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AGROPOLITAN SEA CUCUMBER FARMING IN MAPAN -MAPAN, PITAS SABAH: BIG SPENDING SMALL SUCCESS

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ABSTRACT

This paper investigated why sea cucumber farming -Agropolitan balat (Holothuria Scabra spp.) Mapan-Mapan in Pitas, Sabah funded by taxpayers' money was not successful in term of economic returns. Between the first (2013) and third year of this project (2015) the authors visited the site more than 20 times. Primary data particularly on sales were collected by interviewing participants of the project. Details on costing for constructing sea cucumber cages (or enclosure) was provided by the joint venture company. Economic returns from each cage were calculated using Profit Loss analysis. Results are as follows; firstly, the marginal return from two inputs of farming i.e. capital and physical labor was increasing in the beginning of Round 1 but it was diminishing from February, 2014 all the way to the end of Round 1. Secondly, the expected Break Even in round 2 (Year 3) did not materialized due to; (i) incentive to work among participants was severely affected by subsidization and (ii) they were not motivated to put efforts or take any precautionary measures to minimize losses during the annual monsoon months.

Keywords: Sustainable; profit –loss; Agropolitan; sea cucumber; balat; Mapan-Mapan

1.0 INTRODUCTION

The construction of the pen or enclosure for Agropolitan sea cucumber ((*Holothuria Scabra spp.* known locally as Balat) in Mapan-Mapan Laut, Pitas (herein, call Agrobalat) was paid with taxpayers' money. It was allocated by Federal Government under Second Rolling of Tenth Malaysia Plan (politically branded as Economic Transformation Program) channeled via the implementing agency i.e. Sabah Economic Development and Investment Authority (SEDIA). According to the CEO of SEDIA, Datuk Dr. Mohd Yaakub Johari, upon completion sea cucumber farming will benefits 50 participants in four selected coastal villages (80ha of land).

"If this project is successful it will be able to provide income of up to RM1, 000 per month to the participants" (Sabah Times online: 2012).

Constructing the pens (or cages), jetty and platform and then handing it over to the participants is just the beginning. By no means is the project successful, far from it. Artisanal fishermen are poor because they have no access to formal credit due to low credit worthiness. It seem fair although not necessarily efficient, to spend huge taxpayers' money to build sea cucumber cages for them. Unfortunately, economic returns on taxpayers money invested in this very ambitious project was very small.

To what extent large amount of taxpayers' money spent in this project benefitted the participants? This question was answered by calculating the profit-loss of each participant

from the first year (October to December 2013) to second year (end of 2014). In addition this paper explained why this project appeared financially sustainable at the out -set but faltered in Round 1 (Year 2).

This paper is organized as follows; introduction gives a brief background of the project, scope of study, research objectives and questions. Followed by a literature review on sea cucumber in Sabah. Third section is methodology - details on study site, primary and secondary data collection and profit –loss analysis. Results in section four. The future prospect of this project is given in the last section.

2.0 LITERATURE REVIEW

Currently, Kudat, Pitas- Bengkoka Peninsula as well as Jambongan Island is regarded as the last frontier for collecting wild balat. It is therefore not surprising that these areas has the highest concentration of sea cucumber ranching activities. Some ranching are paid by taxpayers (government) but most are operated by private companies or by artisanal fishermen. Despite all these, very little is known about which sites are abundance with what species of sea cucumber or what species have been depleted due to overexploitation. Literature particularly on balat – the favourite species for ranching in these areas, are few and far in between.

