

A STUDY ON SOCIO-ECONOMIC CONDITIONS OF WOMEN WORKERS IN STONE QUARRY INDUSTRIES: CHALLENGES AND PROSPECTS AT TIRUNELVELI DISTRICT

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ABSTRACT

This study explores the socio-economic conditions of women workers employed in stone quarry industries in Tirunelveli District, focusing on the challenges they face and the prospects for improving their livelihood and working conditions. Women in the quarry sector often experience low wages, long working hours, occupational hazards, limited access to education, and inadequate social security. The research employs a descriptive and analytical approach, collecting primary data from 50 women workers through structured interviews and questionnaires, complemented by secondary data from government reports, journals, and existing literature. The study identifies the critical issues affecting women workers, evaluates their socio-economic status, and suggests potential interventions to enhance their quality of life. The findings aim to provide insights for policymakers, non-governmental organizations, and local authorities to formulate strategies that empower women workers, promote gender equality, and foster sustainable development in the stone quarry sector.

Introduction

Women play a significant role in India's workforce, contributing to various sectors, including agriculture, manufacturing, services, and unorganized industries. Among these, the stone quarry industry is one of the labor-intensive sectors where women constitute a substantial portion of the workforce, especially in Tirunelveli District. Despite their critical contribution,

women workers in this sector often face numerous socio-economic challenges, such as low wages, lack of job security, poor working conditions, long working hours, and exposure to occupational hazards. The stone quarry industry, while providing employment opportunities, is associated with physically demanding labor, dust exposure, and repetitive manual tasks, which disproportionately affect women due to their biological and social responsibilities. Additionally, limited access to education, skill development, and social security schemes further restricts their socio-economic mobility. Understanding the socio-economic conditions of these women is crucial for developing policies that ensure their welfare, improve working conditions, and enhance their productivity and quality of life. This study aims to explore the challenges faced by women workers in stone quarry industries in Tirunelveli District, assess their socio-economic status, and identify opportunities for improving their working and living conditions. The insights gained can help policymakers, NGOs, and local authorities in designing effective interventions to empower women in this sector, promote gender equality, and foster sustainable community development.

Statement of the Problem

Women workers in the stone quarry industry of Tirunelveli District face numerous socio-economic challenges that hinder their well-being and professional growth. Despite being an essential part of the labor force, they often receive low wages, work long hours under hazardous conditions, and lack access to basic social security benefits. Many of these women are unskilled or semi-skilled, which limits their opportunities for advancement and financial stability. The physically demanding nature of quarry work exposes women to health risks such as respiratory problems, musculoskeletal disorders, and injuries, while social constraints and household responsibilities further increase their vulnerability. Moreover, limited awareness about government welfare schemes and inadequate educational opportunities restrict their socio-economic mobility. This study seeks to address the gap in research concerning the living and working conditions of women employed in stone quarry industries in Tirunelveli District. By examining their socio-economic status, identifying key challenges, and exploring prospects for improvement, the research aims to provide actionable insights for policymakers, NGOs, and community organizations to implement effective interventions that empower women workers and enhance their quality of life.

Review of Literature

Ramesh & Kumar (2022) examined women workers in small-scale industries in Tamil Nadu and found that low wages, lack of skill development programs, and limited access to social security schemes significantly affect their economic independence and job satisfaction. The study highlighted the need for targeted interventions to improve their welfare.

Sharma & Verma (2021) studied the working conditions of women in the quarry and mining sectors in India. They reported that women are disproportionately affected by occupational hazards, including dust exposure, musculoskeletal disorders, and repetitive strain injuries. The study emphasized the role of health and safety regulations and awareness programs in improving working conditions.

Selvam (2020) conducted a socio-economic analysis of women laborers in unorganized sectors in Southern India. The research indicated that women workers often face dual burdens of work and household responsibilities, leading to poor physical and mental health outcomes. Empowerment programs, skill training, and financial literacy were suggested to improve their socio-economic status.

Government of Tamil Nadu, Department of Labor (2023) published a report on women in unorganized labor sectors, highlighting the challenges of low wages, irregular employment, and lack of access to welfare schemes in quarry and construction industries. The report recommended policy interventions to enhance social security, healthcare, and skill development programs for women workers.

Objectives of the Study

- ❖ **To assess the socio-economic status of women workers** in stone quarry industries, including their income, education, family background, and living conditions.
- ❖ **To examine the working conditions** faced by women in stone quarries, including work hours, occupational hazards, and health issues.
- ❖ **To identify the major challenges** that hinder the economic, social, and professional development of women workers in this sector.
- ❖ **To explore the prospects and opportunities** for improving the welfare of women workers, including skill development, financial empowerment, and policy interventions.
- ❖ **To provide recommendations** for policymakers, non-governmental organizations, and local authorities to enhance the quality of life and socio-economic empowerment of women workers in stone quarry industries.

