

INVESTMENT PROSPECTS AND POTENTIAL IN THE FISHERIES SECTOR IN SABAH

By

Rayner Stuel Galid
Director of Fisheries, Fisheries Department of Sabah.

1.0 Introduction

One of the important national policies promulgated as a result of the 1997 start of the economic downturn was the emphasis on reducing the amount and value of foreign imports including food items. Concurrent with this policy, the government has embarked upon a program to increase local food production by enhancing and modernizing the agriculture sector. Thus the agriculture sector is once again in the limelight as it becomes one of the economic policy cornerstones upon which Malaysia hopes to consolidate and reinvigorate its economy. The fisheries sub sector has to perform well in order to contribute to these redefined long-term agriculture goals.

Fish in Malaysia is everyman's food. The per capita consumption of fish and other seafood in the country is estimated to be close to 40 kg. This represents more than two-thirds of the total animal protein consumed per capita locally. By end of the planning period of the Third National Agriculture Policy which is year 2010, it is expected that the total national fish production will be 1.93 million metric tonnes worth more than RM9.36 billion. To this end the Fisheries Department of Malaysia has targeted the fisheries sub-sector to grow by at least 5% annually.

The State of Sabah has many potential to be a major contributor in achieving these national goals. This does not only include in the production of fresh fish produce and raw fisheries materials both from marine capture fisheries and aquaculture but also from in production of downstream processed fisheries products.

This paper is prepared to present overview with regards to the State of Sabah's potential on trade and investment in the fisheries sector. As a backdrop of this discussion, this paper begins by briefly presenting both national and state-level policies which governs the local agriculture sector and the fisheries sub-sector. The next section discusses the status of

Sabah's fisheries industry paying particular interest to the principal sub-sectors. The main part of this paper discusses a number of key areas upon which the potential development of fisheries in Sabah rests and where opportunities for investment may be lie.

2.0 Fisheries Industry in Sabah

Fisheries industry in Sabah plays a very important role in providing economic and social stability to the industry players and the fishers as a whole. Contribution of the fisheries sector can be categorised in three aspects; a source of foreign exchange in trades, source of affordable and reliable animal protein and income provision.

The fisheries sector has contributed significantly to Sabah economy. The last ten years has been tremendous with exports listing higher value each year. Real Gross Domestic Product (GDP) for Sabah in 1999 was recorded at RM9065.9 millions, for which the fisheries sector contributed about 3%. Estimated GDP for Sabah in 2000 is RM9.9 millions with fisheries estimated to contribute about 7% of the total GDP. Balance of trade for fisheries sector for the last three years is presented in **Table 1**. Import bills in fisheries do not pose any significant impact to the state's economy, balance of trade has always recorded trade surplus for Sabah.

Table 1.
Fishery Total Trade and Balance for Sabah (1998 – 2000)
(Value in RM Million)

Year	1998	1999	2000
Export	317.7	319	383
Import	34	40.2	45.8
Balance of Trade	283.7	278.8	337

The marine capture fishery is the overall major provider to the fisheries sector, while considerable volume of aquaculture are produced for export and local consumption. There are satisfactory supplies of fishery products for domestic market. Sabah is a net exporter of fish and is self-sufficient to meet demands for high quality seafood to cater for the over two million population.

The prawn industry from both marine capture and aquaculture is the most important commercial commodity in terms of value in the export market. However, recent trade statistics has also shown a notable increased in exports of seaweed from Sabah. In order of importance, the

intensive culture of tiger prawn constitutes the main part of export-oriented aquaculture product.

Export commodities from marine capture consists of commercial fish (groupers, tunas, mackerels, sardines) processed as fresh, chilled, frozen and sold as live. Other marine products for exports are shrimp, anchovies, cuttlefish, squids, octopus, lobsters, crabs and abalone.

Fish landing in Sabah market has shown a steady rate over the last five years, with trawl nets and purse seines as the main fishing gears. These gears are widely operated in the districts of Kota Kinabalu, Sandakan, and Kudat. The previous years' estimated total landings for sixteen marine districts in Sabah are listed in **Table 2**.