Choo (2004) in her report to FAO listed Kudat as one of the landing jetties for various species of sea cucumber. Pitas- Bengkoka Peninsular and Jambongan of Beluran district was not included. Plausibly, at that time, there was no separate record for fish catch from each these areas. Equally plausible is that balat catch from these areas was landed in Kudat, just like it is today. Her report can be summarized as follows; firstly, sea cucumber landing by trawlers and wildling in Sabah was relatively high from 1980 to 1990 but it went down to 37 m.t in 1991 but reached 159 m.t in 2000. Secondly, Kudat was the top four in landing of sea cucumber from 1994 to 2000. Thirdly, most interesting- processed or dried H. Scabra was sold wholesale at USD 10.53 (small), USD18.42 (medium) and USD36.84 (large). The typical suggestions in her report echoed the official position of her office- WorldFish Center, Penang. Among others, sea cucumber trade should be regulated, wildling should be subjected to close season. And training should be given to fishers so that they could produce high quality processed seaweed (beche-de-mer). She was also advocating stock enhancement of wild population through ranching. Furthermore, she cited example of project with a considerable progress i.e. WorldFish Center – Ko-Nelayan project to fatten wild sea cucumber stocks in sea pens in Bum-Bum Island of Semporna.

Johari (2007) work provided some clues on how to address most pressing problem i.e. inconsistency in survival and growth rates of juveniles in captivity. She conducted trials at Borneo Marine Research Institute (Universiti Malaysia Sabah) and discovered that survival and growth rate of juveniles balats (collected from coastal waters of Balambangan Island, Kudat) reared in sea pen and tanks was greatly influenced by artificial feed made of seaweed, water exchange and stocking density. Her experiments shows there was some desirable effects from rearing juveniles in tanks together with shrimp *Penaeus monodon*.

Choo published another paper on sea cucumber fishery in Semporna (Choo, 2012). It was based on her study conducted for WWF-Malaysia to assess feasibility of sea cucumber and abalone farming as supplementary livelihood in Semporna. From the interviews with 51 fishers she presented a rich information on seacucumber wildling its methods, timing, species and the importance of earning from sea cucumber (and abalone) to hard-core poor

fishermen particularly sea gypsies. In this survey, she included two villages located in Bum-Bum Island i.e. kampung Balembang and Kampung Berjasa. Surprisingly, she did not mention WildFish Center and Ko-Nelayan wild sea cucumber stocks fattening project mentioned in Choo (2004). She warned about over exploitation of different species sea cucumber at different sites in Semporna islands. Particularly alarming was that *Holothuria Scabra and Holothuria Whitmei (black teatfish) was occasionally caught in waters off Semporna but were rare* … (Choo: 2012:44).

The descriptions on method of processing sea cucumber of different species, pricing of live sea cucumber, earning of the fishers, trends in sea cucumber landings and recommendations was quite similar to Choo (2004).

The work of Akamine (2014) has two sections that are very much relevant to Agrobalat, Pitas. Sea cucumber retailing market in Kota Kinabalu, according to his observation, have changed for the past ten years. After spending days in Kota Kinabalu in August 2013, he noted more Malays have moved into business of selling dried marine products. The business according to him, was …*a Chinese monopoly* in 1990s – early 2000 (Akamine: 2014:170).

In 1990s, the Malays (including former Philippine residents) were selling low grade (ill shaped) dried sea cucumbers which was not sold by shops owned by the Chinese. Unlike the Chinese shops, in 2013 Malays shops were selling frozen seafood such as groupers, lobsters, dried shark fins, fish maw and Gamat (Stichopus Hermanii, curryfish) soaps. Thirdly, Chinese shops were selling dried sea cucumber as souvenir or gifts to cater for tourists from China. Fourth, there were no souvenirs shops in 1990s but now they are selling good quality (in size and quality) dried sandfish sold sourced from Kudat/Pitas area especially Tigabu, Jambongan and Kalibungan (sic. Kanibungan).

He also wrote about wild sea cucumber farming in Tigabu Island, Pitas. According to him, almost all 116 households own sandfish pen (Pagar) or 30-50 cm high fence made of dead corals and giant clams' shells. Head of the villager were keeping a thousand juveniles in his pen. They are buying wild juveniles' size of a thumb for MYR 0.50 each and feeding them with cassava, after 10-12 months it will be sold for MYR 8-10. He noted also that *They harvest wild bibidgamat (sea cucumber fry) around Kalibungan or Jambongan* (Akamine, J.2014: 173).

