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Women Salt-Pan Workers in Selected Districts of Tamil Nadu: Occupational Risks, Economic Vulnerability and Livelihood Security

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Abstract

Salt-pan work provides an important source of employment and household income for women in coastal districts of Tamil Nadu. However, the work involves occupational exposure, seasonal employment and economic insecurity, which may affect workers' health, income and livelihood security. This study examines the occupational risks, economic vulnerability and livelihood security of women salt-pan workers in selected districts of Tamil Nadu. The study is based on primary data collected from 150 women salt-pan workers, with 50 respondents each from Thoothukudi, Nagapattinam and Ramanathapuram districts. The study examines occupational exposure, health-related work consequences, income conditions, medical expenditure, savings, indebtedness, financial stress, social protection and alternative livelihood opportunities. The analysis considers occupational risks and economic vulnerability as interconnected factors influencing household livelihood security. The study highlights that the economic benefits of salt-pan employment cannot be assessed only through wages, as health-related costs, loss of working days, unstable income and limited livelihood alternatives may affect the effective economic return from employment. The study suggests the importance of strengthening occupational safety, social protection, financial inclusion and livelihood diversification for improving the economic security of women salt-pan workers. The findings provide an economic perspective for developing policies that support safer and more sustainable employment in the salt sector.

Introduction

Salt production is an important traditional economic activity in India, particularly in coastal regions. It provides employment and income to rural households where alternative livelihood opportunities may be limited. Salt-pan production is labour-intensive and involves activities such as preparation of salt beds, brine management, crystallisation, harvesting and transportation. Women participate actively in these activities and contribute to household income. However, the work is often seasonal and physically demanding, with exposure to heat, sunlight and saline conditions (Amutha, D. 2021).

From an economic perspective, employment provides income but may also involve occupational costs. Poor working conditions can affect health, reduce working capacity and result in loss of working days and earnings. Human capital theory recognises health as an important component of productive capacity because poor health can

reduce labour supply and economic productivity (Grossman, 1972). Thus, occupational health among salt-pan workers has implications not only for individual welfare but also for household income and livelihood security.

Women workers may face additional economic vulnerability because their employment income is often combined with household responsibilities. Occupational illness or injury can create both direct and indirect costs through medical expenditure, wage loss and reduced savings. The World Health Organization (2010) notes that occupational health risks can have wider social and economic consequences, particularly for workers in vulnerable employment. Similarly, the International Labour Organization (2019) identifies excessive heat exposure as an important concern for workers' health, productivity and working capacity.

The economic position of workers also depends on the quality and security of employment. Decent work includes productive employment, adequate earnings, social protection and safe working conditions (ILO, 2015). For women salt-pan workers, these dimensions are particularly relevant because seasonal employment, limited social protection and restricted livelihood alternatives may increase household vulnerability (Amutha, D. 2024). The concept of sustainable livelihoods further emphasises the importance of income, assets, capabilities and the ability of households to withstand economic shocks (Chambers & Conway, 1992).

Tamil Nadu has an important salt-producing sector, with coastal districts providing employment to thousands of workers. However, local environmental, occupational and economic conditions may differ across districts. Examining these differences is useful for understanding the livelihood position of women workers in the salt industry. Studies on informal and vulnerable employment also show that workers with limited employment security may face greater difficulties in managing income fluctuations and social risks (ILO, 2018).

The present study therefore considers occupational risk, economic vulnerability and livelihood security as interconnected dimensions. Occupational exposure may affect health and working capacity; reduced working capacity may result in income loss; and medical expenditure and unstable earnings may reduce savings or increase indebtedness (Amutha, D. 2022). This relationship can be represented as: Occupational Risks → Health and Work

Consequences → Economic Vulnerability → Livelihood Security.

The study focuses on 150 women salt-pan workers, with 50 respondents each from Thoothukudi, Nagapattinam and Ramanathapuram districts of Tamil Nadu. Primary data are used to examine occupational conditions, health-related work consequences, income, medical expenditure, savings, indebtedness, financial stress, social protection and alternative livelihood opportunities.

The study contributes to the economic literature by examining women's salt-pan employment beyond wages alone. It considers how occupational conditions and health-related costs may influence household economic security. Understanding these relationships can provide useful evidence for policies concerning occupational safety, social protection, financial inclusion, fair employment conditions and livelihood diversification.

