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Original Article

Socio-economic assessment of dry fish processors in Cuddalore District, Tamil Nadu, India

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Abstract
The present study focuses on the socio-economic characteristics and occupational structure of dry fish processors in the Cuddalore District of Tamil Nadu, India. The primary data was collected from 100 dry fish processors in Cuddalore (50%) and Parangipettai (50%) blocks of the district in 2025 using a structured interview schedule. It was found that the sector was mostly women-dominated (87%) and 66% of respondents were above 45 years. Dry fish processing was the main occupation for 82% of the respondents. Most of the respondents belonged to nuclear families (74%) with 3–5 members. Raw fish procurement was mostly dependent on landing centers (67%), and traditional cement floor drying (54%) was predominant. Credit dependence was reported by 61% of the respondents, mostly from non-institutional sources (62%). Garrett ranking revealed that raw fish scarcity (Garrett mean score: 71.69) and weather uncertainty (Garrett mean score: 67.80) were the key constraints. A statistically significant association was observed between village location and production quality preference (χ^2 = 15.458; p < 0.05). The study concluded that the dry fish processing sector was an economically important but structurally vulnerable component of the marine fisheries value chain, which requires better institutional support and technological assistance to improve livelihood stability.

Keywords: Cuddalore; dry fish processing; socio-economic status; Tamil Nadu; women processors

1 | INTRODUCTION

The fisheries sector constitutes a critical component of food security, nutritional supply, and livelihood generation in developing countries (FAO 2023; CMFRI 2023). Globally, the fisheries and aquaculture sector support more than 600 million people and contributes nearly 20% to the animal protein consumption (FAO 2023). In India, fishery has emerged as one of the fastest-growing agricultural subsectors, contributing substantially to agricultural Gross Domestic Product, export earnings, and rural em-

ployment (CMFRI 2023). Post-harvest fisheries activities such as drying, curing, and processing play a vital role in value addition and income generation for small-scale fishing communities (Béné *et al*. 2016; Allison and Ellis 2001). Dry fish processing is one of the oldest and most widely practised preservation methods in tropical coastal areas (Clucas and Ward 1996). Sun drying continues to dominate small-scale operations because of its low capital requirement and adaptability to coastal climatic conditions (Clucas and Ward 1996). Dried fish provides an economical and shelf-stable protein supply for low-income households and inland consumers, especially during lean fishing seasons and fishing ban periods (Belton *et al*. 2018). In coastal India, post-harvest fisheries activities are largely women-driven, with women actively engaged in cleaning, salting, drying, and marketing (Harper *et al*. 2013; Syda Rao *et al*. 2016). Evidence from Tamil Nadu indicates that fish processing contributes to women's household income and economic participation, although informal employment arrangements and occupational health concerns persist (Kanthimathinathan and Morais 2017). Thus, dry fish processing represents both an economically important and gender-intensive component of the marine fisheries value chain.

Tamil Nadu, with a coastline of approximately 1,076 km, is one of India's major marine fish-producing states. Cuddalore district, located along the southeast coast, comprises 49 marine fishing villages. Landing centres such as Cuddalore fishing harbour and Mudasalodai supply raw materials for traditional dry fish processing units. The activity functions as both a supplementary and, in many cases, primary livelihood source, particularly during lean fishing periods. However, processing units operate predominantly in small-scale, family-based, and informal context, with limited infrastructure, technology adoption, and institutional integration.

Existing literature on dry fish in India has concentrated primarily on marketing efficiency, price spread, and intermediate margins. Studies in Assam and North-East India reported declining marketing efficiency with increasing layers of intermediaries (Kashyap *et al*. 2013). Comparable results from Odisha and Chhattisgarh revealed increased marketing expenses and diminished producer share within multi-tiered marketing systems (Mahish 2015; Pandey and Zechariah 2024). Similar findings on marketing inefficiency due to intermediary layers have been reported in Bangladesh (Samad *et al.* 2009; Flowra *et al.* 2010). Although these studies advance understanding of market structure, they predominantly depict processors as marketing agents rather than as livelihood-dependent production units embedded within resource-constrained and climate-exposed environments. District-level empirical evidence integrating socio-economic characteristics, occupational dependence, processing practices, credit behaviour, institutional access, and systematic constraint prioritization remains limited in Tamil Nadu. In particular, field-based ranking of constraints affecting production continuity, income stability, and resilience has seldom been undertaken in coastal clusters of the state. The absence of such integrated micro-level analysis restricts policy understanding of structural vulnerabilities in raw material procurement, financial inclusion, technological modernization, and climate exposure.

