Business Proposal For Commercial Farming Of Black Tiger Shrimp (Penaeus monodon)
Business Proposal For Commercial Farming Of BLACK TIGER SHRIMP (Penaeus monodon)

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Appendix 1 Projected Cash Flow Statement of 20 Hectares Shrimp Farm
Appendix 2 Government Support
The shrimp culture industry in Malaysia has developed rapidly at a rate of 21% between the years 1991 and 2000. In its effort to develop the industry, the Department of Fisheries Malaysia, in cooperation with the private sector, has introduced various technologies to ensure a sustainable and environmental friendly industry. It is hoped that this publication will serve as a guide to potential investors keen on investing in the industry.
EXECUTIVE SUMMARY

1. The purpose of this Business Proposal is to promote the culture of Black Tiger shrimp (Penaeus monodon) in ponds on a commercial scale. Shrimp farming offers quick returns on investment, highly priced products and a vast potential for the export market.

2. The Business Proposal provides a simple but complete guide to Black Tiger shrimp farming covering relevant topics such as site selection, preparation and management of ponds, harvesting of shrimp, post-harvest technology and financial analysis.

3. Total production is between 2 - 5 tonnes/hectare/cycle. Two cycles of culture are carried out annually. Based on an ex-farm price of RM20/kg, this produces a gross income of between RM80,000 - RM200,000/hectare/year.

4. The Net Present Value (NPV) of this project at a 10% discount factor is positive at RM 2,058,182. The discounted Benefit Cost Ratio (BCR) at 10% is 2.43. The Internal Rate of Return (IRR) is 39%, which is higher compared to the cost of capital. Tested against a 10% drop in price and 10% increase in operating and maintenance costs as well as a drop in shrimp survival rate to 55%, the project is still financially viable.

5. The financial analysis shows that the project is viable giving high returns to operators and investors.
BUSINESS PROPOSAL
FOR COMMERCIAL FARMING
OF BLACK TIGER SHRIMP

1.0 INTRODUCTION

Shrimp culture in Malaysia, particularly of the species *Penaeus monodon* (Black Tiger shrimp), has gained significant economic importance since the onset of success in mass production of shrimp fry in hatcheries, and the improvement gained over the management procedures through the adoption of better culture technology.

High market value, faster growth rate and a shorter culture period are the major characteristics of tiger shrimp which made the species more favourable for brackishwater aquaculture in Malaysia.

Aquaculture production for the year 2000 was 167,894 tonnes, which contributed 11.6% to the overall fish production in the country. The brackishwater and marine aquaculture sectors contributed 117,206 tonnes or 69.8% of the total aquaculture production. Production from brackishwater pond culture was 17,418 tonnes with a value of RM 495 million. The main species produced was tiger shrimp, *Penaeus monodon* which contributed 89.2% of the total production from brackishwater pond with a value RM 462 million.
The number of shrimp farms and farming areas have increased steadily over the years due to active participation by farmers, intensive training and courses provided by the government, locally developed technology and global access to know-how in the culture and processing aspects, easy access to credit facilities, government incentives and consistent good market prices both locally and overseas. Given the above incentives plus the projected potential areas for shrimp aquaculture, the future prospects of shrimp farming in Malaysia are promising.

Plate 1: Shrimp Farm

2.0 STATUS OF SHRIMP CULTURE

2.1 History

2.1.1 The culture of marine shrimps started in the mid 1930's with the development of shrimp trapping ponds in the state of Johore. The trapping ponds were subsequently phased out and replaced by the present stocking pond culture system. Much of the pond construction and water management technology actually came from Taiwan.
2.1.2 Historical development

1930 - Japan develops spawning and mass production of kuruma shrimp \textit{(Penaeus japonicus)} for commercial use
- Malaysia practices trapping pond method

1965-1967 - France breeds and raises \textit{P. stylirostris} through intensive culture in Tahiti
- China develops semi-intensive method for \textit{P. chinensis}
- Taiwan develops intensive pond culture
- USA researches shrimp farming in Texas

1970s - USA takes technology to Ecuador
- Ecuador becomes leading producer of farm-raised shrimp

1980s - Malaysia adopts shrimp farming technology from Taiwan

1990s - Refines culture technologies with cooperation from SEAFDEC AQD and other ASEAN countries.

