

*Short Communication*

# **Gender and Poverty Dimensions in a Value Chain Analysis of Milkfish Mariculture in Misamis Oriental, Philippines**

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## **Abstract**

This paper aims to describe the role of key players in the value chain for milkfish *Chanos chanos* (Forsskål, 1775) in a mariculture Park in Balingasag, Misamis Oriental in the Philippines with an emphasis on gender dimensions. It also estimates the value additions done by the key players and assesses implications on income distribution. Mapping the chain involved primary data collection through observations, key informant interviews, and focus group discussions. The big, medium and small-scale fish cage operators – 90 % men – are the key players in production. Along the chain are men and women milkfish brokers/traders, wholesalers, and retailers. Largely men created value additions; nonetheless, women's involvement in the different nodes of the chain and their leadership in wholesale and retail trade are evident. While women's labor is unpaid in small-scale operations, women's contribution to the household economy convey to them empowerment in household relations and in community affairs. Findings also reveal that large and medium players are able to obtain higher income from mariculture operations. The perpetuation of poverty among small players that results from capital accumulation among big players is revealed when value additions along the chain are analysed "by what function" or "by whom" and "by how much".

## **Introduction**

Milkfish, (*Chanos chanos* (Forsskål 1775)), is the primary fish species in the Philippine aquaculture industry, contributing 398,088 metric tonnes to

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Philippine aquaculture production in the year 2016 (Philippine Statistics Authority (PSA) 2016). The present study addressed the value chain for milkfish that is harvested from the Balingasag Mariculture Park in Misamis Oriental, Philippines and distributed in the Cagayan de Oro and Iligan markets within Region 10 of the Philippines. The Philippine Statistics Authority (PSA) 2006-2015 figures indicate that the farmed average production rate of milkfish in the Philippines and in Northern Mindanao stood at 98.33 % and 99.63 %, respectively, indicating that milkfish is almost entirely raised through aquaculture; the average production rate of milkfish as part of capture fisheries therefore comprised a negligible proportion of the entire production. Production in marine cages in Region 10 in 2007 increased 3.2 times (from 12.64 metric tonne to 53.37 metric tonne) over the 2006 level and rose 7.6 times (from 53.37 metric tonne to 456.76 metric tonne) from 2007 to 2008 due to the establishment of the Balingasag Mariculture Park in March 2007. The launching of the Mariculture Park Development Program nationwide aimed to provide an alternative and sustainable livelihood among fishers, for food security, and for stimulating investment in fisheries in the face of dwindling fishery resources and climate change (Salayo et al. 2012).

The value chain concept was introduced by Porter in 1985 (Porter 2008); he defined it as activities within an organization that adds value to the services and products the organization produces. Activities include product designing, production, marketing, distribution and after-sales services to the final consumer. Kaplinsky and Morris (2001) saw the value chain as a tool in understanding income distribution, its functional decomposition or the share going to or withheld from men and women players. Value-added is the difference between the sales of a commodity and the cost of inputs (factors of production); value is created by form through transformation activities like processing, by time through storage so the product is available at various times, and by place through movement from production to consumption (Brown, Perez et al. 2010). In the locale of the study milkfish is sold fresh to traders up to the consumers, except for a very minimal processing done by women.

The objectives of the study are two-fold: (1) to describe the role of key players in the milkfish value chain with an emphasis on gender dimensions; and (2) to estimate the value addition done by the key players and the implications on income distribution.

## Methods

This value chain analysis (VCA) employed a triangulation of primary and secondary data sources. Primary data gathering involved actual observation, key informant interviews (KIIs), and focus group discussions (FGDs). Three private fish cage investors, 10 fish cage supervisors, 10 small-scale operators, five brokers/traders, seven wholesalers and 14 retailers, two officers of the Balingasag Women's Federation, and the Municipal Agricultural Technologist in Fisheries served as KIs. FGDs with wives of marginal operators/fish cage workers and with fish cage workers were conducted. Secondary data came from the Bureau of Fisheries and Aquatic Resources (BFAR) and Philippines Statistics Authority (PSA) websites, research articles, and from the Balingasag Mariculture Park records. Value addition from each of the key players in the chain were estimated using a cost and returns analysis and were then compared. The study was conducted in January to June, 2014.

## Results

The mariculture park covers 195 ha but only 10 % of this is used for culturing milkfish: 11.5 ha for the 56 fish cages of 11 big fish cage operators; 6 ha for 100 fish cages of 24 medium operators, and 2 ha for 9 fish cages shared by 34 small-scale operators; the last group comprises mariculture park livelihood beneficiaries (DA-BFAR Balingasag Mariculture Park brochure, 2009). Table 1 details the number and sizes of fish cages owned by different types of operators, the stocking density and yield.