In Cuddalore district, traditional open sun-drying predominates, exposing processors to rainfall variability and humidity fluctuations that directly affect drying efficiency and product quality. Dependence on auction-based raw material supply and informal credit systems may further influence income stability and bargaining power. Given the economic importance of dry fish processing and the limited district-level empirical evidence in Cuddalore, a systematic assessment is required to examine socio-economic characteristics, occupational structure, credit behaviour, institutional support utilization, and prioritized constraints affecting dry fish processors in the study area. Therefore, the present study was undertaken to examine the socio-economic characteristics of dry fish processors in Cuddalore district, analyze their occupational structure and processing practices, assess credit behavior and utilization of institutional support, and identify and rank the major constraints affecting dry fish processing as a livelihood activity.

2 | METHODOLOGY

2.1 Study area

In November-December 2025, the survey was conducted in Tamil Nadu, India's Cuddalore District. The district has an approximate 57.5 km coastline and lies between 11°24′ N latitude and 79°46′ E longitude on India's southeast coast. The district is further divided into 13 blocks. Cuddalore and Parangipettai blocks were selected specifically because they have the highest concentration of dry fish processing activity and marine fishing operations within the district, with major landing centres including Cuddalore Fishing Harbour, Mudasalodai, and Parangipettai-Annakoil supplying raw materials to a large number of processors. Despite the economic significance of this cluster, no systematic district-level empirical study has been conducted, making this an important area for investigation. Findings from this study are expected to contribute to evidence-based policy formulation for fisheries livelihood support at the district and state levels, and may inform national programmes such as PMMSY targeting post-harvest fisheries workers. Cuddalore Fishing Harbor, Mudasalodai, Samiyarpettai, MGR Thittu, Parangipettai-Annakoil, and Pettodai are the six important landing centers in this region as they are the primary sources of raw fish for the processors. The villages of Singarathoppu,

Akkarakori, Sonankuppam, and Sothikuppam were surveyed in Cuddalore block, while Mudasalodai, Annankoil, Chinnur Pudupettai, and Killai villages were surveyed in Parangipettai block.

2.2 Sampling design

Cross-sectional survey design was employed, which is widely used in socio-economic research on fisheries-dependent communities (Allison and Ellis 2001; Salagrama 2012). The study population consisted of people engaged in dry fish processing in the selected villages. A total of 100 people was selected for the study, with equal representation from Cuddalore and Parangipettai blocks (50 each). The sample size of 100 was determined based on practical considerations including the availability of active dry fish processors during the survey period and consistency with comparable socio-economic studies on small-scale fisheries communities in India (Singh *et al.* 2014; Syda Rao *et al*. 2016). A census-based sampling frame was unavailable due to the informal and dispersed nature of the occupation; hence, a purposive target of 50 respondents per block was set to ensure adequate representation from both study locations. Convenience sampling was employed due to the seasonal nature of dry fish processing, scattered distribution of processors, and absence of a comprehensive sampling frame. Probability sampling was not feasible due to the absence of a comprehensive sampling frame and the informal nature of the occupation. Convenience sampling is consistent with approaches adopted in similar informal fisheries livelihood studies (Syda Rao *et al*. 2016). The potential for selection bias and limited generalizability beyond the study area is acknowledged as a limitation of the present study.

2.3 Data collection

Primary data were collected through personal interviews using a structured and pre-tested schedule during November–December 2025. Information was gathered on socio-economic characteristics, occupational structure, procurement patterns, drying practices, marketing channels, credit behavior, scheme awareness and constraints.

2.4 Data analysis

The collected data were coded and analyzed using Microsoft Excel 2007 and Statistical Package for the Social Sciences (SPSS) version 27. Descriptive statistics such as count and percentage were computed to summarize respondent characteristics and study variables. The chi-square (χ^2) test was employed to examine the association between categorical variables, particularly between village location and production quality preference. Statistical significance was tested at 5% level of significance ($p < 0.05$) following standard statistical procedures (Gaugh 1992).

Garrett Ranking Technique (Garrett and Woodworth 1973) was used to prioritize the constraints faced by dry fish processors. The percent position was calculated as:

$$\text{Percent Position} = \frac{100(R_{ij} - 0.5)}{N_j}$$

where R_{ij} denotes the rank assigned to the i^{th} constraint by the j^{th} respondent and N_j represents the total number of constraints ranked by the j^{th} respondent. The percent positions were converted into Garrett scores using standard conversion tables, and mean scores were computed to determine the final ranking.