Objectives of the Study

The study has the following objectives:

1. To examine the socio-economic profile of women salt-pan workers in the selected districts of Tamil Nadu.
2. To assess the major occupational risks faced by women salt-pan workers.
3. To examine the occupational health problems experienced by women salt-pan workers.
4. To analyse the economic vulnerability of women salt-pan workers in terms of income, working days, medical expenditure and indebtedness.
5. To assess the level of livelihood security among women salt-pan workers.
6. To examine the relationship between occupational risks, economic vulnerability and livelihood security.
7. To compare occupational risks, economic vulnerability and livelihood security among women salt-pan workers in Thoothukudi, Nagapattinam and Ramanathapuram districts.
8. To identify the major factors influencing the economic vulnerability and livelihood security of women salt-pan workers.
9. To suggest suitable measures for improving occupational safety, economic security and livelihood opportunities among women salt-pan workers.

Research Methodology

1. Research Design

The study adopts a descriptive and analytical research design. It examines the occupational risks, economic vulnerability and livelihood security of women salt-pan workers.

2. Sample Size

The study covers 150 women salt-pan workers from three selected districts of Tamil Nadu such as Thoothukudi, Ramanathapuram, and Nagapattinam. The sample includes 50 respondents from each district.

3. Sampling Method

Purposive sampling is used to select women who are engaged in salt-pan work in the selected districts.

4. Sources of Data

The study is based mainly on primary data collected from women salt-pan workers through a structured questionnaire. Secondary sources are used only to support the literature and conceptual discussion.

5. Statistical Tools

The following statistical tools are used for the analysis:

- Percentage analysis
- Mean
- Standard deviation
- Cronbach's alpha
- Chi-square test
- Pearson correlation
- Multiple regression
- ANOVA.

The analysis focuses on three major dimensions: occupational risks, economic vulnerability and livelihood security.

6. Study Variables

The study examines occupational risks such as heat exposure, physical workload, salt exposure, working hours and workplace safety. Economic vulnerability includes income insecurity, medical expenditure, savings, indebtedness and financial stress. Livelihood security includes employment security, social protection, financial inclusion and alternative livelihood opportunities.

7. Ethical Consideration

The respondents are informed about the purpose of the study. The information collected is used only for academic purposes and the identity of the respondents is kept confidential.

Results and Discussion

The following section presents the analysis of 150 women salt-pan workers from Thoothukudi, Nagapattinam and Ramanathapuram districts. The results examine their socio-economic characteristics, occupational risks, health problems, economic vulnerability and livelihood security.

Table 1. Socio-Economic Profile of the Respondents

Particulars	Category	Frequency	Percentage
Age	Below 25	10	6.7
	25–34	38	25.3
	35–44	45	30.0
	45–54	32	21.3
	55 and above	25	16.7
Education	Illiterate	26	17.3
	Primary	42	28.0
	Middle	35	23.3
	Secondary	34	22.7
	Higher Secondary and above	13	8.7
Marital Status	Unmarried	14	9.3
	Married	109	72.7
	Widowed	22	14.7
	Divorced/Separated	5	3.3
Total		**150**	**100.0**

Source: Primary Data (n=150).

Table 1 shows the socio-economic profile of the respondents. The largest age group is 35–44 years, accounting for 30.0 per cent. Married women constitute 72.7 per cent of the respondents. Regarding education, 28.0 per cent have primary education, while 17.3 per cent are illiterate. The profile indicates that salt-pan work is an important livelihood activity among women with relatively limited educational opportunities.

Table 2. Occupational Characteristics of the Respondents

Particulars	Category	Frequency	Percentage
Experience in salt-pan work	Below 5 years	20	13.3
	5–10 years	36	24.0
	11–20 years	46	30.7
	21–30 years	25	16.7
	Above 30 years	23	15.3
Nature of employment	Seasonal	81	54.0
	Daily wage	53	35.3
	Contract	16	10.7
Working days per month	Below 10	24	16.0
	10–15	36	24.0
	16–20	48	32.0
	21–25	31	20.7
	Above 25	11	7.3
Total		**150**	**100.0**

Source: Primary Data (n=150).

Table 2 indicates that 30.7 per cent of the respondents have 11–20 years of experience in salt-pan work. More than half of the respondents are engaged in seasonal employment. Only 7.3 per cent report more than 25 working days per month. This pattern indicates the importance of employment continuity and working-day availability for the income security of salt-pan workers.

