Marketing Efficiency of Climbing Perch (Anabas testudineus) Cultured with Bioflock System

by Ahmadi .

Submission date: 10-Jun-2023 11:30AM (UTC+0700)
Submission ID: 2112930228
File name: rketing_Efficiency_of_the_Climbing_Perch_Anabas_testudineus.pdf (424.42K)
Word count: 4926
Character count: 25775

Marketing Efficiency of Climbing Perch (*Anabas testudineus*) Cultured with Bioflock System

Ahmadi [1*], Emmy Lilimantik [2], and Emmy Sri Mahreda [3]

[1,2,3]Faculty of Marine and Fisheries, Lambung Mangkurat University, Indonesia.

Corresponding Author: ahmadi@ulm.ac.id

ABSTRACT

The present study aimed to investigate the marketing channels, marketing margin and farmer's share of Climbing perch (*Anabas testudineus*) cultured with bioflock system. The fish were daily marketed in South and Central Kalimantan of Indonesia through two marketing channels i.e. the first channel: fish farmers→wholesalers→retailers→end consumers; and the second channel: fish farmers→institutional market→end consumers. The fish prices at fish farmers, wholesalers and retailers were IDR 60,000, IDR 70,000 and IDR 77,667 per kg, respectively. In the first channel, the highest net profit was received by fish farmers (45%), followed by wholesalers (33%) and retailers (22%). While in the second channel, the restaurant earn profit (74%) almost 3 times higher than fish farmers (26%). The marketing margins of wholesaler, retailer and restaurant were 14%, 23% and 50%, respectively. The current marketing system was considered to be efficient (farmer's share = 77.25%). The fish farming and culinary could be a promising business opportunities due to high demand for this species.

Keywords: Bioflock system, Climbing perch, farmer's share, marketing channel, marketing margin

INTRODUCTION

Indonesia is the world's largest archipelago state and now the second largest global fish producer (**Suadi and Kusano, 2019**). The fishery sector contributes about 8% of national gross domestic product. More than 11 million people are working in this sector as fishermen (8.69%), fish farmers (35.06%), fish processors and fish marketers (55.84%), and salt farmers (0.41%) (**Suraya and Sulistyo, 2019**). Fish consumption increases from 47.34 kg to 50.69 kg per capita per year. Nowadays, perception of

consumer preferences for consuming fish is highly appreciated **(Esilaba *et al.*, 2017)**. Fish consumption preferences are affected by individuals' socio-economic characteristics **(Can *et al.*, 2015)**. Consuming fish is very good for health as fish provides essential amino acid, calcium, phosphorus, iron, zinc, copper, vitamins **(Rahman et al., 2012; Tilami and Sampels, 2017)**. Fish arranges for 19.50% of protein and 2.27% of lipid **(Ahmed *et al.*, 2012)**.

In South Kalimantan Province, Climbing perch (*Anabas testudineus*) is locally known as "*Papuyu*", and favorably considered as one of commercially important freshwater fish species **(Ahmadi, 2019)**. The fish are usually served as delicious food with high quality meat. The market demand for fish consumption continuously increase from time to time, meanwhile the market supply is still low in quantity. After all, freshwater fish marketing is a crucial moment to success for producers and traders to earn the profit since fish being a highly perishable commodity needs immediately processed or sold after harvest. It spoils soon after death due to microbial actions, which result in disagreeable taste, smell and texture thereby reducing consumer acceptability **(Garrow and James, 1994)**. Meanwhile the fish price fluctuates much depend on the season, the quantity and quality of fish, the type and size of fish, freshness, supply and demand, market structure, market distance, and also long-short of marketing channels **(Aswathy and Abdu Samad, 2013; Ali *et al.*, 2014; Begum *et al.*, 2014)**. Nowadays, business transaction can be done through fish market, retail market, fishing port or even via internet order.

Numerous studies have been well-documented to describe the overview of freshwater and marine fish marketing included marketing system **(Husen, 2019)**,

marketing channels (**Ali *et al*., 2014; Rahman *et al*., 2019**), marketing management (**Sathiadhas and Kanagam, 2000**), market intermediaries and marketing margins (**Hussain *et al*., 2003**), market integration (**Omar *et al*., 2014**), typical transportation system used (**Rokeya *et al*., 1997**), economic analysis of fresh fish marketing (**Ali *et al*., 2008**), and marketing strategy (**Ahmed and Hossain, 2012**). All fish marketed here in the form of live fish, fresh fish, smoked and frozen fish sourced from capture fishery, aquaculture and fish processing. Basically the marketing system is the exchange activities associated with transferring property rights to commodities, physically purchasing and allocating resources, handling of products, disseminating information to participants and institutional arrangements for facilitating these activities (**Hossain *et al*., 2015**). In the present study, we investigated the marketing channels for Climbing perch (*Anabas testudineus*) held from bioflock system-based fish farming down to the end consumers including farmer share and the profit gained at different levels of marketing, as well as provided specific suggestions for improving the marketing system in this area of study.