3 | RESULTS AND DISCUSSION

3.1 Spatial distribution of respondents

Singarathoppu (15%) and Mudasalodai (19%) recorded the highest representation among the eight surveyed villages, while Killai showed comparatively lower participation (Table 1). The concentration in Singarathoppu and Mudasalodai reflects proximity to major landing centres and auction platforms that ensure reliable raw material supply. Given the perishability of low-value marine species, processors cluster near landing hubs to reduce transport costs, minimize spoilage, and secure timely procurement. Similar locational clustering has been documented in other coastal dry fish markets (Pandey et al. 2016). In contrast, lower participation in Killai may result from limited bulk landings and weaker market linkages, increasing procurement costs and reducing processing viability. Overall, the spatial distribution highlights strong dependence on landing infrastructure and auction-based supply systems.

TABLE 1 Spatial distribution of dry fish processors in Cuddalore District of Tamil Nadu, India (n = 100).

Block	Village	No. of respondents
Cuddalore	Singarathoppu	15
	Akkarakori	13
	Sonankuppam	12
	Sothikuppam	10
Parangipettai	Mudasalodai	19
	Annankoil	12
	Chinnur Pudupettai	10
	Killai	9

3.2 Socio-economic profile of dry fish processors

The majority of dry fish processors were women (87%), above 45 years of age (66%), with low educational attainment (49% illiterate), and residing in semi-pucca or pucca housing (85%), reflecting a predominantly middle-aged, female, semi-urban occupational profile (Table 2).

3.2.1 Age and gender composition

The majority of the respondents were concentrated in the 46–55 years age group (37%), followed by those above 55 years (29%). Thus, nearly two-thirds (66%) of processors

were above 45 years, indicating an aged occupational structure. Limited youth participation (12% in 26–35 years) suggests declining generational entry into traditional dry fish processing. Similar ageing trends have been reported in coastal Odisha (Singh *et al.* 2014). Ageing participation in small-scale fisheries post-harvest sectors is a widely documented global pattern, with youth entry declining across coastal communities in South and Southeast Asia and sub-Saharan Africa (FAO 2022; Arthur *et al*. 2022).

TABLE 2 Distribution of dry fish processors by their demographic variables in Cuddalore District of Tamil Nadu, India (*n* = 100).

Variable	Category	Respondents	
		n	%
Gender	Male	13	13
	Female	87	87
Marital status	Married	76	76
	Unmarried	3	3
	Widower/separator	21	21
Age group (years)	26–35	12	12
	36–45	22	22
	46–55	37	37
	Above 55	29	29
Religion	Hindu	71	71
	Christian	19	19
	Muslim	10	10
Educational qualification	Illiterate	49	49
	Primary level	28	28
	Secondary level	12	12
	Higher secondary	7	7
	ITI/UG	4	4
Family type	Nuclear family	74	74
	Joint family	26	26
Family size	Small (<3 members)	12	12
	Medium (3-5 members)	72	72
	Large (>5 members)	16	16
Housing status	Kutcha (Thatch/Hut)	15	15
	Semi-Pucca (Tiled/Sheet/Asbestos)	55	55
	Pucca (Concrete/RRC)	30	30

The dominance of middle-aged and elderly women reflects reliance on accumulated traditional skills and restricted occupational mobility. Women constituted 87% of processors, confirming the feminized nature of post-harvest fisheries. Gender-based labour division within fishing communities assigns drying and curing activities primarily to women (Clucas and Ward 1996), and similar female dominance has been documented in Tamil Nadu and Kerala (Kanthimathinathan and Morais 2017) Globally, women constitute approximately 50% of the post-harvest fisheries workforce, predominantly occupying informal, lower-paid positions in processing and marketing (Harper *et al*. 2013; FAO 2022). The high proportion of married (76%) and widowed/separated (21%) respondents underscores the role of dry fish processing as a critical livelihood support mechanism for economically vulnerable women.