This is a new information. During the authors field trips to Tigabu Island and to Jambongan of Beluran from 2013 to 2016, most juveniles kept in sea pens were sandfish *H. Scabra* or bibit balat. None of the owners mentioned about "bibid (sic. bibit) gamat" or fingerlings of *stichopus hermanni*. Not a single gamat was seen in any sea pen inspected by the authors. Gamat was not found when the authors participated in the wildling, harvesting, processing. His descriptions on processing and marketing channel is rather similar to Choo (2004 and 2012). Akamine (2014) has two more important information. One of the pens owners told him that 10 % of juveniles kept in captivity died before harvesting time. Secondly, the same owner sold dried H. Scabra weighted 30-40grams each in Kota Kinabalu for MYR 350 per kilograms. No mention of the total weight per harvest.

Choo (2004, 2012) argues market forces created intense competition among artisanal fishermen. As the price increases, wildling activities will be intensified. When it is combined with rapid loss in natural habitats, most species of sea cucumber will be driven into extinction. That is a familiar example of tragedy of a common. To survive, each hard-core poor fisher has the strongest incentive to collect as many as he can. Smaller ones will

be kept in a pens while the big ones will be processed or sold right away. Choo (2004, 2012), Johari (2007) and Akamine (2014) agreed that one of the ways to slow down over exploitation are by encouraging ranching activities. Given time, wild brood stocks captivated in sea pens would grow and bred in the process. Consequently that would ensure a constant supply of juveniles, marketable size and new recruits of brood stocks. There is a triple bottom lines in ranching, so they say. It gives a sustainable income to the poor, at the same sea cucumber species and its habitats will be conserved. This appealing idea have been tested by fishers in Bum-Bum and Tigabu Island independently. An increase in their income however, was not big enough to allow them to give up artisanal fishing activities. One can also argue that this revenue was earned at the expense of wild sea cucumbers population and its habitats. What would happen when the fishers is not the one who pay for the investment in starting a farm? How will it affect their incentive to work?

3.0 METHODOLOGY

This paper explored the above issues by calculating the economics returns in a government sponsored sea cucumber farming. Between December, 2013 and December, 2015, the authors followed Mr. Irwin Wong Ye Yee of Ocean Drive– the joint venture (J-V) or partner-company in this project, during his monthly visits to Mapan – Mapan and other sites of the project. During the 20 visits (each trip lasted at least 2 days) to Mapan -Mapan, primary data was collected by interviewing the participants. The authors also participated in ranching, wildling and even in fishing. Data on sales were gathered by interviewing buyers and referring to receipts kept by middlemen. Secondary data especially the costing details on construction of cages, training details, and contract documents was compiled from official documents made available by the JV-Company. Profit Loss (or Break Even) Analysis was employed to estimate Pay Back Period and Break Even point for each cage.

3.1 STUDY SITE

Study site is a fishing village of Mapan-Mapan Laut, where the Agropolitan sea cucumber (or Sandfish) farming was first implemented. This project is also known as Agrobalat. Inhabited by 151 individuals, the village is more than 2 hours (longer during rainy season) from Pitas town, accessible by a terrible muddy and gravel road along the boundary of Bengkoka Forest Reserves. It is located in the south east coast of Bengkoka Peninsula, to the north west of Musar Island and Paitan Bay. The village has a primary school and a rural dispensary with a nurse. There is no electricity. The electric poles and cables installed during last election have not been connected to power grid. The authors sent inquiries to Sabah Electricity (SESB) but no reply from them. Like the Federal Ministry of Energy, Green Technology and Water, the District Office was also avoiding from answering the question as why there was no electricity until today.

Village elder - Jamiri Nasirin interviewed by Anna Vivienne- the journalist who visited the village together with the authors in July 2014, described the history of his village as follows; Mapan-Mapan Laut was founded 60 years ago by his family who had to run away from Simangil Island. In 1954, Sinangil Island near South Musar Island, Paitan Bay as it is identified on the topography map, was attacked and pillaged by the *munduk* or pirates (Vivienne,A.:2014). He claim he was 63 years old at the time the interview. If that true that mean he was only three years old when his family moved and started Mapan-Mapan Laut village. Less than a kilometre away from Mapan-Mapan is Kampung Pagasaon, a site for the second phase of Agrobalat project. Two other sites of the Agrobalat are very far away in the

remote villages of Mangkubau Laut and Kampung Malubang. In 2014, the jetty and cages in other three villagers was still underway (Sabah Economic Development and Investment Authority: 2015). Upon completion, Pagasaon will have ten participants and twenty in Malubang.