MATERIALS AND METHODS

1. Research Sites

The research activities were started from field survey to five fish farming sites in Banjarbaru and then moved into six local fish markets located in Banjarbaru, Binuang, Rantau, Barabai, Pelaihari of South Kalimantan Province, and also Kapuas of Central Kalimantan, Indonesia (Fig. 1). These locations are purposively selected to exemplify the business prospect, marketing channels and distribution of Climbing perch at different levels.

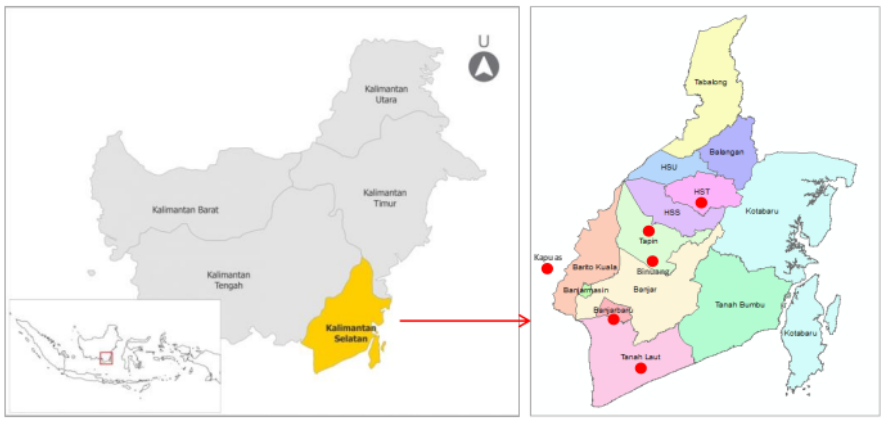

Fig. 1. The map showing the sampling areas for Climbing perch marketing

2. *Characteristic of Respondents*

A total of 22 respondents who directly involved in marketing channels were selected comprising 5 fish farmers, 2 fish collector traders and 15 retailers. The ages of respondents varied between 44-51 year olds with the duration of business ranged of 2-4 years. The wholesalers and retailers were determined by snowball sampling method. Snowball sampling is a purposeful method of sampling in qualitative research (**Naderifar *et al.*, 2017**). The respondents were interviewed using the structured questionnaires. The deep interview was undertaken to get overview and reliable information on the existing fish distribution and marketing systems, marketing channels, and also constraints being faced.

3. *Marketing Margin*

Marketing margin is the difference between the price at the fish farmer level and the price at the end consumer level. It can be simply expressed with this formula (**Flowra *et al.*, 2012**):

$$MM = Pr - Pf$$

where: MM is marketing margin (IDR), Pr is the price at the end consumer (IDR) and Pf is the price at fish farmer (IDR). It can also be calculated using the following formula (**Rahman *et al.*, 2012**):

$$\text{Marketing margin (\%)} = (\text{Selling price} - \text{Purchase price}) / \text{Selling price} \times 100$$

4. Farmer's Share

The farmer's share is the ratio of price received by the fish farmer to the price paid by the end consumer. It can be calculated using the formula (**Saravanapandeeswari and Vanitha, 2017**):

$$Fs = Fp / Cp \times 100$$

where: Fs is farmer's share (%), Fp is farmer's price (IDR/kg), and Cp is consumer's price (IDR/kg). According to **Kohls and Downey (1985)**, if the portion of the price received by fish farmer is greater than 50%, then the marketing system can be said to be efficient. The data were tabulated and analyzed using conventional statistical tools of MS Excel 2010, then presented in textual, charts and tabular forms.

RESULTS AND DISCUSSION

There was about 60-240 kg of fish harvested by individual fish farmer during 8 months of cultured period (Table 1). The sizes of fish varied between 120 and 300 mm total length and between 35 and 125 g weight. The fish are typically being harvested and sold on the same day. When the fish price was set at IDR 60,000 per kg, the fish farmers received money about IDR 3,600,000 to 14,400,000. Of 720 kg of total fish, 672 kg (93.33%) was shared to the wholesalers and the rest 48 kg (6.67%) was given to the local restaurants. In the first channel, there were only two wholesalers, who collected the fish

directly from fish farmers to the number of 162-510 kg to be distributed to 15 retailers (6-8 kg per day or 42-56 kg per week per individual). With the selling price of IDR 70,000 per kg, the wholesaler's revenue was ranged from IDR 11,340,000 to IDR 35,700,000. At retail prices of IDR 75,000-80,000 per kg, each individual retailer receives income ranging from IDR 450,000 to IDR 640,000 per day depends on the quantity of fish sold out to the end consumers. Among variable cost, pellet and fish seed were main purchase account to be borne by the fish farmers (30-41%). While for retailers and wholesalers, it counted for about 93-98% allocated for buying the fish.

