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Economic Participation and Social Vulnerabilities among Informal Sector Women Workers in Alappuzha

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Abstract

Women constitute a substantial segment of the workforce in the informal economy of Alappuzha district, particularly in fishing-related activities, coir production, and casual labour. Their labour contributes significantly to household income and local economic development, yet their participation remains embedded within conditions of economic insecurity, occupational vulnerability, and limited social protection. This study examines the patterns of economic participation and the multidimensional social vulnerabilities experienced by women workers in these sectors. Employing a mixed-method approach, the study analyses data collected from 300 women workers selected from fishing, coir, and casual labour sectors across Alappuzha district. The analysis focuses on employment characteristics, income patterns, financial inclusion, occupational hazards, health conditions, social security coverage, and household decision-making. The study argues that while women's participation in informal economic activities has increased, structural constraints continue to limit their economic security and social empowerment. The findings highlight the need for targeted interventions in labour welfare, health protection, financial inclusion, skill enhancement, and social security provisioning for women workers in the informal economy.

Keywords: Women workers; Informal economy; Economic participation; Social vulnerability; Coir industry; Fishing sector; Alappuzha

Introduction

The quality of the workforce and the extent of labour force participation remain central to economic development and social well-being. Kerala's development trajectory, widely recognised for its achievements in literacy, education, healthcare and other social indicators, presents an important paradox: despite these advances, women's participation in the labour market continues to be concentrated largely within the informal economy, where employment is often insecure, poorly remunerated and inadequately protected [1-3]. Studies on informal labour consistently show that irregular employment, wage disparities, limited skill development, occupational insecurity and weak welfare support continue to constrain women's economic advancement [4,5]. Similar concerns have been documented in Kerala's traditional industries, where technological change, labour restructuring and limited institutional support have reshaped women's employment without eliminating long-standing forms of vulnerability [6-10]. Alappuzha provides a particularly suitable setting for examining these issues because its economy continues to depend on fisheries, coir production and a wide range of informal occupations sustained by women's labour. Women are actively engaged in fish processing, vending and marketing, coir production activities such as fibre extraction, spinning and weaving, as well as casual wage employment, making a substantial contribution to household livelihoods and local production systems. Yet these sectors continue to be characterised by occupational hazards, seasonal employment, limited social protection and constrained livelihood opportunities, even as industrial and environmental changes reshape traditional patterns

of work [11-20]. This context makes Alappuzha an appropriate case for examining how economic participation intersects with social vulnerability among women employed in Kerala's informal economy. Although women play an indispensable role in Alappuzha's fishing, coir and casual labour sectors, their work continues to be shaped by multiple and overlapping forms of vulnerability. Irregular earnings, seasonal employment, occupational hazards, health problems, indebtedness, limited access to institutional credit and inadequate social security remain common features of their working lives. Many women are concentrated in low-paid segments of production with few opportunities for skill development, occupational mobility or asset creation. Sector-specific risks further intensify these challenges, including exposure to harsh weather in fisheries, physically demanding and respiratory-intensive work in coir production, and insecure employment conditions in casual labour [11-20]. These conditions raise an important question: to what extent does participation in informal employment translate into genuine economic empowerment when structural disadvantages continue to shape women's livelihoods? While earlier research has provided valuable insights into particular occupations and employment patterns, comparatively little attention has been given to examining economic participation alongside occupational risks, financial security, savings, access to credit and broader socio-economic conditions across multiple informal sectors within a common regional context [1-5,16,17]. Addressing this gap, the present study investigates the socio-economic conditions of women engaged in fishing, coir production and casual labour in Alappuzha by analysing income, savings, asset ownership, credit access, occupational hazards and health-related challenges alongside other dimensions of economic empowerment. The findings are expected to contribute to debates on gender and informal labour while providing evidence to support labour welfare, livelihood security, occupational safety, financial inclusion and social protection initiatives for women workers in Kerala.

