# Foreign Direct Investment in Cement Industry in Nepal

## A Study on Socio-economic Impact

*Study Report*


**Nepal Rastra Bank**

**Economic Research Department**

**Economic Development Division**



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# Foreword

Cement industry is one of the important industries necessary for the infrastructure development of a country. The construction sector, contributing around 7 percent to GDP, is a major growth driver for Nepal. In the aftermath of April 2015 earthquake, the massive reconstruction activities escalated the demand for cement. Consequently, several cement industries have been established and some of those have been set up with foreign direct investment (FDI).

This study has been carried out upon the request of Investment Board of Nepal to investigate the status of cement industries, particularly FDI based ones. The study focuses on their contribution towards meeting the domestic cement demand, and their impact on the social wellbeing and economic condition of the surrounding communities. It has been found that FDI-based cement industries are dominant in the Nepalese market both in terms of the investment and the production capacity. At present, significant excess capacity exists in the cement industries of Nepal. However, given the infrastructural needs of the country, the demand for cement is expected to rise significantly in the coming years. The study has also found that cement industries have benefitted the local residents in several aspects such as growth in employment and business opportunities, and increase in land prices. Cement industries have, however, also found to adversely affect the local people through creating environmental pollution.

I believe that this study would be useful to all the concerned stakeholders. We have completed this study with valuable suggestions, information and data from various institutions and individuals. I would like to extend my sincere thanks to all concerned firms and stakeholders for their contribution and inputs in completing this study. I would also like to thank Executive Director Dr. Gunakar Bhatta, Director Mr. Dipak Lamechhane, Director Mr. Biggyan Raj Subedi, Deputy Director Mrs. Binti Shrestha (Prasai), Assistant Mr. Rohan Byanjankar, and all colleagues of Economic Development Division of Economic Research Department for their valuable contribution to preparing this report.

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Prakash Kumar Shrestha, Ph.D.

Executive Director

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# Abbreviation

| | |
|---|---|
| DOI: | Department of Industry |
| FDI: | Foreign Direct Investment |
| GoN: | Government of Nepal |
| IBEF: | India Brand Equity Foundation |
| IBN: | Investment Board of Nepal |
| IMF: | International Monetary Fund |
| MoF: | Ministry of Finance |
| MOICS: | Ministry of Industry, Commerce, and Supplies |
| NPC: | National Planning Commission |
| NRB: | Nepal Rastra Bank |
| OPC: | Ordinary Portland cement |
| PCC: | Per Capita Cement Consumption |
| PPC: | Pozzolanic Portland cement |
| PSC: | Portland Slag Cement |
| SAARC: | South Asian Association for Regional Cooperation |
| TEPC: | Trade and Export Promotion Centre |

# Executive Summary

1. **This study aims to investigate the status of cement industry in Nepal, particularly FDI based, their role in meeting the domestic cement demand, and their impact on the social wellbeing and economic condition of the surrounding communities.** At present, 55 cement industries are operational in Nepal: 3 FDI-based, 2 government owned and 50 locally and privately owned. Besides, 2 FDI based industries are under construction.
2. **The study is based on the survey of 7 out of 55 cement industries that are operational in Nepal.** The sample consists of 3 FDI-based, 2 government owned and 2 locally owned cement industries. The installed capacity of sampled seven cement industries accounts for 31.24 percent of the total installed capacity of the entire cement industry. For socio-economic impact analysis, two employees from each of the selected industries and 10 local people residing near each of these industries were selected as respondents. Besides, executive heads of the sampled cement industries and government officials were also consulted during the study.
3. **The FDI-based cement industries are occupying the cornerstone position in the Nepalese market both in terms of the investment and the production capacity.** The FDI in cement industries in Nepal stands at Rs. 56.97 billion as of 2018/19 compared to the total capital of domestic cement industries of Rs. 122.33 billion. The FDI-based cement industries in Nepal (with the respective percentage of foreign investment in parenthesis) are Hongshi-Shivam Cement Pvt. Ltd (70 percent), Arghakhanchi Cement Pvt. Ltd. (18 percent), Maruti cement Ltd (21 percent), Tianyi cement industries Pvt. Ltd (70 percent), and Hauxin cement Narayani Pvt. Ltd (100 percent). The former three industries are currently in operation, while the latter are under construction phase. The 3 FDI-based cement industries which have come into operation constitute 20.31 percent of the total installed capacity of the Nepalese cement industry. Of the 55 cement industries in operation, average daily production capacity of 3 FDI-based industries is 2783 tonnes while that of 2 government owned, and 50 locally and privately owned industries are 820 tonnes and 622 tonnes respectively.
4. **Nepal has moved towards self-sufficiency in cement production in recent years.** The annual installed capacity of 55 cement industries stands at 15 million tons in 2018/19 while

the domestic demand is 9.05 million tons. Domestic cement industries produced 7.49 million tons while 1.56 million tons of cement was imported in 2018/19. Though the import of both cement and clinker declined in 2018/19, significant quantity has still been importing primarily because of issues like certification, quality inconsistency and bulk supply ability issues related to domestic cement industries.

5. **There exists significant excess capacity in cement industries of Nepal. The average capacity utilization of sampled seven industries stands at 50.41 percent, with** government-owned cement industry at 50.12 percent, locally-owned cement industry at 63.78 percent, and FDI-based cement industry at 45.81 percent.

6. **Since the demand for cement is projected to be doubled in the next three years, there is still room for more cement industries to be set up in Nepal.** The per capita consumption of cement is low in Nepal (303 kg) compared to other countries like China (1716 kg), South Korea (1102 kg) and Bhutan (734 kg). As Nepal is in the process of developing infrastructure, the demand for cement is likely to go up. Several mega projects and national pride projects such as Gautam Buddha Regional International Airport, Budhigandaki Hydropower Project, Pokhara Regional International Airport, and so on are under construction. Similarly, Upper Marshyangdi Hydropower–2, Kaligandaki Gorge Hydropower Project, and Ankhu Khola Hydropower Project are already in the pipeline. A study by the Ministry of Industry, Commerce, and Supplies (2019) has projected the installed capacity of the cement industry increase to 20 million tons by 2023/24. Huaxin cement industry with a production capacity of 3000 MTD, Garud cement industry with a production capacity of 3000 MTD, and Tianyi cement industry with a production capacity of 720 MTD[1] are under construction and is expected to start production by 2022/23.

7. **FDI-based cement industries are found to be more efficient and profitable than both government owned and locally owned cement industries.** In order to produce 1 ton of cement, while the FDI-based cement industry, on an average, uses 0.99 metric tons of limestone, the government-owned cement industry uses 1.45 metric tons. Similarly, the production cost to the sales ratio of the FDI-based cement industry is about 46.63 percent compared to 48.95 percent and 82.18 percent of locally owned and government owned cement industry. Arising economies of scale owing to larger size and the use of superior

[1] Extracted from Industrial Information System, Department of Industry

technology in the FDI-based cement industries are the reasons behind their higher efficiency.

8. **Majority of respondents, especially those who reside near FDI-based or locally owned cement industry, agree that cement industry has assisted in the promotion of business opportunities.** Government-owned cement industries are located far from the residential area while the FDI- based and locally owned cement industries are located near residential areas.
9. **Around fifty-seven percent of respondents agree that FDI-based cement industry has provided employment to local people.** However, for the government owned and locally owned industries, 90 percent and 60 percent respondents, respectively, agree that cement industries have provided employment to local people. However, local people constitute of less than 10 percent of total employees in cement industry.
10. **Around 92 percent of respondents agree that cement industries has created negative externality through air, sound, land and water pollution.** Air pollution is the major negative externality faced by the residents followed by sound pollution and land pollution. FDI-based industries, owing to their superior technology, generate comparatively lower air pollution than locally owned and government-owned industries.
11. **Respondents residing near cement industry who agree that the industry has contributed to infrastructure development are 37 percent for FDI based cement industry compared to 90 percent for the government-owned cement industry.** The majority of the cement industries have contributed to building roads and schools. The government owned cement industries are found to be engaged more in infrastructure development.
12. **The impact of the cement industry on nearby land prices is found to be mixed. Forty-seven percent of respondents agree that the cement industry has a positive impact on land prices.** The majority of the respondents living near the government-owned cement industry respond that the cement industry does not have a positive impact on land prices. Land prices have been increased by almost 433 percent near the FDI-based cement industry followed by a locally-owned cement industry (359 percent), and government-owned industry (100 percent) compared to the land prices before establishment of these factories. However, the hike in land price has resulted only in the front part of the industry

while the land located behind the industry has lost its value due to pollution generated by the industry.

13. **The role of the government is important in increasing the capacity utilization of the cement industries.** The government can raise the domestic demand by aggressively undertaking construction activities of the mega projects for infrastructure development. The government could also introduce a favorable policy including provision of certification for domestically produced cement that would encourage export of cement to the adjoining states of India given that the nearby states of India do not have limestone ore.
14. **Regulations need to be designed to make cement industries internalize the negative externalities they create.** Government authorities must not allow establishment of cement industries near the residential areas or highways where the pollution could easily reach out to general people. Besides, cement industries should be mandated to invest in local development such as roads, schools, hospitals as part of its corporate social responsibility.
15. **FDI in cement industries should be kept open as FDI helps in bringing new technology into the country and promotes the competition forcing domestic industries to be more efficient**. It is, however, better to allow FDI in cement industries only on condition that local investors also hold certain minimum percent equity in such industries. This would help in the transfer of both technical and managerial know-how from foreign investors to local stakeholders. Also, it is important to review the regulation regarding the maximum permissible debt to equity ratio in FDI based cement industry in the context that significant amount of debt is being raised by the FDI-based cement industry in Nepal.

# CHAPTER I: INTRODUCTION

## 1.1. Background of the study

The cement industry is one of the most important industries for infrastructure development. Cement is a basic substance required in construction[2], and therefore, the demand for cement is generally used as an indicator of construction activities taking place in an economy. The consumption of cement has been increasing in Nepal in recent years. After the earthquake of 2015, the reconstruction activities have driven up the demand for cement. The domestic annual demand for cement in Nepal increased from 4.54 million tons in 2014/15 to 4.81 million tons in 2015/16 and to 9.05 million tons in 2018/19[3]. Although most of the reconstruction activities now have been completed, the demand for cement is unlikely to subside. Nepal aims to upgrade to developing country status by 2022 and achieve sustainable development goals (SDG) by 2030. This calls for a total investment amounting to Rs. 17 trillion, mostly in infrastructure in 9 years (UNDP, 2013). Besides, the National Planning Commission has identified 22 national pride projects in line with the national vision of "Prosperous Nepal; Happy Nepali". This necessitates the investment in mega projects in physical and social overhead, which is likely to raise the demand for cement within the country.

Because of the sheer quantity of cement required in the construction sector and the huge transportation cost associated with its import, it is strategically important for an economy to develop robust domestic capacity in cement production. Development of the domestic cement industry will bring the utilization of domestic limestone ore, save foreign exchange, generate employment opportunities as well as ensure cost-effective and smooth supply of cement to meet the domestic demand.

Although Nepal has been historically dependent on imports for meeting a significant proportion of its cement demand, the situation has now been changing with the establishment of new cement industries in the country. Buoyed by the surging demand for

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[2] As per Industrial Production Index for Nepal, the weightage of cement in construction activities on an average is around 20 percent. (Source: Central Bureau of Statistics, Kathmandu, Nepal)

[3] Calculation by NRB using the data of excise duty from Department of Customs and import data from TEPC

cement due to reconstruction activities, several cement industries have been established in recent years, and some of those have been set up with foreign direct investment (FDI). The inflow of FDI in the cement industry can be attributed to the brighter prospect on near-future of development activities in Nepal as well as the liberal FDI policy adopted by the government.

