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Research Note

Gender Profiling of Workers in Shrimp Processing Factories in Andhra Pradesh, India

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Abstract

This study profiles the gender distribution of workers in shrimp processing factories in Andhra Pradesh, India, a key hub for shrimp farming, processing, and export. A survey of 20 shrimp processing units by involving 10,051 workers in these units, revealed that women constituted 63% of the workforce, and they are primarily engaged in processing and jobs related to quality control. Men were more involved in auxiliary and managerial positions. The study highlights the significant role of women in the shrimp export industry, even though their role in decision-making and managerial roles remains very limited. It highlights the importance of adopting gender-responsive management practices, enhancing support for them in the workplace, and implementing measures to reduce gender segregation, which are essential for promoting equity and boosting productivity in the seafood processing sector.

Keywords: Gender profile, shrimp processing factories, export

Introduction

India is one of the leading nations in the export of fishery products and has exported 1,735,286 tonnes of fishery products valued USD 8.09 billion (INR

63,969 crores) in 2022-23. The country has an infrastructure of 625 fish processing factories and the processed fish products are exported to 129 countries. In seafood trade parlance, fish is a generalized term that includes several aquatic animals such as finfish, shrimp, cuttle fish, squid, octopus but excludes marine mammals. Frozen shrimp has been the mainstay of India's fishery exports over the last decade and was the largest contributor, both in terms of quantity (40.98%) and value (67.72%) in 2022-23.

Andhra Pradesh is the leading state in the farming, processing, and export of farmed shrimp from India and majority (> 90%) of the processing factories in the state are currently involved in the processing of shrimp. The introduction of the farming of the pacific white shrimp, *Penaeus vannamei*, in Andhra Pradesh in 2010 and its expansion in subsequent years has led to the establishment of additional processing factories and increasing the freezing capacities of existing factories (Ashok et al., 2015). Andhra Pradesh has exported 327,620 tonnes of fishery products dominated by frozen shrimp, which realized a value of USD 2.51 billion in 2022-23.

Processing of shrimp is essential to extend its shelf life, maintain its nutritive and sensory properties, increase convenience, ensure safety and most importantly, increase its economic value. The shrimp processing factories in Andhra Pradesh procure market-sized shrimp, mainly from the aquaculture farmers, and process them into different shrimp products such as block frozen shrimp, individually quick frozen (IQF) shrimp, battered and breaded frozen shrimp, cooked frozen shrimp, etc., and store them under frozen condition at -18 °C in cold storages. The frozen shrimp products from India are

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mainly exported to USA, China, European Union, South East Asia, Middle East Asia and Japan.

The main activities in a shrimp processing unit are pre-processing, processing, frozen storage, quality control, machinery operation, shipment, sales and overall management. In order to undertake all these activities, shrimp processing factories engage a large workforce that is distributed across the different sections. Previous studies on gender issues in the processing sector have largely focussed of fish and mainly concentrated on the West Coast of India (Beena, 1990; Shyam, Antony, & Geetha, 2011; Sathyan, Afsal, & Thomas, 2014; Jeyanthi, Gopal, Murthy, & Geethalakshmi, 2015). Andhra Pradesh, located on the East Coast, is the most significant player in the processing and export of farmed shrimp from India with well-developed infrastructure for shrimp processing.

Previous research on export factories highlights that young women are often favoured as the workforce due to their perceived obedience, acceptance of low wages, and minimal demands for better working conditions. This phenomenon has been described as "nimble fingers and docile bodies" (Pearson & Kusakabe, 2012).

Additionally, these women are often treated as a disposable workforce, often employed as parttimers or laid off during periods of low work activity, only to be rehired based on the availability of shrimp and the demands of exporters (Das, 2014).

Worldwide, in the processing sector, majority (71%) of the women are employed as part-time workers and just over 50% of the women workers were employed on full-time basis (FAO, 2020). The processing factories in India also employ many women and studies show that almost 75% of the labour force in these factories are women and they contribute substantially to the income of the processing factories though they have minimal presence in decision-making positions in the family and in the workplace (Nishchith, 2000; Gopal, 2017). This study examines the gender composition of workers in shrimp processing factories in Andhra Pradesh, India, with a focus on understanding the distribution of women across various sections within the processing units.

Materials and Methods

A questionnaire-based survey was conducted in 20 randomly selected shrimp processing factories in

Andhra Pradesh during September 2022 which constitute 18.5% of the total registered shrimp processing factories in Andhra Pradesh.

The workers engaged in the shrimp processing unit were categorized into different groups based on their nature of work:

- i) Processing workers who are engaged in raw material receiving, pre-processing, grading, freezing, packaging and cold storage.
- ii) Quality control workers who work as quality assurance managers, technologists and laboratory assistants).
- iii) Managerial level personnel like Chief Executive Officers (CEOs)/Managing Directors (MDs) and plant managers.
- iv) Auxiliary workers such as water treatment plant operators, effluent treatment plant operators, pest control workers, drivers, security staff, etc.