3.2.2 Educational status and household characteristics

Educational attainment was low, with 49% illiterate and only 11% possessing higher secondary or technical qualifications. Similar literacy patterns have been reported in traditional curing yards in Andhra Pradesh and Odisha (Pandey *et al*. 2016). Low educational attainment among women fish processors is a characteristic feature of small-scale fisheries communities across the Global South, where it consistently constrains access to formal credit and technology (Weeratunge *et al*. 2010; FAO 2022). Low educational levels may constrain access to institutional credit, formal market participation, adoption of improved drying technologies, and record-keeping practices. Household characteristics indicate moderate socio-economic stability. Nuclear families predominated (74%), and most households comprised 3–5 members (72%), suggesting manageable dependency ratios. Housing status showed that 55% resided in semi-pucca houses and 30% in pucca houses, indicating partial asset accumulation but limited long-term capital formation. Only 15% lived in kutcha dwellings, reflecting some degree of economic consolidation within the sector.

3.3 Occupational structure and processing practices

3.3.1 Occupational dependence and experience

Dry fish processing was the primary occupation for 82% of respondents, indicating strong livelihood dependence. However, 61% supplemented income through daily wage labor, 24% through fresh fish marketing, and 15% through other activities. Such diversification represents defensive adaptation to seasonal landings and price volatility (Allison and Ellis 2001). Income diversification as a coping strategy is well documented among small-scale fisheries households in the Global South, including in Bangladesh, Sri Lanka, and West Africa, where multiple livelihood sources buffer against seasonal income shocks (Arthur *et al*. 2022; Béné *et al*. 2003). Similar income patterns have been observed in Odisha and Chhattisgarh dry fish clusters (Singh *et al.* 2014; Mahish 2015). The reliance on auxiliary income suggests constrained surplus generation and weak reinvestment capacity within the processing segment.

Experience distribution shows occupational persistence, with 83% having more than 10 years of experience and only 5% below five years. Comparable long-term engagement has been documented in eastern coastal India (Singh *et al.* 2014). While accumulated experience sup-

ports production consistency, weak youth participation may restrict innovation and long-term adaptive capacity.

3.3.2 Raw material procurement and drying practices

Raw material sourcing was largely auction-dependent, with 67% procuring from landing centers and 28% directly from fishermen. Only 5% relied on own capture, confirming limited vertical integration and exposure to auction-driven price fluctuations (Singh *et al.* 2014). Traditional open sun-drying dominated (77% using cement or sand floors), while solar dryer adoption was minimal (3%). Similar technological stagnation has been reported in other coastal curing yards (Immaculate *et al*. 2013; Clucas and Ward 1996). Similar technological stagnation in small-scale fish processing has been reported across the Global South, including in Sri Lanka, Nigeria, and Tanzania, where traditional open-air drying persists due to low capital availability and limited technology access (FAO 2022; Arthur *et al*. 2022). Continued reliance on conventional methods constrains quality standardization and adaptive capacity, highlighting scope for modernization to improve economic sustainability.

3.3.3 Production quality and marketing

Chi-square analysis showed a statistically significant association between village location and production quality preference (χ^2 = 15.458; *df* = 7; *p* = 0.031), indicating spatial variation in quality orientation. Prior to interpretation, the expected cell frequency assumption was verified; more than 80% of cells had expected frequencies exceeding 5, satisfying the standard requirement for chi-square validity (Gaugh 1992). Cells with expected frequencies below 5 were fewer than 20%, which is within the acceptable threshold for reliable chi-square inference. Processors located near major landing centres and established retail markets exhibited stronger quality focus, likely driven by better infrastructure, buyer expectations, and price incentives. Marketing remained moderately integrated but intermediary-dependent. The Producer → Retailer channel dominated (43%), followed by direct consumer sales (28%), while 17% operated through wholesalers and 12% supplied lower-grade products to feed markets. The predominance of retailer-mediated channels reflects limited access to distant or high-value markets. Similar localized marketing structures have been documented in Indian marine fish trade systems (Narayanakumar and Sathiadhas 2005). Restricted participation in extended value chains may constrain price realization and bargaining power within the processing segment.