Table 3. Occupational Risks of Women Salt-Pan Workers

Occupational Risk	Mean	SD
Exposure to intense heat and sunlight	2.85	0.89
Prolonged standing and walking	2.84	0.90
Physical workload	3.03	0.92
Exposure to salt and saline water	2.97	0.97
Long working hours	2.91	0.94
Lack of protective equipment	2.94	0.84
Workplace safety risks	2.95	0.97
Seasonal employment	2.89	0.89
Weather-related work interruptions	2.91	0.95
Other occupational difficulties	2.93	0.92
Overall Occupational Risk	**2.92**	**0.92**

Source: Computed from Primary Data

Table 3 presents the occupational risks experienced by the respondents. Physical workload records the highest mean score of 3.03, followed by exposure to salt and saline water with a mean of 2.97. The overall mean score of 2.92 indicates a moderate level of perceived occupational risk in the sample.

Table 4. Occupational Health Problems

Health Problem	Frequency	Percentage
Skin problems	7	4.7
Eye problems	10	6.7
Body pain	33	22.0
Back/joint pain	20	13.3
Leg/foot pain	5	3.3
Headache	17	11.3
Fatigue	34	22.7
Dehydration	16	10.7
Other problems	8	5.3
Total	**150**	**100.0**

Source: Primary Data

Table 4 shows that fatigue is the most frequently reported health problem, accounting for 22.7 per cent, followed by body pain at 22.0 per cent. Back and joint

pain accounts for 13.3 per cent. These conditions may affect working capacity and may result in additional medical expenditure or loss of working days.

Table 5. Economic Vulnerability of Women Salt-Pan Workers

Statement	Mean	SD
Seasonal work creates income insecurity	2.95	0.93
Loss of working days reduces household income	3.01	0.94
Occupational health problems increase medical expenditure	3.00	0.98
Medical expenditure creates financial pressure	2.99	1.01
Salt-pan work provides regular savings	2.96	0.94
Household indebtedness creates financial pressure	3.04	0.93
Irregular income creates financial stress	3.02	0.96
Overall Economic Vulnerability	**3.00**	**0.96**

Source: Computed from Primary Data

Table 5 indicates that household indebtedness records the highest mean score of 3.04. Loss of working days also has a relatively high mean score of 3.01. The overall mean of 3.00 indicates a moderate level of economic vulnerability in the sample.

Table 6. Livelihood Security of Women Salt-Pan Workers

Statement	Mean	SD
I have employment security	2.96	1.02
I have access to social-security benefits	2.93	0.94
I have access to formal financial services	3.01	0.93
I have alternative livelihood opportunities	3.04	0.95
I feel economically secure about the future	3.00	0.94
My present livelihood provides reasonable family security	3.02	1.01
Overall Livelihood Security	**2.99**	**0.97**

Source: Computed from Primary Data

Table 6 shows that alternative livelihood opportunities record the highest mean score of 3.04. Access to social-security benefits records a mean of 2.93. The overall mean score of 2.99 suggests a moderate level of perceived livelihood security.

Table 7. Reliability Analysis

Construct	No. of Items	Cronbach's Alpha
Occupational Risk	10	0.913
Economic Vulnerability	6	0.896
Livelihood Security	6	0.876

Source: Computed from Primary Data

Table 7 indicates satisfactory internal consistency among the three constructs. The Cronbach's alpha values range from 0.876 to 0.913. All the values are above the commonly

accepted level of 0.70, indicating good internal consistency of the scales.

Table 8. Correlation between Major Study Variables

Variables	Occupational Risk	Economic Vulnerability	Livelihood Security
Occupational Risk	1.000	0.383**	-0.217**
Economic Vulnerability	0.383**	1.000	-0.333**
Livelihood Security	-0.217**	-0.333**	1.000

Note: Correlation is significant at the 0.01 level (2-tailed).

Source: Computed from Primary Data.

Table 8 shows a positive relationship between occupational risk and economic vulnerability (r = 0.383). This suggests that higher occupational risk is associated with greater economic vulnerability in the sample. Occupational risk has a negative relationship with livelihood security (r = -0.217). Economic vulnerability also has a negative relationship with livelihood security (r = -0.333). Thus, the results indicate that greater economic vulnerability is associated with lower livelihood security.

Table 9. District-wise Comparison of Major Variables

Variable	Thoothukudi Mean	Nagapattinam Mean	Ramanathapuram Mean	F-value	p-value
Occupational Risk	3.01	2.77	2.99	1.959	0.145
Economic Vulnerability	3.03	2.92	3.03	0.324	0.724
Livelihood Security	2.87	3.05	3.06	0.992	0.373

Source: Computed from Primary Data.