Table 2
Estimated Marine Landing, Sabah 2000 (*Provisional data*)

	District	Total Landing (Metric Tonnes)
1	Kota Kinabalu	48,914
2	Kunak	38,441
3	Kudat	31,281
4	Tawau	23,417
5	Sandakan	22,808
6	Lahad Datu	14,509
7	Semporna	9,250
8	Kota Belud	4,343
9	Beaufort	2,470
10	Beluran	2,229
11	Pitas	1,928
12	Papar	1,371
13	Kuala Penyu	892
14	Tuaran	690
15	Kota Marudu	385
16	Sipitang	332

Kota Kinabalu has remained as the main landing point for marine fish. Statistics recorded estimated landing of 207.2 metric tonnes in 1999 and 204 metric tonnes is estimated for 2000. Most of these fish are traded locally, sold to nearby district, processed and export as fish meal while higher value seafood was exported as chilled and frozen product.

For coastal fisheries, trawling continues to be the mainstay activity. There were 1442 trawlers in Sabah in 1999. Although finfish trawl fisheries is significant, in terms of value, the prawn fisheries is a large contributor. In 2000, most of the 8200 tonnes of prawn production were exported earning a value of RM144 million. This represent 65% of the total export value of marine fisheries products.

In 1999, the total fish production from marine capture fisheries was 207,000 metric tonnes. Of these, commercial gears contributed about 76 percent (158,428 metric tons) of the total marine fish landings. The bulk of the commercial landings were contributed by 25-40 GRT trawlers (27 percent of total marine landings), gillnets (7 percent) and 25-40 GRT purse seiners (6 percent). Landings from traditional gears which represented 24 percent of the total marine fish landings were mainly contributed by hook & line (handlines contributed 12 percent of total marine landings) and bagang (static liftnet) (4 percent).

Aquaculture has expanded tremendously in the past decade, witnessing the increased number of prawn producers, cage culture operators and seaweed farmers. The total production from marine aquaculture activities in year 2000 was about 6,300 metric tonnes; the 4 main contributors were shrimp pond culture, seaweed mariculture, fish cage culture and mollusc farming (**Table 3**). In 1999, the department record shows a number of 68 prawn producers were actively involved in prawn farming while 247 cage operators are involved in supplying local restaurants and the live fish trade and about 550 seaweed farmers were actively cultivating seaweed.

The future will hold promisingly for prawn farmers and seaweed operators as the demand for both commodities is expected to increase. Operators for high value marine fish cage culture will definitely enjoy more economic benefit as the availability of marine fish fry from local hatcheries in Sabah is materialising.

Table 3: Fish Production from Marine Aquaculture in Sabah (2000)

	1999			2000		
	Area (m ²)	Production (T.M)	Value (RM'000)	Area (m ²)	Production (T.M)	Value (RM'000)
SHRIMP	11,290	1,843.06	53,363.58	3,017.62	2,063.91	60,099.09
FINFISH	-	-	-	-	-	-
MOLLUSCS	62,850.28	126.56	239.71	58,701.20	193.47	392.37
SEAWEED	2,900	3008.38	6,616.11	815.21	4,031.20	6,853.04
TOTAL	77,040.58	4,981	60,219.40	62,534.03	6,288.58	67,344.50

The major activity in freshwater aquaculture in Sabah is fish pond culture that rears fish such as Nile tilapia, lampam jawa, Chinese carps, patin, kalui, kissing gourami and marble-head goby. At present there are several start-up operations on cage culture, tank culture and ornamental fish

breeding and culture. There are also some small-scale operations in the culture of freshwater soft-shelled turtles and bullfrogs.

There were around 16,500 total number of freshwater ponds which cover an area of some 1490 hectares in 2000. The top five districts where these ponds are located are in Kota Belud, Keningau, Ranau, Tambunan and Tuaran. There were about 5,555 fish farmers engaged in freshwater aquaculture in Sabah in 2000.

Sabah has few true large water bodies other than the 7 major river systems. Apart from some ox-bow lakes, the state does not have comparable freshwater bodies as found in West Malaysia where there are extensive mining pools, several dam lakes, and many naturally occurring lakes. Although there are no survey data on the fish production accruing from freshwater capture fisheries, indications are that fishing are carried out along the major rivers albeit on a part-time basis by riparian inhabitants for their own consumption. Some commercial fisheries are found along the S. Segama, S. Padas and S. Kinabatangan.