3.4 Constraints affecting dry fish processing

The major constraints affecting dry fish processing were prioritized using the Garrett ranking technique presented in Table 3. Garrett ranking identified scarcity and high cost of raw fish as the most severe constraint (Mean = 71.69; Rank I), reflecting strong dependence on landing-centre supply and seasonal catch fluctuations. As processors operate without vertical integration, irregular procurement disrupts production continuity and compresses profit margins. Similar supply-driven vulnerabilities have been reported in traditional dry fish clusters (Pandey *et al*. 2016). Weather unpredictability ranked second (Mean = 67.80; Rank II), highlighting the exposure of open sun-drying systems to rainfall and humidity variability. Reliance on conventional drying floors increases spoilage risk and affects product quality (Clucas and Ward 1996), thereby elevating income instability. Climate variability as a primary livelihood constraint for small-scale fish processors has been widely reported across the Global South, particularly in South Asia and sub-Saharan Africa, where sun-drying is the predominant preservation method (Akintola and Fakoya 2017; FAO 2020). Financial constraints—including lack of working capital (Rank III) and inadequate drying infrastructure (Rank IV)—further restrict operational efficiency and scaling potential. Limited institutional credit access reinforces intermediary dependence, reducing bargaining power and price realization. Institutional gaps (Rank V), health issues (Rank VI), and spoilage losses (Rank VII) compound these vulnerabilities. Overall, the ranking demonstrates structural exposure to supply, climatic, and financial risks, collectively undermining productivity and long-term livelihood stability.

TABLE 3 Constraints faced by dry fish processors in Cuddalore District of Tamil Nadu, India (*n* = 100).

Constraints	Total score	Mean score	Rank
Scarcity / high cost of fresh fish	7169	71.69	I
Unpredictable weather / rain during drying	6780	67.80	II
Lack of working capital (credit gap)	5750	57.50	III
Lack of proper drying yard / infra-structure	5226	52.26	IV
Non-membership in cooperatives / relief gap	4194	41.94	V
Health issues (back pain / skin issues)	3432	34.32	VI
Spoilage / insect infestation	2549	25.49	VII

3.5 Credit behavior and financial dependency

Credit dependence was observed among 61% of respondents (Table 4), indicating considerable working capital constraints. Among borrowers, 62% relied on non-institutional sources, mainly money lenders (53%, while only 38% accessed institutional credit. This skewed pattern reflects limited financial inclusion and structural reliance on the informal lending systems. Informal credit provides quick, collateral-free access for raw fish procurement during peak landing periods but typically in-

volves higher interest rates and inflexible repayment terms, intensifying financial stress during lean seasons. Similar dependence on non-institutional credit has been reported in traditional fish processing clusters (Pandey *et al*. 2016). Globally, reliance on informal moneylenders is a structural feature of small-scale fisheries financing, particularly among women processors in developing countries, where collateral requirements and documentation barriers restrict formal bank access (Pomeroy *et al*. 2020; FAO 2022). Low literacy levels and lack of collateral further restrict the access to formal banking services, limiting investment in infrastructure and technology. Overall, the prevailing credit structure indicates financial vulnerability, constrained capital formation, and reduced capacity for enterprise expansion and long-term livelihood stability. Heavy reliance on informal lending mechanisms may increase repayment pressure and reduce income retention, particularly during lean fishing seasons.

TABLE 4 Credit utilization among dry fish processors in Cuddalore District of Tamil Nadu, India (*n* = 100).

Particulars	Respondents	
	n	%
Credit Indebtedness (*n* = 100)		
Availed Loan	61	61
Not Availed Loan	39	39
Source of credit (for those who availed) (*n* = 61)		
Institutional Sources	**23**	**38**
Commercial Banks / cooperatives	13	21
Self-help groups (SHGs)	10	17
Non-institutional sources	**38**	**62**
Money lenders	32	53
Friends and relatives	6	9

3.6 Government scheme awareness and utilization

Awareness on welfare schemes for Fishermen and Fisherwomen Savings-cum-Relief schemes is 100%, yet benefit realization was uneven. While all male respondents received Fishermen Relief benefits, only 69% of women accessed the Fisherwomen scheme, and just 13% benefited from Fishing Ban Period Relief. In contrast, development-oriented schemes showed limited penetration: PMMSY awareness was 45% with only 12% utilization, and Kisan Credit Card awareness was 30% with 8% benefit receipt. Although 75% were aware of the Group Accident Insurance Scheme, only 5% received coverage. The divergence between awareness and utilization indicates procedural bottlenecks, eligibility constraints, and limited institutional facilitation. Welfare transfers demonstrate wider outreach, whereas credit-linked and capital-intensive schemes require documentation and formal engagement, restricting access in informal, women-dominated enterprises. Similar implementation gaps have been observed in post-harvest fisheries sectors (Salagrama 2012). The observed disparity in benefit realization between male and female processors may be attributed to structural and institutional barriers. Women processors in informal occupations often lack the documentation required for formal scheme enrollment, such as fishing license registration, bank account ownership, or identity proof linked to fisheries databases. Additionally, limited mobility, low literacy, and dependence on male household members for administrative procedures further constrain women's access to development-oriented schemes. Similar structural exclusion has been documented in post-harvest fisheries sectors across India (Salagrama 2012). Women processors in informal fisheries economies in Bangladesh, Sri Lanka, and sub-Saharan Africa face comparable exclusion from formal government schemes due to documentation and mobility barriers (Senevirathne *et al*. 2025; FAO 2022). Strengthening gender-responsive facilitation mechanisms, including doorstep enrollment drives and simplified documentation procedures, would help bridge this gap. Limited uptake of development schemes constrains asset creation and weakens long-term livelihood stability. Awareness and benefit realization patterns are presented in Table 5.