Plate 2: Shrimps Are Weighed Before The Stocking Rate Is Determined
2.2 Potential Areas

2.2.1 Production in the year 2000 was 15,540 tonnes from 7,151 ha of farming areas. The government through the Department of Fisheries has targeted a production of 150,000 tonnes by the year 2010. To achieve this target a land area of 37,500 ha is required. These are in the mangrove tidal land, abandoned or uneconomical agricultural land areas.

2.2.2 Major farming areas are located in the states of Sabah, Perak, Johor, Sarawak and Kedah accounting for 42%, 13%, 11%, 10% and also 10% respectively, of the total shrimp farming areas. The states that still have vast potential are Sarawak, Sabah, Pahang, Selangor and Johor.

3.0 FARMING OPERATIONS

3.1 Current Culture Practises

3.1.1 Two different culture systems, namely semi-intensive and intensive are widely practised.

3.1.2 The system commonly preferred in Malaysia is the intensive culture system using stocking densities ranging from 25 to 50 pieces per square meter.
3.1.3 In the intensive system, the ponds are fertilized prior to the start of culture operations. Water exchange of between 30-50% is carried out after the first month of culture operation. Only formulated pellets are given from the start of the culture and the frequency is about 4 to 5 times daily after the first month of culture. Aeration is needed throughout the culture period mostly from late evening until about 8.00 am of the following morning. The expected harvest is between 3.0-7.0 tonnes/ha/cycle.

3.1.4 Zero water exchange or a closed system is also being practised. To some extent, certain farms use probiotics as bioremediators to improve the culture system. As a procedure to sterilise and thus disinfect the water from pathogenic microbes, chlorine-based compound such as calcium or sodium hypochlorite is added prior to the start of the culture. Fresh, clean and treated seawater is added whenever necessary to compensate loss through evaporation.

3.2 Suitable Sites and Water Quality

3.2.1 Mangrove areas were the area of choice in the 1960s. However it is less suitable due to its inherent acid sulphate soil condition. Most preferred areas are lands adjacent to mangrove forest with adequate supply of clean seawater.

3.2.2 Areas of low productivity, abandoned or uneconomical agricultural schemes with supporting infrastructure and facilities, as well as areas with positive social economical impacts are well sought after at present. Mangrove forest reserves, conservation areas, flood prone areas and areas subject to pollution and coastal erosion are avoided.
3.2.3 Suitable water quality for shrimp farming is given below:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dissolved oxygen</td>
<td>&gt; 4.0 mg/L</td>
</tr>
<tr>
<td>Salinity</td>
<td>15-25 ppt</td>
</tr>
<tr>
<td>Water temperature</td>
<td>28-32 °C</td>
</tr>
<tr>
<td>pH</td>
<td>7.5-8.5</td>
</tr>
<tr>
<td>Secchi disc reading</td>
<td>25-50 cm</td>
</tr>
<tr>
<td>Ammonia (unionized)</td>
<td>&lt; 0.10 mg/L</td>
</tr>
<tr>
<td>Nitrite-(Nitrogen)</td>
<td>&lt; 1.28 mg/L</td>
</tr>
<tr>
<td>Hydrogen sulphide</td>
<td>&lt; 0.03 mg/L</td>
</tr>
<tr>
<td>Alkalinity</td>
<td>&gt; 80 ppm CaCO₃</td>
</tr>
</tbody>
</table>

### 3.3 Pond Design and Layout

3.3.1 Minimal tree felling is done to ensure sufficient buffer zone.

3.3.2 Minimal digging is done, bunds are constructed with imported soil and pumps are used to avoid acid sulphate conditions.

3.3.3 Intake and discharge points need to be constructed separately. Reservoirs in the supply system and effluent treatment ponds for water discharge are provided.

3.3.4 Rectangular or square ponds ranging between 0.5 ha to 1.0 ha are preferred.

3.3.5 Ponds with High Density Polyethylene (HDPE) plastic lining are sometimes used to avoid acid sulphate soil conditions, better disease control and for easy waste management.
Plate 4: Shrimp Ponds Normally Range Between 0.5 – 1.0 ha In Size

Plate 5: Construction of Shrimp Ponds

3.4 Pond Preparation

3.4.1 Proper pond preparation is a prerequisite to successful culture of shrimp in ponds. Wastes from leftover feed and other organic matters must be removed thoroughly prior to the stocking of shrimp fry.

3.4.2 In ponds where the wastes are not substantial, the ponds are left to dry until the surface of the pond bottom cracks and thereafter the wastes are then scraped off.