Table 1. The volume and value of fish production at different marketing levels

Marketing level	n	Share of production (kg)			Price (IDR/kg)	Revenue (IDR)	
		Quantity	Average	Total		Average	Total
Fish farmers	5	60-240	144	720 [1)]	60,000	8,640,000	43,200,000
Wholesalers	2	162-510	336	672	70,000	23,520,000	47,040,000
Retailers	15	42-56 [2)]	44.8	672	77,667	3,479,482	52,192,224

[1)] About 48 kg of total fish shared to the restaurant (second channel); [2)] Weekly quota (in kg/wk)

The market demand for Climbing perch fish consumption reaches 900 kg per day, which is almost entirely sourced from the wild and only 30% produced from fish farming. In line with population growth and economy improvement, it is predicted that market needs of Climbing perch to meet fish consumption of the community for next 5 years ranging from 1.5 to 2 tons per day. The bioflock technology in aquaculture system had been successfully applied for some commercial fish and shrimp species such as Nile tilapia (**Nahar *et al.*, 2015**), African catfish (**Ekasari *et al.*, 2016**), pink shrimp (**Emerenciano *et al.*, 2013**), the pacific white shrimp (**Da Silva *et al.*, 2013**), Japanese tiger prawn (**Zhao *et al.*, 2012**), the green tiger shrimp (**Megahed, 2010**), Malaysian prawn (**Perez-Fuentes *et al.*, 2013**), the giant tiger prawn (**Anand *et al.*, 2014**) and most

recently applied for Climbing perch cultured in the ponds and business has favorable prospect (**Izmaniar *et al*., 2018**).

1. Marketing Channels

There were two marketing channels for bioflock system-based Climbing perch cultured (Fig. 2). The first channel, four of five fish farmers sold out the fish to the wholesalers (80%), and then distributed to the 15 retailers and finally marketed to the end consumers. The second channel, one fish farmer sold out the fish through institutional market/the restaurant (20%) and then directly distributed to the end consumers. The basic reasons why most of fish farmers preferred to the first channel are as follows: (1) fish farmers do not need to bear the transportation costs and other risks; (2) there are still many farmers who depend on fish traders to market their fish production. The presence of fish traders also provides convenience for fish farmers during the process of harvesting, payment, transportation and distribution; (3) each fish farmer usually has own customer (fish trader) so that the sale transaction can work well; (4) fish traders also have the fixed customers (retailers) in some market areas so that the sales process can run quickly and timely. The retailers usually make the payment in cash; (5) there is a commitment and trust between fish farmers and fish traders, especially in terms of payments, which is usually done by fish traders after the fish have been sold out. A partner's reputation in the market has a strong positive impact on the trust-building process (**Kwon and Suh, 2004**). Success in business is determinable how the key players build a good market communication to generate a sustainable business.

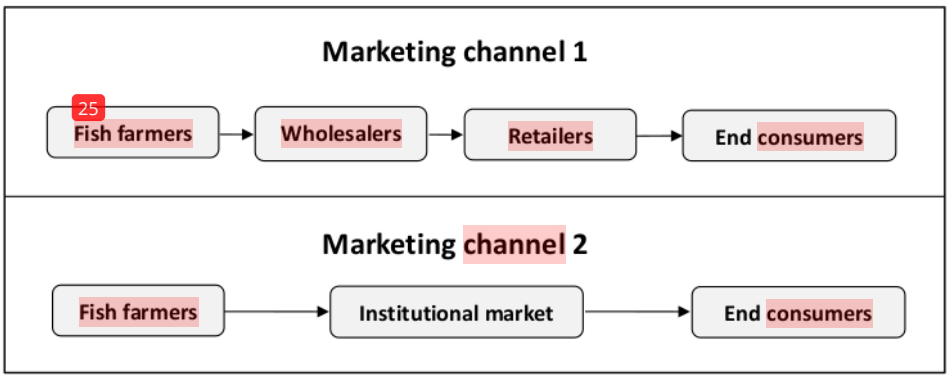

Fig. 2. Marketing channels of Climbing perch from fish farmers to end consumers

2. *Marketing Margin*

Marketing margin analysis was performed to see how big the role of market intermediaries as a link between fish farmers and final consumers in influencing the fish price. There was a variation in the fish prices at different marketing channels. The lowest fish price usually goes to the fish farmer level and then increasingly at the wholesalers or institutional market level and terminates in the retailer level leading to variation in the marketing margin (Table 2). It was estimated that the fish farmers received the net margin about 18% of the selling price for their fish production. According to **Huger and Hirenath (1984)**, the higher the value of marketing margin, the lower the efficiency of the marketing system. **Rabby *et al.* (2015)** assumed that the producers and intermediaries could be more benefited financially, if efficient marketing was arranged properly. In wholesale market, marketing intermediaries usually perform important role by providing financial assistance, inputs and other marketing facilities to the farmers since their motive is also profit oriented **(Keno, 1994)**. Otherwise generally felt by the consumers is that they have to pay higher price due to the involvement of too many intermediaries in the marketing channels.