Review of Literature and Theoretical Underpinning

Women's economic participation has emerged as a central concern in development, gender and labour studies, with growing recognition that employment alone provides only a partial understanding of women's socio-economic position. Beyond labour force participation, attention has increasingly shifted towards access to resources, decision-making power, working conditions and the structural constraints that shape everyday livelihoods. In this context, Agarwal argues that women's bargaining power within households and communities depends largely on their access to economic resources, employment and social support, while Kabeer views empowerment as the expansion of women's ability to make meaningful life choices through the interaction of resources, agency and achievements. Duflo similarly emphasises the mutually reinforcing relationship between women's empowerment and economic development but cautions that employment and economic growth alone cannot dismantle entrenched social norms and institutional barriers. These perspectives are particularly relevant to informal labour markets, where women often remain confined to insecure, poorly paid work with limited social protection despite their substantial economic contribution. Evidence from different sectors consistently reflects this gap between economic participation and economic security. Studies of women in the informal economy report that irregular employment, low wages, inadequate welfare benefits, wage discrimination and restricted access to skill development continue to constrain livelihood opportunities [4,5]. Comparable patterns are evident in fisheries, where livelihood insecurity is shaped not only by income but also by seasonality, environmental uncertainty, occupational risks and unstable markets [11]. Research from Kerala shows that fisherwomen make significant contributions to household economies through processing, marketing and related activities, yet remain disadvantaged in access to productive assets, institutional support and decision-making [12,13]. while recent studies from Alappuzha point to changing market conditions and emerging forms of livelihood vulnerability [16,17]. Similar concerns are reported in Kerala's coir industry, where women dominate production activities but continue to face low wages, financial insecurity and difficult living conditions, highlighting the continuing need for stronger welfare measures and institutional support [14]. Research on women workers in Kerala's traditional industries increasingly demonstrates that economic participation is closely intertwined with occupational health, technological change and labour market restructuring. Studies of the coir industry identify musculoskeletal disorders, respiratory illnesses and persistent physical strain as common consequences of labour-intensive production processes, highlighting that employment often carries substantial health costs that remain invisible in conventional assessments of economic well-being [15]. The growing body of research on mechanisation further shows that technological modernisation has improved productivity and strengthened export competitiveness while simultaneously displacing labour and increasing the demand for new skills [6]. Similar conclusions are reached by Pratheesh and Nair, Pratheesh, Pratheesh, Pratheesh, and Pratheesh et al., who argue that technological transformation has fundamentally altered employment relations in the coir sector by creating new opportunities alongside greater livelihood insecurity, work alienation and labour displacement. Recent historical analyses also demonstrate that these changes are part of a broader process of

industrial restructuring that continues to reshape labour relations and traditional production systems in Alappuzha [18-21].

The wider literature on Alappuzha likewise emphasises that industrial change, labour vulnerability and social exclusion are closely interconnected. Although traditional sectors continue to sustain a large share of local livelihoods,informal employment remains characterised by weak social protection, insecure work and limited institutional safeguards [9,10,21,22]. Studies on coastal communities further show that changing market conditions and socio-cultural transformations have reshaped women's roles while generating new forms of livelihood uncertainty [16,23]. Parallel evidence from the coir sector points to the persistence of low wages, insecure employment and inadequate welfare support despite the industry's continued economic importance [14,18-20]. Together, these studies suggest that structural vulnerability remains a defining feature of women's work in Kerala's informal economy rather than a temporary consequence of economic transition. Recent scholarship has further broadened this perspective by linking labour, environmental change, cultural heritage, digital empowerment and subaltern knowledge systems, demonstrating that women's livelihoods in Alappuzha are shaped by wider ecological, historical and socio-economic transformations [18-20],[9,24,25,21]. The present study is informed by the empowerment perspectives of Agarwal, Kabeer and Duflo, while also drawing upon vulnerability-based approaches that emphasise the influence of occupational risks, employment insecurity, health hazards and institutional exclusion on workers' well-being. Viewed together, these perspectives underline that empowerment depends not merely on labour force participation but on whether employment expands women's access to resources, strengthens decision-making capacity and improves livelihood security. Although previous research has generated valuable insights into fisheries, coir production and other informal occupations, most studies have examined these sectors independently or focused on a single dimension of women's experiences. Comparative evidence integrating economic participation, occupational hazards, financial security and social vulnerability across multiple informal sectors within the same regional setting remains limited. By examining women engaged in fishing, coir production and casual labour in Alappuzha, the present study addresses this gap and offers a more comprehensive understanding of how economic participation and social vulnerability intersect within Kerala's informal economy [26].