3.4.3 In ponds with lots of waste, the bottoms are thoroughly cleaned by using farm machinery such as bulldozers.

3.4.4 After cleaning the wastes, the pond can then be flushed several times prior to liming, application of pesticides and fertilization.
3.4.5 Liming is done prior to fertilization and generally agriculture lime and hydrated lime are used. However, dolomite has also been used by some farm operators in the northern region of Peninsular Malaysia. In the case of hydrated lime, about 1 tonnes/ha is used.

3.4.6 Calcium hypochlorite is applied at a concentration of 30 ppm to kill all pathogenic bacteria.

3.4.7 Tea-seed cake (1ppm) is commonly used to eradicate unwanted competitors and predators once the screen at the pond gate is installed.

3.4.8 Pond fertilization is normally carried out the day the pond is filled with water. Triple Super Phosphate (TSP) and urea are commonly used in pond fertilization. Normally about 10.0kg of TSP and 40.0kg urea are used for a one-hectare pond. Plankton bloom will be visible two days after fertilization.

3.5 Pond Management

3.5.1 Use good quality disease free fry, appropriate transportation techniques and optimum stocking rates.

3.5.2 Use quality feeds, with good water quality, approved food additives, feeding regimes and rates to be adjusted with feed demand to avoid over feeding.

3.5.3 Use good quality water, good water management, aeration, waste water management with treatment and proper discharge.

3.5.4 Apply good disease management practices by using only healthy fry from selected hatcheries.

3.5.5 Apply proper handling and disposal of infected shrimp and only use approved drugs and chemicals treatment.

3.5.6 Pond effluents should be properly treated before reuse or discharged into public waters.

3.5.7 An average of 30-40 pieces/kg of shrimp can be harvested after about 3-4 months of culture period.
Plate 6: Aerators Are Necessary For Good Water Management

Plate 7: Harvesting of Shrimp

Plate 8: Harvested Black Tiger Shrimp
3.6 Shrimp Health Management

3.6.1 White Spot Disease or White Spot Syndrome Virus (WSSV) found in Black Tiger shrimp is caused by Baculovirus. Infected shrimp have red discoloration and white spots or patches about 0.5-2.0 mm in diameter on the surface inside the carapaces. These white spots are abnormal deposits of calcium salts. White spot disease causes mass mortalities of shrimps that can reach 100% within 3-10 days after onset of these symptoms, especially in juvenile shrimps of all ages and stages.

3.6.2 Control and Prevention

3.6.2.1 Ensure shrimp fry are WSSV free through Polymerize Chain Reaction (PCR) analysis.

3.6.2.2 Obtain Specific Pathogen Free (SPF) broodstock for hatchery operations.

3.6.2.3 Bio security measures such as fencing and netting are done to prevent entry of vectors and carriers into culture ponds.

3.6.2.4 Environmental friendly culture practices such as proper waste/sludge disposal are carried out to prevent WSSV.

3.7 Harvesting

3.7.1 Operators should plan ahead a harvesting programme to ensure product quality.

3.7.2 Partial harvesting for the live market using lift nets can be carried out by local farm operators to remove marketable size shrimp after about 90 days of culture. Live shrimp of about 15-20 g are highly sought after in Penang, Kuala Lumpur, Johor Bahru and Singapore.

3.7.3 Total harvesting can be done using bag nets and transfer nets.

3.7.4 Shrimp quality should be maintained throughout the harvesting process to ensure freshness of the product.
4.0 MARKETING

4.1 Processed Products

4.1.1 Processed shrimps are as below:

<table>
<thead>
<tr>
<th>Head-on Shell on</th>
<th>Frozen fresh shrimps which comes in the original description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Headless Shell-on</td>
<td>Frozen fresh shrimps which are unpeeled and without the head</td>
</tr>
<tr>
<td>Peeled Deveined Tail-on</td>
<td>Frozen fresh shrimps which are peeled without the head but with the tail-on and deveined</td>
</tr>
<tr>
<td>Peeled Deveined Tail-off</td>
<td>Frozen fresh shrimps which are peeled, without the head and tail and deveined</td>
</tr>
<tr>
<td>Peeled Undeveined</td>
<td>Frozen fresh shrimps which are peeled, and without the head and tail</td>
</tr>
</tbody>
</table>

4.1.2 Processing plants are located in various parts of Peninsular Malaysia and in eastern States of Sabah and Sarawak. Some processing plants cater specifically for shrimps while others process other marine products too. In the northern States of Kedah, Penang and Kelantan of Peninsular Malaysia, most of the harvested shrimps are processed at Seberang Prai, Penang.