In 2000, Sabah recorded a total of RM 383 million worth of exports and RM 46 million was recorded for import of seafood commodities. Contributors to the Sabah's export were lobster (RM 5.3 million), processed prawns (RM 238 millions), squids, cuttlefish and octopus (RM 20 millions), fish meal (RM7.8 million), and dry seaweed (RM10 millions).

Currently, there are 18 prawn processors/exporters registered with the Department of Fisheries Sabah. Processing plants in Sabah does very basic processing activities. The processing of prawn for exports involved sorting, grading, cleaning, freezing and packing.

3.0 Policies on Fisheries in Sabah

The future of the agriculture sector in Sabah has been steered strategically to play an essential role in the state's food production. With this in mind, the government has formulated the Sabah Outline Perspective Plan (OPPS), 1995-2010 and the Second Agriculture Policy (SAP2) and ensures the existing trend in development and production stay at the highest level of sustainable and production capacities for each food industries. These endeavours are translated through development and services, each served by respective departments through programs and projects under the Eight Malaysia Plan (2001-2005).

The OPPS has indicated the importance of the private sector as the engine for growth and stress on enhancing private sector capacity and agriculture growth. Fisheries will be given special attention specifically in the development of aquaculture and deep-sea fishing.

The formulation of the Second Agriculture Policy (SAP2) for Sabah that was passed in 2000 shows government highest commitment in the development of the food sector in Sabah. The Second Sabah Agricultural Policy (1999-2010) was prepared to promote sustainable development in the state's agriculture sector, one that are efficient and competitive to stand trials of global competitions.

The guiding principle under the SAP2 is to pursue food production enhancement and transform the state's agriculture into a modernised, commercialised and dynamic sector to meet challenges ahead. The government has given strong thrusts to the private sector to continue their support in strengthening key business areas and ensure successful implementation of the policy.

The objective of SAP2 is to maximise income through the optimal exploitation of the agricultural resources in order to improve and continue their contributions to the state's economy.

The specific objectives of SAP2 are:-

- Transforming smallholders into a more commercial and dynamic sector;
- Increasing efficiency and productivity of the agriculture sector;
- Increasing the level of domestic food production;
- Accelerating the development and growth of local agro-based downstream processing and manufacturing industries;
- Promoting globally competitive agriculture;
- Strengthening essential economic foundation and basic support services;
- Adopting sustainable development.

Five basic strategies were identified to achieved the policy objectives, there are:-

- Optimal utilisation of agricultural resources.
- Acceleration of agro-based industries development.
- Intensified research and development.
- Human resource development.
- Development of efficient marketing systems and strategies.

Sabah has the potential and the necessary fisheries resources to further increase production especially aquaculture and high value-added marine product. The plan for expansion under the SAP2 for fisheries are;

- Increasing production for food security and exports.
- Improvement in productivity and competitiveness.
- Increasing private sector investment.
- Sustainable exploitation of resources.
- Human resource development.
- Rationalisation of fisheries-related institution.

The government has identified strategic plan to realize the above through the development of integrated and commercial capture fisheries and aquaculture. The economic foundation of this sector will be strengthened in order to provide adequate technology, expanding infrastructure, support services and enabling an effective legal, administrative and institutional framework. A coordinated investment in fisheries and aquaculture with equal benefit in partnership with the private sector will be implemented.

The policy also identified the need in increasing efficiency and productivity through intensification and the use of automation and mechanisation in fishing, fish handling, aquaculture production and product processing. The plan has acknowledged that improvement in the existing marketing of fish and fish based-product; market distribution and market information system need to be further improved.

Corporate assistance and business matching programs are to be developed to cater for investment interest and trade enquiries from foreign and local would-be investors. The government welcome private sector investments in commercial fishing, large-scale fish/prawn culture operations, feed and fry production in Sabah.

Producers are encouraged to target product-based approach, targeting specific market demand in export niche and specialty markets. In meeting the importing countries requirements, producers have to comply with seafood safety standards and quality assurance program that are currently enforced.