**Table 1.** Fish cages - characteristics, stocking density and yield

	Big Operators	Medium Operators	Small-scale Operators
No. of fish cages operated	7–14	2–6	¼ a fish cage
Materials used	High density poly-ethylene, galvanized iron pipes, bamboo	Galvanized iron pipes bamboo	Bamboo
Size	Circular: 10 m, 15 m, 20 m diameter Square: 10 m x 10 m x 5 m	Square: 10 m x 10 m x 5 m	Square: 5 m x 5 m x 5 m
Fingerlings stocked/fish cage	15,000 – 60,000	15,000	5,000
Yield/fish cage(MT)	7.50–30.0	7.5–8.0	≈ 2.0

Source: Balingasag Municipal Agriculture Office 2014.

## ***Gender and Poverty in the Milkfish Value Chain***

### ***Inputs and Services***

This node of the chain is the pre-stocking stage where repairs and maintenance of fish cages and the sourcing of fingerlings are done in preparation for production. Male fish cage caretakers hired by private investors perform the former but women were also hired to mend or fabricate fishnets. The small-scale operator does these tasks, assisted by men and women (specifically for net repairs) next-of-kin whose labor is unpaid. Procurement of fingerlings (PhP 8 each) was also done at this stage. As indicated in Table 1 above, the minimum stocking density for private investors is 15,000 fingerlings, but only 5,000 for small operators.

### ***Production***

This is the milkfish grow-out period and covers 4 months of feeding milkfish juveniles till they are harvested. To allow time between crops for repairs and maintenance, there are only two grow-out periods, but grow-out is spread throughout the year in different fish cages so harvesting can be year-round. The fish cage operators are the key players in this node. Men comprised 80 percent of the 35 private (big and medium) operators and women composed the remaining 20 %. They had college education and access to investment capital. Similar to other mariculture parks (Aquapark Final Project eReport 2014), the small-scale operators are the fish cage livelihood beneficiaries, totalling 34. Only men and local residents can become beneficiaries. They are provided with fish cages and working capital. Four beneficiaries share a 10 m x 10 m x 5 m fish cage. Working capital is lent to a group of at least three, but the insufficient amount compels the beneficiaries to take turns in operating a fish cage. The pooled operating capital covers the cost of fingerlings, repairs and maintenance of fish cages and only 60 % of the feed required such that additional feed needs to be purchased on credit. For private investors, fingerlings and feed account for 20.4 % and 70.9 % of costs, respectively; labor and overhead costs account for the remaining. Private fish cage operators manage their fish cages through their hired fish cage supervisors who manage the fish cage caretakers in feeding the juveniles. Fish cage operations are done by men but women are hired to count the fingerlings for stocking in fish cages.

Hired watchers, sometimes armed, are all men and they secure the fish cages day and night from poaching.

Small-scale operators alternate with their respective wives and/or male children (13–15 years old), during school holidays in meeting the requirements of the grow-out period. The wives feed the juvenile milkfish when the operators engage in fishing, find an extra job, or get ill. It is not unusual to find the small operator and his wife safeguarding the fish near harvest time. Fish harvesting is done by fish cage workers, augmented by hired menfolk from their families. Women prepare the food for the harvesters. Fish brokers/traders shoulder labor and food expenses. Fish is sold fresh so no form value is created.

### ***Trading***

The brokers/traders of milkfish are those contacted by fish cage operators during harvest time to buy the fish for distribution to wholesalers. Our informants estimate that 75 % of the brokers/traders are men. The brokers/traders pay using cheques post-dated three to four days from the purchase date or give a promissory note to pay in 3–7 days. Traders generate place value as they move the fish through fish cars from the mariculture park to the fish landing area or “bagsakan” where they sell the fish to wholesalers. Wholesalers, whom we observed to be generally women, sell the fish to retailers, most of whom are also women, who go to the “bagsakan” to buy fish. Apart from recording sales and collecting payments from retailers, wholesalers have minimal activities and incur mainly labor expenses. Some of them also defer their payment for the fish for three days as they allow a two-day credit term to retailers who are their regular buyers. Retailers similarly generate place value as they transport the fish to the final consumers at the public markets. Few men join their wives in fish retail, but we learned that most wives partner with their retailer-husbands in selling the fish. Big and medium fish cage operators, fish brokers and wholesalers, both men and women, reported getting a personal share of profits. Small-scale fish cage operators and milkfish retailers revealed that profits become part of total family income.

