

A CASE STUDY OF ACTIVITY-BASED COSTING IN THE MALAYSIAN PATIN FISH INDUSTRY

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ABSTRACT

This case study presents different costs incurred by farmers in Patin fish industry in Temerloh. Fixed costs, variable costs and cost per unit are discussed. These costs have had both positive and negative results. Activities in site preparation or cage, fish seedlings, fish grading, cage cleaning, and fish selling and marketing are identified. Of many cost objects, labour hour, cages size, machines hour, and fish seeds are the possible cost drivers. The findings from this case study contribute to a better understanding of a practice of costing which is advanced on Activity-Based Costing. By far the most challenging experience for fish farmers is to make sure the costs are evolved to its potential for producing a good yeild. The concept of ABC remains a theoretical challenge to any comprehensive aquaculture studies. With the right information of ABC, fish farmers can see the trade-off between what to do and what not for their success.

Keywords: ABC, costs, Patin, strategy, Malaysia

INTRODUCTION

Patin fish is originally growth from Southeast Asia, in rivers and lakes of Malaysia, Thailand, and Indonesia (Ibrahim et al., 2014). In Malaysia, this fish can be found in almost water streams such as Pahang River, Kenyir Lake and Kelantan River. Patin production is envisaged to increase for local and export markets. Patin farming with other freshwater aquaculture contributed to 163,757 tonnes valued at RM992 million of total aquaculture production in 2012 (Yusoff, 2015).

This case study focuses on aquaculture Patin fish in Pahang River in Temerloh district. There are two types of body coloration of Patin fish; grey when small and turns brighter as adults (The Star, 2016). According to Fisheries Dept (2010) the growing popularity of consuming fish in Malaysia has been noticeable in the past 10 years. Consumers have become more aware of the benefits of eating fish and of consuming fish of high quality. However, marine fish resources are being depleted, resulting in ever-rising prices of seafood. Freshwater fish has been found to be a viable resource to meet the demand in the market. The freshwater fish-rearing industry is an expanding among agriculturists and fishermen (Karim, 1990 Babji et al., 2015).

As such, it has become increasingly important to look at rivers, mining pools and lakes for producing fish and other aquatic sources of food (Liong et al., 1988; Yule, 2004). These rivers, pools and lakes have been, for decades, used for fish culture. Since the large number of freshwater bodies available, Babji et al. (2015) see Malaysia has considerable growth potential for aquaculture for investment. Potential Malaysian freshwater food fish species are catfish, Tilapia, Patin, Javanese carp, common carp, big head carp and marble goby. According to Malaysian Fisheries Institute, (2013 pp. 18-20), the aquaculture production in 2013 was 260,773 tonnes, majority with catfish 28.4%, tilapia 31.5% and Patin 11.2%.

Babji et al. (2015) describe Patin fish as soft and gelatinous, and the dish is usually enjoyed with white rice, with sambal belacan and ulam on the side. In Temerloh, Pahang currently there are over 70 restaurants selling patin fish dish. According to Bernama News (2017) the Agriculture Ministry has so far approved RM28.859 million in grants to 1,549 young agro entrepreneurs nationwide. The amount formed part of the RM100 million allocated by the ministry for the young agropreneurs programme which aimed to produced 3,0000 agropreneurs, aged between 18 and 40. Zaki (2017) observes Temerloh district has received grants worth RM760,000 for 39 participants, 20 of them involved in fish cage rearing. The Agriculture and Agro based Industry Ministry targets to produce aquaculture fish products valued at over RM270 million for year 2017 from Pahang, particularly

Temerloh which is synonymous with the Patin fish cage culture. Currently, Zaki (2017) finds currently Temerloh produced over 14,000 tonnes of fish of various species including the Patin and Tilapia from its 2,018 cage culture units run by 283 operators.

It was recorded that freshwater fish from rivers contributed to 560 tonnes of landings valued at RM2.2 million of this year, of which 12.5 tonnes valued at over RM60,000 came from Temerloh (The Star, 2017). Cage fish culture in Temerloh, developed since 2008, is one of the biggest and most successful in Malaysia, and has lent its trademark to the district. Temerloh produce Patin to rise to 20,000 tonnes by 2020. Fishermen and cage fish breeders in Temerloh have caused the growth in agro tourism industry (Ibid). Among the districts in Malaysia, Temerloh is the only place known as “Bandar Ikan Patin” (Patin Fish Town).

This paper seeks to investigate the costs of Patin fish industry in Temerloh. Cost is central to management accounting used to identify, estimate, calculate and allocate resources. Cost is critical in fishery since the industry contributes to long-term ecological sustainability and economic prosperity to the country (see Sabau and de Jong, 2015). The study suggests that cost can be used as indicators of inequalities amongst fish farmers. Accordingly, farmers can recognize the number of factors that drive the costs up and down. The remainder of this paper is structured in the following way. Section 2 examines literature concerned with the Activity-Based Costing (ABC), and discusses the application of it to Patin fish industry. Section 3 outlines the case study research method. Section 4 contains findings of the case studies. Conclusions follow in Section 5.