The private sector continues to play a dominant role in the state fisheries development process. The sector provides employment opportunities as well as enhances foreign exchange earnings for the state. The government is committed to an orderly development and expansion of the sector.

Expansion in development to include management resources will be supported and reinforced by support services, research and development. Policy directions for fisheries industries investment and development in the SAP2 are summarised as follow:-

Capture Fisheries	Aquaculture
<ul style="list-style-type: none"> ▪ Maximize production in capture fisheries, pursued on a rational manner. ▪ Encouraged the adoption of efficient and resource-friendly fishing technologies. ▪ Promote joint ventures between local and foreign private sector under regional groupings such as Brunei Indonesia Malaysia Philippines-East ASEAN Growth Area (BIMP-EAGA). ▪ Improvement and expansion of onshore facilities and services. 	<ul style="list-style-type: none"> ▪ Encourage growth and expansion in brackish-water and fresh water fish production. ▪ Increase in aquaculture ventures in shrimp farming, large-scale cage culture, production of seed for candidate species, which are of high value, and feed production. ▪ Large-scale aquaculture farming with operations of vertical integration of production and value-added processing at the farm level.

3.1 Department of Fisheries, Sabah Strategic Plans and Initiatives for Fisheries Investment.

Both the Third National Agriculture Policy (NAP3) and the Second State Agriculture Policy (SAP2) stressed on increasing local and foreign investment through joint ventures or private sectors initiatives. The government is gearing all its support services to established pro-business ambiance and reinforced productivity based on market demands.

The Department of Fisheries Sabah has prepared several strategic plans relevant and complimentary to investment policies under NAP3 and SAP2. These plans include;

- To identify capable private sector and encourage commercial fishing and large-scale aquaculture production.
- To encourage establishment of consortium and estate grouping between aquaculture farmers for commercial production.
- To initiate business interest from relevant corporate mega company which already successful in business to invest and take up commercial fishing and aquaculture industry in Sabah.

- To encourage joint ventures between local companies and investors from other countries under the existing trade regional cooperation such as the BIMP-EAGA.
- To encourage investment from local and foreign companies to invest in high level of seafood processing, packaging and marketing.
- To established a 'One Stop Sabah Seafood Investment and Information Centre' to provide assistance and services to prospective investors and strengthen investment and market link in Sabah seafood sector.

Increasing investment, up-date on international fisheries, trade and marketing development are an initiative put in placed by the department in early 1999. Since then, the following ranged of services are available from the department:

- A help-desk service as a stop point for all trade, investment and market enquiries.
- Organising and coordinating business meetings and business matching between prospective importer/investor with local producers/exporters.
- Assisting local processor to get market information and seafood safety regulation.
- Receive and re-direct enquiries and correspondence for seafood market opportunities.
- Support services in providing company lists and commodity search for would be importer/buyer.
- Providing support for industry-developed investment.
- Providing assistance for application in Investment Incentives for new incorporated companies in fisheries/aquaculture project

The development of the seafood industry in Sabah has been a joint responsibility shared between the private and public sector. The private sector is expected to take the lead in channelling investments in production and processing side of the sector while the government act as an effective facilitator for a favourable environment for business and commerce. To take this discussion further, it is pertinent also to mention other supporting services that have been established by the Sabah government in order to demonstrate wholesome and earnest effort in helping out respective and would-be investors in the state fisheries industries.

4.0 Roles and Functions of Sabah State Departments/Agencies on Investment

The Department of Industrial Development and Research is a government agency established to provide services and assistance to boost industrial development through increase of investment. The State Centre of Investment Committee (SCOIC) is a Unit under the department that is responsible in processing and assessing project proposals forwarded by investors for commercial and industrial related business in the state. Department of Industrial Development and Research also serve as the secretariat to the State Investment Committee that is chaired by the Honourable Chief Minister of Sabah. This committee also play a very important function in reviewing the state investment policies, provide investment guidelines, to consider and approve investment submissions, facilitate and assist investors.

The Sabah Fisheries Department is continuing efforts and future growth in expansion to broaden and ease access to investment in the fisheries sector. Identification of suitable areas for aquaculture expansion is in the process of ground studies before proposals to zone and gazette these areas are submitted to relevant authorities.