Methodology

This investigation employs a mixed-method research design to examine the socio-economic conditions of women engaged in fishing, coir production and casual labour in Alappuzha district, Kerala. Quantitative evidence is combined with qualitative insights to capture both measurable aspects of economic participation and the everyday realities associated with occupational vulnerability, workplace risks and socio-economic well-being. Since women's experiences in the informal economy extend beyond income and employment status, the integration of both approaches provides a broader understanding of the social, economic and institutional conditions shaping their livelihoods. Alappuzha was selected because of its long association with labour-intensive occupations and its large concentration of women employed in fisheries, coir production and casual wage work. The district continues to depend substantially on these sectors, making it an appropriate setting for examining the relationship between economic participation and social vulnerability. The research focuses on women involved in fish processing, fish marketing, coir-related occupations and different forms of casual wage labour. The enquiry is situated within the broader concern that, despite women's substantial contribution to household income and local production, irregular employment, occupational hazards, inadequate social protection, limited access to productive resources and restricted opportunities for economic advancement continue to affect their lives. Primary information was obtained through a structured interview schedule administered directly to 300 women workers selected using proportionate sampling to ensure adequate representation from the fishing, coir and casual labour sectors. The sample size was considered sufficient to capture variations in socio-economic characteristics and occupational experiences across the three occupational groups. The interview schedule collected information on demographic characteristics, employment patterns, income, savings behaviour, access to credit, asset ownership, occupational hazards, health conditions and other socio-economic factors associated with economic empowerment and vulnerability. Secondary information was compiled from books, scholarly journals, government reports, labour statistics, welfare board publications and earlier studies relating to women workers, fisheries, coir production and the informal economy. The investigation was undertaken with two objectives: (i) to evaluate the economic empowerment of women employed in the fishing, coir and casual labour sectors, and (ii) to identify work hazards, health risks, saving patterns and socio-economic factors influencing their empowerment. To examine these issues, four sets of hypotheses were formulated: H01: There is no significant relationship between age and the socio-economic condition of women workers; H11: There is a significant relationship between age and the socio-economic condition of women workers; H02: There is no significant relationship between age and the problems faced by women workers; H12: There is a significant relationship between age and the problems faced by women workers; H03: There is no significant relationship between traditional occupation

and financial problems among women workers; H13: There is a significant relationship between traditional occupation and financial problems among women workers; H04: There is no significant relationship between the number of employed family members and the problems faced by women workers; H14: There is a significant relationship between the number of employed family members and the problems faced by women workers. The empirical analysis covers major dimensions of economic participation and social vulnerability, including income, savings behaviour, access to credit, ownership of assets, occupational risks, workplace hazards, health conditions and household socio-economic circumstances. Data were coded, classified and analysed using appropriate statistical techniques. Percentages, averages and frequency distributions were employed to describe the socio-economic profile of respondents, while inferential techniques, including Analysis of Variance (ANOVA) and other relevant statistical tests, were used to examine associations among variables and test the hypotheses. Qualitative evidence gathered during field interactions complemented the statistical analysis by providing contextual explanations for the observed patterns, resulting in a more comprehensive understanding of the opportunities, constraints and vulnerabilities experienced by women workers in Alappuzha's informal economy.

Demographic Profile of Women Workers

Understanding the demographic characteristics of women workers is essential for analysing patterns of economic participation and the nature of social vulnerabilities within the informal economy. Demographic variables such as age, educational attainment, marital status, and family size significantly influence labour force participation, earning opportunities, occupational mobility, access to resources, and exposure to socio-economic risks. In labour-intensive sectors such as fishing, coir production, and casual labour, these factors shape both the capacity of women to engage in income-generating activities and their ability to cope with economic uncertainties (Table-1).