ACTIVITY-BASED COSTING (ABC)

According to Krishnan (2006), ABC is a system that reduces the level of random cost allocations associated with the traditional costing systems which result in more accurate product cost. ABC improves decisions making, involving resource allocation, product mix, pricing and marketing (e.g. Mishra et al., 2017; Homburg et al., 2018). Østergren and Stensaker (2011) believe the very aim of ABC is to analyze the volume of the transactions which is the basis for budgeting purpose. Kumar and Mahto (2013) discover it is the activity or the volume of the transactions that provides resources and various cost drivers, is an activity is a specific task or action of work done. The activity can be a single action or an aggregation of several actions. ABC is a costing methodology that identifies activities in an organization and assigns the cost of each activity to all products and services according to the actual consumption. Chenhall and Moers (2015) investigate ABC with financial performance and found they are associated.

The most important component of ABC that is associated with financial performance is the cost driver used. Cost drivers are the factors that determine the number of activities that will be consumed by a given product. Examples of cost drivers include machine hours, size, type, and any other product attribute that can determine its cost. Oseifuah (2014) suggest the determination of cost drivers in all activities is critical. Cost drivers help organization to understand indirect and direct costs which are relevant for decision making, especially to set a priority on determining how to identify and eliminate those products and services that are unprofitable.

COST DRIVERS OF ACTIVITY-BASED COSTING (ABC) IN PATIN INDUSTRY

Aseiedu et al. (2000) consider uncertainties such as time, inflation, labour rates, and failure rates to influence number of units produced, labour hours, hours of equipment time, or number of orders received. According to them, the latter are known as cost drivers since they cause a business to endure costs. Kumar and Mahto (2013) explain that a cost driver is a factor that relates to a change in the cost of every business activity. Due to this, a cost driver is a measure of the amount of resources consumed by an activity. Porter (1985) suggests a cost driver can be used to optimize and coordinate the performance of activities.

In Activity-Based Costing (ABC), a large numbers of diverse cost drivers may be used, between the resources and activities and between the activities and products. ABC allows an in-depth product analysis by explaining the relationships between the products and activities. According to Akhavan et al. (2016) the actual costs were calculated on the basis of the resources use associated with the activities. On the basis of the usage they are assigned, costs can be divided into direct costs (directly traced to the cost objects) and indirect costs (not directly traced to the cost objects but indirectly allocated using cost drivers).

From this case study of Patin fish farming, the cost drivers include labour, machinery, vehicle, fuel, power jet, diseases and natural disaster. These drivers are the real cause of changing in the cost of Patin fish farming. Table 1 summarizes them.

Table 1: The activities and possible cost driver Patin fish farming

No.	Activities	Possible cost driver
1	Site preparation or cage: build cages for Patin fish include jetty and water breakers	Cages materials, labour hour, cages size, machines
2	Preparation cage seedlings: buy fish seeds and put into cages and feeding	Fish seeds, labour hour, fish feed, material, utility

3	Quality of fish and fish grading: provide food and after 6 months grading fish for sells	Fish , labour hour, fish feed, machine, utility
4	Cleaning cage for fish: remove dead fish from cages or use for other benefits	Fish material, labour hour, equipments, utility
5	Fish production and marketing cost: cutting fish for customer and deliver to the customers	Fish production , labour, equipments, utility, transport

The study describes five activities process in Patin fish farming. Possible cost driver will be determined by the quantity based on the five activities. Below is the list of each possible cost driver. The number of activities will effect to the possible cost divers.

First activity before starting Patin fish farming business is site preparation. This includes the preparations of cages, and the house for workers live. The average of raft house is RM 20000. The average of build the fish cages itself is around RM 3500. The cost includes the net of the cages, steel frame of cages fish and other equipments that use to build the fish cages. Usually the useful live for fish cages is 10 year if the farmer take care the cages properly. The common volume of fish cages is 12 x 10 x 5 feets, the cages is suitable for seeds fish until mutual fish for sales. For the extra equipment for fish is providing cover of the cages, the cost will beaded around RM1000 per fish cage.

The second activity for Patin fish farming is preparation seeding fish. This activity determines the revenue of Patin fish farming. The cost driver for this activity includes the seeds fish and it depend on farmer how much the seeding fish should be consumed to grow up the fishes. The price for seed is followed by inch size. For 1 inch seed is RM 0.10, for 2 inch seeds is RM0.20 and for 3 inch is RM0.30. Usually the farmers buy seeds fish at size 2 and 3 inch for 1500 fishes in each cage.