It can be seen that from the pre-stocking of fish cages up to retailing, women played important roles. However, in small-scale operations women generally form part of unpaid family labor. Nonetheless, whether in focus group

discussions or in individual interviews, the women, particularly the wives of fish cage operators and the retailers, claimed feeling empowered as a result of working in tandem with their spouses in nurturing their livelihoods. The women said that by helping in fish cage operations, their spouses can engage in additional jobs, e.g., as caretakers of other fish cage operators, as carpenters, or as substitute tricycle drivers, and earn extra income. As milkfish retailers or as partners in their spouses' retail activities, the women are also able to contribute to household income. The respect that the women's economic activities engender allows them participation in major household decision-making, such as allowing both a son and a daughter to finish high school and accepting official functions in community organizations, e.g., secretary, thereby getting involved also in community affairs.

### *Value Additions along the Chain*

Taking the yield of 7.5 metric tonne of a single 10 m x 10 m x 5 m fish cage, the cage size common to all players except the small-scale operators who only operate a quarter of this size, as the basis for determining value additions, Table 2 shows the value-added by key players in the different nodes of the chain per kilogram. Value-added is the difference between gross value received and the cost of inputs (Brown et al. 2010). Gross value received for the fish cage operator is the farm gate price.kg<sup>-1</sup> of milkfish. Other inputs that he pays for include management expenses, labor cost, cost of fingerlings and feeds, and depreciation costs. Cost of inputs by the other players refers to their buying price.kg<sup>-1</sup> of milkfish. Value received for a kg by other players down the chain refers to the selling price.kg<sup>-1</sup> of milkfish while their major input cost is the buying price.kg<sup>-1</sup>. Other input costs for the brokers/traders refer to the cost of bringing the milkfish from the mariculture park to the "bagsakan", which includes labor cost, gasoline expense, and depreciation of the Asian utility vehicle or light truck, popularly called "fish car" used to transport fish. For the wholesaler, other input costs are nil as he/she only transfers the fish to the retailers at PhP 5.00 commission/kg from the broker; other input costs for the retailer include labor and transportation expenses in bringing the fish from the "bagsakan" to the wet market for final distribution to the consumers.

Using a cost and return analysis, private fish cage operators are able to create a value-added per kilogram estimated at PhP 11.11/kg, which was

realized only after four months of production or during harvest time. The brokers/traders' value added is estimated at PhP 12.05/kg and generated only in a day's time. Wholesalers are able to add only a value of PhP 5/kg in a day. The retailers are able to create the highest value added estimated at PhP 12.46/kg; however, they are able to sell only about 400 kg of milkfish in 1-2 days (Table 2).

**Table 2.** Value-added per kilogram by key players for a 7.5 metric tonne harvest (in PhP)

Particulars	Private (big and medium) fish cage operators (80 % men)	Brokers/Traders (75 % men)	Wholesalers (Mostly women)	Retailers (Mostly women)
Gross value received (Selling price/kg)	92.00	105.00	110.00	125.00
Cost of milkfish/kg	74.07	92.00	105.00	110.00
Cost of other inputs	6.82	0.95	-	2.54
Total cost of inputs	80.89	92.95	105.00	112.54
Value Added (Gross Value-total cost)	11.11 <sup>1</sup>	12.05	5.00	12.46

**Table 3.** Percentage of value-added to gross value-added by key players per kg of milkfish sold for 7.5 MT harvest and factors of production used

Key players	Value-added (PhPp)	% Value-added of Key Players	Inputs
Private [big and medium] fish cage operators (80 % men)	11.11 <sup>1</sup>	27.35	Management, labor, financial capital, depreciation cost of fish cages
Brokers/Traders (75 % men)	12.05	29.67	Management, labour, financial capital, depreciation cost of fish car
Wholesalers (mostly women)	5.00	12.31	Management, labor
Retailers (mostly women)	12.46 <sup>2</sup>	30.67	Labor, financial capital
Gross Value-added (Total wealth created)	40.62	100.00	

<sup>1</sup>Realised after 4 months of production

<sup>2</sup>Retailers are able to sell only 400 kgs

Table 3 shows the percentage of value added by the key players in the different nodes of the chain. Gross value added per kg is PhP 40.62. Value additions are largely generated by men owing to their more active involvement in fish cage operations, which generates 27.4 % of value added, and in brokering/trading, which generates 29.7 % of value added. This suggests a bigger income accruing to men from milkfish mariculture in Balingasag. Women are more involved in wholesaling and retailing; the former creates only a minimal percentage share of the gross value added (12.3 %), and while the latter generates the highest value addition in the chain (30.7 %), the retailer reported being able to absorb only 400 kgs of milkfish a day for distribution to final consumers.