Given the resources and technology gap in the country, Nepal has adopted an open and active policy to attract FDI in several sectors, including the cement industry. Investment Board of Nepal has identified 8 different potential investment sectors for FDI, that is, hydropower, transport, agriculture, tourism, information communication technology, mines and minerals, health and education, manufacturing, and financial. Table 1 shows the FDI commitments received in key sectors of the Nepalese industry in 2018/19. Industries that fall on the mineral category have the least number of FDI recipient projects and have the least FDI inflow in 2018/19. However, the FDI in cement industries stands at Rs. 56.97 billion, while the total capital of domestic cement industries stands at Rs. 122.33 billion as of 2018/19 (DOI, 2020a). At present, there are 3 cement industries with FDI in operation while 2 are still under construction.

Table 1: *FDI commitments in the Nepalese industry in 2018/19.*

| **Category** | **Number of Projects** | **FDI (Share in total FDI)** | **FDI to Project Cost** | **FDI in cement*** |
|---|---|---|---|---|
| Agro and forestry-based | 17 | 1.58 | 98.56 | - |
| Information technology | 24 | 2.55 | 73.61 | - |
| Manufacturing | 62 | 26.57 | 61.53 | 5 |
| Mineral | 2 | 0.05 | 70.00 | - |
| Service | 108 | 27.89 | 98.48 | - |
| Tourism | 131 | 41.36 | 85.43 | - |
| **Total** | **344** | **100** | **-** | **5** |

*Source: DOI, 2020*

*Note:* * Number of industries approval from DOI between 2013/14 and 2018/19

With the growth in the number of cement industries, the installed capacity for the cement now exceeds the domestic demand. The installed production capacity of cement stands at 15 million tons whereas the domestic demand is at 9.05 million tons in 2018/19 in the

country[4]. Of this, 7.49 million tons have, however, been met with domestic supply while the rest have been from imports.

Though the country seems to be self-sufficient in terms of installed production capacity for cement at present, several issues warrant the attention of the policymakers. Despite the existence of sufficient domestic capacity for cement production, a significant quantity of cement has still been imported at present. Given the prospective infrastructural activities in the coming years, it is also necessary to identify whether the present installed capacity of cement production is sufficient to meet future demand. Further, many questions need to be explored such as whether the FDI in cement industries have helped to introduce better technology and management expertise within the country or not; and whether the government should prioritize the FDI in the cement industry or not. Besides, there are several socio-economic effects associated with the cement industries which need to be duly considered by the policymakers.

The establishment of cement industries generally brings significant externalities, both positive and negative. Setting up cement factories can generate employment opportunities, directly by hiring local people and indirectly by stimulating business activities near its premises. The development of the road to the factory site will also benefit the local community and can also boost the land prices. However, the cement factory can create significant pollution both air and noise which can be hazardous to the health of surrounding communities. Battelle (2002) figures out that the cement industry generated about 3 percent of global greenhouse gas emissions. Cement plants and quarries have adverse effects on local ecology, biodiversity and water resources. Busuyi, Frederick, and Fatai (2008) find that the lifestyle of people around cement manufacturing plants is poor and characterized by poor education and a high percentage of illiteracy. Apart from its widespread impact on the surrounding environment, the cement industry has a significant impact on the national economy. While granting a permit for setting up a cement factory, it is, therefore, important that the authority should analyze both social cost and benefits associated with the project and ensure that both get accounted for.

[4] Calculation by NRB using excise data of cement industries from Department of Customs and data of cement imports from TEPC.

## 1.2. Objectives of the study

This research aims to analyze the status of the cement industry in Nepal, especially FDI based, and how they compare with locally owned cement industries and how effective have they been in fulfilling the gap between domestic demand and supply of cement. This study also explores the socioeconomic impact of cement industries on surrounding communities. Specifically, the objectives of the study are:

- To investigate the effectiveness of FDI on fulfilling the existing gap in cement production.
- To examine the impact of cement industries on social wellbeing and economic condition of the surrounding communities.

## 1.3. Significance of the study

The study has provided a clear insight into the status of cement industries; especially FDI based ones, in Nepal. The details of installed capacity, actual domestic production and import of cement and clinker help in evaluating the development and competitiveness of the domestic cement industries. The study focuses on the role of FDI-based cement industries in fulfilling the growing demand of cement in the country. The comparison of technical and financial status of FDI based and locally owned cement industries has provided important information relating to the technical and managerial efficiency of FDI based industries relative to locally owned ones. Such information can be crucial for policymakers while assessing the need for FDI in cement industries.

The present study also aims to examine the socio-economic impact of cement industries on surrounding communities. The study concentrating on the socio-economic impact of the cement industry has not been conducted in Nepal yet. However, this type of study has been conducted in the majority of other SAARC countries. The analysis of socio-economic aspects like employment generation, health hazards, infrastructure development, land prices, among others, provides valuable information which could be useful in designing policies that require the cement industries to internalize the externalities associated with them.

## 1.4. Limitations

The study covers all the FDI based and government owned cement industries operating in Nepal but covers only two privately and locally owned cement industries. As such, care should be taken while generalizing the results with respect to locally owned cement industries. Further, non-probability sampling method (judgmental sampling) has been used to select respondents during the study for the sake of convenience. The number of respondents are limited; hence results may not be fully representative.

# CHAPTER II: REVIEW OF LITERATURE

The review of literature is classified into two parts: a) review of international literature and b) review of national literature. Under review of international literature, the study has reviewed the research done by Afeni and Adeogun (2015), Kusena, Shoko and Marambanyika (2012), Burange and Yamini (2009), and Muthukrishan (2002). Moreover, the study has reviewed the study report prepared by the Ministry of Industry, Commerce, and Supplies (2019) as well.

## 2.1. Review of International Literature

Afeni and Adeogun (2015) assess the socio-economic impact of limestone quarrying and processing operations at Ewekoro, South-Western Nigeria on the inhabitants of the community and the workers. They find that limestone exploitation have both positive and negative effects on the host community and the workers. However, the benefits derived by the host community like employment, good roads, schools, and hospitals are insignificant compared to the negative effects of the exploitation on the community which includes a reduction in crop production, negligence of education by students, overcrowding and high competition for little-available social amenities. They have made several recommendations to ameliorate those negative socioeconomic effects.

Similarly, Kusena, Shoko, and Marambanyika (2012) examine the socio-economic impact of cement production at Sino on the nearby Hozheri community by collecting data through questionnaires, observations, and interviews from sixty-five households selected through stratified random sampling. Research findings reveal that the establishment of Sino-Zimbabwe cement manufacturing company has socio-financial benefits to the surrounding community through the creation of employment, establishment of a lucrative local market, retention of skilled teachers, construction of schools and healthcare facilities as well as provision of bursaries to excelling students. However, local people and the company blame each other for the slow pace of development being realized. High dust emissions also pose a threat to human health, crops, livestock, and indigenous forests. The study has recommended that the company should adopt effective environmental management tools to reduce dust emissions.

Muthukrishan (2002), however explores the performance of the cement industry with special reference to Tamil Nadu. The trends in productivity growth have been measured by introducing partial and total factor productivity. The operating efficiency has been measured in terms of capacity utilization, limestone consumption, coal consumption, power consumption, and average price realization per tonne of cement. The sector-wise comparison of operating efficiency indicates that the performance of private sector cement companies has been more outstanding than that of the public sector cement company. Also, the productivity status has been analyzed based on eight parameters suggested by Alan Lawlor. They are total earnings to conversion cost, purchased services to total earnings, wages, and salaries to sales percentage, profits to conversion cost ratio, profits to sales percentage, profits per employee, sales per employee, and value-added per employee. The sector-wise comparison of total earnings to conversion cost ratio finds that the earnings in the private sector are consistently good. The purchased service costs are higher in the public sector. The private sector has more control over wages and salaries than the public sector. Likewise, the comparison of profit to conversion cost indicates that the private sector has reported good profits. In terms of profit to sales, the private sector is better than the public sector. The sector-wise comparison of sales per employee indicates that the public sector is below unity compared to higher than unity in the private sector.

Similarly, Burange and Yamini (2009) study the performance of the Indian cement industry and find that the cement industry has been experiencing a boom on account of the overall growth of the Indian economy. The performance of the industry, under different policy regimes, truly establishes that decontrol of the industry and the liberalization of the economy has led to remarkable improvement in the indicators such as installed capacity, capacity utilization, per capita consumption, and exports. Positive trends can be evidenced in some of the other indicators too namely technology, prices, and regional and market concentration. While evaluating competition among firms for the year 2006-2007, out of the sample of 17 firms (90.21 percent of the market share), about 47 percent have recorded above industry average performance in the overall competitiveness index. The marginal difference between the indices of competitiveness of different firms implies the tough competition among the firms in the industry.

## 2.2. Review of National Literature

A study done by Ministry of Industry, Commerce, and Supplies (2019), Government of Nepal shows the present status of cement manufacturing industries and has made a forecast of the demand of cement in Nepal for the next 10 years. The methods used for data collection includes direct interviews, Focus Group Discussion (FGD), and Key Informant Information (KII). The study has projected the installed capacity of the cement industries in the country to reach 10 million tons per annum by the end of 2020 and 20 million tons per annum by 2024. This study worries that small cement plants of less than 500TPD are likely to face threats in the future from the large-sized FDI based cement factories. The study asserts that the large number of small and medium-sized cement manufacturers has been impacting the cost of production and failing to reap the economies of scale and, therefore, the establishment of a few giant industries could be a viable option. Hence, FDI in cement industry is necessary.

In the last two decades, cement production in Nepal has not followed a linear growth. Since 2010, the production has spiked significantly and by the end of 2019, the import of cement has declined sharply. On account of the direct relationship of cement demand with the GDP growth, the study finds out that the multiplier factor of 4.79 to the cement demand in Nepal, that is, a one percentage point increase in GDP leads to 4.79 percent in the demand for cement in Nepal.

There have not been many studies related to the cement industry in Nepal. The study by Ministry of Industry, Commerce, and Supplies (2019) has covered the other aspects but it has not focused on socio-economic aspects. In this regard, the present study focuses on the FDI based industries and explores the socio-economic impact of Nepalese cement industries on surrounding communities in detail.

# CHAPTER III: RESEARCH METHODOLOGY

## 3.1 Research Design

This study has been conducted through a descriptive and explorative research design. The study mainly focuses on the cement industry having FDI. A comparison has been made between cement industries having FDI and not having FDI in the areas of production, employment, profitability, capacity utilization, among others. Qualitative as well as quantitative data have been collected. Qualitative data have been processed and presented through explanation, interpretation, and summarization, while quantitative data have been processed through percentage, ratio, and trend analysis.

## 3.2 Nature and Sources of Data

Primary data has been mainly used for this study, but secondary data is also used wherever deemed necessary. The questionnaire has been the main instrument for collecting primary data. A semi-structured interview has also been conducted to collect tacit information. The respondents included executive heads of the sampled cement industry, employees of the industry, government officials, and the local people who are living around the industry. For a different group of respondents' different sets of questionnaires have been developed (Annex 3). Published as well as unpublished annual reports of the industry, reports published by various authorities, media coverage, among others are the major sources of secondary data.

## 3.3 Sampling and Data Collection

The judgmental sampling method has been applied to choose the sample items from the stratified population. The cement industries operating in the country have been grouped into three categories.