Women workers across the fishing, coir and casual labour sectors are predominantly concentrated in the economically active age group of 31–45 years, accounting for 40 per cent of respondents in the fishing and casual labour sectors and 45 per cent in the coir sector. The dominance of this age group reflects the continued dependence of working-age women on informal employment to meet household responsibilities and sustain family incomes. Younger women are less represented in coir work, possibly indicating changing educational aspirations and occupational preferences, while the continued participation of older women points to the limited availability of alternative employment outside traditional occupations. Educational attainment varies across sectors. Secondary education is the most common qualification among fishing and casual labour workers (40% each), whereas coir workers exhibit comparatively higher educational levels, with 25 per cent completing higher secondary education and 20 per cent holding graduate degrees. Although lower levels of illiteracy among coir workers suggest gradual improvements in educational access, most respondents remain within lower and middle levels of education, limiting opportunities for upward occupational mobility and entry into formal employment (Figure 1).

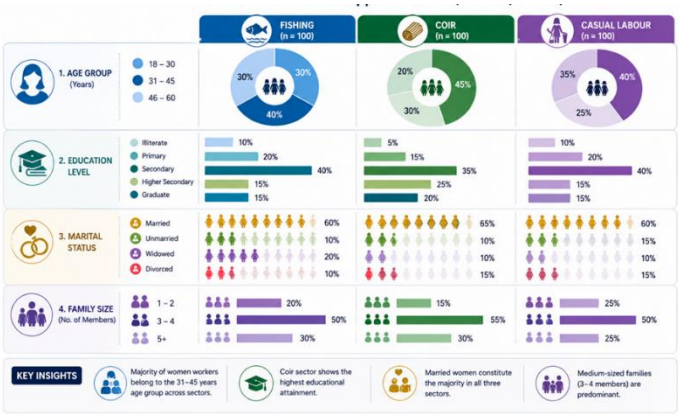


Figure 1: *Socio-demographic Profile of Women Workers in Fishing, Coir and Casual Labour Sectors in Alappuzha District, Kerala (N = 300).*

Source: *Authors' illustration (AI-assisted) based on primary survey data collected from women workers in Alappuzha District, Kerala (2024–2025).*

Married women constitute the majority of the workforce in all three sectors, representing 60 per cent of respondents in the fishing and casual labour sectors and 65 per cent in the coir sector, underscoring the importance of women's earnings in maintaining household livelihoods. The relatively larger share of widowed women in the fishing sector reflects the greater dependence of coastal households on women's labour following the loss or absence of male earners, while the presence of single and divorced women across all sectors highlights the role of informal employment as a crucial source of livelihood under diverse family circumstances. Household size further reinforces these economic pressures, with more than half of the respondents living in families of three to four members and many supporting households of five or more. Taken together, these demographic characteristics show that women's participation in Alappuzha's informal economy is shaped largely by economic necessity, family responsibilities and constrained employment options. They also provide an important backdrop for understanding the patterns of income, occupational risk, financial security and social vulnerability discussed in the subsequent analysis.

Economic Participation and Financial Security

Economic participation among women workers can be assessed through indicators such as income, savings, access to credit, and ownership of assets. These variables provide insights into the financial position of workers and their capacity to manage household expenses, respond to economic uncertainties, and sustain livelihoods. Variations in these indicators across sectors reflect differences in employment opportunities, earning potential, and access to financial resources (Table 2).

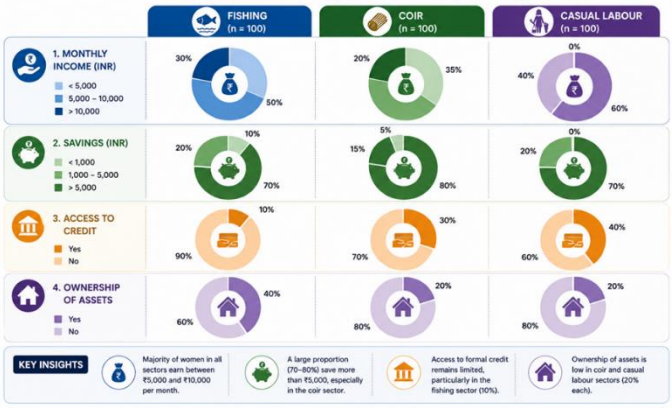


Figure 2: *Economic Empowerment Indicators of Women Workers in Fishing, Coir and Casual Labour Sectors in Alappuzha District, Kerala (N = 300).*