Department of Fisheries –Sabah (DOF-S) was assigned by SEDIA to implement i.e. selecting contractor to build cages, jetty and supporting facilities. The other contractors supply the participants with specified size fingerlings, fibreglass boats and outboard engines. Quotation call for constructing jetty, platform and twenty one cages for Agrobalat Mapan-Mapan was opened on 12 May 2012. And by mid-2013, construction was already completed. That was few months after the ten PPRT houses (Project Perumahan Rakyat Termiskin or Hard-core poor housing scheme) built by Federal Ministry of Rural and Regional Development (Minister was Datuk Seri Shafie Afdal) was handed over to ten of the participants for Agrobalat Mapan-Mapan.

Prior to moving into the newly built PPRT houses, the ten participants (*Bajau* ethnic) of Agrobalat were squatting on the state land, living in ramshackle houses. Only two of PPRT house recipients has experience in sea cucumber ranching. The other ten (*Ubian* ethnic) participants of Agrobalat Mapan-Mapan continue to live on the squatters, a clustered stilt houses 100 meters away from the newly constructed jetty and cages. The squatters consisted of 32 dilapidated stilt houses without a proper sanitation system and clean water supply. Most houses have been harvesting rain water but during the drought they were competing for underground water from the only well in the village.

In total, six of the twenty participants has prior experience in Balat ranching including two women living on the stilt house. Sometimes in the early 2006, using their own money, Mr. Jamiri bin Nasirin, his son Mr. Erman, the present chairman of the Committee for Development and Safety of the Village or Jawatankuasa Kemajuan dan Keselamatan Kampung (JKKK) and four others built cages near to their stilt houses. These pioneer cages (as shown in table 1) are made from mangrove wood as stakes, split bamboo and discarded fishing nets. Few years after that, Ministry of Rural Development through District Office of Pitas constructed twelve cages 100 meters away from Agrobalat site (called by the participants as KPLB/District Office cages, shown in table 1). Unfortunately these cages did not last, it was destroyed by strong waves during monsoons. The participants did not have enough money to fix it, after two years it was abandoned. By 2013 only 12 remain active in growing out balats collected from the wild population. Those who have given up ranching reverted to fishing and balat wildling at adjacent reef and mudflat during low tide. When there is a demand, they would skin dives around Musar Island and at the areas near to Jambongan Island where sea cucumber of different species was reported still in abundance.

Agropolitan sea cucumber project in Mapan - Mapan Laut village was head started in early 2012 by DOF-S and Ocean Drive. But sea cucumber cages and its supporting infrastructures was handed over to twenty participants by DOF-Sabah's Director, Datuk Rayner Stuel Galid only in October 2013. Participants was selected by District Office based on recommendation from chairman of JKKK. Each of them were given a cage and 1,000 fingerling (weighted 20 -30 grams each), fibreglass fishing boat and an outboard engine.

Table 1: Participants of Agrobalat, Mapan-Mapan village

Participants living in PPRT houses	**Agrobalat cage**	**KPLB /District Office cage**	**Pioneering cages**
1.Urong bin Kumin 560612125345	Yes	No	
2.Sariful bin Usman 620603125951	Yes	Yes but not active	
3.Alai bin Taham 420717125419	Yes	Yes	
4. Mariani bte Amat (Female) 730526125444	Yes	Yes	
5. Amansa bin Amat 790327125817	Yes	No	
6. Alba bin Kumin 680821125153	Yes	No	
7. Rasid bin Japar 620413125379	Yes	No	
8.Umai bin Nurami 570130125157	Yes	No	
9. Jikan bin Rani 700203125311	Yes	Yes	Yes
10. Mani bin Intingim 400717125277	Yes	No	
Participants living in stilt houses			
11. Astinah bte Jamari (Female) 250318125456	Yes	No	Yes
12. Abd Karim bin Katu 790810126545	Yes	No	
13. Jamari bin Nasirin 471221126037	Yes	Yes	
14. Zaim bin Rano 691225125177	Yes	Yes but not active	
15. Dushi bin Sali 430318125081	Yes	No	
16.Arim bin Kumin 600528125717	Yes	Yes	
17. Ming bin Japar 710415125857	Yes	No	Yes
18. Amat bin Duri 520514125249	Yes	No	
19.Kasmin bin Rano 800101125933	Yes	Yes but not active	
20. Nasrah bte Rani (Female) 510905125132	Yes	No	Yes