Table 2: *Selection of sample design*

| S. N. | Particulars | | Population | Sample | Industry | Basis of Selection |
|---|---|---|---|---|---|---|
| 1 | Cement Industries with FDI | | 3 | 3 | Hongshi Shivam Cement Pvt. Ltd.<br>Arghakhanchi Cement Pvt. Ltd<br>Maruti Cement Ltd | FDI related |
| 2 | Cement Industries without FDI | Government Owned | 2 | 2 | Hetauda Cement Ltd, Udaypur Cement Ltd | Govt. Owned |
| | | Locally owned[5] | 50 | 2 | Ghorahi Cement Industry Pvt. Ltd.<br>Jagadamba Cement Industries Pvt. Ltd. | Large in Production Size, representation of a geographical area, and representation of both integrated and clinker-based industry. |
| **Total** | | | **55** | **7** | | |

Note: There are 5 cement industries with foreign investment, but only 3 are currently in operation.

Employees of the selected industry also have been the respondents of the study. The permanent employees have been selected based on their job- administrative/ technical, and labor. Two employees from each category have been interviewed in the study.

Local people residing near the factory site and the government officials have been another group of respondents. At least 10 local people have been selected based on judgmental sampling method. During selection, priority has been given to the residents who live very near to the factory site. The other respondents include chairman of Federation of Nepal Chamber of Commerce and Industry, Cement Manufacturers Association of Nepal, Director General of Department of Industry, investors of the cement industry, and engineers of national pride projects. Field survey and interviews were carried in January 2020.

[5]The domestic cement industries fully owned by Private Nepalese investors.

# CHAPTER IV: DATA PRESENTATION AND ANALYSIS

This chapter is presented in six sections. The first section makes an international comparison of cement consumption across countries. The second and third section deals with the scenario of the cement industries and the status of cement production in Nepal, respectively. The fourth section describes the market structure of cement in Nepal while the fifth section analyses the efficiency of cement industries. The last section analyzes the socio-economic impact of the cement industries on the surrounding communities. The data of FDI-based, government-owned, and locally owned cement industries are used separately for comparison. A relative frequency contingency table has been used for data presentation and analysis.

## 4.1. Cement Consumption: International Comparison

According to Concreatech (2018), China is the largest consumer of cement with 2386 million metric ton followed by India with 284 million metric tons in 2017. Both China and India together accounted for about 64.17 percent of the total cement consumption in the world. China's cement consumption alone in 2017 is more than the total cement consumed by the rest of the world combined.

The developing countries are the major cement consumers of the world. Out of 20 top cement consuming countries, 16 countries are developing countries. Likewise, 14 out of 20 countries are Asian. Amongst SAARC countries, India, Pakistan, and Bangladesh occupy the top 20 positions in cement consumption.

Table 3: *Top 20 countries based on cement consumption in 2017*

| Rank | Country | Consumption (Mt) | Share (%) | Rank | Country | Consumption (Mt) | Share (%) |
|---|---|---|---|---|---|---|---|
| 1 | China | 2386 | 57.2 | 11 | Iran | 49 | 1.2 |
| 2 | India* | 284 | 6.9 | 12 | Saudi Arabia | 47 | 1.1 |
| 3 | The United | 97 | 2.3 | 13 | Japan** | 42 | 1.0 |
| 4 | Turkey | 75 | 1.8 | 14 | Mexico | 41 | 1.0 |
| 5 | Indonesia | 66 | 1.6 | 15 | Pakistan* | 39 | 0.9 |
| 6 | Vietnam | 60 | 1.4 | 16 | Philippines | 30 | 0.7 |
| 7 | South Korea** | 57 | 1.4 | 17 | Thailand | 29 | 0.7 |
| 8 | Russia | 55 | 1.3 | 18 | Germany** | 29 | 0.7 |
| 9 | Egypt | 54 | 1.3 | 19 | Algeria | 28 | 0.7 |
| 10 | Brazil | 54 | 1.3 | 20 | Bangladesh* | 28 | 0.7 |

*Source: Concreatech, 2018*

*Note:*

* 3 out of 8 SAARC countries are in the top 20 lists.

** 4 out of 39 advanced economies[6] are in the top 20 lists.

# 14 out of 20 countries are Asian.

## 16 out of 20 countries are developing economies

### Global cement consumption in the world stands at 4142 million metric tons in 2017

Table 4: *Top 10 Asian countries in terms of Per-capita Cement Consumption (PCC) in 2017*

| Rank | Country | PCC (kg) | Rank | Country | PCC (kg) |
|---|---|---|---|---|---|
| 1 | China | 1716 | 6 | Mongolia | 560 |
| 2 | South Korea | 1102 | 7 | Hong Kong | 829 |
| 3 | Macau | 995 | 8 | Bhutan* | 734 |
| 4 | Brunei | 979 | 9 | Vietnam | 643 |
| 5 | Singapore | 916 | 10 | Malaysia | 619 |
| - | Nepal | 303 | - | India[7] | 202 |

*Source: Concreatech, 2018*

*Note:* * Bhutan is only South Asian country to be in the Top 10.

Table 4 depicts the top 10 Asian countries in terms of per capita cement consumption in 2017. The per capita cement consumption is the ratio of total cement consumption to the total population of a country. China, with 1716 kg per person, is the country with the highest per capita cement consumption in Asia in 2017.

[6] Advanced economies as classified by International Monetary Fund (IMF, 2019)

[7] IBEF. (2018). *Cement*. Retrieved fromhttps://www.ibef.org/download/cement-dec-2018.pdf

The per capita cement consumption for Nepal stood at 303 kg in 2017 (Concreatech, 2018), which is far below the world average and even less than in Bhutan, marking a slower pace of infrastructural development relative to other countries.

## 4.2. Cement Industries in Nepal

Himal Cement Factory, established in 1972, was the first cement factory in Nepal. Later Hetauda Cement Factory and Udaypur Cement Factory were established in 1976 and 1987 respectively. All of these were government-owned enterprises. After the closure of himal cement industry in 2002, only two government owned cement industries are currently in operation. With the adoption of economic liberalization policy since the early 1990s, the private sector has emerged as the major player in the Nepalese cement industry. Thus, private cement factories have gradually increased in Nepal.

The Economic Survey 2019/20 has identified the cement industry as one of the leading industries of Nepal (Ministry of Finance, 2020). According to the Cement Manufacturers' Association (2020), 55 cement industries are in operation in Nepal. Of these, Hetauda Cement Industry and Udaypur Cement Industry are the only two government owned industries; 3 are FDI based-includes both joint ventures and wholly-owned, and the remaining 50 are locally owned industries.

Nepalese cement industries produce PPC, OPC, and PSC cement. Nepalese cement industries are mandatorily required to produce at least 33-grade PPC, PSC and OPC cement. However, the Nepal Bureau of Standards and Metrology provides Nepal Standard certification to PPC, PSC, and OPC category as a whole but not on specific grades within them. Table 5 depicts the categorization of cement industry according to ownership and product.

Table 5: *Categorization of cement industry according to ownership and product*

| Category | PPC | OPC | PSC | PPC/OPC/PSC | PPC/OPC | OPC/PSC | PPC/PSC | Unspecified | Total | Share |
|---|---|---|---|---|---|---|---|---|---|---|
| **Local** | 4 | 24 | 1 | 34 | 33 | 9 | 0 | 15 | **120** | **96%** |
| **FDI** | 0 | 0 | 0 | 3 | 1 | 0 | 1 | 0 | **5** | **4%** |
| **Total** | **2** | **24** | **1** | **37** | **34** | **9** | **1** | **15** | **125** | **100%** |
| **Share** | **1.6%** | **19.2%** | **0.8%** | **29.6%** | **27.2%** | **7.2%** | **0.8%** | **12.0%** | **100%** | |

*Source: Department of Industry, Government of Nepal, 2075*

*Note:* PPC is generally used for plastering; OPC is used for roofing and making grouts; PSC is environmentally friendly cement, which is similar to PPC. PPC generally takes 28 days to achieve concrete strength with a minimum of 430kg/sqcm, while OPC takes 28 days to achieve concrete strength with a minimum of 530 kg/sqcm.

### 4.2.1. FDI in Cement Industries in Nepal

The FDI in cement industries stands at Rs. 56.97 billion, while the total capital of domestic cement industries amounts to Rs. 122.33 billion as of 2018/19 (DOI, 2020a). List of cement industries with FDI is given in Table 6. Out of five so far registered, 3 are in operation and 2 are under construction. A brief description of those in operation is presented below.

Table 6: *List of Cement industries with FDI in Nepal*

| S.N. | Cement Industry with FDI | FDI | Foreign Partner and country | Registered date | Status |
|---|---|---|---|---|---|
| 1 | Hongshi-Shivam Cement Pvt Ltd | 70 % | Hong Kong Red Lion Cement No 3 (Hongshi Group), China | 12/14/2015 | Operation |
| 2 | Tianyi Cement Industries Pvt.Ltd. | 70 % | N/A | 11/12/2017 | N/A |
| 3 | Arghakhanchi cement PvtLtd | 18 % | Uma International, India | 12/31/2015 | Operation |
| 4 | Maruti Cements Ltd | 21 % | Gravity Sales Pvt Ltd, India | 12/25/2005 | Operation |
| 5 | Hauxin Cement Narayani Pvt Ltd (under construction) | 100 % | Huaxin Central Asia Investment (Wuhan) Co Ltd, China | 12/15/2017 | Under Construction |

*Source: DOI, 2020a*

#### *4.2.1.1. Hongshi-Shivam Cement*

Hongshi-Shivam Cement is one of the largest cement manufacturers established with a joint venture between Nepal's Shivam Holdings and Hong Kong Red Lion Cement No 3, a subsidiary of China's Hongshi Group. The Chinese company owns a 70% stake and Shivam owns 30 % in the joint venture (DOI, 2020b).

Table 7: *Source of financing for Hongshi-Shivam Cement*

| SN | Source | Rs. (bn) | Equity (%) | Capital Structure |
|---|---|---|---|---|
| **1** | **Equity** | **14.04** | **100%** | 38.19% |
| 1.1 | Hong Kong Red(Hongshi Group) | 9.83 | 70% | |
| 1.2 | Shivam Holdings | 4.21 | 30% | |
| **2** | **Debt** | **22.72** | | 61.81% |
| **Total** | | **36.76** | | **100%** |

*Source:Nepal Investment Board*[8]*, 2017*

*Note:* Debt to equity ratio is 1.62 times

Hongshi-Shivam Cement has secured a loan worth USD 140.5 million from the five-bank consortium led by NMB Bank, which includes Nepal Investment Bank, Prabhu Bank, Everest Bank, and Nepal SBI Bank (IBN, n.d.). The company has employed 519 employees of which 118 are Chinese and 401 are Nepalese.

#### *4.2.1.2. Arghakhanchi Cement Pvt Ltd*

Arghakhanchi Cement Pvt. Ltd., previously known as Dynasty Industries Nepal Pvt. Ltd., is also an FDI-based cement industry of Nepal with foreign investment amounting to 18 percent of total equity investment (Table 6). The cement industry owns and operates a cement manufacturing and VSK clinker manufacturing unit at Birpur, Kapilvastu with the capacity of manufacturing 500 TPD cement and 300 TPD clinker and Unit-II at Mainahiya, Rupandehi of 1100 TPD.

