lahiri-Dutt, Kuntala. 2008. "Artisanal and Small Scale Mining in India: Selected studies and an overview of the issues". International Journal of Mining, Reclamation and Environment: 22:3, 194-209.

Ethical Trading Initiative. 2018. "The ETI Base Code." https://www.ethicaltrade.org/sites/default/files/shared_resources/ETI%20Base%20Code%20%28English%29.pdf.

Fairmined. n.d. "What is Fairmined?" https://www.fairmined.org/.

Gereffi, Gary, John Humphrey, and Timothy Sturgeon. 2005. "The governance of global value chains." Review of International Political Economy 12, No. 1: 78-104.

Glocal Research, India Committee of the Netherlands and Stop Child Labour. 2017. "The Dark Sites of Granite. Modern slavery, child labour and unsafe work in Indian granite quarries – What should companies do?".

Government of India. 2014a. Indian Minerals Yearbook 2014 (Part III: Mineral Reviews) Delhi: Indian Bureau of Mines.

Government of India. 2014b. Economic Survey 2013-14. https://www.indiabudget.gov.in/budget2014-2015/survey.asp.

Government of India, Ministry of Labour and Employment. 2019. "Central sphere and state-wise minimum wages rate list for skilled, semi-skilled and unskilled workers with effect from 1st October 2019". Lok Sabha Q & A 18th November 2019.

Government of India, Ministry of Mines. 2019. "Ministry of Mines Annual Report 2018-19".

Government of India, Indian Bureau of Mines. 2020. "Indian Minerals Yearbook 2019 (Part III: Minerals Reviews); Minor Minerals 30.15 Marble".

Government of Rajasthan. 2015. "Rajasthan Mineral Policy 2015".

Government of Rajasthan. 2017. "Report of the Comptroller and Auditor General of India on Economic Sector for the year ended 31 March 2017" https://cag.gov.in/sites/default/files/audit_report_files/Report_No5_of_2017_-_Economic_Sector_Government_of_Rajasthan.pdf.

Government of Rajasthan, Department of Mines and Geology. 2018. "2017-18 Mineralwise Summary Report (Minor minerals)".

Government of Rajasthan. 2020a. "COVID19; Action Plan of the Task Force on Restarting the Economy in Rajasthan" April 2020.

Government of Rajasthan. 2020b. "DMF Rajasthan" http://mines.rajasthan.gov.in/DMFT/index.jsp.

Gunasekaran, S (Dr.) and Manicandan, G. 2009 "Feasibility Study for Setting Standards in Natural Stone Sector in Rajasthan". *Centre for Education and Communication*.

Heldal, Tom, and Neeb, Peer R. 2000. "Natural stone in Norway: production, deposits and developments." *Norges Geologiske undersøkelse Bulletin* 436, 15-26.

IAS Gateway. 2019. "Labour Ministry Notifies Rules To Allow Employment Of Women In Mines." February 12 2019. https://iasgatewayy.com/labour-ministry-notifies-rules-to-allow-employment-of-women-in-mines/.

International Council on Mining & Metals (ICMM). 2020. "Mining Principles." https://www.icmm.com/website/publications/pdfs/mining-principles/mining-principles.pdf.

International Labour Organisation (ILO). 1999. "Report of the Director-General: Decent Work". Report presented at the 87th Session of the International Labour Conference, Geneva, June 1999.

International Labour Organization (ILO). 2008. "Freedom of association in practice: Lessons learned". Global Report under the follow-up to the ILO Declaration on Fundamental Principles and Rights at Work. Report I (B), International Labour Conference, 97th Session, Geneva.

International Responsible Business Conduct (IRBC). n.d. "TruStone Initiative." https://www.imvoconvenanten.nl/en/trustone.

International Trade Centre (2020) "International Trade Statistics 2001-2020" http://www.intracen.org/itc/market-info-tools/trade-statistics/ Accessed 1 July 2020.

Kaplinsky, Raphael, and Morris, Mike. 2000. "A handbook for value chain research". Vol. 113. Brighton: University of Sussex, Institute of Development Studies.

Kapoor, Radhicka. "Technology, jobs and inequality: Evidence from India's manufacturing sector." 2020. In Accelerators of India's Growth – Industry, Trade and Employment, pp. 301-321. Springer, Singapore, 2020.

Madhavan, P. and Sanjay R. 2005. "Budhpura 'Ground Zero' Sandstone quarrying in India" India Committee of the Netherlands.

Marshalls. 2020. "Indian Sandstone" https://www.marshalls.co.uk/gardens-and-driveways/product/indian-sandstone-paving.

Marshall, Shelley D., Taylor, Kate and Balaton-Chrimes, Samantha. 2016. "Rajasthan Stone Quarries: Promoting Human Rights Due Diligence and Access to Redress in Complex Supply Chains." *Non-Judicial Redress Mechanisms Report* Series 11. Available at SSRN: https://ssrn.com/abstract=2878214.