4.1.3 Processed shrimps are exported mainly to Japan, Europe, USA, Australia and New Zealand. Headless shell-on and peeled shrimps are preferred by the Japanese and American markets while cooked and peeled shrimps are preferred by the Australians and New Zealanders.
4.1.4 To comply with international trade and World Trade Organization (WTO) requirements, a Hazard Analysis Critical Control Point (HACCP) certificate must be obtained from the Ministry of Health Malaysia before the shrimps are exported.

5.0 PRODUCTION COST

The cost of production of 1 kg of shrimp ranges from RM12.00 to RM16.00. Feed is the major component in the overall cost (40-60%), fry (8-13%), electricity/diesel (10-20%), labour (10-20%) and bioremediation/chemical (less than 10%).

The cost of a PCR tested post larva (PL15) ranges from 1.5 to 2 sen per piece. There are about 50 active hatcheries in the country, each of which can produce between 5 to 10 million PL per production cycle.

Skilled technicians and general workers are available. Besides local manpower, recruitment of foreign workers are also allowed by the Malaysian Government.

Both local and imported feeds are available. Their prices and quality are also comparable.

Bioremediation products, liming materials, chemicals and farm equipment are available locally.
6.0 FINANCIAL ANALYSIS

The financial analysis presented here is for a 20-ha shrimp farm. The farm is managed by a manager who is assisted by a technician, 5 general workers and a clerk. The financial analysis for the project is based on a 10-year cash flow and the following assumptions.

- Total land area of 20 ha (TOL status)
- 10 units of 1 ha culture ponds
- 1 unit of 2 ha reservoir
- 1 unit of 1 ha sedimentation pond
- All activities are assumed in year 0 of the project
- Stocking rate of 30 pieces/m2
- The survival rate is 65%
- Food conversion ratio (FCR) of 1.8
- Culture period of 4 months per cycle (2 cycles per year)
- Average size of harvested shrimp is 25 gm/shrimp
- The productivity, input used, prices of inputs and outputs are assumed to be constant throughout the period of analysis.

The capital development costs consist of all expenditure on physical assets that are involved in getting the project started. These include the costs of land development, infrastructure (road, drainage, fencing, electrical and water supplies), pond construction, farm equipment, vehicles, buildings and other facilities. The total development cost is estimated at RM 1,443,750 for a module of 10 culture ponds (Appendix 1).

Operating costs include the costs of all inputs such as fry, feed, electricity, fuel, salary, fertilizers and chemicals. The total operating and maintenance cost for one year (2 cycles) production is estimated at RM 1,341,677 (Appendix 1).
6.3 Revenue

The total production from the project is estimated at 97,500 kg per year or 48,750 kg per cycle. Based on an ex-farm price of RM20, the value of production per year will be RM1, 950,000 (Appendix 1).

6.4 Financial Viability

The financial viability of the project is measured using three main indicators namely the Net Present Value (NPV), Benefit Cost Ratio (BCR) and the Internal Rate of Return (IRR). The NPV of the project at a 10% discount factor is positive at RM 2,058,182, showing the project has a good financial position after 10 years of operation. The discounted BCR at 10% is 2.43, which means that every Ringgit of initial investment will generate a return of RM2.43. The IRR of the project is 39%, which is higher compared to the cost of capital (Appendix 1). All these indicators show that the project is financially viable.

6.5 Sensitivity Analysis

A sensitivity analysis is undertaken to assess the effects of some most probable risks on the viability of the project. In this analysis, the financial indicators are tested against a 10% drop in price; a 10% increase in operating and maintenance costs; and a drop in the shrimp survival rate to 55%. The result of the sensitivity analysis shows that the project is still viable even if it is subjected to the above risks.

Table 3: Summary of Sensitivity Analysis

<table>
<thead>
<tr>
<th>Scenario</th>
<th>NPV @ 10% (RM)</th>
<th>IRR (%)</th>
<th>B/C Ratio @ 10%</th>
<th>Payback Period [Year]</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Original</td>
<td>2,058,182</td>
<td>39</td>
<td>2.43</td>
<td>2 to 3</td>
</tr>
<tr>
<td>2. Drop in price by 10%</td>
<td>859,992</td>
<td>23</td>
<td>1.60</td>
<td>3 to 4</td>
</tr>
<tr>
<td>3. Increase in operating and maintenance cost by 10%</td>
<td>1,233,780</td>
<td>28</td>
<td>1.85</td>
<td>3 to 4</td>
</tr>
<tr>
<td>4. Drop in survival rate to 55%</td>
<td>824,507</td>
<td>22</td>
<td>1.57</td>
<td>3 to 4</td>
</tr>
</tbody>
</table>
7.0 CONSTRAINTS