In the first channel, there was a difference in the price (IDR 17,666 per kg) between the price at fish farmers (IDR 60,000 per kg) and the average price at the end consumers (IDR 77,666 per kg). The percentages of marketing margin for the wholesalers to the fish farmers, the retailers to the fish famers and the retailers to the wholesalers were 14.29%, 22.75% and 9.78% respectively. It was clearly pointed out that the wholesalers had margin (IDR 10,000 per kg) greater than retailers (IDR 7.666 per kg), this because: (1) they acted as the price maker in the marketing system since they have a good marketing intelligence; (2) they sold out the fish in large quantity in order to reduce the marketing cost; while (3) retailers sold out the fish in small quantity resulted in the marketing cost was relatively high. At the same time, the amount of marketing costs paid by the wholesalers (IDR 2,050 per kg) was lower than paid by retailers (IDR 2,456 per kg); this because they do not need to pay for stall rental cost, market retribution and other relevant services. In the first channel, the highest net profit was received by fish farmers (45%), followed by wholesalers (33%) and retailers (22%). While in the second channel, the restaurant earn profit (74%) almost 3 times higher than fish farmers (26%) corresponding to marketing cost spent. It was calculated that the marketing margin of restaurant to fish farmer was 50% (see Table 2). The profit received by the wholesalers (IDR 7,950 per kg) was comparatively higher than received by retailers (IDR 5,210 per kg). It means that the market intermediaries can be said to be efficient because they create the business much more profitable. Aktar et al. (2013) reported that 80% of the fish retailers in Noakhali District of Bangladesh have improved their livelihood status through fish trading. **Omar *et al.* (2014)** suggested that efficient marketing system should be developed by reducing marketing cost and increasing marketing services to make the business more profitable.

Moreover, the fish farmers should also follow standard scientific culture practices and regularly access information on the fish prices **(Kumar *et al*., 2010)**.

Table 2. Market prices, marketing margin and farmer's share for Climbing perch at different levels of marketing channels

Marketing Level	Parameter Observed	Marketing Channel	
		1	2
Fish farmers			
	Production cost (IDR/kg)	49,225.52	49,225.52
	Selling price (IDR/kg)	60,000.00	60,000.00
	Marketing margin (IDR/kg)	10,774.48	10,774.48
	Marketing cost (IDR/kg)	-	-
	Profit (IDR/kg)	10,774.48	10,774.48
Wholesalers			
	Purchase price (IDR/kg)	60,000.00	
	Selling price (IDR/kg)	70,000.00	
	Marketing margin (IDR/kg)	10,000.00	
	Marketing cost (IDR/kg)	2,050.32	
	Profit (IDR/kg)	7,949.68	
	Margin of wholesaler to fish farmer (%)	14.29	
Retailers			
	Purchase price (IDR/kg)	70,000.00	
	Selling price (IDR/kg)	77,666.67	
	Marketing margin (IDR/kg)	7,666.67	
	Marketing cost (IDR/kg)	2,456.00	
	Profit (IDR/kg)	5,210.67	
	Margin of retailer to fish farmer (%)	22.75	
Restaurant (Institutional market)			
	Purchase price (IDR/kg)	-	60,000.00
	Selling price (IDR/kg)		120,000.00
	Marketing margin (IDR/kg)		60,000.00
	Marketing cost (IDR/kg)		29,000.00
	Profit (IDR/kg)		30,500.00
	Margin of restaurant to fish farmer (%)		50.00
Consumers			
	Purchase price (IDR/kg)	77,666.67	120,000.00
	Total margin (IDR/kg)	28,441.15	10,774.48
	Total marketing cost (IDR/kg)	4,506.32	29,000.00
	Total profit (IDR/kg)	23,934.82	41,274.48
	Farmer's share → efficient (Fs > 50%)	77.25	50.00

3. *Farmer's Share*

The selling price of fish at fish farmers was IDR 60,000 per kg, while the price at retailer level fall between IDR 75,000 to IDR 80,000 per kg or IDR 77,666 per kg in average. The price portion received by the fish farmers was ranged of 75-80% or about 77.25% of the price paid by the end consumers (Table 2), which was found to be higher than 50%, indicating that fish marketing system here was considered to be efficient **(Kohls and Downey, 1985)**. Compared to other single-species from different geographical areas, the percentage of farmer's share obtained in the present study being equal to the trout marketing in Kohgiloye and Boyer Ahmad Province of Iran **(Shahi *et al.*, 2012)**, but it was higher than European anchovy (54%) or Atlantic horse mackerel (60%) traded in Trabzon province **(Dağtekin, 2010)**.