One-way analysis of variance (ANOVA) using posthoc Tukey Honestly Significant Difference (HSD) was performed to test the significant difference in the average number of women and men workers between the four different categories viz., processing workers, quality control workers, managerial workers and auxiliary workers and also within each category (Cochran & Cox, 1992).

Results and Discussion

All the selected processing factories were involved in the production of block frozen and individually quick frozen (IQF) shrimp products. Eleven out of twenty processing factories also had cooking operations. The total freezing capacity of each processing unit is calculated as the sum of the capacity of all the freezers (blast freezers, plate freezers, IQF freezers) installed in that unit. The installed freezing capacity (tonnes per day, TPD) of each shrimp processing unit ranged between 20 TPD and 98.6 TPD with an average freezing capacity of 48.4±21 TPD. However, it was observed that the installed freezing capacity might not be fully utilized on a day-to-day basis as it inter alia depends on raw material availability and purchase orders. The number of women employed per ton of freezing capacity ranged between 1 to 20 with an average of 7±4 women whereas the number of men employed per ton of freezing capacity was relatively lower ranging between 1 to 7 with an average of 4±2 men, re-emphasising the dominance of women workforce in processing factories has been continuing over the last three decades (Beena, 1990; Gopal, Geethalakshmi, Unnithan, Murthy, & Jeyanthi, 2009; Sathyan et al., 2014).

The total workers engaged in shrimp processing factories ranged between 161 and 1330. The number of women workers in the processing factories ranged from 72 to 991 with an average of 315±228 and the number of men workers ranged from 76 to 369 with an average of 188±83. The total women workers (n=6292) working in the 20 processing factories were distinctly higher than the men workers (n=3759). Women formed 63% of the total workers in shrimp processing factories indicating the significant role that women play in the processing of export-oriented food products. Similarly, De Silva and Yamao (2006) observed that women constituted 63% of the fish processing workforce in Sri Lanka.

The average ratio of women to men was 6:1, indicating that the women workforce was significantly larger than the men workforce in the shrimp processing factories of Andhra Pradesh. Similar ratios of 1.74 and 1.66 for women to men among contractual and permanent employees, respectively, were reported by Jeyanthi et al. (2015) in seafood processing factories of Gujarat.

The women to men ratio varied with the freezing capacity of the shrimp processing factories i.e., large factories (> 50 TPD) and small factories (< 50 TPD). The ratio of women to men was relatively higher in processing factories with large freezing capacities (1.75±0.9) than factories with lower freezing capacities (1.41±0.6). Similarly, shrimp processing factories with cooking facility had higher percentage of women processing workers (77%) compared to factories processing only raw frozen shrimp products (65.9%). The factories involved in cooking are often involved in producing a special product called 'cook-peel' which involves peeling the shrimp after it is cooked. This requires additional women workforce for peeling and is reflected in the higher percentage of women in factories with cooking facility.

The distribution of the workers in different sections of the processing factories revealed that majority of the workers were engaged in the processing area (81.3%) followed by auxiliary areas (15.4%), quality control laboratories (2.7%) and management (0.6%).

In terms of workforce distribution, the majority of workers in processing areas and quality control laboratories were women, while men dominated in auxiliary roles and management (Fig. 1). The average number of women workers in processing areas was significantly higher (p<0.01) compared to quality control, management, and auxiliary areas. Notably, the average number of women workers in processing areas was also significantly greater (p<0.01) than that of men.



Fig. 1. Gender profile of workers engaged in different activities in the shrimp processing factories of Andhra Pradesh

(Women, n=6292 and Men, n=3759)

The whole shrimp received from the aquaculture farms or from the sea are washed and depending on the buyer requirement the shrimp are de-headed, peeled and made into different market styles (easy peel, butterfly, peeled-deveined, peeled-undeveined, etc.) in the pre-processing halls. In the processing halls, the shrimp received from the pre-processing halls are converted to frozen shrimp products. The major activities in the processing section include soaking of shrimp, glazing, plate freezing, IQF, packaging, labelling and metal detection. In some processing factories, cooked shrimp, cook-peeled shrimp, marinated shrimp, battered and breaded shrimp are also prepared. All the activities in the shrimp processing unit are performed in accordance with the Hazard Analysis Critical Control Point (HACCP)-based food safety management system. The frozen shrimp products are stored in cold storages at a temperature of -18 °C. The food safety testing of the shrimp products is performed at the in-house laboratory to ensure that the processed shrimp products are safe for human consumption.

The predominant workplaces of women in the shrimp processing factories were found to be de-

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heading and peeling of shrimp in the pre-processing halls followed by freezing (block / IQF), grading and value addition activities (Fig. 2a, 2b). To carry out these activities, all the women workers have to wear clean uniforms with masks covering the nose and mouth, hair nets, gum boots and gloves, perform the processing activities in a standing posture and should not engage in any conversation. Though the work is repetitive, it requires workers to focus for the entire duration of the shift (~8 h) so that the quality and safety of the product is not affected. Andhra Pradesh accounted for 31% by value and 18.88% of total quantity of fishery exports from India in 2022-23. These figures stand testimony to the enormous contribution of women working in the shrimp processing sector to India's fishery exports as majority (> 90%) of the processing factories in Andhra Pradesh are actively engaged in the processing of shrimp.