7.1 Environmental Impacts

The exploitation of the coastal areas for shrimp farming had been conducted rapidly over the last 15 years especially along the west coast of Peninsular Malaysia and in Sabah. However, little is known about the impact of such activities on the coastal resources. There is therefore an urgent need to address the impact of aquaculture activities on all forms of marine organisms and their ecosystems, both existing and in potential areas for aquaculture so as not to adversely affect the environment. The costly collapse of the shrimp aquaculture industry in Taiwan and China, the drop in pond production in the Gulf of Thailand as well as in the south-eastern part of Thailand, the destruction of massive mangrove forests in Philippines and Indonesia and more recently the drop in production in Ecuador would serve as a timely reminder to Malaysia, to act accordingly, to avoid costly lessons in our endeavour to further develop the shrimp farming industry in this country. To reduce the impact of shrimp culture on the environment, farmers and investors are advised to follow the Code of Practice and Farm Certification Scheme guidelines.

7.2 Competitiveness

Cost in production appears to be one of the major factors likely to affect the future expansion of shrimp farming in Malaysia. High local labour cost and the competitive export market will pose some problems. To remain competitive, more efficient pond management measures must be adopted to reduce production cost and increase productivity. Management measures including proper pond preparation, optimum-stocking densities, cost effective feeding regimes and implementing measures to control discharges will go a long way to improve productivity leading to sustainable development of shrimp farming in Malaysia.
7.3 Conflict of Interests

Land for expansion has become increasingly more expensive and difficult to acquire especially in Peninsular Malaysia partly because of conflict of interests. In an effort to expedite the processing of land for aquaculture purposes, the Department of Fisheries has initiated action to draft the proposal for zoning areas for aquaculture.

7.4 Diseases

Without proper management disease outbreaks will occur frequently. Diseases can cause mass mortality to the culture at all stages. White Spot disease attacked shrimp farms throughout Peninsular Malaysia in 1996. White Spot disease causes mass mortalities of shrimps that can reach 100% within 3-10 days after onset of these signs, especially in juvenile shrimps of all ages and sizes.

8.0 FUTURE PLANS

Under the Third National Agriculture Policy (1998-2010), aquaculture in Malaysia is designated to play a leading role to supplement the natural fishery resources, which has already reached its maximum sustainable yield. A prospective plan has been drawn up by the Department of Fisheries Malaysia with the aim of gradually increasing shrimp production from the present production of about 16,000 tonnes to 150,000 tonnes by the year 2010 involving some 30,000 ha of brackishwater ponds.

Guidelines to prospective farm operators would need to be introduced and should strongly emphasize the need for addressing the discharge of waste matters from such farms. The proposed zoning of areas for aquaculture would be a step in the right direction to ensure that conflict of interest is minimized in such areas.
To standardize procedures there is a need to apply the Environmental Impact Assessment (EIA) process to all future aquaculture proposals and not just to the major ones. In addition, it is necessary to formulate an integrated coastal zone management plan involving intersectoral approaches to ensure the success of the prospective aquaculture plan.

Farm Accreditation – To award farm accreditation to ensure quality produce from the farms. The elements of accreditation include:

- Criteria guidelines set up by the Department of Fisheries
- Code of Practice (COP)
- ISO 9002
- Standard Sanitary Operating Procedure (SSOP)

Inland aquaculture regulations are to be implemented as a measure to control and monitor aquaculture development, practices and activities.

9.0 GOVERNMENT SUPPORT

See appendix 2

10.0 CONCLUSION

There is good potential for the development of the shrimp industry in Malaysia given the available land resources and technical expertise in the country. With a promising domestic and export market as well as good financial viability, the shrimp industry can be very successful in Malaysia.
# APPENDIX 1