#### *4.2.1.3. Maruti Cement Ltd*

Maruti Cement Limited is the first private sector Greenfield cement plant in Nepal. Gravity Sales Pvt. Ltd., an Indian based company, has ownership of 21 percent of total

[8] *Project Investment Agreement – Hongshi Shivam Cement Plant, p.36*

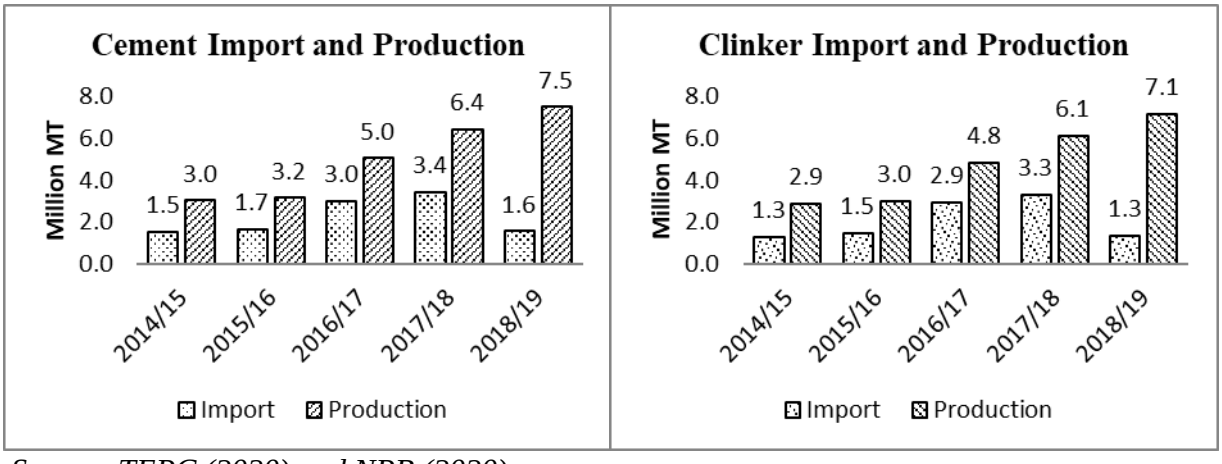
equity investment. It has an installed capacity of producing 207000 MT PPC and 138000 MT PSC (DOI, 2020b).

## 4.3. Status of Cement Production in Nepal

Over the past few years, cement production has followed an upward trend in Nepal. Currently, 55 cement industries are in operation with an annual capacity of 15 million metric tons (Table 8). The establishment of Hongshi Cement as a big cement manufacturer as well as an increase in production of clinker and cement by other domestic factories has played a crucial role in lowering the import of cement. Domestic cement industries produced about 7.49 million tons of cement in 2018/19 (Table 8).

According to Nepal Rastra Bank (2019a), Nepal imported cement worth Rs 12.97 billion in 2018/19 compared to Rs. 31.12 billion in the previous year. In quantitative terms, 1.56 million tons of cement was imported in 2018/19 compared to 3.42 million ton in 2017/18 (TEPC, 2020). Likewise, Nepal imported clinker worth Rs. 12.80 billion in 2018/19 compared to Rs. 30.50 billion in the preceding year. In quantitative terms, 1.35 million tons of clinker was imported in 2018/19 compared to 3.32 million metric ton in 2017/18 (TEPC, 2020).

*Figure 1*: Import and production of cement and clinker




*Source: TEPC (2020) and NRB (2020)*

Figure 1 depicts the pattern of change in the import of cement and clinker between 2014/15 and 2018/19. There has been a sharp decline in the import of cement and clinker.

In 2018/19, the cement import declined by almost 54 percent and clinker import fell by almost 56 percent as compared to the previous year.

The gap between the domestic demand and supply of cement has gradually narrowed down. Nonetheless, the cement is still being imported from India due to various reasons. Domestic cement industries have a limited ability to supply cement in bulk quantities as needed by the megaprojects. The megaprojects in Nepal use cement manufactured both in Nepal and India. These projects rely on Indian companies for supplying cement in bulk. The testing of the quality of cement requires about two to three weeks[9], and for each batch of cement the testing needs to be carried out. When cement supply consists of smaller batches, considerable time gets wasted in the testing process which slows down the construction activities. Another reason for megaprojects to rely on Indian companies is due to their quality consistency, which is a major problem in Nepalese cement manufacturers[10].

Table 8: *Present scenario of Cement Production*

| **Description** | **Quantity (Million Metric ton)** |
|---|---|
| Annual installed capacity* | 15 |
| Annual actual production** | 7.49 |
| Domestic consumption demand | 9.05 |
| Export | 0 |
| Import | 1.56 |

*Source: TEPC, 2020; Cement manufacturers' association, 2020*

** Interview with Chairman, Cement manufacturers' association*

*** Extracted from customs data*

Table 9 presents the annual installed capacity of sampled cement industries. The total installed capacity of sampled cement industries amounts to 4.687 million metric tons, which is 31.24 percent of the total installed capacity of the entire cement industry in Nepal. Three FDI-based cement industries constitute 20.31 percent of the total installed capacity of the industry.

[9] For projects, it is mandatory to test the quality of cement which requires casting a block of cement concrete and then allowing it to cure for at least three weeks.

[10] Information gathered from the interview with the authorities associated with national pride projects and other mega projects such as Tamakoshi Hydropower Project.

Table 9: *Annual installed capacity of sampled cement industries*

| SN | Category | Cement Industry | Million metric tons | Share in national installed capacity (%) |
|---|---|---|---|---|
| 1. | FDI based | Hongshi cement | 2.190 | 14.600 |
| 2. | | Arghakhanchi | 0.402 | 2.677 |
| 3. | | Maruti | 0.456 | 3.042 |
| 4. | Locally owned | Ghorai | 0.712 | 4.745 |
| 5. | | Jagadamba | 0.329 | 2.190 |
| 6. | Government Owned | Udayapur | 0.307 | 2.044 |
| 7. | | Hetauda | 0.292 | 1.947 |
| **Total** | | | **4.687** | **31.244** |

*Source: Field Survey*

Table 10 depicts the average production capacity of FDI-based, government-owned, and locally-owned cement industries in Nepal. FDI-based cement industries are giant with an average production capacity of 2783.33 tons per day, followed by government-owned, and locally-owned. The production capacity of average FDI based cement industry is more than 4 times the average of privately and locally owned cement industries. Ministry of Industry, Commerce, and Supplies (2019) has concluded that domestic industries with a production capacity of fewer than 500 tons per day are under threat as FDI-based industries with larger production capacity enjoys economies of scale and can adopt penetrating pricing strategy, which ultimately forces small domestic cement industry to exit from the market.

Table 10: *Production Capacity*

| SN | Category | Number of industry | Average production capacity (Ton per day) |
|---|---|---|---|
| 1 | FDI based | 3 | 2783.33 |
| 2 | Government-owned | 2 | 820.00 |
| 3 | Locally owned | 50 | 622.12 |

*Source: Field Survey*

The demand for cement is expected to rise in coming years as Nepal is in the process of developing and enhancing infrastructure and social overhead. Several mega projects and national pride projects are under construction and these projects are the major drivers of cement demand. Some of the major ongoing projects are Gautam Buddha Regional International Airport, Budhigandaki Hydropower Project, Pokhara Regional International Airport, and the like. Several mega projects are in pipeline such as Upper Marshyangdi Hydropower – 2 projects, Kaligandaki Gorge Hydropower Project, and Ankhu Khola Hydropower Project.

Table 11: *Forecast of Cement Demand for the next 5 Years*

| Year | Annual Cement demand (million MT) |
|---|---|
| 2020/21 | 13.27 |
| 2021/22 | 15.41 |
| 2022/23 | 18.69 |
| 2023/24 | 22.42 |
| 2024/25 | 25.88 |

*Source: Estimation based on regression result shown in Annex 2*

Based on the NPC's projection for the growth of construction sector in the 15th Plan, the demand for cement is projected for the next five years. The forecast of cement demand for the next 5 years presented in Table 11 is based on the elasticity coefficient of real GDP obtained from two-stage regression presented in Annex 2. Likewise, the Ministry of Industry, Commerce, and Supplies (2019) has projected to increase the installed capacity of cement industry to 20 million metric tons by the end of 2023/24. Huaxin cement industry with production capacity of 3000 MTD, Garud cement industry with production capacity of 3000 MTD, and Tianyi cement industry are under construction and expected to start production by 2022/23. Hence, we can argue that these FDI based cement industries will be helpful to fulfil the demand and supply gap in cement production.

## 4.4. Market Structure of Nepalese Cement Industry

Prices of almost all the cement industries remain in a same range except for Hetauda and Udayapur cement industries. The average year-round price of OPC cement of 26 cement

industries was Rs. 775 per bag, while the average price of OPC cement of 24 cement industries, excluding government-owned industries, was Rs. 764 per bag at the time of survey (Table 12).

Table 12: *Descriptive statistics regarding price of OPC cement of 26 cement industries*

| **Descriptive statistics including Hetauda and Udayapur** | | **Descriptive statistics excluding Hetauda and Udayapur** | |
|---|---|---|---|
| Mean | 775 | Mean | 764 |
| S.D. | 43.40 | S.D. | 26.56 |
| C.V. | 5.64 | C.V. | 3.47 |

*Note: Annex 1 presents the market price of OPC cement of 26 cement industries*

The price of government-owned cement industries is relatively higher than that of other industries (Annex 1). The prices of cement produced by domestic industries other than government-owned are more or less similar. The price of Hetauda cement and Udayapur cement is at least 15.96 percent and 18.84 percent, respectively, higher than the average price of other cement factories in Nepal. As reported by heads of the government owned cement factories during interview, they have been using at least 30 to 40 years long conventional production technologies and the production process occasionally gets halted due to kiln brick lining problem, kiln heating up[11], and kiln inlet seal breaking.

After analyzing the price structure of 26 cement brands produced in Nepal, the study finds that Sweezy's kinked demand model best describes the Nepalese cement market structure. Excluding government-owned cement industries, all other domestic cement industries tend to follow each other in case of a downfall in price, but they may not necessarily follow in case of price rise.

Nepalese cement industries are upward price rigid means that if one of the firms increases the price, then others may not follow it, but if one of the firms decreases price, other firms also follow them. The same scenario was seen when Hongshi-Shivam cement industry set its price below the prevailing market price.

[11] It takes time to heat up kiln once the kiln stops.

## 4.5. The efficiency of Cement Industries

Under this, the study focuses on the financial and technical aspects of the cement industry. Under the financial segment, the study encompasses sales, conversion cost, wages and salary, and profit. The technical aspects consider capacity utilization, limestone consumption and production of electricity.

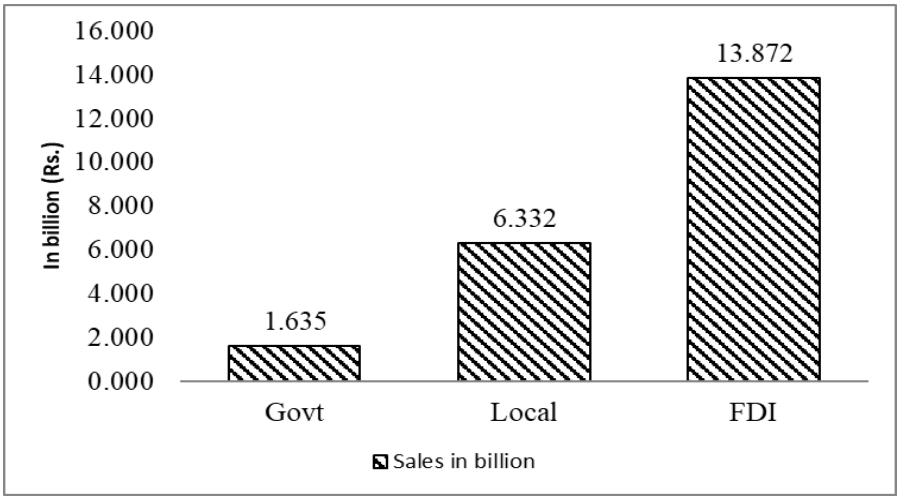
### 4.5.1. Financial status

Among the sampled cement industries, the average sales of FDI-based cement industries are 1.74 times that of government-based and locally owned cement industries combined. The sales revenue of FDI-based cement industries is driven by revenue generated from the sale of clinker, while the majority of domestic industries make value addition to clinker purchased or produce clinker for their use only (Figure 2).