Source: *Prepared by the authors (AI-assisted) based on primary survey data collected from 300 women workers in the fishing, coir and casual labour sectors of Alappuzha District, Kerala (2024–2025).*

Monthly earnings are concentrated in the ₹5,000–₹10,000 range across all three sectors, though notable differences emerge at both ends of the income distribution. Fishing and coir workers each have 20 per cent of respondents earning more than ₹10,000 per month, whereas none of the casual labourers fall into this category. Conversely, the largest share of workers earning below ₹5,000 is found among casual labourers (40%), followed by coir workers (35%) and fishing workers (30%), reflecting the comparatively weaker earning potential of casual employment. Savings above ₹5,000 are reported by a majority of respondents, particularly in the coir sector (80%), while 70 per cent of both fishing and casual labour workers reported similar saving levels. Although these figures point to a degree of financial discipline, the ability to save remains closely linked to income stability and continuity of employment (Figure 2). Economic security is further shaped by unequal access to financial resources and productive assets. Only 10 per cent of fishing workers reported access to credit, compared with 30 per cent of coir workers and 40 per cent of casual labourers, limiting the capacity of many households to manage emergencies or invest in livelihood activities. Asset ownership is relatively higher among fishing workers (40%), whereas only one-fifth of respondents in the coir and casual labour sectors possess productive or household assets. Together, these patterns suggest that while women across all three sectors make an important contribution to household livelihoods, differences in earnings, access to finance and asset ownership continue to shape their long-term economic security and vulnerability within the informal economy.

Occupational Hazards and Health Risks

Occupational hazards and health-related risks constitute important dimensions of the working conditions experienced by women in the informal economy. Women engaged in fishing-related activities, coir production, and casual labour are frequently exposed to a range of physical, chemical, biological, and psychological risks arising from the nature of their work. Examining these hazards is essential for understanding the vulnerabilities associated with informal employment and their implications for workers' health and well-being (Table 3).

Occupational hazards remain a major concern for women across all three sectors, with physical risks emerging as the most common form of workplace exposure. Fishing workers report the highest incidence of physical hazards (70%), followed by coir workers (60%) and casual labourers (50%), reflecting the physically demanding nature of these occupations, including repetitive tasks, prolonged exertion, heavy lifting and exposure to harsh environmental conditions. Chemical hazards are most evident in the coir sector, where half of the respondent's reported exposure, compared with 30 per cent in both the fishing and casual labour sectors. Biological hazards are less common overall but are relatively more pronounced among fishing workers (20%) because of their regular contact with fish and aquatic environments. Psychological stress is another significant dimension of occupational vulnerability. Half of the women engaged in fisheries reported work-related stress, while the corresponding figures were 40 per cent among coir workers and 30 per cent among casual labourers. Irregular incomes, seasonal employment, demanding working conditions and the burden of balancing paid work with household responsibilities are likely to contribute to these experiences. The pattern across sectors underscores that the challenges faced by women in the informal economy extend well beyond low earnings, pointing to the need for stronger occupational health measures, preventive interventions and worker welfare initiatives.

Social Vulnerabilities and Welfare Access

Women workers in the informal economy often encounter multiple forms of vulnerability arising from insecure employment, limited social protection, and restricted access to welfare mechanisms. In addition to occupational hazards, the absence of stable employment opportunities and inadequate institutional support can adversely

affect household well-being and long-term economic security. The present analysis examines key dimensions of social vulnerability, including job insecurity, seasonal unemployment, debt dependence, lack of social security coverage, and access to welfare provisions among women workers in fishing, coir, and casual labour sectors (Table 4).