Source- Ocean Drive Resources (2013, b).

4.0 RESULTS

4.1 TOTAL COST OF THE CAGES

Under the Agrobalat Mapan-Mapan, twenty cages plus one "Induk cage" was constructed diagonally to the end of fringe mangrove forest. And a new jetty was constructed on the top of mudflat that has patches of sea grasses about twenty meters away from the cages. The entire project area was about 1,000 acres (400 ha). The main portion of fixed cost was RM840, 000 (twenty one cages multiply by RM40, 000) i.e. taxpayers' money spent on materials used in building cages. Construction was very expensive due to high labor charges, transportation costs and purchase of belian (Ironwood) that was used as stakes for cages, beams for jetty and planks for the platform. Total cost is shown in table 2 below.

Cost for constructing brood stocks cage (500fts X 500fts cage) was not calculated in the profit loss for each participant because it belong to all of them. In the beginning of the project, 500 brood stocks (valued at RM200 each) was released by DOF-Sabah into "Induk cage" for breeding and future supply of juveniles. Unfortunately, until end of Round 2, participants have not reached any agreement on who should do or pay for maintaining the Induk cage. They were constantly arguing on how to divide fingerlings produced inside Induk cage. It was left mostly unattended. The participants' claim few spats spawned by brood stocks trapped inside but many were floating out from the cages during high tides

and settled in the surrounding mudflat and sandy areas. The number of Balat escaped from Induk Cage was not accounted for. There was no census on the population of Balat in or outside the cages. One thing is very clear, ever since Agrobalat started, outsiders mostly from far away villages of Sibogo, Tanjung Kapor and Tigabu Island have been wildling in Mapan-Mapan area almost on monthly basis. Participants have reported that there were at least 10-20 of coming to Mapan - Mapan during low tide each month. Each outsider was reported, on average to have collected 30 Balats of different sizes (mostly juvenile) per hour from the mudflat near to the Agrobalat cages.

Table 2: Estimated Total Cost for 200 fts by 100 fts cage or enclosure

a. Fixed /Initial Cost	Amount (MYR)	
(i)Materials for construction of cage including Ironwood stakes, net for fencing, nail and other tools, plastic sacks (filled by sand and stacked around the fence), fuel etc.	N.A	Depreciation value= 8,000 per year for all 21 cages or 380 per year per cage
(ii)Transportation of materials and labor charges and fuel for generator	N.A	
Sub-total for fixed cost	**40,000**	
b. Operational /variable cost		9 months
(iii)1,000 Balat fingerlings (size of 20-30 grams priced at MYR 1.70 each)	1,700	Fingerlings grow rate vary
(iv)Diesel for week (133 liters X MYR 1.80) MYR 2.20 per 1 liter since Oct 2014 Under Community Drumming Program*	240	2,160
(v) One labor for maintenance –inspecting Balat, refill and stacking sacks of sand etc. 24 Labor working days = 6 X 4 weeks or equivalent to 168 hours (7 hours per day X 4 days). Calculated based on Minimum Wage Legislation for Sabah.	800 per month or 33.3 per day or 4.76 per hour	7,200
Sub- total for variable	**2,740**	
a+ b (total cost)	**42,740**	

Note:
*Community Drumming is a scheme under Price Equalization Program implemented by the Federal Ministry of Domestic Trade, Consumer Affairs and Cooperatives in which subsidized diesel are sold at MYR 2.20 per litre (market price MYR 2. 40 per litre). It was distributed by the contactors to participants of Agrobalat. Each participant has a rationed diesel of 133 litres per month.
Source- calculated by the authors based on the interviews with Mr. Irwin Wong, supervisor and workers of the contractor.