The production cost to sales ratio of cement for FDI-based cement industries is significantly lower in comparison to government-owned cement industries. Quantitatively, the production cost to the sales ratio of the FDI-based cement industry is about 46.63 percent, that of locally owned cement industry is about 48.95 percent, and the government-owned cement industry is about 82.18 percent. Likewise, wages and salary to sales ratio of FDI-based cement industries stand at 1.62 percent, while such a ratio of government-owned and locally owned cement industries stand at 5.54 percent and 2.58 percent respectively. The lower sales revenue of government-owned cement industry is due to diseconomies of scale, lack of sales outlets, and reluctance of dealers to engage in trade due to lower profit margin.

Similarly, the net profit margins of locally owned cement industries and FDI-based cement industries are 10.42 percent and 10.17 percent respectively, while that of government-owned industries is negative.

*Figure 2*: Average sales figures of cement industries




*Source: Field Survey*

### 4.5.2. Technical status

Capacity utilization of FDI-based industries was 45.81 percent at the time of survey, which is lower than that of government-owned cement industry of 50.12 percent, and locally-owned cement industry of 63.78 percent. Overall capacity utilization of all cement industries is shown in Table 13. There is a wide fluctuation in capacity utilization and the FY2018/19 showed heavy decline of capacity utilization to 40.4 percent from 74.6 percent a year earlier.

Table 13: Capacity Utilization of Cement industries from 2013/14 to 2018/19

| Year | Capacity Utilization |
|---|---|
| 2013/14 | 60.67 |
| 2014/15 | 51.53 |
| 2015/16 | 54.91 |
| 2016/17 | 71.80 |
| 2017/18 | 74.60 |
| 2018/19 | 40.40 |

*Source: Nepal Rastra Bank, 2019b*

As the major ingredient for cement production, government-owned cement industries use 1.45 metric tons of limestone for producing 1 ton of cement, while FDI-based cement industries use 0.99 metric tons of limestone for producing 1 ton of cement on average.

Such a comparison cannot be done as one of the sampled local cement industries does not produce clinker.

Electricity consumption is the major performance indicator of an industry. On average, the electricity consumption by domestic cement industries was 45236 MWh and by FDI-based cement industries was 122722 MWh in 2018/19. Because of its large-scale production, FDI-cement industries consume more units of electricity. Also, FDI-based cement industries produced 104949.6MWh of electricity in 2018/19.

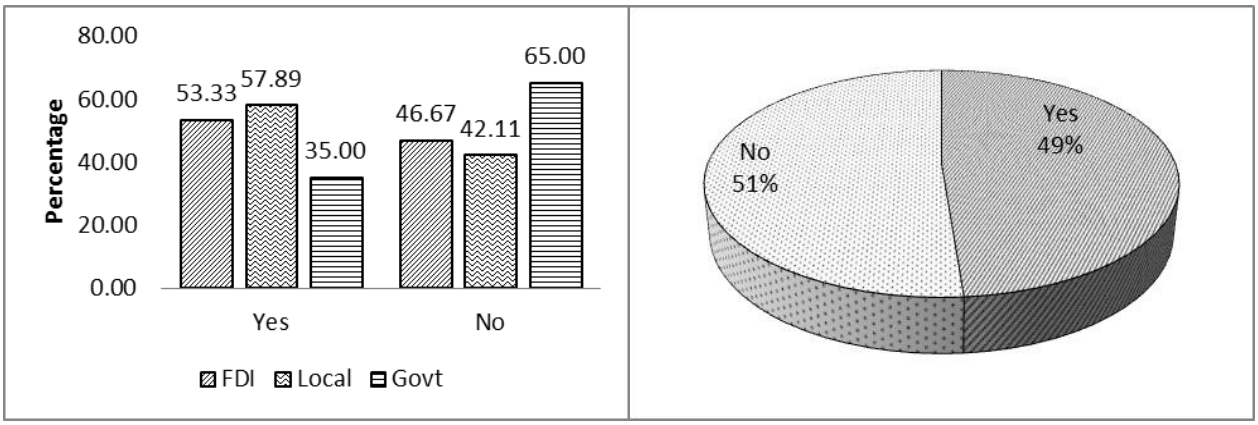
## 4.6. Socio-economic Impact on the Surrounding Communities

The socio-economic impact of cement industries on local communities has been analyzed based on employment opportunity, business opportunity, land prices, and environmental pollution to the local people and corporate social responsibility borne by industry as reported by respondents.

### 4.6.1. Promotion of business opportunities

The respondents who agree that the cement industry has assisted in the promotion of business opportunities constitute 49%, while 51% shows disagreement. Government-owned cement industries are located far from the residential area, while FDI- based and locally owned cement industries are located near residential areas so the former do not seem to promote business opportunities much. Quantitatively, majority (54% and 57%) of respondents near FDI-based and locally owned cement industries respectively agree that the cement industry has promoted the business opportunity, whereas only 35% of respondents living near government-owned cement industries agree that cement industry has promoted their business opportunity (Figure 3).

*Figure 3:* Promotion of business opportunities by the cement industry

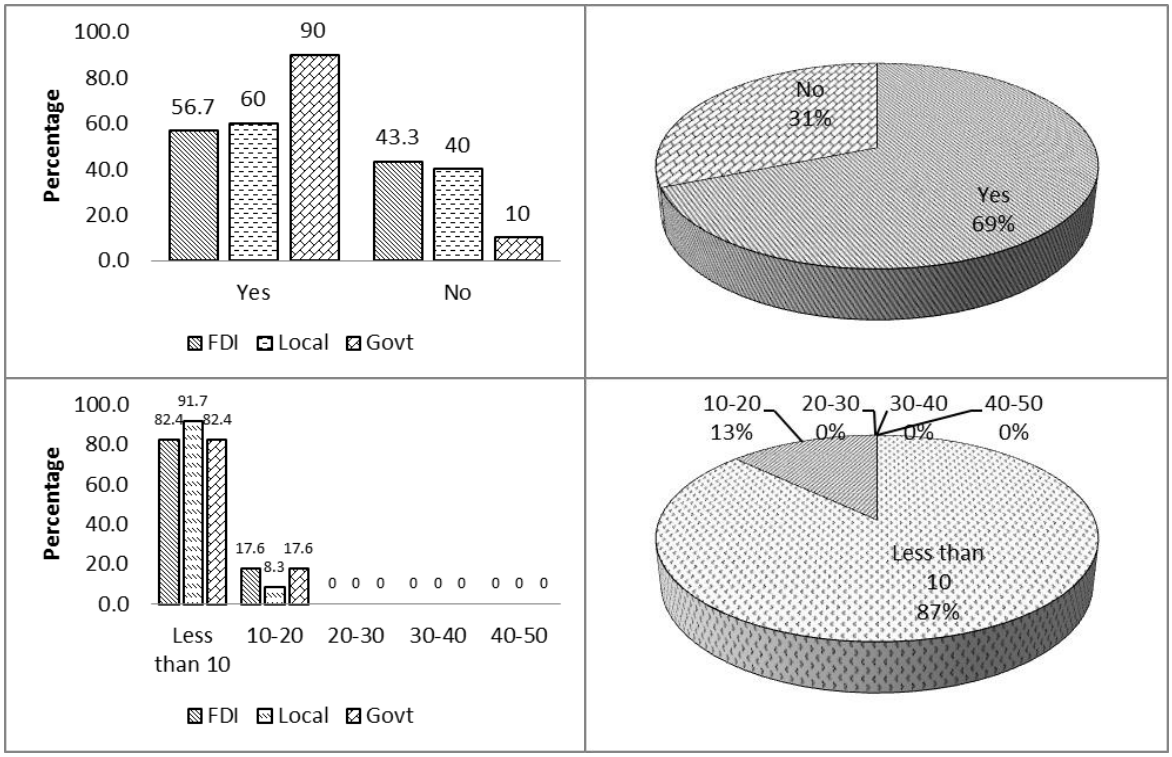



*Source: Field Survey*

### 4.6.2. Employment opportunities

Around sixty-nine percent of respondents on average agree that the cement industry has employed local people. However, as high as 90 percent of respondents living near government-owned cement industries agree that the industries employ local people, while only 57 percent of them near FDI-based cement industries agree that local people are employed by the cement industry (Figure 4). However, the local people account for less than 10 percent of the total employment of the cement industry. Industries prefer to avoid local people due to lack of skills and to avoid the problem of unionism.

*Figure 4*: Employment to local people

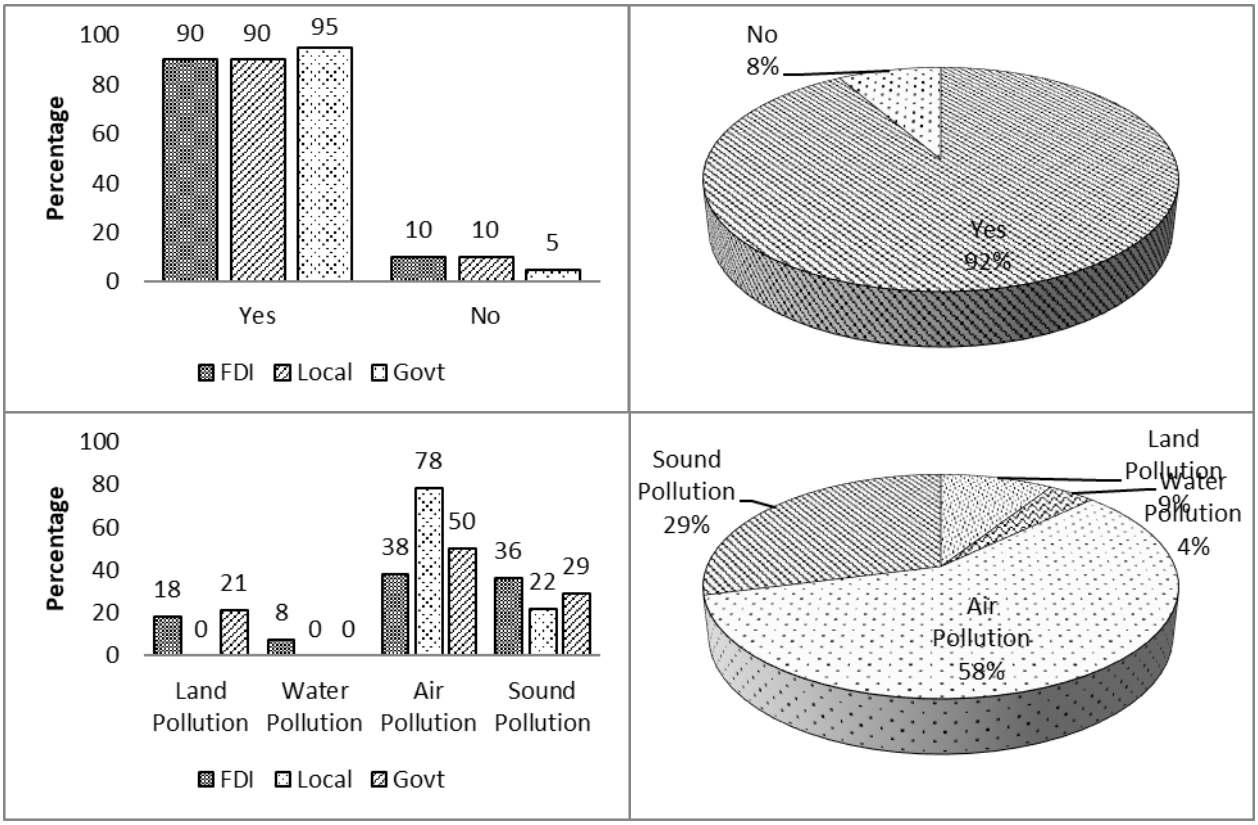



*Source: Field Survey*

### 4.6.3. Negative externalities and pollution

Ninety-two percent of respondents agree that they have suffered from negative externality from the cement industry (Figure 5). The majority of respondents in all three categories of industries have been suffered from negative externality. Air pollution is the major negative externality faced by the residents followed by sound pollution and land pollution. FDI-based industries, owing to their superior technology, generate comparatively lower air pollution than locally owned and government-owned industries.