## PROJECTED CASH FLOW STATEMENT OF A 20 HECTARES SHRIMP FARM

### Item / Year

<table>
<thead>
<tr>
<th>Item / Year</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
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</thead>
<tbody>
<tr>
<td>CASH INFLOW</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yield (kg)</td>
<td>97,500</td>
<td>97,500</td>
<td>97,500</td>
<td>97,500</td>
<td>97,500</td>
<td>97,500</td>
<td>97,500</td>
<td>97,500</td>
<td>97,500</td>
<td>97,500</td>
<td>97,500</td>
</tr>
<tr>
<td>Revenue @ RM20.00/kg</td>
<td>1,950,000</td>
<td>1,950,000</td>
<td>1,950,000</td>
<td>1,950,000</td>
<td>1,950,000</td>
<td>1,950,000</td>
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<td>1,950,000</td>
<td>1,950,000</td>
<td>1,950,000</td>
<td>1,950,000</td>
</tr>
</tbody>
</table>

### CASH OUTFLOW

#### A. Capital Development Costs

1. Land survey (20 ha) | 20,000
2. Land clearing @ RM3,000/ha | 60,000
3. Farm road @ RM1,000/ha | 20,000
4. Land fencing @ RM1,000/ha | 20,000
5. Pond Construction @ RM 20,000/ha | 260,000
6. Water inlet and outlot gate @RM15,000/ha of pond | 195,000
7. Electrical wiring @ RM10,000/ha of pond | 130,000
8. Office Building & manager’s quarter | 100,000
9. Store & worker’s quarter | 50,000
10. Paddle wheels @12/pond @ RM1,500 / wheel | 180,000 180,000
11. Generator - 3 units @ RM50,000 / unit | 150,000 150,000
12. Water pump - 10 units @ RM 5,000 / unit | 50,000 50,000
13. Fiber glass tanks - 10 units @ RM1,000 / unit | 10,000 10,000
14. Small lorry - 1 unit @ RM 60,000 / unit | 60,000 60,000
15. Pick-up truck - 1 unit @ RM 70,000 / unit | 70,000 70,000
16. Contingencies 5% | 68,750
17. Total Capital Development Cost | 1,443,750 380,000

#### B. Operating and Maintenance Costs

1. Fertilizer - TSP @ 375kg / ha @ RM1.30 / kg | 9,750 9,750 9,750 9,750 9,750 9,750 9,750 9,750 9,750 9,750
2. Lime @1000kg / ha @ RM0.37 / kg | 7,400 7,400 7,400 7,400 7,400 7,400 7,400 7,400 7,400 7,400
3. Fry - PL 15 stocking @ 30 pcs / m2 @ 2sen / pc | 120,000 120,000 120,000 120,000 120,000 120,000 120,000 120,000 120,000 120,000
4. Feed @ RM3.50 / kg ; FCR 1 : 1.8 | 614,250 614,250 614,250 614,250 614,250 614,250 614,250 614,250 614,250 614,250
5. Electricity | 260,000 260,000 260,000 260,000 260,000 260,000 260,000 260,000 260,000 260,000
6. Petrol/diesel | 15,000 15,000 15,000 15,000 15,000 15,000 15,000 15,000 15,000 15,000
7. Salary
   - 1 manager cum supervisor @ RM5,000 / mth | 60,000 60,000 60,000 60,000 60,000 60,000 60,000 60,000 60,000 60,000
   - 1 technician @ RM1,500 / mth | 18,000 18,000 18,000 18,000 18,000 18,000 18,000 18,000 18,000 18,000
   - 5 workers @ RM1,000 / mth | 60,000 60,000 60,000 60,000 60,000 60,000 60,000 60,000 60,000 60,000
   - 1 clerk cum storekeeper @ RM1,000 / mth | 12,000 12,000 12,000 12,000 12,000 12,000 12,000 12,000 12,000 12,000
8. Wage
   - Harvesting - 8 man-day / ha / cycle @ RM30 / day | 4,800 4,800 4,800 4,800 4,800 4,800 4,800 4,800 4,800 4,800
   - Pond cleaning - 4 man-day / ha / cycle @ RM30/day | 2,400 2,400 2,400 2,400 2,400 2,400 2,400 2,400 2,400 2,400
9. Administrative expenses | 18,000 18,000 18,000 18,000 18,000 18,000 18,000 18,000 18,000 18,000
10. Maintenance @ 5% of capital costs | 72,188 72,188 72,188 72,188 72,188 72,188 72,188 72,188 72,188 72,188
11. Contingencies 5% | 63,899 63,899 63,899 63,899 63,899 63,899 63,899 63,899 63,899 63,899
12. Total Operating and Maintenance Cost | 1,341,677 1,341,677 1,341,677 1,341,677 1,341,677 1,341,677 1,341,677 1,341,677 1,341,677 1,341,677