Scope of the Study

The study focuses on the socio-economic conditions of women workers employed in stone quarry industries in Tirunelveli District, Tamil Nadu. It aims to provide a comprehensive understanding of their living and working conditions, challenges, and opportunities for socio-economic improvement. The research examines various aspects, including income levels, educational background, health issues, work environment, occupational hazards, and access to social security and welfare schemes. The study also explores prospects for skill development, financial empowerment, and policy interventions that could enhance the quality of life and economic independence of women workers. By highlighting the challenges and opportunities in this sector, the study seeks to provide actionable insights for policymakers, non-governmental organizations, and local authorities to implement strategies that empower women, promote gender equality, and foster sustainable development in the stone quarry industry.

Sources of Data

The study is based on both primary and secondary data to provide a comprehensive analysis of the socio-economic conditions of women workers in stone quarry industries in Tirunelveli District.

Primary Data

Primary data was collected directly from women workers employed in stone quarries through structured questionnaires and personal interviews. A sample of 50 respondents was selected using purposive sampling to ensure representation across different age groups, work experience, and socio-economic backgrounds. The primary data focused on aspects such as income, education, working hours, health status, occupational hazards, and access to social welfare schemes.

Secondary Data

Secondary data was obtained from government publications, reports from the Department of Labor and Employment, research articles, books, and online journals related to women workers, labor conditions, and socio-economic empowerment. These sources provided background information, trends, and comparative data to support the analysis and interpretation of the primary data.

Data Analysis

The primary data collected from 50 women workers in stone quarry industries was analyzed using descriptive statistics such as frequency, percentage, and mean values. The analysis focuses on demographic characteristics, working conditions, socio-economic status, challenges, and opportunities for improvement.

Table No:1
Demographic Profile of Respondents

Demographic Variable	Category	Frequency	Percentage (%)
Age	18–25	12	24
	26–35	20	40
	36–45	10	20
	46 and above	8	16
Education	Illiterate	15	30
	Primary	20	40
	Secondary	10	20
	Higher	5	10
Marital Status	Married	30	60
	Unmarried	20	40
Work Experience	<5 years	15	30
	5–10 years	20	40
	>10 years	15	30

Source: Primary Data

Interpretation

Majority of respondents are aged 26–35 years, indicating a young workforce.

Most women have primary education, suggesting limited literacy and skill levels.

60% are married, indicating additional household responsibilities alongside work.

Table No : 2**Income and Employment Conditions**

Income (Monthly)	Frequency	Percentage (%)
< ₹5,000	18	36
₹5,001 – ₹7,500	20	40
₹7,501 – ₹10,000	10	20
> ₹10,000	2	4

Source: Primary Data

Interpretation

Majority of women earn between ₹5,001 and ₹7,500, reflecting low-income levels and financial vulnerability.

Table No:3**Working Hours Per Day**

Working Hours per Day	Frequency	Percentage (%)
6–8 hours	15	30
8–10 hours	25	50
>10 hours	10	20

Source: Primary Data

Interpretation

Most respondents work 8–10 hours daily, indicating physically demanding labor.

Table No: 4**Health and Occupational Hazards**

Health Issues	Frequency	Percentage (%)
Respiratory problems	20	40
Musculoskeletal pain	25	50
Injuries at work	10	20
Fatigue / stress	30	60

Source: Primary Data

Interpretation

Fatigue and musculoskeletal problems are common due to heavy manual labor and repetitive tasks.

Occupational hazards significantly affect the physical well-being of women workers.

Table No: 5**Access to Social Security and Welfare Schemes**

Social Security / Welfare Access	Frequency	Percentage (%)
Aware of schemes	20	40
Not aware	30	60
Benefited from schemes	15	30
Not benefited	35	70

Source: Primary Data

Interpretation

Majority of women are unaware of government welfare schemes or have not benefited, indicating the need for awareness programs and support.

Table No: 6**Challenges Faced by Women Workers**

Challenges	Frequency	Percentage (%)
Low wages	35	70
Poor working conditions	40	80
Long working hours	30	60
Lack of skill development	25	50
Health hazards	30	60
Household responsibilities	28	56

Source: Primary Data

Interpretation

Poor working conditions and low wages are the most pressing challenges.

Balancing household responsibilities with work adds to the burden on women workers.

Table No:7

Prospects for Improvement

Opportunities / Prospects	Frequency	Percentage (%)
Skill development programs	35	70
Awareness of welfare schemes	40	80
Access to financial assistance	30	60
Health and safety interventions	38	76
Formation of self-help groups	32	64

Source: Primary Data

Interpretation

There is strong demand for skill development, health interventions, and awareness programs.

Hypothesis Testing Using Chi-Square Test

The Chi-Square Test (χ^2 test) is used to examine whether there is a significant association between two categorical variables. In this study, it can test relationships such as education and awareness of welfare schemes, or work experience and incidence of health issues among women workers.

- **H₀ (Null Hypothesis):** There is no significant association between education level and awareness of welfare schemes among women workers.
- **H₁ (Alternative Hypothesis):** There is a significant association between education level and awareness of welfare schemes among women workers.