5.0 Prospects and Investment Opportunities in Sabah's Fisheries Sector

Sabah's fisheries investment attractions are varied. Some investors are drawn by the increasing market demands for tiger prawn, while other investors continue to pursue the Asian live fish trade which continues to fetch higher price in the market. Because of the higher price for specific seafood, expansions in investment are destined for exports. Essentially, decision and inclination are based on access to local resources and marketing capabilities on the part of the producers.

5.1 Current Scenario

Sabah strategic location in the region provides tremendous trade route for businesses. The government is promoting the state to be one of Malaysia's major food producing centre. Local and foreign investors are encouraged to invest in the production of value-added food industries. The government supports foreign investment in fisheries sector in the form of finance, technology transfer, research and development of marine hatcheries.

Policy on investment and incentives are made available to facilitate and encourage investors into the fisheries sector. The Department of Fisheries has develop corporate services in line with 'business and investors friendly' approach that the government has instilled in the state.

The state realised the importance of land use planning and the vital contribution of the aquaculture sector for the state's economy. With respect to aquaculture and fisheries activities, permits are issue by the Land and Survey Department for land and water based activities.

Comparative local advantages have stimulated increasing trends in availability and quality of marine-based products for internal and external markets. Sabah's fishery is rich with sea products, good quality cultured prawn, crustaceans and high value live marine fish to cater for the Asian market.

The government have put strong emphasis on maintaining the competitiveness and continued expansion of Sabah's seafood sector. Higher demands for fish product have led to increase in business and investment inclination among the private sectors. Sabah fish commodities are exported to other state in Malaysia and major foreign trading partners such as the United State of America, Spain, China, Hong Kong and Japan.

Tenure and links with regional and international markets for prawn and fish from Sabah has been established for decades. There are readily resources and technology capability in the capture, culture and processing of prawn. The culture and capture of commercial value fish and lobster for the live fish trade has benefited exporters tremendously. The continue increase in disposable income and growing number of population in Asian countries like Hong Kong, Singapore and Taiwan will contribute further in increasing demands for prawn and fish from Sabah.

5.2 Marine Resources

The marine fisheries resources of Sabah's waters have an estimated potential yield of 252,000 tonnes. The coastal waters of Sabah has about 112,000 tonnes of demersal fish resources while pelagic stocks may make be about one-third as much. Deep sea resources are estimated to be 140,000 tonnes and of that pelagic resources comprised of about 100,000 tonnes. The above figure is probably a conservative figure. This is based on the fact the resources of the deep seas off the east coast of Sabah, especially

the Semporna waters, has not been included. (No data are available about the resources there because there had no stock assessment work done so far.) However, fish landing reports (including from those based in Labuan) from the few fishing vessels which had operated in this area revealed that this place is rich in tuna and other deep sea pelagic fishes. Trial fishing done around the Terumbu Layang-Layang area off the west coast of Sabah indicated that some 50,000 tonnes of pelagic fishes (especially tuna) can be exploited in an area of 35,000 square nautical miles around this area (including Sarawak's portion of the EEZ).

The physical and oceanographic features of the Palawan Trench located off the West Coast makes it a potential fishing ground for oceanic tunas. Available data from past fishing operations indicated that both bigeye (*Thunnus obesus*) and yellowfin (*Thunnus albacares*) tunas are abundant and widely distributed in the area. The relatively shallow waters and numerous coral reefs and shoals found in the southern portion of the Spratly Islands (e.g. Ardasier Bank near Pulau Layang-layang) was found to be rich in fisheries resources. Past experimental handline operations had indicated good catch rates of many commercial value species (snapper, grouper, wrasse, trevally, barracuda). Acoustic surveys also indicated high fish biomass especially between the 100-200 meter isodepth, which consisted mainly of small pelagics.