Fixed cost is much easier to calculate than variable cost. The technique recommended by DOF-S to the participants of Agrobalat is grow -out pen in which participants releases juveniles into enclosures or cages. It is not really a farming or ranching per se, since fingerlings size of 20-30grams was produced by brood stocks originally taken from wild population. Ocean Drive the J-V company to SEDIA supplied the first batch fingerlings also breeds brood stocks and male sourced from wild population. Spats which grown to certain size was transferred from nursery to grow -out tanks. These juveniles were later transported during midnight from Ocean Drive nursery (located 20 km from Kota Kinabalu) all the way to Mapan -Mapan. It arrived at Mapan-Mapan early morning the next

day, and later released into the enclosures where it was expected to recuperate within 1-2 days. Few died while most survived and started to burrow into the sand or forage within the wire mesh parameters. Fishermen does not feed them therefore have no influence over their growth rate. Breeder from Ocean Drive believe that without artificial selection on Balat mothers, genetic variation of the fingerlings would probably follow a normal distribution consisting mainly of average quality with an outliers of bad and high quality (desirable traits-fast growing and healthy) adult Balat. In other words, each individual fingerlings has different grow rate, after nine months some will grow up to 600 grams (wet weight) more or less.

4.2 PROJECTED AND ACTUAL REVENUE OF THE PARTICIPANTS IN YEAR 1 (OCT-DECEMBER 2013)

The revenue of the participants projected by Ocean Drive assumed agrobalat has 5 years farming cycle. Second assumption was that the participants of Agrobalat would honor the Memorandum of Understanding they have signed with Ocean Drive. They promised to sell only to Ocean Drive- the JV Company after at least nine months when the farmed balat grown into marketable size. In addition to that a contract was signed on 23 October 2013, in which participants agreed to sell or contra fish catch with ice blocks delivered by JV-company on weekly basis. In lieu, Ocean Drive agreed to assist the participants to purchase fishing equipment (crab traps etc.) and bring it from KK to the village.

The projected average monthly income per participant during Y1 (Oct-Dec 2013) shown in table 3 indicates a double counting problem because income from (v) fishing overlapped with (vii) profit sharing-fishes. It gave an impression that income will be doubled by Y2 and increased 31% in Y3 onwards. In addition to that, projected total monthly income was highly inflated too due to subsidies i.e. items (ix), (x) and the PPRT houses to participants' number 1 to 10 (as shown in table 1). One can argue that these subsidies is an income from taxpayers that was transferred to hard-core poor fishermen. But that beg further questions, will it give them a head start or some sort of insurance against fluctuation or seasonality effects in fishing? Will it help them to weather the nine months long gestation period of Balat grow out too? But wouldn't it interfere with their incentive to work hard to make their Balat grow out successful?

Table 3: Projected Average Monthly Income (in MYR) per Participant

	Year 1	Y2	Y3	Y4	Y5
(v)Fishing	800	1,600	1,600	1,600	1,600
(vi)Sea cucumber (s.c)	(440)	1,390	3,040	3,040	3,040
(vii)Profit sharing-fishes	300	300	300	300	300
(viii)Profit sharing-s.c	-	350	630	630	630
(ix)Subsidy from DOF-S	500	500	500	500	500
(x)Subsidized fuel	240	-	-	-	-
Total Monthly Income	2,280	4,140	6,070	6,070	6,070

Source- Ocean Drive Resources (2014).

The answer to the questions above is yes. Table 3 also shows that the initial 1,000 fingerlings (20-30 grams) was valued only at MYR 0.44 cents each in Y1 yet market price was MYR 1.70 or more. What was the justification for doubling of income in Y2 and onwards? Was it because each participant was given a 20' fiberglass boat equipped with

outboard engine? Perhaps they were thinking of selling the boat and engine, the cash could have increased their wealth (and consumption) temporarily. Is it plausible these assets contributed to a higher catch per unit effort (CPUE)? The real receipts of quantity sold to Ocean Drive (in table 4) shows a seasonality effects in fishing, there was a 44% increase in fish catch by November but moderate 12% in December.