*Figure 5*: Negative externality and Pollution



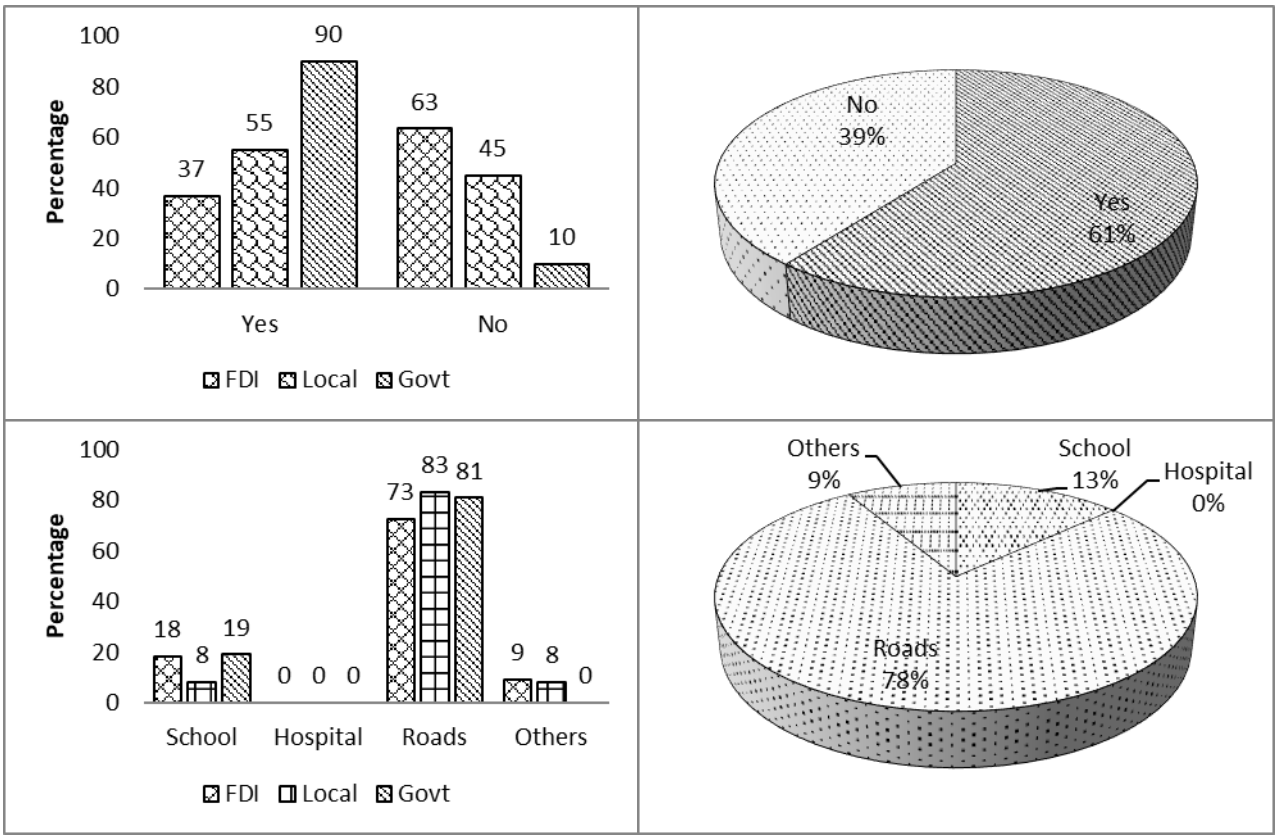

*Source: Field Survey*

### 4.6.4. Contribution to infrastructure development

Ninety percent of respondents agree that the government-owned cement industry has contributed to infrastructure development, while only 37 percent of respondents living near the FDI-based cement industry agree on the same (Figure 6). Analyzing the overall scenario, 61 percent of total respondents have agreed that the cement industry has contributed to infrastructure development.

The majority of the cement industries have contributed to building roads. About 78 percent of total respondents reveal that the cement industry has built or assisted in road maintenance (Figure 6). Further,- about 19 percent of respondents living near FDI-based and Government-owned cement industries agree that the industry has made contributions in building schools in their locality. However, the government-owned cement industries are found more active in infrastructure development.

*Figure 6: Contribution to infrastructure development by the cement industry*



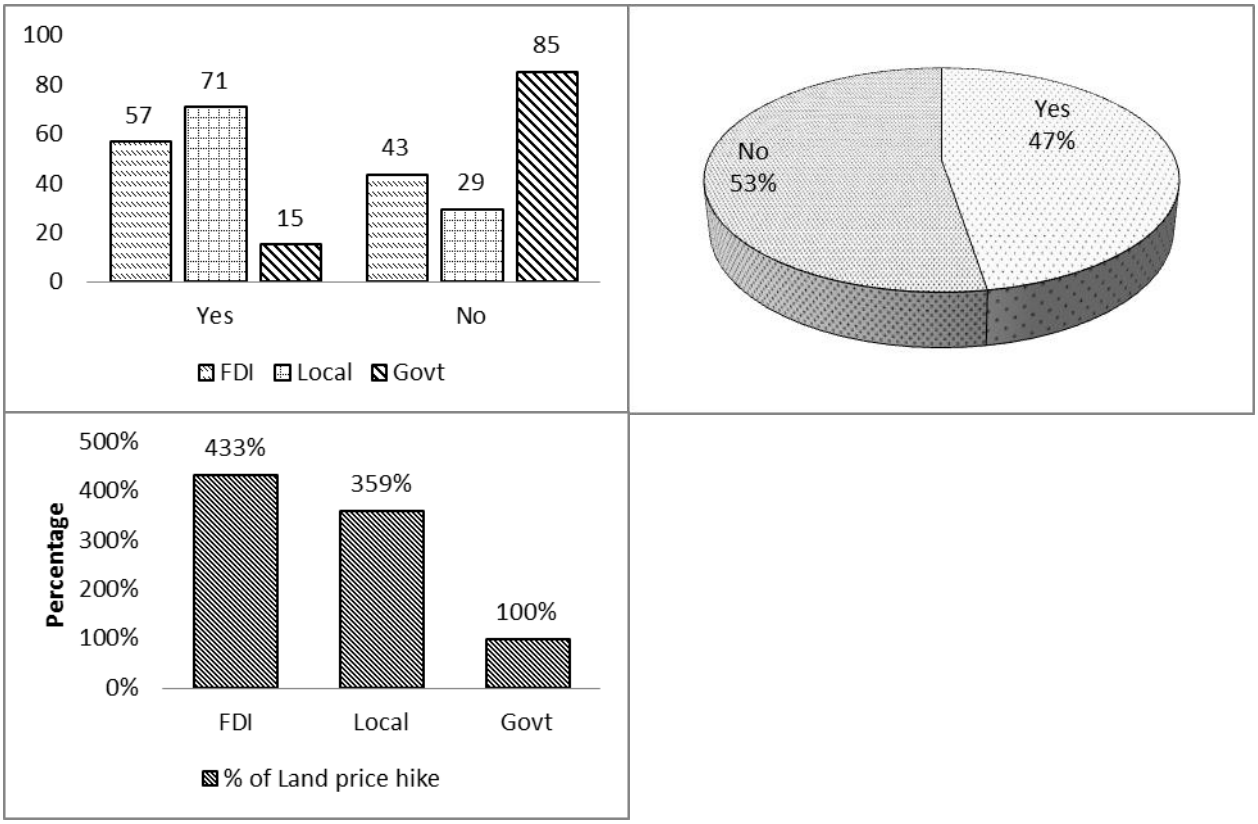

*Source: Field Survey*

### 4.6.5. Impact on land prices

Forty-seven percent of respondents agree that the cement industry has a positive impact on land prices (Figure 7). The majority of the respondents living near the government-owned cement industry has responded that the cement industry does not have a positive impact on land prices. However, 57 percent and 70 percent of respondents near the FDI-based and locally owned cement industry, respectively, believe that the cement industry has led to a hike in land prices. Quantitatively, land prices have increased by almost 433 percent near the FDI-based cement industry followed by a locally-owned cement industry (by 359 percent), and government-owned industry (by 100 percent). However, the hike in land price results only in the front part of the industry, while the land located behind the industry has lost its value due to pollution generated by the industry.

Further, the direction of the wind has also affected the land price. Residents located west of the factory suffered much in the area with the dominance of easterlies; as a result, land prices have dropped on the west side of the industry.

*Figure 7*: Impact on Land Prices




*Source: Field Survey*

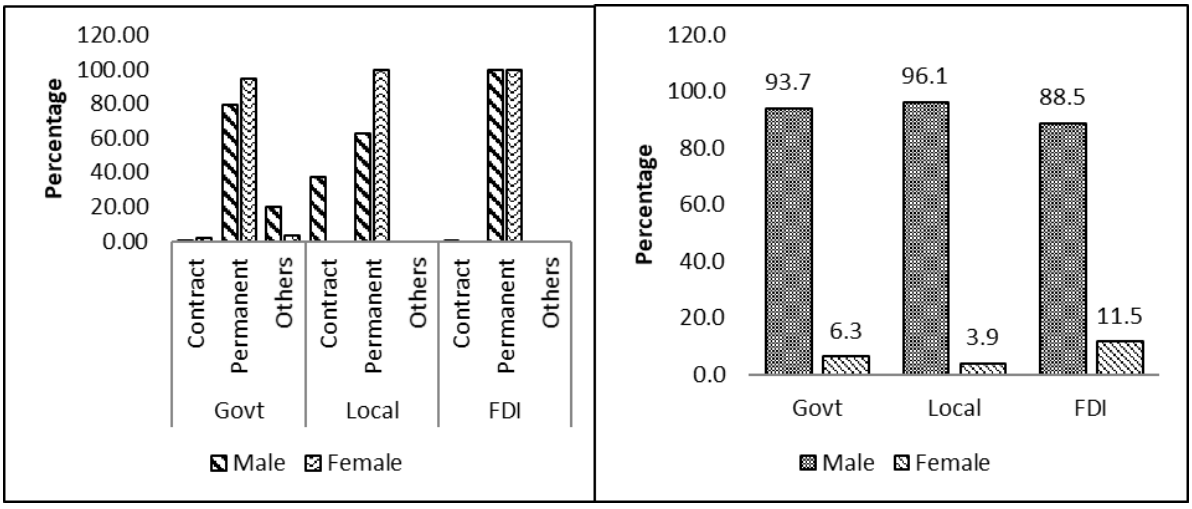
## 4.7. Facilities to Employees

For analysis of employee facility, the study considers salary to employees, working hours, benefits others than salary, and quality of work life.

### 4.7.1. Employment status

Male employees have dominated the cement industry. Permanent employees are dominant in all three categories of cement industry. Except in government-owned industries, all women employees are permanent employees. Locally owned cement industries have a large number of employees working under contract (Figure 8).