Large pelagics refers mainly to oceanic tunas, some large carangids (e.g. trevally) and oceanic sharks. In this context, the "large pelagic" fishery refers only to tunas which formed the bulk of the pelagic landings. Available assessment information indicated that the small pelagic resources in the inshore coastal waters are moderately exploited, and for the outer shelf area and offshore waters to be lightly exploited. At present, the current pelagic landings of around 80,000 mt (70,000 mt of small pelagics and 10,000 mt of small to large tunas) are still below the combined potential yield of 100,000 mt (80,000 mt of small pelagics and 20,000 mt of small to large tunas). The current tuna landings of approximately 10,000 metric tons per annum which includes both coastal (neritic) and oceanic tunas, can be increased significantly if appropriate gears and techniques are used. In particular, the use of FADs in conjunction with purse seining, usage of midwater trawling and the expansion of both handline and longline operations, could enhance production. However, since the above estimates of stock availability are still preliminary in nature, more rigorous assessments will therefore be needed. Also, no data is available at the moment on the species breakdown of the tuna landings but a substantial portion consists mainly of coastal species.

There appears to be some resource development potential, particularly with respect to the small pelagics scattered over the outer shelf area and in the offshore waters. Despite the apparent potential for the further exploitation and pelagic resources on both coastal and EEZ waters off Sabah, there are certain limitations relating to the relatively low density of these resources and also the longer travelling times required to reach these fishing grounds (e.g. along the Palawan Trench and around Pulau Layang-Layang). Both these factors may affect the overall viability of exploiting the offshore small pelagic resources. The most abundant small pelagics found in these areas are mainly sardines, small scombrids (e.g. mackerels), neritic tunas and carangids (mainly round scads, hardtail scads and scads). Furthermore, the domestic market prices for these species are generally low (wholesale price range : RM 0.50-2.00/kg) and the local market potential is rather small. The use of appropriate gears (e.g. purse seiners with the aid of FADs or fish aggregating devices, midwater trawlers, pair trawlers) and larger vessels can improve the economic viability of the fishery, and the development of related processing and canning operations can enhance market potential if sufficient resources are available.

From past resource surveys carried out by both state and federal fisheries researchers, the most abundant oceanic tunas found along the Palawan Trench, off Semporna and other offshore waters are yellowfin and bigeye tunas.

Based on the analysis of available CPUE (catch and effort) data, it is clear that the shrimp resources in Sabah are intensively exploited and therefore there is no further development opportunities in this sub sector. There is compelling evidence to support a further reduction in the fishing effort that could not only enhance the present catch per unit effort but could also result in modest increase in the future overall shrimp landings.

5.3 Investment Potentials in Sabah Fisheries

The state has identified several sub-sectors in fisheries suitable for large-scale operation and has good potential for investment. Investment in these fisheries fields may be considered as viable as returns are able to be recovered within a few years after operation. Investments and joint ventures are encouraged specifically in prawn culture, seed production in marine finfish, seaweed cultivation, downstream processing, high value added fish product, marketing, support facilities and large-scale fish culture.

The Second Sabah Agriculture Policy (SAP2) has identified aquaculture sector as a potential sector to compliment and fill in the gap in fish production to cater for local and export markets. The last decade has seen quite an increase in Sabah prawn production as prawn farming has proved to be a lucrative business. With the forecasted increase in pond cultured production of prawns, processors will be able to maximize their production to meet export demands. Trade records for exports of prawn from Sabah for the last three years are summarised in **Table 4**.

Table 4.
Exports of Processed Prawn, 1998 – 2000, Sabah.
(Value in Millions)

Year	1998	1999	2000
Exports of Shrimp (fresh, in shell, chilled, frozen)	RM 180 (5414 metric tonnes)	RM188 (6835 metric tonnes)	RM 238 (8126 metric tonnes)

There is potential for expansion of shrimp culture in Sabah, although the area available is not large compared to other regional countries. A 16 districts-survey study undertaken by the Fisheries department, Sabah in 1997 shows that for coastal shrimp aquaculture there is a total coastal area of 929,889 ha, areas with high potential covered 4,048 ha (0.4%), medium covered 145,551 ha (15.6%) and low potential 123,060 (13.2%) (**Table 5**). Areas of high and medium potential are most likely to be suitable for shrimp farm development, as borne out by the analysis of the Tawau area where much of the existing farms are on land classified as high and medium potential. The analysis also indicates that Sabah has a relatively low area which is ideal (high potential) for shrimp aquaculture development. Assuming that both high and medium have some physical potential for development (albeit under different constraints), this gives a potential area of 149,599 ha.

