Industry and Market Status of Tilapia in Malaysia

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Presentation Outline

1. Status of Fisheries Sub-sector’s Development in Malaysia
2. Contribution of Aquaculture in Food Fish Production
3. Tilapia Aquaculture: History
4. Development of Tilapia Aquaculture
5. Tilapia Market Chain
6. Advances in Tilapia Industry
7. Tilapia: National Key Economic Area
8. Conclusion
Food fish production in 2013 was 1.78 million tones (RM10.6 billion)
Contribution to National GDP 1.3%, 12.5% Agriculture GDP
134,000 employment (105,000 fishermen + 29,000 fish farmers)
RM5.9 billion Fish & Fish Product Trade
377 million pcs. (RM629 million) ornamental fish

Supply and Demand of Food Fish

<table>
<thead>
<tr>
<th>YEAR</th>
<th>2013</th>
<th>2015</th>
<th>2020</th>
</tr>
</thead>
<tbody>
<tr>
<td>SUPPLY (million tons)</td>
<td>1.74</td>
<td>2.07</td>
<td>2.36</td>
</tr>
<tr>
<td>DEMAND (million tons)</td>
<td>1.51</td>
<td>1.75</td>
<td>1.92</td>
</tr>
<tr>
<td>Per capita consumption (kg)</td>
<td>53.1</td>
<td>56.8</td>
<td>61.1</td>
</tr>
<tr>
<td>SSL (%)</td>
<td>125</td>
<td>102</td>
<td>110</td>
</tr>
</tbody>
</table>
Fisheries Industry Overview

Coastal: 1,155,000 m.t  
Deep Sea: 329,000 m.t  
Aquaculture: 308,000 m.t  
Ornamental fish: 377 million pcs  
Fish Fry: 9.5 billion pcs  

Total: 1,787,000 m.t

Annual Growth Rate (AGR)
Average AGR (2002 – 2013) 4.0%
Capture Fisheries: 3.6%
Aquaculture: 6.6%

Self Sufficiency Level (SSL) on Food Fish (%)

<table>
<thead>
<tr>
<th>Year</th>
<th>SSL (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010</td>
<td>101.70%</td>
</tr>
<tr>
<td>2011</td>
<td>123.70%</td>
</tr>
<tr>
<td>2012</td>
<td>128.00%</td>
</tr>
<tr>
<td>2013e</td>
<td>124.90%</td>
</tr>
</tbody>
</table>
Aquaculture Production in 2013 totalled 308,000 tonnes (RM2.6 billion)

Under the 10th Malaysia Plan, aquaculture identified as one of the thrust areas.

Projected production in the year 2015 targeted at 585,000 tonnes.
Significant increased in production of freshwater fish and shrimp,
Increase production responding to increase in demand for tilapia, catfish and shrimp in domestic and export market.
### Advantages in Aquaculture Development

<table>
<thead>
<tr>
<th>Advantage</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Strategic Location</strong></td>
<td>Strategically located in the middle of Southeast Asia, Malaysia is an important producer, market and trading nation for fish and fishery products in the region.</td>
</tr>
<tr>
<td><strong>Good Climatic Condition</strong></td>
<td>The good climatic condition and free from natural disaster, the country is very conducive to aquaculture and fishing industry.</td>
</tr>
<tr>
<td><strong>Blessed with abundant fisheries resources</strong></td>
<td>Malaysia is blessed with abundant fisheries resources that can provide ample supply of raw materials to a wide range of seafood business. The country’s fish production in 2012 was close to 2.0 million tones, comprising 1.47 million tones of wild catches and 637,517 tones of aquaculture products, including seaweed.</td>
</tr>
<tr>
<td><strong>Strong Government Backup</strong></td>
<td>Strongly backed by government support, under the National Agro-food Policy (2011 - 2020) and National Economic Transformation Programme. Government has identified deep-sea fishing and aquaculture as part of the government’s strategies to increase fish supply for the domestic market, improve the balance of trade and expand exports.</td>
</tr>
</tbody>
</table>
Tilapia Aquaculture History

- 1952: introduced to fish farmers.
- Species: Oreochromis mossambicus
- Culture system: earthen pond & in ex-mining pool.
Commercial Tilapia Aquaculture

• 1980’s : Introduction of commercial culture

• Species: Hybrid Red Tilapia

• Culture system: earthen ponds, concrete tanks and floating cages
## Tilapia: Contribution to Freshwater Aquaculture Production (2013)