#### C. Total Capital Development Cost | 1,443,750 380,000

#### NET CASH FLOW

<table>
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<th>NET CASH FLOW</th>
<th>808,323</th>
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<th>228,323</th>
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<td>CUMULATIVE CASH FLOW</td>
<td>808,323</td>
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<td>808,323</td>
<td>1,217,866</td>
<td>1,826,189</td>
<td>2,434,512</td>
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<td>NET PRESENT VALUE @ 10% (RM)</td>
<td>2,058,182</td>
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<tr>
<td>INTERNAL RATE OF RETURN (IRR) (%)</td>
<td>39%</td>
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<tr>
<td>BENEFIT COST (B/C) RATIO @ 10%</td>
<td>2.43</td>
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<tr>
<td>PAYBACK PERIOD (YEAR)</td>
<td>2 to 3</td>
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<tr>
<td>COST OF PRODUCTION PER KILOGRAM (RM/KG)</td>
<td>15.63</td>
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APPENDIX 2

GOVERNMENT SUPPORT

1.1 Brackishwater Aquaculture Research Centre, 81500 Gelang Patah, Johor.
- On the job training for farm management
- Site selection
- Farm design and layout
- Feed and nutrition
- Water quality management
- Shrimp health management (e.g. PCR technique etc.)

1.2 National Shrimp Fry Production and Research Centre, Kampung Pulau Sayak, Kedah.
- Scheduled training
- Seed production
- Hatchery management
  Farm management
- Handling and processing
- Feed and Nutrition
- Shrimp health management (e.g. PCR technique etc.)
- Water quality
- Site selection

1.3 Malaysia Fisheries Institute, Terengganu
- HACCP Competency for Quality Control (QC) Supervisors
- HACCP Competency for Line Workers
- Fish Handling and Quality Assessment
- Processing

1.4 Fish Quarantine Centre, Subang, Selangor
- Microbiological analysis
- Chemical residue analysis (metal)
- Water quality analysis
- PCR test
2.1 Brackishwater Aquaculture Research Centre, 81500 Gelang Patah, Johor

- Development of culture systems and technology
- Disease control and health management
- Water quality and environment management
- Feed and nutrition
- Shrimp genetic and broodstock development

2.2 National Shrimp Fry Production and Research Centre, Kampung Pulau Sayak, Kedah

- Seed production techniques
- Culture technologies
- Microbiology
- Plankton and water quality
- Nutrition

2.3 Fisheries Research Institute, Penang

- Microbiological analysis
- Chemical residue analysis (pesticide and metal)
- Histamine analysis
- Water quality analysis
- DNA analysis

2.4 National Fish Health Centre, Batu Maung, Pulau Pinang

- Bacteriology
- Virology
- Microbiology
- Parasitology
3.1 Fund For Food (3F)

a) Purpose of Facility
• To encourage primary food production. Main focus is on local consumption [not for export]

b) Eligibility
• Malaysian citizen residing in Malaysia, or Malaysian company having 51 % or more share of equity.
• Project cost is inclusive of land purchase and working capital. The purchase price of land must not be more than 20 % of the total project cost.
• For export oriented projects, at least 50 % of its production must be for local market.

c) Limits of Financing
• Minimum : RM 10,000.00/project
• Maximum : RM 3 million/project or 90 % of project cost whichever is lower.

d) Interest Rate/Profit Margin (Islamic Financing)
• 4 % per annum / 4 % profit margin

e) Loan Tenure
• Up to 8 years

3.2 Commercial Loans

a) Purpose of Loan
• To finance all types of agricultural activities including production, processing, manufacturing and marketing.

b) Eligibility
• Malaysian citizen residing in Malaysia, or Malaysian company having 51 % or more equity.

c) Limits of Financing
• 70 % of project cost.

d) Interest Rate
• Commercial rate (up to 4 % above Base Lending Rate)

e) Loan Tenure
• Up to 10 years
3.3 Bumiputra Commercial and Industrial Community (MPPB)

a) Purpose of Loan
To increase the number of Bumiputra entrepreneurs in agriculture especially in food production, processing and marketing

b) Eligibility
Private Limited Company with Paid-Up capital of not less than RM 100,000
• Farmer or Fishery Association with equity not less than RM 100,000
• On-going entrepreneur
• Application must be recommended by the supervising Department or Agency

c) Limits of Financing
Minimum: RM 10,000
Maximum: RM 3 million or
• Up to 90% of project cost whichever is lower

d) Interest Rate
4% per annum

e) Loan Tenure
Up to 10 years

3.4 Agricultural Mechanization and Automation (MAP)

a) Purpose of Loan
• To promote the modernisation and mechanisation of the agricultural sector by encouraging the use of tractors, machines and automation in agricultural projects.