Table 4: Actual revenue per participant in Y1 (October, November and December 2013)

	17- 31st Oct	**Nov**	**Dec**	**Total**
Tonnage (kg)	831	1,544	1,751	4,126
Average purchase price (MYR)	6.89	6.72	6.73	
Average revenue per participant (20 participants)	286.30	518.80	589.20	
fish	7%	9%	11%	
shrimp	2%	1%	3%	
crabs	81%	80%	74%	
sea cucumber	10%	10%	12%	
No. of participants achieved revenue > MYR800	4	7	8	
			5. Amanshah bin Duri	
Name of participants achieved revenue > MYR800	9. Jikan bin Rani	9. Jikan bin Rani	9. Jikan bin Rani	
	11 Astina bte Jamari	11. Astina bte Jamari	11. Astina bte Jamari	
	12. Karim bin Katu	12. Karim bin Katu	12. Karim bin Katu	
	20. Nasrah bte Rani	13.Jamari bin Nasirin	13. Jamari bin Nasirin	
			17. Ming bin Japar	
		18. Amat bin Duri	18. Amat bin Duri	
		19. Kasmin bin Anya	19. Kasmin bin Anya	
		20. Nasrah bte Rani	20. Nasrah bte Rani	

Source- Ocean Drive Resources (2014).

As shown in table 4, average income from profit sharing on fish catch was not that high either. It was not because the average purchase price paid by Ocean Drive was lower than by the middlemen. Furthermore, the fish catch quantity per participant was more or less the same before and after Agrobalat. The fibreglass boat with inboard engine did not increase their CPUE. This is rather disappointing considering before the Agrobalat, average income from fishing was around MYR 300-400 (below Poverty Line Income for rural area in Sabah).

Where did the sea cucumber sold in Y1 come from? Were they selling the fingerlings from the Agrobalat cages? When this question were asked, participants were silent. Regardless of what happened, the balats was sold to JV - company by the four top earners in Y1. They were participant 9, 11, 12 and 20, they were selling fish consistence both in quantity and quality together with the unprocessed sea cucumber. Notice that six of the top earners are the participants living in the dilapidated stilt houses. It is not very clear if their poor living condition actually motivates them to work much harder than those participants who live in a relatively comfortable PPRT house. Is was not too surprising that participant number 9 - Mr. Jikan became a star performer. He owned more cages – Agrobalat, KPLB,

pioneer cages. He also worked together his sister - another top earner- female participant 20- Nasrah (owned Agrobalat and pioneer cages). Another top earner -female participant 11- Astina owned an Agrobalat and pioneer cages worked closely with her father- top earner participant 13- Jamari who himself owned Agribalat and KPLB cages.

4.3 PROJECTED AND ACTUAL REVENUE OF THE PARTICIPANTS AT THE END OF ROUND 1 IN YEAR 2 (2014)

Table 2 shows that total cost incurred in Y1 is as a cash outflow. Item (a) fixed cost expenditure (i) + (ii) incurred for cages construction was a capital investment rather than a handout. Taxpayers' money was spent to build cages for twenty participants. It should be more than RM40, 000 if we include the 20hp outboard engine given to each participant. Whereas item (b) variable cost i.e. expenditure (iii) on initial fingerlings and (iv) subsidized fuel was a direct transferred of income from taxpayers to participants. Ipso facto, risk of failure and uncertainty was absorbed (or rather, transferred to) by taxpayers who paid 98% of the total cost. Each participant- the hardcore poor artisanal fishermen invested only1.8% of total cost. All they have to do was to invest their physical labor equivalent to opportunity cost valued based on minimum wage. What could go wrong with that? After all, cages constructed was paid with taxpayers' money not with an interest bearing loan.