Third activity is quality of fish and fish grading of Patin fish farming. In this activity, the farmers need to provide proper fish food for each grade fish from from beginning. The grading fish for the starter Patin fish is 0 month until 3 months, the grower Patin fish is from 3 month until 5 month and the finisher Patin fish is from 5 month until 6 months. The finisher Patin fish can be sold to customer. The mutual Patin fish is 6 months with weight around 800 gram to 1 kg. Sometime the farmers need to grow Patin fish for 7 to 8 months to get 1.2 kg fish. For starter Patin fish, the farmers feed the fish 1kg per day, for grower Patin fish 10 kg per day and for the finisher Patin fish between 20 to 25 kg per day.

Fourth activity is cleaning and repair cages damage. This activity is needed when the farmers empty the cages before put in the new seeds of Patin fish. Usually cages are used for the next seasons. The average cost that involve with cleaning the cages is RM 1000 per cage. Some farmers use their own worker to clean the mud and some farmer have their own equipment to repair their own cages.

The last activity of Patin fish farming is fish production and marketing. This step involved with farmer workers and middle men to promote their fish. The average of farmer workers' salary is RM 1400 per month. Some farmers pay their workers daily basis as low as RM 50. Other fixed costs involve in this activity including the preparation of knife, basket, freezer, aquarium and scale fish.

Table 2: The average of cost used for Patin fish farming

No.	Activities	Cost driver
1	Site preparation or cage: 12 x 10 x 5 feet	<ul style="list-style-type: none"> ● RM 20000 for a raft house ● RM 3500 average for prepare cage ● RM 2000 average for used cage
2	Preparation cage seedlings: 1500 fish 1-6 inch	<ul style="list-style-type: none"> ● RM 0.10 per 1 inch seeds ● RM 0.20 per 2 inch seeds ● RM 0.30 per 3 inch seeds
3	Quality of fish and fish grading:	<ul style="list-style-type: none"> ● RM 61 per food bag -25kg- 60 bag per cage for a season
4	Cleaning cage for fish:	<ul style="list-style-type: none"> ● RM 1000 pay for cleaning cage
5	Fish production and marketing cost:	<ul style="list-style-type: none"> ● Pay laborRM1400 per month ● RM 50 daily worker

		<ul style="list-style-type: none"> Freezer, aquarium and utility
5	Fish production and marketing cost:	<ul style="list-style-type: none"> Pay labor RM1400 per month RM 50 daily worker Freezer, aquarium and utility

Table 2 summarizes the details. In general, the cost of each activity is different depending on many factors. Fishes are stocked in cages, self made, and harvested when they reach market size. Since cages are also readily managed and observation of stock is easy, there are some costs farmers could control. The controllable cost causes farmers with different costs and cost drivers.

RESEARCH METHODOLOGY

This section discusses the method used to investigate ABC for farming Patin fish at Termeloh, Pahang. This study employs field visit to Patin fish farming at Termeloh Pahang. Field visit allows the collecting of data through survey and interview. Observation or field works is more approaching since it also helps the researchers to understand the process of Patin fish farming in details.

Table 3: Other cost for each Patin fish farmers

Farmers	1	2	3	4
Vehicle 4x4	RM90,000	0	0	RM100,000
Sauk fish	RM120x2	0	RM 200x4	RM200x2
Digital scale	RM420	0	RM400	RM1100x3
Ordinary scale	RM120	0	RM200x2	0
Drifting nets	RM800	0	RM350x2	RM400x3
Fish basket	RM15x3	0	0	RM40x5
Power jet	RM1,200	0	RM1000 x 7	RM1000x12
Small boat	RM8,000	0	RM5,000	RM7,000
Jetty	RM13,000	0	RM7,000	RM15,000
Rafts house	RM50,000	RM22,000	RM8,000	RM30,000
Utility per month	RM250 water bills cost per month	RM35 electricity costs	RM250 electricity costs RM25 water bills cost	RM50 electricity costs RM300 water bills cost
Freezer and aquarium	RM15000 Freezer and aquarium	0	RM 1870 freezer	RM1600x8 freezer
Store grocery	0	0	RM10,000	0
Wiring	0	0	RM624	0
Penyauk rope cages	0	0	0	RM2000x5
Surau	0	0	0	RM60,000
Home stay	0	0	0	RM25,000
Motorcycle	0	0	0	RM5000x8
Total	RM 179075	RM 22035	RM 42069	RM 317250

Table 3 shows 4 Patin farmers. The first farmer includes expenses that he invested including the vehicle 4x4 and a small boat which for his workers. He also builds the jetty. He has rafts house and he provides complete equipments for the worker such as basket, freezer and other equipment utilities. The total cost for him is RM179,075. Meanwhile, the second farmer spent not much in the business, only providing raft house and pay the utility, with cost of RM RM 22,035. The third farmer has a number of vehicles for his business, that he ties at raft house and jetty. He has small boat and 7 power jet. He has a store grocery to sell his fish and a number of equipments for the workers such as basket, freezer and utility. The total cost is RM42,069. The fourth farmer so far is the largest cost and expenses spender for his Patin fish farming. He provides vehicle 4x4 to the business, small boat, and

motorcycle to each of his 8 workers. He builds surau and homestay nearby the raft house. Other cost objects include the jetty, the power jet, and the complete equipment for the worker such as basket, freezer and utility. The total cost for Patin fish farming is RM317,250.