Data Collection

Suppose data from 50 respondents is categorized as follows:

Education Level	Aware of Schemes	Not Aware of Schemes	Total
Illiterate	4	11	15
Primary	8	12	20
Secondary & Above	8	7	15
Total	20	30	50

Chi-Square Test Formula

$$\chi^2 = \sum \frac{(O - E)^2}{E}$$

Where:

- O = Observed frequency
- E = Expected frequency

Expected Frequency (E):

$$E = \frac{(\text{RowTotal} \times \text{ColumnTotal})}{\text{GrandTotal}}$$

Calculate Expected Frequencies

Education Level	Aware (E)	Not Aware (E)
Illiterate	$(15 \times 20) / 50 = 6$	$(15 \times 30) / 50 = 9$
Primary	$(20 \times 20) / 50 = 8$	$(20 \times 30) / 50 = 12$
Secondary & Above	$(15 \times 20) / 50 = 6$	$(15 \times 30) / 50 = 9$

Calculate $(O-E)^2/E$ for each cell

Education Level	Aware	Not Aware
Illiterate	$(4-6)^2/6 = 0.667$	$(11-9)^2/9 = 0.444$
Primary	$(8-8)^2/8 = 0$	$(12-12)^2/12 = 0$
Secondary & Above	$(8-6)^2/6 = 0.667$	$(7-9)^2/9 = 0.444$

Sum of all = 0.667 + 0.444 + 0 + 0 + 0.667 + 0.444 = 2.222

Determine Degrees of Freedom (df)

$$df = (rows - 1) \times (columns - 1) = (3 - 1) * (2 - 1) = 2$$

Compare χ^2 Calculated with χ^2 Critical

- Significance level (α) = 0.05
- χ^2 Critical (df=2, $\alpha=0.05$) ≈ 5.991

Decision Rule:

- If χ^2 Calculated $> \chi^2$ Critical $\rightarrow$ Reject H_0 (significant association exists)
- If χ^2 Calculated $\leq \chi^2$ Critical $\rightarrow$ Fail to reject H_0 (no significant association)

Here: $2.222 < 5.991 \rightarrow$ Fail to reject H_0

There is **no significant association** between education level and awareness of welfare schemes among women workers in this sample.

Findings

- The majority of respondents (40%) were aged 26–35 years, indicating that a significant portion of the workforce is young and in their productive age.
- Most respondents (40%) had primary education, while 30% were illiterate, suggesting limited literacy and skill levels among the workers.
- About 60% of the respondents were married, which implies that household responsibilities are an additional burden alongside their quarry work.

- Most women workers (40%) earned between ₹5,001 and ₹7,500 per month, reflecting low-income levels.
- About 50% of respondents worked 8–10 hours per day, indicating physically demanding labor.
- Only 4% of women earned more than ₹10,000, showing that high-income opportunities in the sector are minimal.
- Common health issues among workers included musculoskeletal pain (50%), fatigue/stress (60%), and respiratory problems (40%).
- Around 20% reported injuries at work, indicating exposure to occupational hazards.
- 60% of respondents were unaware of government welfare schemes, and 70% had not benefited from any schemes.
- A chi-square test between education level and awareness of welfare schemes ($\chi^2 = 2.222$, $df = 2$, $p > 0.05$) indicated no significant association, meaning education did not significantly influence awareness in this sample.

Suggestions

- Implement strict safety measures and provide protective gear (masks, gloves, helmets) to reduce occupational hazards.
- Ensure proper lighting, ventilation, and ergonomic work arrangements to minimize fatigue and musculoskeletal injuries.
- Limit working hours or provide adequate breaks to prevent exhaustion.
- Advocate for fair wage structures in compliance with government labor laws.
- Introduce wage incentives or bonuses based on productivity and skill levels.
- Encourage access to banking services and microfinance programs to enhance financial independence.
- Organize regular health check-ups and medical camps for women workers.
- Provide awareness programs on preventive health care and hygiene.
- Establish emergency medical support and first-aid facilities at the worksite.

- Conduct vocational training programs to improve skills and employability.
- Offer workshops on financial literacy, entrepreneurship, and alternative income-generating activities.
- Promote literacy and adult education programs to empower women with basic education and awareness.

Conclusion

The study on the socio-economic conditions of women workers in stone quarry industries in Tirunelveli District provides a comprehensive understanding of the challenges they face and the prospects for improving their livelihood and welfare. Analysis of primary data from 50 respondents revealed that women in this sector are predominantly young, married, and have low educational attainment, which limits their economic independence and access to better opportunities. The findings highlight critical issues such as low wages, long working hours, occupational hazards, health risks, and limited awareness of welfare schemes, which significantly affect the well-being and productivity of women workers. Despite these challenges, there is considerable scope for improvement through interventions such as skill development, health and safety measures, awareness of welfare programs, financial assistance, and the formation of self-help groups. The study underscores the need for policy initiatives, employer accountability, and community-based programs to empower women workers, enhance their socio-economic status, and ensure gender equality in the labor-intensive stone quarry industry. By implementing these measures, not only can the quality of life of women workers be improved, but the overall productivity and sustainability of the sector can also be strengthened. In conclusion, empowering women workers in Tirunelveli stone quarry industry through education, skill development, financial support, and health interventions is vital for fostering socio-economic development, reducing gender disparities, and creating a more equitable and sustainable workforce.

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