Each participant was expected to have cash inflow by July 2014 which is the end of round 1, assuming fingerlings grow on average to 600 grams after nine months discounting 20% mortality. So initially each enclosure has 1,000 fingerlings weighted 30kg wet (30 grams each fingerling) assuming they did not sell any during Y1 and before end of Round 1 (R1). At the end of R1 sometimes in July 2014 there should be at least 800 balat weighted at least 480 kg wet. For simplicity, the fingerlings collected from the wild added by the participant into enclosure are not included. The ex-farm gate price for live/wet balat was MYR30 per kg therefore expected cash inflow by the end of R1 should be MYR 14,400. That if that participant decided to sell it all. Otherwise, Ocean Drive recommended them to sell 77 balats weighted average 600 grams wet each priced at ex-farm MYR18 per kg in order to get a cash flow of MYR 1,390. At the end of R1 the stock would be 723 balats for selecting brood stocks or saving worth MYR13, 014.

So what really happened during Y2 or end of R1? On July 2014 that was end of Ramadhan fasting month for Muslims, most of them was in a festive mood to celebrate Hariraya (Aid Fitr). Participants' number 1,2,4,11,13 and 20 sold their live Balat for RM20 per kilograms to an outsider. Other participants was not willing to share their sales information for a reason known only to them. Only one of those six agreed to be interviewed- participant 2 named Mr Sariful Osman aged 52. He sold 40kg wet balats and generated a total revenue of RM800. However, he neither kept any sale receipts nor recorded the size and quantity of Balat he sold. Lucky the buyer was also farming balat at the nearby fishing village, agreed to reveal details of the transactions. He bought 67 Balats weighted 600 grams each from Mr. Sariful at the discounted price due to water content. At this cash inflow level, total revenue paid 29.1% of the variable cost, he was still in a huge deficit RM41, 940. Up to August 2014, he did not do stock inventory or counted how many Balats inside his enclosure weighted below or above 600 grams or so. He was confident that his enclosure must have at least 733 Balat left.

5.0 CONCLUSION

Was it financially sustainable? It appears so when we look at marginal return on the inputs of this investment. During the first and second year or R1, marginal return on capital was extremely high, that is why revenue projected by Ocean Drive was very optimistic. Moreover, capital was not an interest bearing loans and their physical labor was readily available. The economic return shows that a participant were experiencing a deficit until R1, should be able to recover the total cost and eventually to break even and profit from there onwards. The story of Mr. Sariful illustrates this point. If he was frugal he could have purchase 67 fingerlings which means to restock, he would spent RM113 (size 30 grams priced at RM1.70 each) or equivalent to 37% of RM300 - his monthly household expenditure. But if he was not, then in the next harvest (R2 sometimes July 2015), his stock of 733 Balats must have grown to one kilogram each; all will be worth at least RM14, 660 and more because some Balats grow faster or bigger than the others. Most participants should be able to reach a Break- Even point even before R3 - third harvest by selling live Balat, but we are not sure if they could afford restocking or will have enough saving to build a second cage once the original cage overcrowded. As long as the marketable size Balat are not properly processed, profit margin will always be very thin. Low grade (below Grade C wholesale valued at MYR800/kg) processed Balat should fetch a wholesale price of MYR300 per kg. At the end of R1 in Y2, agrobalat cage was only generating MYR88 per month, only 8 % of the targeted MYR 1,000 per month. If and only if, nothing happened to the cages, then participants was expecting to reach the targeted monthly income by R2 in Year 3. Mortality rates during Y1 and Y2 was unknown, participant was not doing any census to count how many was eaten by river otters or by starfish, stolen, infected by disease or died. From December 2013 to end of January 2014, big waves, strong currents during storms of annual monsoon destroyed 20% of the cages. It was once again battered during Monsoon from November to February in 2014, resulting in more than 50% of the cages was totally damaged. The cages lost most Balats, was washed away or escaped during high tide. At that time Mr. Sariful was having a difficulty to fix his cage and restock his fingerlings. His wife or children and he might be readily available but not the wild Balat. The population of wild Balat at the nearby mudflats were overexploited due to intense wildling. He went wildling further away from his enclosure and have used his rationed diesel, spending less time for fishing and even lesser time to care for the whatever Balats remaining in his cage. In the end this huge spending of taxpayers' money resulted only in small success in terms of economic returns.

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