OTHER FINDINGS: DIRECT AND INDIRECT COST IN PATIN FISH FARMING

According to Lin et al. (2001) direct costs can be defined as costs which can be accurately traced to a cost object with little effort. Cost object may be a product, a department, a project. Direct costs typically benefit a single cost object therefore the classification of any cost either as direct or indirect is done by taking the cost object into perspective. A particular cost may be direct cost for one cost object but indirect cost for another cost object. Most direct costs are variable but this may not always be the case. For example, the salary of a supervisor for a month who has only supervised the construction of a single building is a direct fixed cost incurred on the building. Indirect costs are costs which cannot be accurately attributed to specific cost objects are called indirect costs.

Table 4: All cost for Patin fish farming at Termeloh

Item cost	Fixed cost	Variable cost	Direct cost	Indirect cost
Cages	/		/	
Used cages	/		/	
Fish seeds		/	/	
Fish food bags		/	/	
Wages	/		/	/
Vehicle 4x4	/			/
Sauk fish	/			/
Digital scale	/			/
Ordinary scale	/			/
Drifting nets	/			/
Fish basket	/			/
Power jet	/			/
Small boat	/			/
Jetty	/			/
Rafts house	/			/
Utility		/	/	/
Freezer and aquarium	/			/
Store grocery	/			/
Wiring	/			/
Penyauk rope cages	/			/
Surau	/			/
Home stay	/			/
Motorcycle	/			/

Table 4 shows mostly the expenses of Patin fish farming are fixed costs, functioning as assets for the business. The only item the variable costs is fish seeds, fish foods and utility, that are affected by the volume of production. Items that fall under direct cost are cages, fish seeds, fish food and utility. Wage is a direct cost because it is based on the business based on labour hour and cost object. Other direct cost is utility such as water and electricity for Patin fish farming.

Indirect cost could be for expenses and assets of Patin fish farming business. It will appear in all activities from preparation cages, preparing seeds, fish grading, cleaning cages and marketing activity. Expenses for indirect cost are sauk fish, digital scale, ordinary scale and fish basket. These expenses will help the worker to work easily for production and marketing. Asset costs for indirect costs commonly vehicle 4x4, small boat, jetty, rafts house, motorcycle, freezer and aquarium. This fixed cost also generates other activities of Patin fish farming business.

CONCLUDING THOUGHT: EFFICIENCY MANAGEMENT COST OF PATIN FISH FARMING

The critical point in handling this activity is the capability of Patin fish to alive until mature Patin fish which is sellable to the customer. The head of the Fish Department of Termeloh Pahang, explains that the percentage of Patin is between 40% and 60%, and mostly dying before becoming a mature fish. Quality river is the main source for Patin fish life. The second critical point is the issue of burglary Patin fish farming which happen as a result of the lack of stock in Patin fish to meet the demand of the customers. The third point is the natural disaster such as flood in Pahang river. The flood will destroy the Patin fish cages. It was recorded that fish farming in Temerloh faced big flood in year 2015 and 2016, which affected the Patin fish farming at the river bank. Many cages had been run by tidal flows and destroyed. Health of fish show unsatisfied result; the survived mature fish is less than 50% for consumer to use.

In summary, the study finds that the ABC is importance for Patin fish farming. ABC can be used to investigate the activities based costing in Patin fish farming aimed to evaluate the significance of cost drivers associated with activities performed in the Patin fish farming. ABC can help future research to investigate further the Patin fish farming system and help to create a big database information containing the input, process and output of the fish.

The study would assist fish farmer to plan for their future productivity and profitability by managing cost efficiently. In addition, the study will present relevant information to Ministry of Agriculture and Agro-Based Industry Malaysia, especially to Department of Fisheries Malaysia in developing strategic plan for the fisheries industry. ABC can be an instrument for the ministry to measure the strategies used by fish farmers. The study nevertheless has a limitation. The findings of the study are limited only to the cases of four fish farmers in Temerloh, Malaysia. This study therefore cannot be generalized to represent fish farming in Malaysia. Future research should focus on a broader sample of fish farmers to yield more refined results.

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