Employment insecurity remains a defining feature of women's work across all three sectors, although its intensity varies. Casual labourers experience the greatest insecurity (75%) because of the irregular nature of daily wage employment, followed by fishing workers (65%), whose livelihoods are strongly influenced by seasonal fluctuations and changing market conditions. Coir workers report comparatively lower levels of job insecurity (60%), yet precarious employment remains common. Seasonal unemployment is most evident in the fishing sector, affecting 70 per cent of respondents, while 60 per cent of casual labourers and 50 per cent of coir workers also reported interruptions in employment. These patterns highlight the instability of informal work and its direct implications for income continuity. Financial vulnerability is further reflected in widespread debt dependence and limited social security coverage. Borrowing to meet household needs and emergency expenses is common across all sectors, with the highest dependence reported among casual labourers (65%), followed by fishing (55%) and coir workers (50%). At the same time, the absence of social protection remains a major concern, affecting 70 per cent of casual labourers, 60 per cent of fishing workers and 55 per cent of coir workers. Restricted access to pensions, insurance and welfare benefits leaves many women exposed to economic shocks, health emergencies and income loss. Together, these findings show that sustained participation in the informal economy does not necessarily translate into livelihood security, as employment instability, financial dependence and inadequate social protection continue to shape the everyday realities of women workers in Alappuzha.

Skill Development, Social Networks and Institutional Support

The capacity of women workers to sustain their livelihoods depends not only on income and employment opportunities but also on access to training, social support systems, and institutional assistance. These factors can enhance workers' ability to adapt to changing labour market conditions, improve occupational skills, and cope with economic uncertainties. The present analysis examines the extent of support available to women workers across the fishing, coir, and casual labour sectors (Table 5).

Table 5 presents notable differences in women's access to skill development, social networks and institutional support across the three occupational sectors. Training opportunities remain uneven, with half of the fishing-sector workers reporting participation in skill development programmes compared with 40 per cent of coir workers and only 30 per cent of casual labourers. This pattern suggests that opportunities to acquire new skills and adapt to changing occupational demands are not equally available across sectors, potentially influencing workers' long-term livelihood prospects. Support from family members, neighbourhood networks, self-help groups and community organisations is more widely available than formal institutional assistance. Fishing workers reported the highest level of social support (60%), followed by coir workers (50%) and casual labourers (40%). These informal networks appear to provide an important source of resilience by helping women cope with financial constraints, employment uncertainty and other day-to-day challenges associated with informal work. By contrast, institutional and policy support remains limited irrespective of occupation. Only 30 per cent of fishing workers and 20 per cent of respondents in both the coir and casual labour sectors reported receiving assistance through welfare schemes, government programmes or other institutional mechanisms. The comparatively low coverage indicates that many women continue to rely more heavily on family and community support than on formal systems of protection. Expanding access to training, strengthening institutional outreach and improving the implementation of welfare programmes would enhance livelihood security and reduce the vulnerabilities faced by women employed in Alappuzha's informal economy.

Relationship between Socio-Economic Characteristics and Problems Faced by Women Workers

The socio-economic conditions of women workers are influenced by several demographic and occupational factors, including age, nature of occupation, and household employment characteristics. To understand whether these factors significantly affect the problems experienced by women workers, statistical tests were conducted using Analysis of Variance (ANOVA). The results are presented below (Table 6).

The ANOVA result indicates a statistically significant relationship between age and the socio-economic condition of women workers ($p < 0.05$). Therefore, the null hypothesis stating that there is no significant relationship between age and socio-economic condition is rejected. The findings suggest that socio-economic conditions vary across different age groups, reflecting differences in work experience, earning opportunities, and household responsibilities (Table 7).

The ANOVA results show a statistically significant difference in the problems reported by women workers across different age groups ($F = 5.12$, $p = 0.007$). As the significance value is below the

0.05 threshold, the null hypothesis is rejected. This finding suggests that the nature and intensity of difficulties experienced by women workers vary with age. Differences in work experience, physical capacity, family responsibilities and economic obligations are likely to influence how challenges are experienced at different stages of the life course, making age an important factor in understanding vulnerability within the informal workforce (Table 8).