Private investors can sell more than 7.5 metric tonnes of milkfish per harvest as they operate several fish cages (Table 1). Traders are also able to buy and sell bigger quantities given their access to capital, capacity to pay for labor and credit arrangements with operators. Wholesalers may similarly be able to absorb and sell more fish to retailers. Income accruing to these groups of players therefore multiplies with the volume sold. As profit margins from mariculture take four months to be realized, the attractive layers of profit margins in trading, earned only in a day, serve as incentives to some private operators to also engage in fish trade, thereby allowing them to create value up to the wholesale node of the chain.

The small-scale operators are able to create value estimated at PhP 7.38/kg in four months as they only have approximately 2,000 kgs of harvest and do not benefit from economies of scale, e.g., small volume of purchases of feed. Moreover, they earn only twice in two years as fish cage operators, because of their alternating production arrangements with other beneficiaries.

### ***Increasing women's participation in the mariculture park through fish processing***

In 2011, a 500 m<sup>2</sup> Milkfish Processing Plant was built by BFAR in Balingasag to increase women's participation in fish cage operations. 30 women were organized and trained to produce frozen and deboned milkfish for supermarkets and other institutional buyers. However, there are certification



requirements, such as for Good Manufacturing Practices (GMP) and Hazard Analysis and Critical Control Points (HACCP) for these lucrative markets to ensure that products are of high quality and pose no risk to consumers. Documents on food safety and maintenance of facility, among others, are required. The women were provided training for certification, but due to the very minimal volume of processing (<100 kgs.month<sup>-1</sup>) regular expert supervision and monitoring are absent thereby impeding the women's compliance as most of them did not even finish high school. The women more often rely on walk-in customers and earn only less than PhP 400 per month.

## **Discussion**

Income status and work requirements shape gender roles in the milkfish value chain in Misamis Oriental, Northern Mindanao. Where the fish cage operators can afford to hire workers, women's participation is peripheral; in small-scale operations, it is prominent yet forms part of unpaid (family) labor. This is consistent with the findings of Ferrer et al. (2014) and Sumagaysay (2014) among others, in their studies on small-scale fisheries. Consistent likewise with these studies are the involvement of men in activities requiring strength and the engagement of women in work needing patience and meticulous attention. However, cross overs are sometimes necessary as when women paddle a wooden fishing boat or "banca" to feed juvenile fish or men count fingerlings.

Findings also lend support to assertions by Silvander (2013) that households use various strategies to cope with poverty. A common strategy is to transform family members (usually wives and children) into unpaid workers, resulting in lower operational expenses and additional income. Diversifying livelihoods is another coping mechanism and manifested by small-scale operators working as caretakers of big fish cages or taking extra jobs. Livelihood diversification was also observed by Ellis (2000) in his studies on rural livelihoods.

Women's ability to provide/augment household income by serving as unpaid/substitute workers in fish cage operations, or by engaging or assisting in fish trade not only improve power relationships in the household but also afford women participation in community affairs. In an interview with the Agricultural

Technologist in Fishery of the Balingasag Municipal Agricultural Office (Karen May Sabugaa, personal communication) it was learned that gender considerations in the pursuit of inclusive and sustainable development in small scale fisheries as espoused by FAO (2015) have prompted BFAR to mitigate male dominance in fish cage operations by establishing an onsite milkfish processing facility. However, weaknesses earlier mentioned in meeting certification requirements for food safety render precarious the women's livelihood in fish processing.

Meanwhile, the distribution of benefits over time along the milkfish value chain (Table 2), as indicated by the value added by key players in the various nodes, provide insights on the percentage of value creation by men and women. It similarly provides insights for the persistence of poverty among small-scale players and capital accumulation among big and medium ones over time as the latter are able to exploit economies of scale.

## **Conclusions**

Evaluations of gender and poverty issues through VCA are gaining ground. This VCA for milkfish set in the context of the Balingasag MP opens a social window that allows a closer look at how access to factors of production shapes the roles of men and women in a value chain. It shows how value created in the chain and its distribution transform the way men and women relate to each other and how it expands women's participation in decision making in the household and in the community. As well, the VCA provides a better understanding of how value creation and subsequent income distribution lead to the perpetuation of poverty among small players and to the accumulation of wealth among big players.

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