<table>
<thead>
<tr>
<th>ITEMS</th>
<th>Production (MT)</th>
<th>Value (RM Mill.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Freshwater Fish</td>
<td>132,892</td>
<td>1,225</td>
</tr>
<tr>
<td>Tilapia</td>
<td>44,099</td>
<td>329</td>
</tr>
<tr>
<td>Percentage</td>
<td>33%</td>
<td>27 %</td>
</tr>
</tbody>
</table>
## Tilapia: Production (2008 - 2013)

<table>
<thead>
<tr>
<th>Year</th>
<th>Production (MT)</th>
<th>Value (RM)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2008</td>
<td>34,822.50</td>
<td>200,195,380</td>
</tr>
<tr>
<td>2009</td>
<td>35,588.34</td>
<td>208,167,590</td>
</tr>
<tr>
<td>2010</td>
<td>38,886.68</td>
<td>250,985,940</td>
</tr>
<tr>
<td>2011</td>
<td>43,068.74</td>
<td>304,162,910</td>
</tr>
<tr>
<td>2012</td>
<td>52,295.30</td>
<td>379,785,380</td>
</tr>
<tr>
<td>2013</td>
<td>44,099.24</td>
<td>329,060,250</td>
</tr>
</tbody>
</table>

Growth 2008 – 2013: 6.4% in quantity and 13.3% in value
Tilapia: Species Composition (1970 - 2013)

- Significant growth in Hybrid Red Tilapia production since 1980’s
- Good market acceptance domestically
- Availability of quality fry and commercial feed
Tilapia: Development of Culture System

Land based system: Ex-mining pond, earthen ponds, tank system
Tilapia: Development of Culture System

Floating Net Cages: wooden, galvanized, HDPE frame
Tilapia: Development of Culture System

Polar Circle HDPE cage (20m Ø),
Production capacity 50 m.t/cage/cycle
Existing 5 Module (20 cages/ module)
- 2 Modules (Trapia)
- 3 Modules (DoF)
Mechanized operation: Using fish pump for fish harvesting
Mechanized operation: Using fish feeding machine
Tilapia: Hatchery

- Government hatchery: 13
- Private hatchery: 30 (78.8 mill fries per/year).
### Import of Tilapia Fry

<table>
<thead>
<tr>
<th>No</th>
<th>Exporting Countries</th>
<th>Year</th>
<th>Total (pieces)</th>
<th>Value (RM)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Filipina, Thailand, China, Vietnam</td>
<td>2010</td>
<td>12,684,084</td>
<td>328,909.98</td>
</tr>
<tr>
<td>2</td>
<td>Vietnam, Thailand</td>
<td>2011</td>
<td>1,014,280</td>
<td>83,550.66</td>
</tr>
<tr>
<td>3</td>
<td>Thailand, Indonesia</td>
<td>2012</td>
<td>911,355</td>
<td>84,173.22</td>
</tr>
<tr>
<td>4</td>
<td>Vietnam</td>
<td>2013</td>
<td>303,000</td>
<td>17,271.00</td>
</tr>
<tr>
<td>5</td>
<td>Taiwan</td>
<td>2014</td>
<td>50,000</td>
<td>1,611.30</td>
</tr>
<tr>
<td></td>
<td><strong>GRAND TOTAL</strong></td>
<td></td>
<td><strong>14,962,719</strong></td>
<td><strong>515,516.16</strong></td>
</tr>
</tbody>
</table>

Source: KLIA Biosecurity
TILAPIA MARKET CHAIN

FARMER

WHOLESALE

Market Certification

WHOLESALER

EXPORT

Products: Market Certification
Live, Frozen whole fish, GGS, Fillet
Destination:
Saudi Arabia, Dubai, Singapore, US

WHOLESALE MARKET

Products: Live, Fresh, Fillet
Market Segments
Major Cities: KL, JB, Penang

• Fresh market
• Farmer’s market
• Seafood Restaurants
• Supermarket
Tilapia Products
Advances in Tilapia Industry

Impact of Genetic Advances to Aquaculture Development

- *Oreochromis niloticus*
  - GIFT Tilapia
  - 20 million fry/hatchery/year
  - DNA traceability programme
Advances in Tilapia Industry

Impact of Genetic Advances to Aquaculture Development

- *Oreochromis niloticus*
  - Significant increase in production (50 m.t/cage/cycle)
  - 40,000 m.t/farm/year
  - Value added products & export market
Advances in Tilapia Industry

• New Vaccine to Control Tilapia Fish Disease - StrepToVax
  – a feed-based vaccine for controlling infection of Streptococcus sp. bacteria in Tilapia.
  – This vaccine reduced dependency of farmers on antibiotic usage against bacterial infection in Tilapia.

• Production of all male Tilapia using YY male.