Table 1: *Demographic Profile of Women Workers (n = 300).*

Sector	Age Group (Years)	Education Level	Marital Status	Family Size
Fishing	18–30: 30%31–45: 40%46–60: 30%	Illiterate: 10%Primary: 20%Secondary: 40%Higher Secondary: 15%Graduate: 15%	Married: 60%Unmarried: 10%Widowed: 20%Divorced: 10%	1–2: 20%3–4: 50%5+: 30%
Casual Labour	18–30: 35%31–45: 40%46–60: 25%	Illiterate: 10%Primary: 20%Secondary: 40%Higher Secondary: 15%Graduate: 15%	Married: 60%Unmarried: 15%Widowed: 10%Divorced: 15%	1–2: 25%3–4: 50%5+: 25%
Coir	18–30: 25%31–45: 45%46–60: 30%	Illiterate: 5%Primary: 15%Secondary: 35%Higher Secondary: 25%Graduate: 20%	Married: 65%Unmarried: 10%Widowed: 10%Divorced: 15%	1–2: 15%3–4: 55%5+: 30%

Table 2: *Economic Participation and Financial Security Indicators.*

Sector	Monthly Income (INR)	Savings (INR)	Access to Credit	Ownership of Assets
Fishing	<5000: 30%5000–10000: 50%>10000: 20%	<1000: 10%1000–5000: 20%>5000: 70%	Yes: 10%No: 90%	Yes: 40%No: 60%
Coir	<5000: 35%5000–10000: 45%>10000: 20%	<1000: 5%1000–5000: 15%>5000: 80%	Yes: 30%No: 70%	Yes: 20%No: 80%
Casual Labour	<5000: 40%5000–10000: 60%>10000: 0%	<1000: 0%1000–5000: 20%>5000: 70%	Yes: 40%No: 60%	Yes: 20%No: 80%

Table 3: *Occupational Hazards and Health Risks among Women Workers*

Sector	Physical Hazards	Chemical Hazards	Biological Hazards	Psychological Stress
Fishing	Yes: 70%	Yes: 30%	Yes: 20%	Yes: 50%
Coir	Yes: 60%	Yes: 50%	Yes: 10%	Yes: 40%
Casual Labour	Yes: 50%	Yes: 30%	Yes: 5%	Yes: 30%

Table 4: *Social Vulnerabilities and Welfare Access among Women Workers.*

Sector	Job Insecurity	Seasonal Unemployment	Debt Dependence	Lack of Social Security
Fishing	Yes: 65%	Yes: 70%	Yes: 55%	Yes: 60%
Coir	Yes: 60%	Yes: 50%	Yes: 50%	Yes: 55%
Casual Labour	Yes: 75%	Yes: 60%	Yes: 65%	Yes: 70%

Table 5: *Skill Development, Social Networks and Institutional Support*

Sector	Access to Training	Social Support	Institutional/Policy Support
Fishing	Yes: 50%	Yes: 60%	Yes: 30%
Coir	Yes: 40%	Yes: 50%	Yes: 20%
Casual Labour	Yes: 30%	Yes: 40%	Yes: 20%

Table 6: *Relationship between Age and Socio-Economic Condition*

Source of Variation	Sum of Squares	df	Mean Square	F Value	Significance
Between Groups	18.42	2	9.21	4.68	0.011
Within Groups	583.96	297	1.97		
Total	602.38	299			

Table 7: *Relationship between Age and Problems Faced by Women Workers*

Source of Variation	Sum of Squares	df	Mean Square	F Value	Significance
Between Groups	22.35	2	11.18	5.12	0.007
Within Groups	648.40	297	2.18		
Total	670.75	299			

Table 8: *Relationship between Traditional Occupation and Financial Problems.*

Source of Variation	Sum of Squares	df	Mean Square	F Value	Significance
Between Groups	26.14	2	13.07	6.21	0.003
Within Groups	625.11	297	2.10		
Total	651.25	299			

Table 9: *Relationship between Employed Family Members and Problems Faced by Women Workers.*

Source of Variation	Sum of Squares	df	Mean Square	F Value	Significance
Between Groups	15.88	2	7.94	3.94	0.021
Within Groups	598.42	297	2.01		
Total	614.30	299			

A statistically significant difference is observed in the financial problems reported across occupational groups ($F = 6.21$, $p = 0.003$), leading to the rejection of the null hypothesis. The result indicates that financial hardship is not uniform among women employed in fishing, coir production and casual labour. Variations in the nature of employment, income stability, seasonal fluctuations and access to livelihood resources contribute to differing levels of financial stress across these occupations, underscoring the influence of occupational context on women's economic well-being (Table 9).