McKinsey. 2014. "Putting India on the growth Path: Unlocking the Mining Potential" https://www.mckinsey.com/~/media/McKinsey/Featured Insights/India/Putting India on the growth path/Putting India on the growth path.ashx.

Mining Technology. 2020. "Mining operations on hold due to Covid-19 drops to 729." https://www.mining-technology.com/comment/mining-operations-hold-covid-19-drops/.

Mosch, S., Nikolayew, D., Ewiak, O., and Sieesmund, S. 2011 "Optimised extraction of dimension stone blocks" *Environmental Earth Sciences* (63).

Natural Resource Governance Institute. 2017. "Natural Resource Charter Benchmarking Framework" Natural Resource Governance Institute: London.

Natural Resource Governance Institute. 2018. "Open Contracting for Oil, Gas and Mineral Rights: Shining a Light on Good Practice" Open Contracting Partnership, Natural Resource Governance Institute.

Organisation for Economic Co-Operation and Development. 2016. "OECD Due Diligence Guidance for Responsible Supply Chains of Minerals From Conflict-affected and High-risk Areas," Third edition. https://www.oecd.org/daf/inv/mne/OECD-Due-Diligence-Guidance-MineralsEdition3.pdf.

PwC. 2020. "Mine 2020". http://www.Pwc.com/mine.

Raza, S.R. et al. 2019. Regulatory Framework of Minerals and Mining Industry in India in Relation to Environmental Concerns: A Critical Analysis VL-5.

Responsible Mining Index. 2020. "RMI Report 2020". https://2020.responsibleminingindex.org/en.

Siddiqui, M and Lahiri-Dutt, K. 2015. "Informal mining & quarrying: Livelihoods of Irregular Quarry Workers in India". Economic and Political Weekly, 2015.

Singh, Surjit. 2007. "Industrialisation in Rajasthan: Process and Pattern" in V s Vyas (ed), Rajasthan: The Quest for Sustainable Development' Academic Foundation and Institute of Development Studies 159.

TFT. 2020. "Raising Standards in the Stone Industry" https://www.stenhuggerlauget.dk/media/7007/about-the-tft-responsible-stone-programme.pdf.

The Sustainable Purchasing Leadership Council. https://www.sustainablepurchasing.org/about/.

Upadhyaya, Krishna Prasad. 2008. "Poverty, Discrimination and Slavery: The Reality of Bonded Labour in India, Nepal and Pakistan". *Anti-Slavery International*.

Urda Kassis, Cynthia, Massih, Mehran and Pratt, Jason. 2020. "ESG loans a new source of mining finance." *Mining Journal*, April 30, 2020.

Van den Brink, Susan, Kleijn, René, Tukker, Arnold and Huisman, Jaco. 2019. "Approaches to responsible sourcing in mineral supply chains." *Resources, Conservation & Recycling* 145, 389-398.

Verstringhe, James. 2020. "How do investors assess companies for ESG?" Tavistock. http://www.tavistock.co.uk/2020/05/07/how-do-investors-assess-companies-for-esg/.

Yadav, Anumeha. 2018. "Bijolia's Harvest of Stone: Conditions of Work Among Quarrying Labour in Rajasthan". CSE Working Paper 2018-13.

Legislation

Air (Prevention and Control of Pollution) Act, 1981

Boilers Act, 1923

Bonded Labour System (Abolition) Act, 1976

Child Labour (prohibition and regulation) Act, 1963

Code on Occupational Safety, Health, and Working Conditions, 2018

Construction and Demolition Waste Management Rules, 2016

Contract labour Regulation and Abolition Act, 1970

Employees State Insurance Act, 1948

Environmental Impact Assessment Notification, 2006

Environmental Protection Act, 1986

Factories Act, 1948

Forest Conservation Act, 1980

Rajasthan Unorganised Workers' Social Security Act, 2008

Granite Conservation and Development Rules, 1999

Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016

Income Tax Act, 1961

Industrial Establishment Act,1963

Inter-State Migrant Workmen Act, 1979

Inter-State Migrant Workmen Act, 1979

Limestone and Dolomite Mines Labour Welfare Fund Act, 1972, effective 1977

Marble Development and Conservation Rules, 2002

Mineral Conservation Development Rules, 2017

Mines and Minerals (Regulation and Development) Act, 1957

Minimum Wages Act, 1948

Rajasthan Minor Mineral Concession Rules, 2017

National Minerals Policy 2019.

Noise Pollution (Regulation and Control) Rules, 2000

Rajasthan Shops and Commercial Establishment Act

Solid Waste Management Rule, 2016

The Constitution of India

The Mineral Conservation and Development Rules, 2017 (Amendment)

The Mines Act, 1952

The Inter-State Migrant Workmen Act, 1979

Unorganised Workers' Social Security Act, 2008

Water (Prevention and Control of Pollution) Act, 1974,

Workmen's Compensation Act, 1923

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