• DNA Marker-assisted Selection program at FRI Glami Lemi to produce fast growing red tilapia.
Advances in Tilapia Industry

Environment-friendly Modular Culture System

MODULAR
CLEAN
SAVES WATER
HEALTHY FISH

Business plan
“Humane culture”
Advances in Tilapia Industry

Value added products of Tilapia

Tilapia Satay

Fillet
Tilapia: National Key Economic Area (NKEA)

EPP 4: Integrated Cage Farming

Large Scale Cage Farming Integrated with Hatcheries, Processing Plants and Utilizing Modern Farming Methods e.g. HDPE Polar Circle Cages (20 m diameter) for Tilapia Culture
# Integrated Cage Farming

Integrated modern approach for large scale fish cage farming will be implemented in new aquaculture industrial zone (ZIA) areas and championed by strong anchor companies.

<table>
<thead>
<tr>
<th>Hatchery</th>
<th>Grow out</th>
<th>Processing</th>
</tr>
</thead>
<tbody>
<tr>
<td>On site hatchery to ensure quality seed supplied to small and medium enterprises (SME)</td>
<td>New culture system using high-density polyethylene (HDPE) and GI cages</td>
<td>Processing plant located near cage farms</td>
</tr>
<tr>
<td>Anchor company will also control major inputs</td>
<td>Standard Operating Procedures (SOP) will be implemented to manage production quality and volume</td>
<td>Sufficient volume to export value added products</td>
</tr>
</tbody>
</table>

Certification and buffer zone requirements

<table>
<thead>
<tr>
<th>Processing</th>
</tr>
</thead>
<tbody>
<tr>
<td>HACCP compliant facilities</td>
</tr>
</tbody>
</table>

**Focus will be on three species that have strong global demand**

Broodstock centres will be developed to create high quality fry and reduce import dependency on high value fin fish.

- Grouper
- Seabass
- Tilapia

**Target**

Specific breeding goals e.g. growth rate, low feed conversion ratio (FCR) and disease resistance.

**Locations**

- Rompin — Sea bass and Grouper
- Tasik Kenyir — Tilapia
- Kuching — Seabass and Grouper
Integrated cage farming approach has been identified as a primary method to boost production of the targeted species

**Key advantages of cage farming**

- **Fast approval of sites**
  - Easier to get state authority's approval to utilise sites
  - Vast potential areas available such as in lakes/reservoirs and estuaries (public water bodies)

- **Lower capital cost**
  - Lower capital cost for both the government (basic infra e.g. jetty, roads) and the private sector (cages cheaper than RAS and ponds)
  - Low energy cost because no pumping is required

- **Higher productivity**
  - Produce higher yield per area e.g. TRAPIA Malaysia Sdn. Bhd. produce 100 MT/yr of Tilapia using polar circle HDPE vs. max 4 MT/ha/yr of fish using earthen ponds
  - Fish has no off flavor due to running water

**Mechanisms to improve productivity and quality**

1. **Integrated approach**
   - Hatchery
   - Grow out
   - Processing
   - Ensure SMEs use good quality seeds sourced from anchor company
   - SMEs have to adhere to SOPs to ensure better growth and survival
   - Processing sites are located near the vicinity to lower cost
   - Sufficient volume to export value-added products

2. **Application of best practices**
   - HDPE polar circle and bigger GI cages are proven new culture systems
   - Provision of buffer zone for each module
   - Certification requirement at every value chain
   - Good aquaculture practice to ensure bio security & quality
   - Regular monitoring by DoF
Several Industrial Aquaculture Zone (ZIA) areas have been identified for large scale and integrated cage farming of the targeted species.
## AQUACULTURE PRODUCTION TARGET BY YEAR 2020 (M.T)

<table>
<thead>
<tr>
<th>YEAR</th>
<th>FRESHWATER FISH</th>
<th>MOLLUSC</th>
<th>MARINE FISH</th>
<th>MARINE SHRIMP</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>2014</td>
<td>190,000</td>
<td>110,000</td>
<td>53,000</td>
<td>100,000</td>
<td>453,000</td>
</tr>
<tr>
<td>2015</td>
<td>234,084</td>
<td>129,435</td>
<td>74,261</td>
<td>148,121</td>
<td>585,901</td>
</tr>
<tr>
<td>2016</td>
<td>293,615</td>
<td>155,038</td>
<td>93,985</td>
<td>187,462</td>
<td>730,100</td>
</tr>
<tr>
<td>2017</td>
<td>368,084</td>
<td>185,605</td>
<td>118,885</td>
<td>237,126</td>
<td>909,700</td>
</tr>
<tr>
<td>2018</td>
<td>461,252</td>
<td>222,108</td>
<td>150,318</td>
<td>299,823</td>
<td>1,133,501</td>
</tr>
<tr>
<td>2019</td>
<td>577,734</td>
<td>265,668</td>
<td>189,975</td>
<td>378,922</td>
<td>1,412,299</td>
</tr>
<tr>
<td>2020</td>
<td>725,119</td>
<td>318,422</td>
<td>240,587</td>
<td>479,872</td>
<td>1,764,000</td>
</tr>
</tbody>
</table>
DEVELOPMENT STRATEGIES (50:50)