Table 9 compares the three districts. The results show some differences in mean scores across districts. However, the p-values are above 0.05 for all three variables. Therefore, the district-wise differences are not statistically significant in this analysis.

Table 10. Regression Analysis: Determinants of Economic Vulnerability

Dependent Variable: Economic Vulnerability

Independent Variables	Beta (β)	t-value	p-value
Occupational Risk	0.235	3.658	<0.001
Loss of Working Days	0.215	4.180	<0.001

Medical Expenditure	0.228	4.720	<0.001
Indebtedness	0.249	4.966	<0.001
R^2	**0.568**		
Adjusted R^2	**0.556**		
F-value	**47.726**		
p-value	**<0.001**		

Source: Computed from Primary Data

Table 10 indicates that the regression model is statistically significant in the analysis. The R^2 value of 0.568 indicates that approximately 56.8 per cent of the variation in economic vulnerability is explained by the variables included in the model.

Indebtedness has the largest standardized beta coefficient (β = 0.249), followed by occupational risk (β = 0.235). Loss of working days and medical expenditure also show positive and statistically significant relationships with economic vulnerability.

Table 11. Regression Analysis: Determinants of Livelihood Security

Dependent Variable: Livelihood Security

Independent Variables	**Beta (β)**	**t-value**	**p-value**
Occupational Risk	-0.011	-0.176	0.861
Economic Vulnerability	-0.148	-2.606	0.010
Social-Security Access	0.291	6.360	<0.001
Alternative Livelihood Opportunities	0.370	8.905	<0.001
R^2	**0.604**		
Adjusted R^2	**0.593**		
F-value	**55.394**		
p-value	**<0.001**		

Source: Computed from Primary Data

Table 11 shows that the regression model is statistically significant in the analysis. The R^2 value of 0.604 indicates that approximately 60.4 per cent of the variation in livelihood security is explained by the selected variables.

Alternative livelihood opportunities have the highest positive coefficient (β = 0.370), followed by social-security access (β = 0.291). Economic vulnerability has a negative coefficient (β = -0.148). This indicates that higher economic vulnerability is associated with lower livelihood security, while access to alternative livelihood opportunities and social protection is associated with higher livelihood security.

Major Findings

The analysis produces the following findings:

1. The largest age group is 35–44 years, accounting for 30.0 per cent of the respondents.
2. Married women constitute 72.7 per cent of the sample.
3. More than half of the respondents are engaged in seasonal employment.
4. The largest proportion of respondents have 11–20 years of experience in salt-pan work.
5. Physical workload records the highest mean score among the occupational-risk indicators.
6. Fatigue and body pain are the most frequently reported health problems in the data.
7. Economic vulnerability records an overall mean of 3.00.
8. Indebtedness records the highest mean among the economic vulnerability indicators.
9. Livelihood security records an overall mean of 2.99.
10. Occupational risk has a positive relationship with economic vulnerability.
11. Occupational risk and economic vulnerability have negative relationships with livelihood security.
12. The district-wise ANOVA does not show statistically significant differences among the three districts.
13. The economic vulnerability regression model explains 56.8 per cent of the variation in the dependent variable.
14. The livelihood security regression model explains 60.4 per cent of the variation.
15. Alternative livelihood opportunities and social-security access show positive associations with livelihood security in the regression model.

Conclusion

The findings indicate that salt-pan employment provides an important livelihood source but may also expose women workers to occupational and economic risks. Physical workload, prolonged exposure to difficult working conditions and employment seasonality can influence the continuity of earnings.

The relationship between occupational risk and economic vulnerability is particularly relevant from an economic perspective. Health problems may lead to medical expenditure and loss of working days. When working days are lost, the worker may experience a reduction in earnings. If the

household has limited savings, additional expenditure may increase financial pressure.

The negative association between economic vulnerability and livelihood security highlights the importance of stable income and financial protection. Employment alone may not guarantee livelihood security when income is irregular and households face health expenditure or indebtedness.

The regression results also indicate the importance of alternative livelihood opportunities and social protection. Diversification of household income sources may help reduce dependence on seasonal salt-pan employment. Access to social-security measures may also strengthen the ability of workers and their households to manage economic shocks.

Overall, the analysis supports an integrated economic perspective in which occupational conditions, health, income and livelihood security are interconnected.

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