The great portion of the price received by fish farmers was closely related to the marketing system itself that has been formed between them and wholesalers due to some reasons: (1). Fish farmers willing to get greater profits without any risks to be borne; (2) since fish farmers have a limited fish production, it was better to sell out the fish directly to the wholesalers rather than selling it the retail market; and (3) Fish farmers have also the bargaining power to determine a reasonable price based on the quality and size of fish because they also knew well about the market price of this species as important food fish. Such bargaining interaction was also shown by both the aquafarmer's association in Thambikottai village of Tiruvarur District and fishermen associations in Kombuthurai, Tamil Nadu of India **(Kumar *et al.*, 2010)**. Market information is needed by the fish farmers as a part of market transparency and also reference for arranging a competitive pricing strategy. In this regard, there was a good lesson learned from Aquachoupals

model in Andhra Pradesh of India that provides access to prices on a daily basis, in which the farmers were able to take the critical decisions on when and where to sell their productions **(Kumar *et al.*, 2010)**. A tangible deliverable was also demonstrated by Ghana's farmers who received significantly higher prices for their productions after using mobile phone-based Marketing Information Services (MIS) program and how information affects a farmer's decision to sell at the farmgate rather than at the market **(Courtois and Subervie, 2014)**. In the present study, the retailers have more bargaining power when they sold out the fish to consumers than they purchased from wholesalers, because the bargaining power between retailers and wholesalers is almost equal, as well as the bargaining power between fish farmers and wholesalers. Dealing with the purchase ability of the party, most of wholesalers and retailers use their own capital to do business. It was similarly reported by **Jamali *et al.* (2013)** that about 70% retailers in Gopalpur Upazila of Tangail District used their own money for fish trading.

4. Constraint and Solution

At the fish farmer level, some constraints being faced such as the availability of superior fish seeds, electrical supply and the limited capital for fish production are crucial to success. For the wholesalers, it takes time to collect the fish harvested since the fish farming sites are scattered. Moreover, asynchronous fish harvested by individual fish farmer resulted in high cost of fish marketing. While for the retailers, the quantity of fish which is shared by the wholesalers does not correspond with the retailer's demand, this because the supply of fish obtained from the fish farmers is still lacking. Occasionally if there is more demand of fish among the retailers, the wholesalers preferred to deliver the fish to a location that is closer from fish farming than far-off to reduce marketing costs.

Specific suggestions for improving the current marketing systems should incorporate: the certified fish hatchery to produce superior seeds, improvement of bioflock technology for small scale fish farming to increase fish production, introduction of modern wholesaling and retailing facilities, the strengthening of institutional marketing, and promotion of mobile phone-based Marketing Information Services to find out the global and local market transparency. In the long term, it is necessary for interested parties to form the cooperative society with legal entity. The defined role of the cooperative society will support beneficially for fish marketing system as a whole **(Rabby *et al*., 2015)**.

CONCLUSION

It can be concluded that the fish marketing channel through market intermediaries was less efficient than through institutional market. The highest net profit per kg was received by the fish farmers followed by the wholesalers and retailers. The marketing margin of institutional market was 2-3 times higher than that of wholesalers and retailers. The current marketing system is considered to be efficient. It is a great challenge to increase fish production, and the prospect of culinary business is open. To the best our knowledge, the present study provides the first reference on the bioflock system-based fish marketing of Climbing perch in the investigated areas.

REFERENCES

Ahmadi. (2019). Morphometric characteristic and growth patterns of Climbing perch (*Anabas testudineus*) from Sungai Batang River, Indonesia. Int. J. Hydrol., 3(4): 270-277.

Ahmed, S. and Hossain, B. (2012). Marketing strategies for frozen fish exporters in Bangladesh. J. Arts. Sci. Commer. 3(3): 1-8.

Ahmed, S., Rahman, A.F.M.A.; Mustafa, M.G.; Hossain, M.B. and Nahar, N. (2012). Nutrient composition of indigenous and exotic fishes and rainfed waterlogged paddy fields in Lakshmipur, Bangadesh. World J. Zool., 7(2): 135-140.

Aktar, N.; Islam, M.R.; Hossain, M.B. and Rahman, M. (2013). Fish species availability and marketing system of fish in different markets of Noakhali district in Bangladesh. World Appl. Sci. J., 22(5): 616-624.

Ali, E.A.; Gaya, H.I.M. and Jampada, T.N. (2008). Economic analysis of fresh fish marketing in Maiduguri Gamboru market and Kachallari Alau Dam landing site of Northeastern Nigeria. J. Agric. Soc. Sci., 4: 23-26.