1. IMPROVE PRODUCTIVITY OF EXISTING PROJECTS: 705,000 m.t (40%)
   - Extension Services (Attitude & Technology)
   - R&D+C
   - Strengthening the Production Value Chain (Input & Marketing)
   - Function of PNK/PPK
   - Good Aquaculture Practices
   - Expansion of Export Market
   - Source of Financing
   - Human Resource Development
   - Enforce Aquaculture Regulation

2. EPP NKEA: 580,000 m.t (33%)
   - Production from existing companies.
   - Production from new companies.
   - Incentives / New Companies
   - Development of new area in Sabah & Sarawak

3. RESTRUCTURING PROJECTS: 480,000 m.t (27%)
   - Private sector investment
   - Synergy Farming
   - Young Agropreneur
   - Cluster Development

Total: 1,764,000 m.t
Synergic farming Approach for AIZ Tasik Temengor: Implementation Model

1. ANCHOR COMPANY
   - Training & monitoring services.
   - Provides SOP and supervision
   - Supply of quality inputs (Fry & fish feed)
   - Buy back of harvested yield

2. PARTICIPANTS
   - Implement the freshwater fish cage culture project
   - Ready to get the loan from Agrobank
   - Sell the yield to the anchor company

3. FARMERS ASSOCIATION
   - Facilitate financial management for participants.
   - Manage the monthly allowance for participants (RM3,000/month).
   - Clearing of input bills (fish fry, fish feed etc.).

4. DEPARTMENT OF FISHERIES MALAYSIA
   - Selection of participants
   - Provide basic infrastructures.
   - Provide cage culture system.
   - Bear the operating cost for the training programme.
   - Prepare agreement.
   - Monitor project

5. STATE GOVERNMENT
   - Sub-lease (30 years) water areas Sites (Processing, hatchery & feed mill)

Agreement Letter

Synergy Farming Program Agreement

Equipment Loan Agreement
### SUMMARY OF SYNERGY FARMING
**AIZ TEMENGOR LAKE, PERAK**

<table>
<thead>
<tr>
<th>ITEM</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anchor Company</td>
<td>Trapia Malaysia Sdn Bhd</td>
</tr>
<tr>
<td>Area</td>
<td>100 ha (NKEA – EPP 4)</td>
</tr>
<tr>
<td>Species</td>
<td>GIFT Tilapia (Genomar Supreme Traceable Tilapia)</td>
</tr>
<tr>
<td>Culture System</td>
<td>Polar Circle HDPE cage (20m Ø), Production capacity 50 m.t/cage/cycle @ 6 months</td>
</tr>
<tr>
<td>Current status</td>
<td>Existing 3 Module (20 cages/ module)</td>
</tr>
<tr>
<td></td>
<td>- 2 Module (Trapia)</td>
</tr>
<tr>
<td></td>
<td>- 1 Modul (DOF)</td>
</tr>
<tr>
<td></td>
<td>2 new modules (90% completed)</td>
</tr>
<tr>
<td>Commence</td>
<td>2010</td>
</tr>
<tr>
<td>Target</td>
<td>10 modules (200 cages)</td>
</tr>
<tr>
<td>Production</td>
<td>15 mt/day raw fish for filleting</td>
</tr>
<tr>
<td>Product</td>
<td>Tilapia Fillet (US, Canada, EU)</td>
</tr>
<tr>
<td>Job Opportunities</td>
<td>200 participants</td>
</tr>
</tbody>
</table>
Market Promotion for Tilapia Products
Aquaculture Certification

GOOD AQUACULTURE PRACTICES

• Environment, socio-economic aspects
GLOBAL G.A.P Certification
European Seafood Show (Brussels) 2010
Conclusion

• Tilapia has the potential to be the primary species for domestic and export market due to its strong consumer demand.

• Good stocking material has been developed internationally e.g GIFT.

• Proven technology; breeding and grow-out technology.

• Strong demand from United States (premium fillet segment), increasing demand from EU and Middle East.

• Government will continue to provide business support services and facilitate private sector investment in Tilapia Aquaculture in Malaysia.
TERIMA KASIH
Thank You

4th INTERNATIONAL TRADE AND TECHNICAL CONFERENCE AND EXPOSITION ON TILAPIA (TILAPIA 2015)