On the other hand, men were majorly deployed as auxiliary workers such as loading and shipping workers, machinery staff, supervisors, and drivers of insulated and refrigerated vehicles. The average number of men workers in the auxiliary areas were significantly higher (p<0.01) than the women workers. The work includes lifting heavy loads (shipment loadings), operation of machines such as freezers, compressors, ammonia plants, operation of water filtration assembly, effluent treatment, driving trucks. Due to the nature of the work, men are preferred for these jobs. Generally, men are assigned physically demanding and mechanical work while women are assigned tasks that require more attention to details and thoroughness (Prieto-Carolino et al., 2021). Work in the processing plant especially in the pre-processing section is routine, repetitive, and

involves drudgery (Gopal, 2019). It is perceived that

a large number of women are employed in fish



Fig. 2a. Women workers performing pre-processing and processing activities in shrimp processing factories



Fig. 2b. Areas in the shrimp processing factories where women workers dominate

Gender Profiling of Shrimp Processing Factory Workers

processing as they are compliant, flexible, meticulous and accept lower pay in processing factories (Montford, 2015). Standing continuously wearing completely covered uniform, without talking and constantly handling chilled material in the shrimp pre-processing and processing areas is strenuous for the women workers. On the other hand, men workers in shrimp pre-processing and processing areas usually perform activities such as carrying crates of raw material (~25 kg) from insulated trucks to raw material receiving section, filling trolleys with ice (~50 kg) and pushing them from flake ice unit to all the pre-processing tables, carrying shrimp shell waste from each pre-processing table to the waste disposal room, carrying additives such as salt and sodium tripolyphosphate (STPP) from dry chemical room to the soaking areas, lifting treated shrimp material from soaking tubs and placing them on work tables, carrying master cartons from cold stores to the refrigerated containers for shipment, and so on.

The proportion of women (47%) in the quality control was almost equal to that of the men (Fig. 3) and the number of women technologists (51%) in the quality control area was nearly equal to men in the quality control section. There was no significant difference in the (p>0.01) in the average number of women and men in the quality control sections. Within the quality control workers, there was no significant difference in the (p>0.01) in the average number of sections. Within the quality control workers, there was no significant difference in the (p>0.01) in the average number of women and men working as technologists.

Quality assurance personnel are involved in testing the raw material, finished shrimp products, water, ice and food contact surfaces for different quality parameters such as physical (eg. filth), chemical (eg. sulphite, antibiotic residues) and microbiological (total bacterial counts, faecal indicator bacteria, and pathogens namely *Salmonella, Vibrio cholerae*, Coagulase positive *Staphylococci, Listeria monocytogenes* etc.) as per the requirements of food safety regulations of the importing country. They are also engaged in sending samples to external laboratories, laboratory management, documentation and assist the plant management during food safety audits.

Generally, technologists with considerable experience and skills get appointed as quality control managers. However, the proportion of women working as quality mangers in the surveyed shrimp processing factories was relatively low (33%) sug-



Fig. 3. Gender profile of Quality Control workers in the shrimp processing factories

(Total QC Workers: 160)

gesting that the progression of women technologists to quality managers is low. There was significant difference (p<0.05) in the average number of women and men working as quality control managers. Quality managers work round the clock, travel extensively and are responsible for all mandatory and voluntary certifications and audits.

The proportion of women in top management positions was a mere 6.5%. Moreover, none of the plant managers in the 20 surveyed shrimp processing factories were women (Fig. 4). The average number of women in the managerial position was significantly lower (p<0.01) than men. Though the contributions of women and men to the fishing industry in general and processing sector in particular were significant, the power imbalance was observed to be in favour of men (Montford, 2015; Prieto-Carolino et al., 2021).

The gender profiling of workers in seafood factories in Andhra Pradesh, India indicated that women are the major workforce in the shrimp processing factories serving crucial roles in shrimp processing and export quality assurance. However, the results of the present study also indicate that the representation of women in managerial positions is meagre when compared to other areas in the shrimp processing unit and the women tended to be concentrated in two areas: (i) contractual low-paid floor level jobs; or (ii) jobs in testing labs attached to the factories.

Further research is needed to understand the reasons for the gender segregation of women and men in the shrimp industry in Andhra Pradesh, and to develop strategies to transform gender roles and gender relations in the workplace and in the community. Gender equality, the fifth goal of the 17



Fig. 4. Gender profile of Managerial Personnel in the shrimp processing factories (Total Managerial Personnel: 51)

Sustainable Development Goals of the UN and has global relevance. Presence of women in top management has been positively associated with good workplace management, firm's performance, productivity, and profitability (Smith, Smith, & Verner, 2006; Melero, 2011; Moreno-Gómez & Calleja-Blanco, 2018; Burkhardt, Nguyen, & Poincelot, 2020). There exists a compelling need to sensitize the management to place qualified and trained people, irrespective of gender, in the roles of plant managers and quality assurance managers as gender responsive management holds the potential to transform not only the status of women, but also the shrimp processing and export sector.

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