Ali, M.M.; Rahman, M.M.; Hossain, M.Y.; Rahman, M.Z.; Hossen, M.A.; Naser, S.M.A.; Islam, R.; Subba, B.R.; Masood, Z. and Hoque, M.A. (2014). Fish marketing system in southern Bangladesh: recommendations for efficient marketing. Our Nature.12(1): 28-36.

Anand, P.S.S.; Kohli, M.P.S.; Kumar, S.; Sundaray, J.K.; Roy, S.D.; Venkateshwarlu, G.; Sinha, A. and Pailan, G.H. (2014). Effect of dietary supplementation of biofloc on growth performance and digestive enzyme activities in *Penaeus monodon*, Aquaculture, 418: 108-115.

Aswathy, N. and Abdussamad, E.M. (2013). Price behavior and marketing efficiency of marine fish in Tuticorin, Tamil Nadu. J. Fish. Econom. Dev., 13(2): 29-35.

Begum, R.; Akter, T.; Barman, P.P.; Marine, S.S. and Hossain, M.M. (2014). Potential for development of marine fish marketing systems in Chittagong District of Bangladesh. J. Sylhet Agric. Univ., 1(2): 247-252.

Can, M.F.; Gunlu, A. and Can, H. (2015). Fish consumption preferences and factors influencing it. Food Science and Technology (Campinas), 35(2): 339-346.

Courtois, P. and Subervie, J. (2014). Farmer bargaining power and market information services. American J. Agric. Econom., 97(3): 1-25.

Da Silva, K.R.; Wasielesky, W. and Abreu, P.C. (2013). Nitrogen and phosphorus dynamics in the bioflock production of the pacific white shrimp, *Litopenaeus vannamei*. J. World Aquac. Soc., 44(1): 30-41.

Dağtekin, M. (2010). Fishery production and marketing structure in Trabzon (MSc Thesis). Çukurova University, Adana, Turkey.

Ekasari, J.; Suprayudi, M.A.; Wiyoto, W.; Hazanah, R.F.; Lenggara, G.S. and Sulistiani, R. (2016). Bioflock technology application in African catfish fingerling production: the effects on the reproductive performance of broodstock and the quality of eggs and larvae. Aquaculture, 464: 349-356.

Emerenciano, M.; Cuzon, G.; Paredes, A. and Gaxiola, G. (2013). Evaluation of bioflock technology in pink shrimp *Farfantepenaeus duorarum* culture: growth performance, water quality, microorganisms profile and proximate analysis of bioflock. Aquac. Int., 21(6): 1381-1394.

Esilaba, F.A.; Moturi, W.N. and Mokua, M.A. (2017). Urban consumer's fish preferences and the determinants influencing fish selection and consumption: Case study of Nakuru, Kenya. Int. J. Fish. Aquat. Stud., 5(3): 356-360.

Flowra, F.A.; Bashar, A.H.M.; Jahan, K.S.N.; Samad, M.A. and Islam, M.M. (2012). Fish marketing system and socio economic status of Aratdars in Natore and Rajshahi, Bangladesh. J. Our Nature, 10(1): 34-43.

Garrow, J.S. and James, W.P.T. (1994). Human nutrition and dietetics. London, UK: Churchill Livingstone.

Hossain, M.A.; Abdulla-Al-Asif; Zafar, M.A.; Hossain, M.T.; Alam, M.S. and Islam, M.A. (2015). Marketing of fish and fishery products in Dinajpur and livelihoods of the fish retailers. Int. J. Fish. Aquat. Stud., 3(1): 86-92.

Huger, L.B. and Hirenath, K.C. (1984). Efficiency of alternative channels in marketing of vegetables in Belgaum City - A comparison. Indian J. Agric. Econ., 34(3): 192-200.

Husen, M.A. (2019). Fish marketing system in Nepal: Present status and Future prospects. Int. J. Appl. Sci. Biotechnol., 7(1): 1-5.

Hussain, S.A.; Badar, H. and Khokhar, S.B. (2003). Market intermediaries and their marketing margins for Inland Fish – A case study of Lahore District. International J. Agric. Biol., 5(1): 73-76.

Izmaniar, H.; Mahyudin, I.; Agusliani, E. and Ahmadi. (2018). The business prospect of Climbing perch fish farming with bioflock technology at De' Papuyu Farm Banjarbaru. Int. J. Envi. Agric. Biotechnol., 3(3): 1145-1153.

Jamali, A. (2013). Present status of fish marketing in Gopalpur Upazila of Tangail District. J. Aquat. Sci., 1(2): 24-30.

Keno. (1994). Marketing costs of intermediaries in wholesale markets of fruits and vegetables. Technical Bulletin of Faculty of Horticulture, Chiba University, Japan.