*Figure 8*: Employment status

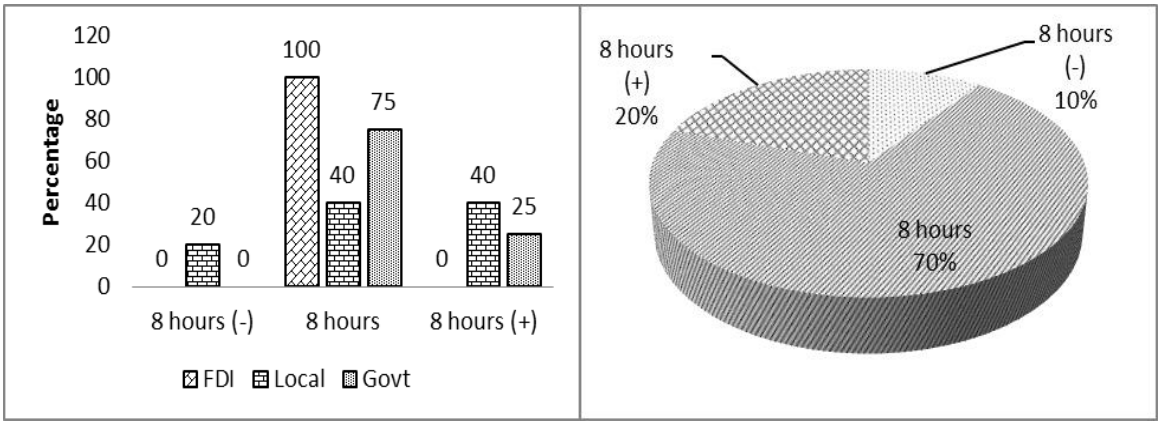



*Source: Field Survey*

### 4.7.2. Working hours

Seventy percent of employees work for 8 hours while 20 percent work for more than 8 hours (Figure 9). Interestingly, 100 percent of respondents working in the FDI-based cement industry work for 8 hours, while 40 percent and 25 percent of employees working in locally owned and government-owned cement industry work for more than 8 hours respectively. FDI-based cement industries seem to be strict in following working hours.

*Figure 9*: Working hours

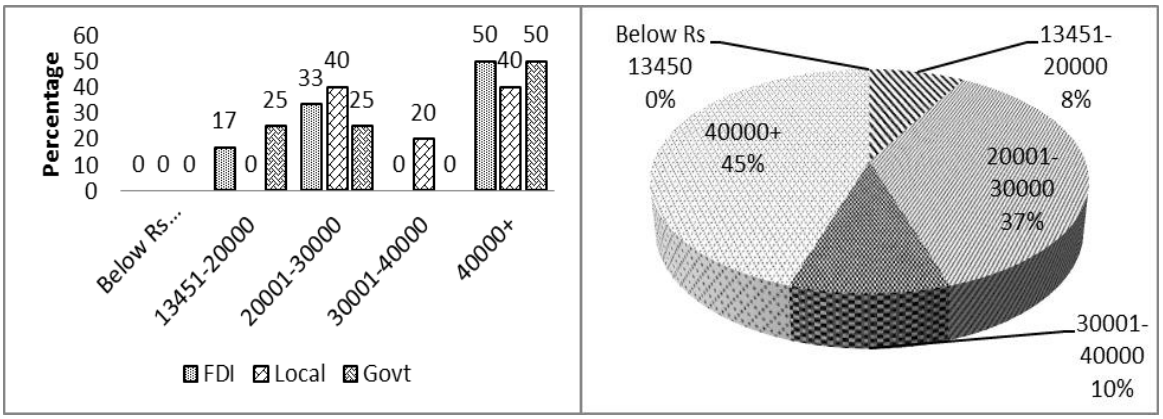



*Source: Field Survey*

### 4.7.3. Salary earned by employees

Forty-five percent of employees earn more than Rs 40,000 per month (Figure 10). About half of employees working in FDI-based and government-owned cement industries earn more than Rs. 40000 salary a month. The FDI-based industry seems better as employees earn a higher salary and industry follows strict working hours, that is, 8 hours per day.

*Figure 10: Salary earned by employees*

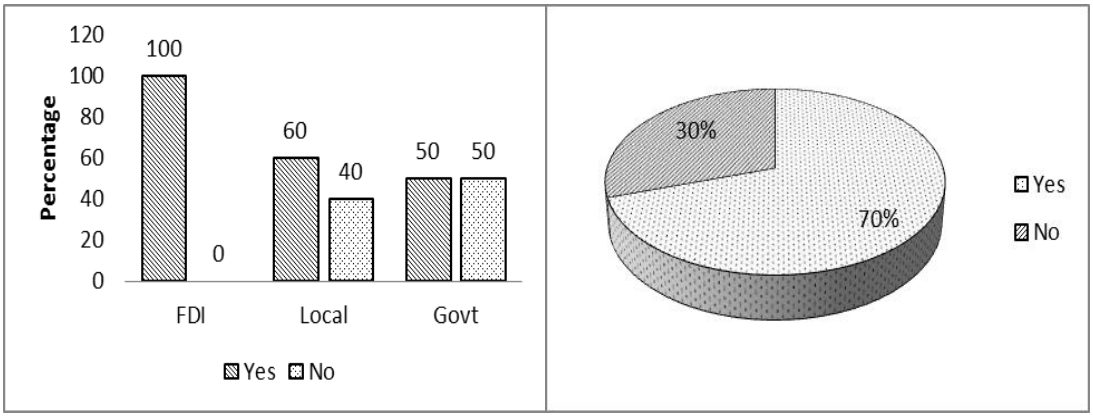



*Source: Field Survey*

### 4.7.4. Benefits other than salary

Seventy percent of respondents receive some sort of benefits other than salary (Figure 11). All respondents working in the FDI-based cement industry get benefits other than salary, while 60 percent and 50 percent of respondents working in locally owned and government-owned employees get benefits other than salary respectively. About 66 percent of employees working in a locally-owned cement industry only get bonuses while 50 percent of employees working in government-owned cement industry get a bonus, provident fund, and insurance. Interestingly, about 66 percent of employees working in FDI-based cement industries receive a bonus, provident fund, insurance, and other benefits. Thus, FDI-based cement industries care more about benefits other than salary in comparison to domestic industries.

*Figure 11*: Benefits other than salary

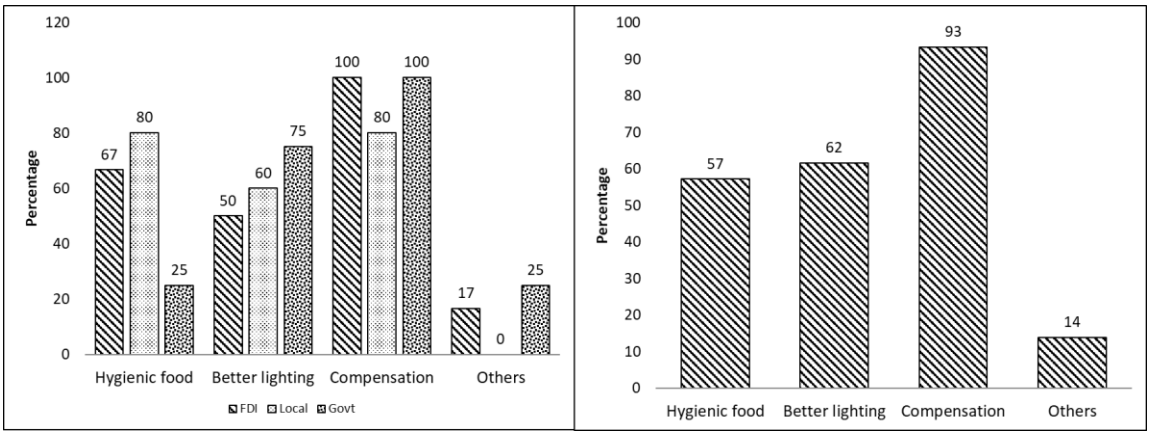



*Source: Field Survey*

### 4.7.5. Quality of work-life

Quality of work-life has been assessed through three variables, hygienic food, better lighting, and compensation for industrial accidents. About 93 percent of employees agree that the industry provides compensation for industrial accidents (Figure 12). Likewise, 57 and 62 percent agreed that the industry provides better lighting and hygienic food. Government-owned industries provide better lighting and compensation for industrial accidents, while locally owned industries provide hygiene food. The FDI-based industry provides compensation for industrial accidents but focuses less on hygiene food and lighting facilities.

*Figure 12:* Quality of work-life




*Source: Field Survey*

# CHAPTER V: CONCLUSION AND RECOMMENDATIONS

## 5.1 Conclusion

In the last few years, the cement and clinker production in the country have been picking up following a surge in demand from the post-earthquake reconstruction works. With increase in domestic production, cement import has declined. However, new cement industries have been established in FDI. This has created an optimistic scenario for the country to move further in the path of self-sufficiency in cement production.

The study finds that the annual actual production is around half (7.49 million metric tons) of the annual installed capacity (15 million metric tons) of the total cement industries in operation with 9.05 million metric ton domestic consumption demand in 2018/19. Around 1.56 million metric tons of cement was imported from India in that year. The mega projects in Nepal often import cement from India due to issues of certification, quality consistency and ability for bulk supply related to domestic cement suppliers.

The demand for cement is likely to increase in the coming years as large investment in infrastructure is very much needed in the country. It is projected that the annual demand for cement will increase to 25.88 million metric tons by 2024/25.

The FDI in cement industries in Nepal stands at Rs. 56.97 billion, while the total capital investment of domestic cement industries stands at Rs. 122.33 billion as of 2018/19. At present, there are 3 cement industries with FDI in operation while 2 are still under construction. The 3 FDI-based cement industries constitute 20.31 percent of the total installed capacity of the cement industry. Of the 55 cement industries in operation, average daily production capacity of 3 FDI-based industries is 2783 tonnes while that of 2 government owned and 50 locally and privately owned industries is 820 tonnes and 622 tonnes respectively.

Based on the survey conducted during the study, FDI-based cement industries are found to be more efficient and profitable than government owned or locally owned cement industries. In order to produce 1 ton of cement, while the FDI-based cement industry uses 0.99 metric tons of limestone on average, the government-owned cement industry uses

1.45 metric tons. Similarly, the production cost to the sales ratio of the FDI-based cement industry is about 46.63 percent compared to 48.95 percent and 82.18 percent of locally owned and government owned cement industry. The economies of scale owing to larger size and the superior technology of the FDI-based cement industries are the reasons behind their higher efficiency.

The operation of large FDI-based cement manufacturers like Hongshi-Shivam cement industry (with the daily production capacity of 6000 metric ton) which is also supplying clinker to a large number of other cement industries has been helping significantly in squeezing the gap between the domestic demand and the production of cement in the country.

On the socio-economic front, it has become beneficial for the local people due to the growth in business activities like hotels, restaurants, retailers, and access to the road networks, schools, hospitals, vehicles near the cement factories. Government-owned cement industries have even contributed to building schools, provided cement in subsidized price to locals, and provided employment to locals. However, in the case of land price, the land in forefront of the industry has recorded price hike while the land in the back part of the industry has lost its value due to pollution generated from the industries.

Most of the employees, especially working in FDI based cement industries, receive benefits like bonus, provident fund and insurance besides salary. The majority of the workers works for 8 hours and earn more than Rs 40000 per month in government owned and FDI-based cement factories. Cement industries have employed the majority number of male employees compared to female employees. Although cement industries have created employment opportunities, only less than 10 percent of the total employment of cement industries is from local people.

Further the cement industries' operations have created hardships in the daily activities of surrounding communities due to sound and air pollution. However, FDI-based industries, owing to their superior technology, generate comparatively lower air pollution than locally owned and government-owned industries.