Table 9 shows a statistically significant association between the number of employed family members and the problems experienced by women workers ($F = 3.94$, $p = 0.021$). Since the significance value is below the 0.05 level, the null hypothesis is rejected. The findings suggest that household employment structure plays an important role in shaping women's economic and social vulnerability. Women from households with multiple earning members are likely to face comparatively lower financial pressure because income responsibilities are shared, whereas those who serve as the primary or sole earners tend to experience greater economic strain and livelihood insecurity. The result highlights that household-level employment opportunities remain an important factor influencing the extent of hardship faced by women engaged in the informal sector.

Major Findings and Policy Implications

Women employed in fishing, coir production and casual labour form a vital segment of Alappuzha's informal workforce, making a substantial contribution to household incomes despite working under insecure and largely unregulated conditions. Most workers belong to the economically active age group of 31-45 years, reflecting the continued dependence of working-age women on informal employment for family sustenance. Although educational attainment has improved, particularly among coir workers, many respondents remain confined to lower and middle levels of education, limiting access to better employment opportunities. Monthly earnings are concentrated between ₹5,000 and ₹10,000, and while many women maintain savings, restricted access to institutional credit and productive assets especially among coir and casual labour workers limits opportunities for long-term economic advancement. Economic participation, therefore, has strengthened household survival more than it has improved financial security or asset ownership. Across all three sectors, employment is accompanied by significant occupational and social risks. Fishing workers reported the highest levels of physical strain and psychological stress owing to the uncertain and seasonal nature of their work, whereas coir workers faced greater exposure to chemical hazards. Casual labourers experienced the greatest employment insecurity, reflecting the irregular and poorly regulated character of their work. Income uncertainty, seasonal unemployment, indebtedness and inadequate social security continue to shape everyday life for many respondents, leaving them vulnerable despite their sustained participation in the labour force. Family and community networks provide important support during periods of hardship, yet formal welfare programmes, skill development initiatives and institutional assistance remain uneven in both coverage and accessibility.

The findings point to the need for a more comprehensive policy response that addresses both livelihood generation and long-term

economic security. Improving access to affordable credit, financial literacy, productive assets and market-oriented skill development can strengthen women's economic resilience while expanding opportunities in traditional sectors undergoing technological change. At the same time, greater emphasis on occupational health and safety, preventive healthcare, regular health screening and sector-specific workplace protections is essential, particularly for women engaged in fisheries and coir production. Expanding social security through wider coverage of welfare boards, pensions, health insurance and emergency assistance, together with simpler access to existing benefits, would reduce vulnerability to economic and health-related shocks. Ensuring that women's work is supported by stronger institutional protection and sustainable livelihood opportunities is fundamental to building a more inclusive and resilient informal economy in Alappuzha.

Conclusion

Women engaged in fishing, coir production and casual labour remain central to the functioning of Alappuzha's informal economy, sustaining household livelihoods while supporting some of the region's most important traditional occupations. Yet their substantial economic contribution is accompanied by persistent structural disadvantages. Informal employment continues to provide only limited economic security because earnings remain low and irregular, access to productive assets, institutional credit and welfare programmes is uneven, and occupational risks are widespread. Economic participation is further shaped by educational attainment, family responsibilities and the limited range of employment opportunities available to women. Although many workers exhibit prudent financial practices through regular savings and continuous labour force participation, these efforts are often insufficient to overcome seasonal unemployment, indebtedness, insecure employment and weak social protection. The prevalence of physically demanding work, health-related risks and psychological stress further reinforces their vulnerability, while the limited reach of formal support systems restricts opportunities for long-term economic mobility. These findings underline a fundamental contradiction within Alappuzha's informal economy: women are indispensable to local production and household survival, yet their labour is not matched by adequate economic security, occupational protection or development opportunities. Strengthening their livelihoods therefore requires measures that move beyond employment generation alone. Expanding access to affordable credit, social security, welfare benefits, occupational health safeguards, skill development and institutional support would reduce economic vulnerability while enhancing the sustainability of traditional industries. Recognising and protecting women's work is not simply a matter of social welfare; it is essential for achieving inclusive regional development, improving household resilience and ensuring that economic participation is accompanied by dignity, security and meaningful opportunities for advancement.

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