There was a considerable geographical variation in shrimp culture potential. The areas with largest apparent potential were Pitas and Sandakan. The analysis also shows a large area in Tawau covering 18,852 ha, including the existing shrimp farming areas.

Table 5: Shrimp aquaculture potential (ha) based on GIS analysis

Area	High	Medium	Low	Potential area*	% M/H of total potential area
Sipitang	167	12782	3973	12,949	8.66
Kuala Penyu and Beaufort	0	9787	9135	9787	6.54
Papar	441	13809	3714	14,250	9.52
Kota Kinabalu and Telipok	599	11464	2200	12,063	8.06
Kota Belud	357	7404	1344	7,761	5.19
Kudat	5	3953	2050	3,958	2.65
P. Banggi and Balambangan	0	3034	7961	3,034	2.03
Kota Marudu	517	7790	3580	8,308	5.55
Pitas	782	14926	9765	15,708	10.50
Jambongan	40	4301	8493	4,342	2.90
Sg. Labuk and Sugut	0	4105	17117	4,105	2.74
Sandakan	413	14784	2277	15,197	10.16
Kinabatangan	0	88	10196	88	0.06
Tambisan	63	10253	6011	10,317	6.90
Tungku	100	3557	9790	3,657	2.44
Bakapit	44	3069	1144	3,114	2.08
Lahad Datu	0	34	6580	34	0.02
Kunak	0	791	92	791	0.53
Semporna (A)	8	213	386	221	0.15
Semporna (B)	0.04	1063	579	1,063	0.71
Tawau (A)	63	6446	11785	6,509	4.35
Tawau (B)	446	11898	4886	12,344	8.25
Total area	4048	145551	123060	149,599	100

The same study by the Fisheries Department also analysed the potential cage farming areas in Sabah. The study indicated a significant area for marine cage farming in several districts (**Table 6**). The analysis confirms the high potential in Sandakan bay, where there is already some cage farming development, but also reveals a significant and untapped potential in Semporna. (Note: The Study Report comments that there were a number of other areas where the GIS analysis could not be undertaken because of a lack of bathymetric data, including small mangrove creeks. The analysis therefore probably underestimates potential cage farming areas in Sabah.)

Table 6: Marine cage aquaculture potential (ha) based on GIS analysis

Place name	Potential for development (ha)		
	High	Medium	Low
Gaya and Sepangar Bay	9.9	856.7	637.3
Usukan Bay	93.4	191.1	
Kudat Bay	75.5	482.8	0.6
P. Banggi & Balambangan	0.2	1167.1	878.2
Sandakan Bay	113.2	3559.3	1247.3
Lahad Datu	0.7	2579.0	939.7
Semporna	936.3	6696.7	1107.
	1229.25	15532.6	4172.8

Live fish and certain shellfish is a potential high earner for the local seafood industry. Although relatively small in terms of total quantity, the live fish trade achieved a value of some 31 million Ringgit last year. Production of high value marine fish fingerlings is identified as a lucrative business. The technology and development of marine fish fingerlings is still at the early stage. There are several breakthroughs in the marine hatchery but yet to produce desired result. The local fish culture can increase its production of commercial species of fish for the live fish trade.

Seaweed farming has contributed largely in providing income for the coastal communities in Sabah. Seaweed is cultivated mainly in Semporna, Kunak, Kudat and Lahad Datu. Over the last three years, Sabah has experienced tremendous increase in production as compared to ten years ago when seaweed was first introduced in Semporna. A limited survey of the potential areas of Sabah's coasts revealed that more than 100,000 hectares of sea are suitable for this type of aquafarming. A GIS analysis carried out by the Fisheries Department shows clearly that the northern and south-eastern part of Sabah are potentially more suitable for seaweed culture, more so than the western area. The area in the western part had only 300 ha, compared to the 15,958 ha in the northern part and 1,824 ha in the eastern part and 84,330 in the Semporna area (**Table 7**). This analysis fits in with the existing patterns of seaweed farming in Sabah, with most farms in the Semporna area, although it indicates the potential for expansion into other areas, subject to more detailed analysis of exposure, water depth, pollution risk, accessibility and potential environmental impacts on coral reefs.