## 5.2 Recommendations

Based on the interview with the stakeholders of cement industry, affected communities, relevant authorities and findings of the study, following recommendations are made:

- The production capacity of domestic cement industries has been underutilized. The government should introduce a favorable policy including provision of certification for cement that would encourage its export in the adjoining states of India given that the nearby states of India do not have limestone ore.
- Because of geographic reasons, constructing the certain sections of roads and highways of Nepal using concrete instead of asphalt can be more cost effective in the long run. Concrete roads are more water resistant and require low maintenance and it increases the demand for cement
- The cement industries are established near the residence or the highway, so the cement industries must be established far from residence and the highways. Department of industry and the company registrar office must direct industries not to establish near residential areas or near highways where industrial pollution can easily reach out to the general public.
- The cement industry is one of the most pollution emitting industries. These industries adversely affect the health and wellbeing of the surrounding communities. In India, cement industries have invested in rural development, education initiatives, and non-farm skill-based income generation program. In Nepal also, cement industries should be mandated to invest in local development such as roads, schools, hospitals as part of its corporate social responsibility.
- Government-owned cement industries have quality products. However, due to low margin, dealers are reluctant to offer their product to customers. So, these industries need to open their outlets to expand their business. Another option for government owned cement industries is to introduce a strategic partner, and use updated technology. These government-owned cement industries should be converted into public limited company to enhance its managerial capacity.

- It is found that significant amount of debt is being raised by the FDI-based cement industry from local banking sector. It is important to review the regulation regarding the maximum permissible debt to equity ratio in FDI based cement industry.
- FDI helps in bringing new technology into the country and promotes the competition forcing domestic industries to be more efficient. It is better to allow FDI in cement industries only on condition that local investors also hold certain minimum percent equity in such industries. This would help in the transfer of both technical and managerial know-how from foreign investors to local stakeholders.

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# Annex 1

*Table 1A: Average annual price of OPC cement per bag*

| Cement Brand | Price (Rs.) | Cement Brand | Price (Rs.) |
|---|---|---|---|
| Agni cement | 753 | Maruti cement | 799 |
| Ambe Cement | 766 | Nirman Cement | 717 |
| Ambuja Cement | 743 | Om cement | 800 |
| Arghakhanchi Cement | 753 | Pyuthan cement | 785 |
| Bishal Cements | 740 | Reliance cement | 760 |
| Buddha cement | 760 | Riddhi Siddhi cement | 771 |
| CG Cement | 795 | Sarbottam cement | 796 |
| Dobhan cement | 755 | Salimar cement | 750 |
| Ghorai cements | 800 | Shivam cement | 800 |
| Hetauda cement | 886 | Trisakti cement | 710 |
| HongshiShivam Cement | 750 | Udayapur cement | 908 |
| Jagadamba cement | 773 | United cement | 783 |
| Mangalam cement | 720 | Vijaya Cement | 770 |

*Source: HousingNepal, 2020*

# Annex 2

## Result

**Instrumental variables (2SLS) regression**

| Log of cement demand | Coef. | p-value | [95% Conf | Interval] | Sig |
|---|---|---|---|---|---|
| Log of Real GVA of construction (pakki) | 2.575 | 0.00 | 2.052 | 3.099 | *** |
| Dummy (1 for rise in cement demand) | .285 | 0.00 | .179 | .391 | *** |
| Constant | -27.798 | 0.00 | -38.017 | -17.579 | *** |

*** p<.01, ** p<.05, * p<.1*

Note: Log of population has been used as an instrumental variable. The two fundamental properties of instrumental variable are: instrumental variable must be correlated with independent variable, and must not be correlated with dependent variable. The population satisfies both requirements as population has a positive impact on economic growth (Fischer, 1992; Knight, Loayza &Villanueva, 1993; Benos, 2009; Mihut & Lutas, 2014), whereas it is not correlated with cement demand. CW research[12] (2020) concluded that in under-developed geographies cement demand is largely driven by investments in infrastructure.

### Endogenity Test

Ho: variables are exogenous

Durbin (score) chi2(1) = 4.9935 (p = 0.0254)

Wu-Hausman F(1,1 = 768.638 (p = 0.0230)

### Power of Instrument

| Variable | R-sq. | Adjusted R-sq. | Partial R-sq. | F(1,2) | Prob. |
|---|---|---|---|---|---|
| Log of Real GVA of construction (pakki) | 0.8691 | 0.7382 | 0.8607 | 12.35 | 0.07* |

* p.<.1*

Note: The endogeneity test confirms that log of real GVA is endogenous variable. Likewise, significant F-statistics (12.35) signifies the model is free of problem of weak instrument.

[12] CW Research. (2016). Global cement demand to slide to 4 billion tons by 2050. Retrieved from https://www.cwgrp.com/cemweek-features/499423-global-cement-demand-to-slide-to-4-billion-tons-by-2050

# Annex 3
# Questionnaire

## Nepal Rastra Bank
### Research Department
#### Economic Development Division

Nepal Rastra Bank is conducting a research on "Foreign Direct Investment in Cement Industry in Nepal". This questionnaire has been developed as per the requirement of this study. Respondents' identity will be kept confidential.

## Questionnaire to Employee

1. How long have you been working in this industry?
   ☐ 0 –3 years ☐ 3 – 6 years ☐ 6 – 9 years ☐ more than 10 years
2. Which type of work do you perform?
   ☐Skilled ☐semi-skilled ☐Unskilled
3. How many hours per day do you work in the factory?
   ☐Less than 8 hours ☐8 hours ☐ more than 8 hours
4. How much do you earn a month?
   ☐ Below 13450 ☐13451 – 20000 ☐20001 – 30000 ☐30001 – 40000 ☐Above 40000
5. Are there other benefits in addition to monthly salary?
   ☐ Yes ☐ No

5.1. If yes, specify the facilities received:
   ☐ Bonus ☐Pension ☐Provident fund ☐ Insurance ☐Social security fund ☐others

6. What is your expected monthly expenditure?
   ☐Below 10000 ☐ 10001 – 20000 ☐ 20001 – 30000 ☐30001 – 40000 ☐Above 40000
7. Have you often faced wage/salary cuts or deprived of job during economic downturns?
   ☐ Yes ☐ No

7.1. If yes, specify the time period_____

8. What facilities have been provided by the factory?
   ☐ Hygienic Food ☐ Better lighting ☐ Compensation for industrial accidents ☐ Others_____
9. Are you satisfied with your job?
   ☐ Highly satisfied ☐Satisfied ☐ Neutral ☐ Dissatisfied ☐highly dissatisfied
10. Is there any reward or recognition scheme?
    ☐ Yes ☐ No
11. Does this factory have grievance handling system?
    ☐ Yes ☐ No
12. If yes, do the workers file in grievance program?
    ☐ Yes ☐ No
13. How long will it take for the management for addressing the grievance?
    ☐Less than 7 days ☐7 – 14 days☐15 - 30 days☐ More than 30 days

**Employee Description**

Name (optional): Gender: ☐ M ☐ F

Age: Address:

Number of years working in this industry:

Industry Name:

# Nepal Rastra Bank
## Research Department
### Economic Development Division

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## Questionnaire to CEO

1. **How do you produce packaging materials?**

   ☐ Import ☐ In-house production ☐ Domestic resources ☐ Others_____

2. **Does this industry have its own outlets?**

   ☐ Yes ☐ No

   2.1.If yes, specify the number of outlets in different locations _____

3. **Does this factory produce clinkers?**

   ☐ Yes ☐ No

3.1.If No, How does factory manage clinkers?

   ☐ Import ☐ Domestic industries ☐ Others

4. **Consumption of raw materials in cement production**

   ☐ Limestone ☐ Shale ☐ Marl ☐ Gypsum ☐ Anhydrite ☐ Iron ore ☐ Use of waste as raw materials ☐ Others_____

5. **Total number of employees/ workers in the industry**

| | **Male** | **Female** | **Total** |
|---|---|---|---|
| **Contract** | | | |
| **Temporary** | | | |
| **Permanent** | | | |
| **Others** | | | |
| **Total** | | | |

6. **Consumption of energy monthly:**

| **Energy** | **Thermal energy demand** | **Electrical energy demand** |
|---|---|---|
| Consumption (MWH) | | |
| Production (MWH) | | |

7. **How the location of cement industry has been chosen?**

☐ Proximity to raw materials ☐ Proximity to market ☐ Far from residence area

☐ Others_____

8. **Does this factory invest in R&D?** ☐ Yes ☐ No

8.1. If yes, what percentage of sales revenue is invested in R&D? _____

9. **Have plants complied with natural noise barriers, such as office buildings, walls, trees or bushes used in the cement industry to reduce noise emissions?**

☐ Yes ☐ No

9.1. If yes, ☐ Office buildings ☐ Walls ☐ Trees ☐ Bushes ☐ Others_____

10. **Operation efficiency of cement**

| **Indicators** | **per ton of cement production** |
|---|---|
| **Capacity utilization (%)** | |
| Limestone consumption | |
| Coal consumption | |
| Power consumption | |
| Annual cement production | |
| Annual cement consumption | |

11. **What are your future plans?**

_____

_____

12. **Is incentive by government satisfactory?**

_____

_____

13. **Has industry received coordination from local people?**

_____

_____

14. **Can cement industry meet the demand of the growing economy?**

_____

_____

**15. Productivity performance**

| **Indicators** | |
|---|---|
| Sales | |
| Conversion cost | |
| Wages and salaries | |
| Profits | |
| Operating income | |
| Number of employee | |

| | |
|---|---|
| Industry name: | Established date: |
| Operation date: | Address: |
| Phone number: | Contact person: |
| Mobile number: | Position: |

# Nepal Rastra Bank
## Research Department
### Economic Development Division

Nepal Rastra Bank is conducting a research on "Foreign Direct Investment in Cement Industry in Nepal". This questionnaire has been developed as per the requirement of this study. Respondents' identity will be kept confidential.

## Questionnaire to Local people

1. **In which professions are you engaged in?**

   ☐ Agriculture ☐ Industry ☐Service☐ Others

2. **Has the industry contributed in growth of business opportunities for local people?**

   ☐Yes ☐No

   2.1.If yes, specify how? _____

3. **Does the industry provide employment opportunity for local people?**

   ☐ Yes ☐ No

4. **If yes, out of total what is percentage of local people?**

   ☐ Less than 10 percent ☐ 10 – 20 percent ☐ 20 – 30 percent ☐ 30 – 40 percent ☐ 40 – 50 percent ☐ 50 – 60 percent ☐ 60 – 70 percent ☐ 70 – 80 percent ☐ 80 – 90 percent ☐ 90 – 100 percent

5. **After the operation of cement industry, have it contributed in the development of infrastructure?**

   ☐Yes ☐No

   5.1.If yes,

   ☐School ☐Hospital ☐Roads ☐Others_____

6. **Have the operation of cement industry hike the land prices?**

   ☐Yes ☐No

   6.1.If yes, what percentage? _____

7. **Have you experienced negative externalities from the industry?**

   ☐Yes ☐No

   7.1.If yes,

   ☐Land Pollution ☐Water Pollution ☐Air Pollution ☐Sound Pollution

8. **Have you experienced any sort of health hazards?**

   ☐Yes ☐No

   8.1.If yes, what kinds of health hazards? _____

   8.2.If yes, is there any compensation mechanism? _____

**9. Does the industry provide cement in subsided price?**

☐Yes ☐No

| **Respondent's Description** | |
|---|---|
| Name (optional): | Gender: ☐ M ☐ F |
| Age: | Address: |
| Number of family members: | |