b) Eligibility
Pertubuhan Peladang Kawasan (PPK), Pertubuhan Peladang Negeri (PPN) and Pertubuhan Peladang Kebangsaan (NAFAS).
Persatuan Nelayan Kawasan (PNK), Persatuan Nelayan Negeri (PNN) and Persatuan Nelayan Kebangsaan (NEKMAT).
Members of PPK and PNK.
c) Limits of Financing
Individual & Partnership:
• Minimum : RM 2,000
• Maximum : RM 300,000

Companies, Cooperatives, Pertubuhan Peladang and Persatuan Nelayan:
• Minimum : RM 5,000
• Maximum : RM 2 million or
• 70 % - 100 % of project cost whichever is lower.

d) Interest Rate
4 % per annum.

e) Loan Tenure
• New machine - 7 years
• Used machine - 5 years

3.5 Investment Incentives
• Malaysian Industrial Development Authority (MIDA)

Companies are eligible to apply for the following incentives:


3.5.1.1 Pioneer Status
Partial exemption from payment of income tax.
• Tax payable on 30 % of statutory income for a period of 5 years, commencing from Production Day.
• Effectively pioneer company would be paying only 8.4 % corporate tax rate.
3.5.1.2 Investment Tax Allowance (ITA)
Allowance of 60% in respect of qualifying expenditure incurred within 5 years from date of approval of project.
- Set off against 70% of statutory income the year of the assessment.
- Any unutilised allowance can be carried forward to subsequent years.
Integrated agriculture projects are eligible for ITA for an additional 5 years on expenditure incurred processing/manufacturing operations.

3.5.1.3 Incentives for High Tech Projects
Pioneer status with full tax exemption of statutory income for 5 years or ITA.

3.5.1.4 Incentives for Research and Development (R & D)
Contract R & D Company - eligible for private sectors with full exemption of income tax for 5 years or 100% ITA on qualifying expenditure incurred within 10 years.
R & D Company - eligible to apply for 100% ITA on qualifying expenditure incurred within 10 years.

3.5.1.5 Incentives for Small Scale Companies
- Eligible for Pioneer Status incentives.

3.5.1.6 Re-Investment Allowance (RA) for Expansion, Modernization and Diversification
Allowance of 60% on capital expenditure incurred

3.5.1.7 Agriculture Allowance (Schedule 3, Income Tax Act, 1967)
- Capital expenditure incurred on clearing and preparation of land is eligible for yearly allowance of 50% of expenditure incurred.

3.5.1.8 Deduction for Capital Expenditure on Approved Agriculture Projects (Schedule 4A, Income Tax Act, 1967)
3.5.1.9 Incentives for Export
- Double Deduction of Export
- Credit Insurance Premium
- Double deduction for promotion of Export

3.5.1.10 Incentives on Infrastructure and Freight (Promoted Areas)
- Infrastructure Allowance 100%
- Double deductions on Shipping Freight Charges are given to manufacturing companies for shipping their goods to Peninsular Malaysia provided they use local ports.

3.5.1.11 Incentives for Training

3.5.1.12 Tariff Related Incentives

3.5.1.13 Special Deduction for Capital Expenditure on Approved Agricultural Projects

3.5.1.14 Extension of Incentive for Promoted Areas
The project located in Eastern Corridor of Peninsular Malaysia, Sabah and Sarawak enjoys the following incentives:
- Pioneer Status with exception of 85% of the statutory income for a period 5 years.
- ITA of 80% on the qualifying capital expenditure to be utilized against 85% of statutory income
- 100% Infrastructure Allowance on capital expenditure incurred for the procession of infrastructure

3.5.2 Additional/new incentives for Agriculture Project under the Income Tax Rules 2001

3.5.2.1 Additional Incentives for Food Production

3.5.2.2 Import Duty, Excise Duty and/or Sales Tax Exemption Incentive on Machinery and Equipment
3.5.2.3 Incentives for Companies Providing Cold Chain Facilities and Service for Food Production

3.5.3 New incentives in Budget 2002

3.5.3.1 Extension of scope of tax incentives to approved food production

3.5.3.2 Extending the scope of 100% allowance on capital expenditure on approved agriculture project
ACKNOWLEDGEMENTS

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