Table 7: Potential areas for seaweed development (ha)

Name	Area (ha.)	Total (ha.)
Kuala Penyu	239.4	299.8
Kota Kinabalu	14.0	
Pangalat	46.4	
Kudat	848.9	15,958.5
Karakit	2,531.8	
Tandak	10.3	
Telaga	294.0	
Bambangan	1,486.9	
Langkon	209.0	
Langkon (2)	297.7	
Pulau Tagajawan	2,632.3	
Pulau Malawali	4,246.1	
Balambangan Barat	246.2	
Pulau Mandidah	3,155.3	
Kampung Lok Agong	1,034.8	1,824.8
Terusan	736.5	
Tanjung Labian	53.5	
Lahad Datu	129.7	84,330.3
Apas Balung	37.3	
Bakapit	983.4	
Semporna	6,231.1	
Pulau Silawa	75,477.4	
Silam	626.4	
Pulau Timbun Mata	85.0	
Pulau Sakar	759.9	
	102,413.4	102,413.4

There is potential in investment for seaweed processing for the export market. Currently, there are only 2 companies in the state that are involved in processing of seaweed. **Table 8** shows exports figures for seaweed recorded for the year 1998 to 2000.

Table 8
Export of Seaweed/Algae for Sabah (1998 – 2000)
(Value in RM Million, Quantity in Metric Tonnes)

Year	1998	1999	2000
Export Value	2.2	6.6	10.2
Export Quantity	1383	2670	4160

The cultivation of seaweed use relatively low technology and minimum financial input. The Sabah Fisheries Department encourages more investors and put emphasis on industrial farming of seaweed and establishment of *carrageenan* extraction plants. Trade statistics for 1999

and 2000 shows export destination for Sabah seaweed are Denmark, Spain, Hong Kong and Korea.

There are good opportunities in the downstream activities with potentials to be developed to cater for local and export markets. These prospects are in fish processing, value added products for instance production of industrial packed seafood, battered and breaded fish fillets, shrimps, squid rings, fish fingers, crab cutlers, convenience and ready to cook products. There exist a sizeable number of local processing plants in Sabah, producing frozen prawns, chilled and frozen fish, crabmeat, fishmeal and squids. There are exporters in Sandakan, Kota Kinabalu and Kudat involved in the live fish trade for local and export markets. Seafood processing is one area recommended by the department for expansion. High value-added food products such as ready to cook and ready to serve or microwave compatible dishes or convenience products are still very much underdeveloped. Even in a highly developed export area such as processed prawns and frozen fish, the level of processing is at the minimum level.

Investment in supporting facilities such as high tech vessels, better post harvest equipment and landing facilities may profit both fishers and producers as losses in post harvest handling of high value marine capture can be resolved. Aquaculture sector can compliment marine produce product to cater for the local prawn processing companies. Private sectors and new investors can tap opportunities in providing technology and services in the supply of fisheries inputs for aquaculture and fisheries.

The marketing and distributions of fisheries products provide wide opportunities especially in wholesale, retail, transportation, imports and exports of fish commodities. With the increasing demand of seafood in this region alone, fisheries entrepreneurs could increase their business by improving their existing market chains and venturing into new market.

In summary, analysis of opportunities and prospects in fisheries investment in Sabah are listed below;

- Growing demands for seafood product.
- Establish regional and international markets.
- Competitive quality of marine and aquaculture product.
- Private sector resilience.
- Technology availability in capture, culture and processing of prawn.
- Readily-available resources.
- Existing and continued public sector support.

8.0 Conclusion

The fishing and aquaculture industry in Sabah has good potential for development. Among the key reasons for this is the yet-untapped fisheries resources, quite extensive suitable land resources, established technology and the strong government support. Demands for fish and fish products in local, regional and international markets will translate to better opportunities for the local processors and exporters. Even though this sector faces a number of constraints and problems, these by no means will hamper the development of the industry. Challenges such as the opening up of regional markets and competition from foreign fish producers will make it incumbent upon local producers to be more resilient and competitive. How this industry will develop in the next few years will depend on the close cooperation between the private sector and the government.