Kumar, B.G.; Ravisankarb, T.; Sureshc, R.; Bhattad, R.; Vimalab, D.; Kumaranb, M.; Mahalakshmib, P. and Sivasakthi Devi, T. (2010). Lessons from innovative institutions in the marketing of fish and fishery products in India. Agric. Econom. Res. Rev., 23: 495-504.

Kwon, I.W.G. and Suh, T. (2004). Factors affecting the level of trust and commitment in supply chain management. J. Suppl. Chain Man., 40(2): 4-14.

Megahed, M. (2010). The effect of microbial biofloc on water quality, survival and growth of the green tiger shrimp *(Penaeus semisulcatus)* fed with different crude protein levels. J. Arab Aquac. Soc., 5(2): 119-142.

Naderifar, M.; Goli, H., and Ghaljaie, F. (2017). Snowball sampling: A purposeful method of sampling in qualitative research. Strides Dev. Med. Edu., 14(3): e67670.

Nahar, A.; Abu, M.; Siddik, B. and Rahman, M.M. (2015). Bioflock technology in aquaculture systems generates higher income in mono-sex Nile tilapia farming in Bangladesh. Adv. Biol. Res., 9(4): 236-241.

Omar, M.I.; Dewan, M.F.; Janifa, U.A. and Hoq, M.S. (2014). Analysis of spatial cointegration and marketing margin of Tilapia *(Oreochromis niloticus)* fish in some selected areas of Bangladesh. J. Econom. Sustain. Dev., 5(7): 63-70.

Perez-Fuentes, A.; Perez-Rostro, C.I. and Hernandez-Vergara, M. (2013). Pond-reared Malaysian prawn *Macrobrachium rosenbergii* with the bioflock system. Aquaculture, 400-401: 105-110.

Rabby, A.F.; Hossain, M.A.; Alam, M.T.; Uddin, M.S. and Dey, T. (2015). Status and economics of three Upazilla fish markets in Moulavibazar District in Bangladesh. J. Sylhet Agric. Univ., 2(1): 87-95.

Rahman, Ahmadi and Mahreda, E.S. (2019). Marketing channels of marine fish in Banjarmasin fishing port, Indonesia. Int. J. Fish. Aquat. Res., 4(3): 15-22.

Rahman, M.M.; Hossain, M.A.; Fatematuzzhura; Tasnoova, S.; Ahamed, F.; Hossain, M.Y. and Ohtomi, J. (2012). Fresh fish marketing status in the Northwestern Bangladesh: Recommendations for Sustainable Management. Our Nature, 10(1): 128-136

Rahman, M.M.; Bashar, M.A. and Hasan, M.N. (2012). Effects of stocking density on survival, growth and production of Thai climbing perch (*Anabas testudineus*) under fed ponds. Sains Malaysiana, 41(10): 1205-1210.

Rokeya, J.A.; Ahmed, S.S.; Bhuiyan, A.S. and Alam, M.S. (1997). Marketing system of native and exotic major carps of Rajshahi District. Bangladesh J. Fish., 20(1-2): 99-103.

Saravanapandeeswari, V. and Vanitha, B. (2017). Producer's share in consumer Rupee in the marketing of Banana, Theni District. Int. J. Curr. Sci. Res., 3(7): 1311-1320.

Sathiadhas, R. and Kanagam, A. (2000). Distribution problems and marketing management of marine fisheries in India. In: "Marine Fisheries Research and Management". Pillai, V.N. & Menon, N.G. (Eds.). MFRI; Kochi, pp. 858-875.

Shahi, H.M.; Zeratkish, Y. and Foroughi, V. (2012). Factors affecting Trout marketing in Kohgiloye and Boyer Ahmad Province of Iran. J. Food Agri. Envi., 10(1): 248-250.

Suadi and Kusano, E. (2019). Indonesian Seafood Supply Chain', in Kusano, E. (ed.), Food Value Chain in ASEAN: Case Studies Focusing on Local Producers. ERIA Research Project Report FY2018 No.5, Jakarta: ERIA, pp.134-163.

Suraya and Sulistyo, P.B. (2019). Sosialisasi identifikasi peluang usaha kelautan dan perikanan di Pesisir Pantai Sawarna -Lebak Banten. Jurnal Abdi MOESTOPO, 2(1): 30-37.

Tilami, S.K. and Sampels, S. (2017). Nutritional value of fish: lipids, proteins, vitamins, and minerals. Rev. Fish. Sci. Aquac., 26(2): 243-253.

Zhao, P.; Huang, J.; Wang, X.H., Song, X.L.; Yang, C.H.; Zhang, X.G. and Wang, G.C. (2012). The application of bioflocs technology in high-intensive, zero exchange farming systems *of Marsupenaeus japonicus*. Aquaculture, 354-355: 97-106.