TABLE 5 Scheme awareness and benefit realization among dry fish processors in Cuddalore District of Tamil Nadu, India (*n* = 100).

Name of the Scheme	Official amount (₹)	Aware of (%)	Benefited (%)
Fisherwomen savings-cum-relief	4500/ year	100	69
Fishermen savings-cum-relief	4500/ year	100	100
Fishing ban period relief	5,000–6,000/ year	100	13
PMMSY (subsidies for ice boxes/racks, trolley)	Up to 50%	45	12
KCC (Kisan Credit Card)	Working capital	30	8
Group accident insurance scheme	1,00,000+	75	5

4 | CONCLUSIONS

Dry fish processing in Cuddalore district represents a women-dominated and economically important segment of the marine fisheries value chain, yet it remains structurally constrained. The sector is characterized by ageing participation, low educational attainment, and heavy dependence on landing-center-based raw material procurement, exposing processors to supply volatility and price fluctuations. Although processing serves as the primary livelihood for most respondents, widespread income diversification and reliance on informal credit indi-

cate constrained profitability and limited capital accumulation. Minimal adoption of improved drying technologies further restricts productivity, quality standardization, and adaptive capacity. While welfare schemes demonstrate broader outreach, limited access to institutional finance and low utilization of development-oriented schemes hinder asset creation and enterprise expansion. Overall, the sector exhibits high livelihood dependence but low structural support. Strengthening financial inclusion, improving infrastructure, stabilizing input supply systems, and promoting technological modernization are essential to enhance income security and long-term livelihood stability of dry fish processors. The structural vulnerabilities documented in Cuddalore are not unique to India but reflect broader patterns observed across dry fish processing communities in the Global South. Similar patterns of feminized post-harvest labor, dependence on informal credit, and technological stagnation have been reported in Bangladesh (Samad *et al.* 2009; Flowra *et al.* 2010), sub-Saharan Africa (Clucas and Ward 1996), and Southeast Asia. Women's marginalization from development-oriented schemes despite their numerical dominance in processing activities has also been documented in fisheries communities across sub-Saharan Africa and South Asia (Harper *et al*. 2013; Salagrama 2012). The convergence of these findings underscores the systemic nature of challenges facing small-scale dry fish processors globally, and suggests that context-sensitive, gender-responsive policy interventions are needed across the Global South.

LIMITATIONS:

The study was confined to selected villages of Cuddalore District and relied on self-reported data, which may be subject to recall bias. Convenience sampling in the absence of a formal sampling frame limits the generalizability of findings beyond the study area. The sample size of 100 respondents, while consistent with comparable socio-economic studies, restricted the application of multivariate inferential approaches. Data collected during a single survey period may not fully capture seasonal variations in fish availability and processing intensity. The analysis relied primarily on descriptive statistics, which is appropriate for a baseline socio-economic assessment; however, future research with larger, probability-based samples should consider regression-based approaches such as logistic regression to identify determinants of credit access, technology adoption, and scheme utilization among dry fish processors.

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ETHICAL APPROVAL

All applicable international, national and/or institutional guidelines for the care and use of animals were followed in this study.

CONFLICT OF INTEREST

The author declares no conflict of interest.

AUTHORS' CONTRIBUTION

Sharmitha Saravanan: Conceptualization, data collection, statistical analysis and manuscript drafting; R. Balaji: Research supervision, conceptual refinement and corresponding author responsibility; S. Moghana Lavanya: Theoretical framework development and manuscript review; R. Gangai Selvi: Statistical validation and econometric guidance; D. Keisar Lourdusamy: Critical review and academic oversight.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available on a reasonable request from the corresponding author.

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