Marketing Efficiency of Climbing Perch (Anabas testudineus) Cultured with Bioflock System

ORIGINALITY REPORT

13%	11%	9%	3%
SIMILARITY INDEX	INTERNET SOURCES	PUBLICATIONS	STUDENT PAPERS

PRIMARY SOURCES

1	rjs.ruh.ac.lk Internet Source	2%
2	talenta.usu.ac.id Internet Source	1%
3	Muhammad Irfan Affandi, Sri Handayani. "Marketing Efficiency Of Organic Rice In Lampung Province", Journal of Physics: Conference Series, 2020 Publication	1%
4	www.fisheriesjournal.com Internet Source	1%
5	ciba.res.in Internet Source	1%
6	jsau.sau.ac.bd Internet Source	1%
7	www.ajol.info Internet Source	1%
8	mail.scialert.net Internet Source	

		1%
9	Submitted to University of Newcastle upon Tyne Student Paper	<1%
10	Md. Yusuf Ali, Shaharior Hossen, S.M. Oasiqul Az, Md. Shahin Alom et al. "Fish availability and Marketing System at Local Markets of a Coastal District, Southern Bangladesh", Asian Journal of Animal Sciences, 2017 Publication	<1%
11	Azis Nur Bambang. " Fish Marketing of Ribbon Fish (sp.) in Nusantara Fishing Port (NFP)at Palabuhanratu, West Java ", E3S Web of Conferences, 2018 Publication	<1%
12	banglajol.info Internet Source	<1%
13	Khalil Minabi, Iman Sourinejad, Morteza Alizadeh, Ebrahim Rajabzadeh Ghatrami, Mohammad Hossein Khanjani. "Effects of different carbon to nitrogen ratios in the biofloc system on water quality, growth, and body composition of common carp (Cyprinus carpio L.) fingerlings", Aquaculture International, 2020 Publication	<1%

14	eprints.cmfri.org.in Internet Source	<1 %
15	trjfas.org Internet Source	<1 %
16	www.scirp.org Internet Source	<1 %
17	www.scribd.com Internet Source	<1 %
18	Suman Lal Debnath, Md Fakhrul Islam, Syed Ariful Haque, Partha Sarathi Das, Md Idris Miah, Md Jasim Uddin. "A study on fish market and marketing system in Gazipur district, Bangladesh", Asian-Australasian Journal of Bioscience and Biotechnology, 2019 Publication	<1 %
19	Wiludjeng Roessali, Endang Dwi Purbayanti, Tutik Dalmiyatun, Suryani Nurfadillah. "Supply Chain Analysis of Chayote in Semarang Regency, Central Java Province, Indonesia", IOP Conference Series: Earth and Environmental Science, 2020 Publication	<1 %
20	ij-aquaticbiology.com Internet Source	<1 %
21	iosrjournals.org Internet Source	<1 %

22	jurnal.ugm.ac.id Internet Source	<1 %
23	mel.cgiar.org Internet Source	<1 %
24	nepjol.info Internet Source	<1 %
25	pubs.sciepub.com Internet Source	<1 %
26	Heliawaty, D Rukmana, Y Iumoindong, A Sulili, N Lanuhu, I Natsir. "Social capital and income of cocoa farmers in peta village, Sendana District, Palopo City, South Sulawesi Province", IOP Conference Series: Earth and Environmental Science, 2021 Publication	<1 %
27	Rahman, Md. Mosaddequr, Md. Akhtar Hossain, Dr Fatematuzzhura, Shuraya Tasnoova, Ferdous Ahamed, Md. Yeamin Hossain, and Jun Ohtomi. "Fresh Fish Marketing Status in the Northwestern Bangladesh: Recommendations for Sustainable Management", Our Nature, 2013. Publication	<1 %
28	Zhe Yu, Zhong - Yi Dai, Liang Li, Gui - Xin Qin, Li - Fang Wu. " Dietary supplementation with biofloc promotes growth, improves immune	<1 %

and antioxidant status, and upregulates NF - κB/Nrf2 signalling molecules and stress resistance in Dybowski ", Aquaculture Nutrition, 2020
Publication

29	www.mdpi.com Internet Source	<1 %
30	Jacob Tubalawony, Fransina Wattimena, Juliana Latuihamallo, Jolen Matakupan. "Marketing Study of Dry Abalone [Haliotis Asinina (Linnaeus, 1758)] in District of South East Maluku", Aquatic Procedia, 2016 Publication	<1 %
31	Kangsen Mai, R. Waagbø, X.Q. Zhou, Q.H. Ai, L. Feng. "Vitamins", Elsevier BV, 2022 Publication	<1 %
32	Sudip Debnath, Moin Uddin Ahmed, Md. Shahin Parvez, Anup Kumar Karmokar, Md. Nazmul Ahsan. "Effect of stocking density on growth performance and body composition of climbing perch (Anabas testudineus) in biofloc system", Aquaculture International, 2021 Publication	<1 %

Exclude quotes	On	Exclude matches	Off
Exclude bibliography	On		