Government role in development of shrimp aquaculture industry in the past 10 years and beyond 2016
Background of shrimp aquaculture industry in Sri Lanka

- The shrimp aquaculture industry initially emerged in the Eastern Province.
- It collapsed due to civil war.
- The industry was revived in the North Western Province in 1980.
- The industry recorded its peak economic performances in the year 2000 by earning Mn USD 69.4 worth of foreign exchange – 4855 mt.
- There was a severe threat from White Spot Disease in the past and it was firstly appeared and affected shrimp aquaculture in 1996.
- Shrimp production came down up to 1570 mt in 2005
• All the stakeholders of the industry stressed and compelled to the Government, there should be a new proper management system to control the adhoc aquaculture practices and uplift the existing management system of the shrimp aquaculture industry.

• After having necessary consultations with all the industry stakeholders following strategies were implemented
Strategies Implemented

1. Establishment of Shrimp Farm Monitoring and Extension Unit
2. Zoning
3. A Society was formed for each sub zone
4. New association was formed and it was comprised with shrimp breeders, shrimp farmers, feed suppliers, chemical suppliers, consultants, etc.
5. Co-management system and public private partnerships were established with NAQDA
6. Establishment of PCR laboratory, Disease diagnosis laboratory, Water quality laboratory and Algae culture unit
7. Dredging of Dutch canal
8. Demarcation of the Dutch canal Reservation
9. Mangrove Plantation
Strategies Implemented

10. Implementation of Crop Calendar
11. Implementation of BMPs
12. New Regulations
13. Implementation of Hatchery Grading system
14. Special bio security measures
15. Broodstock screening for WSSV
Establishment of Brackish water fish health laboratory complex attached to the SFM&EU at Bathulu Oya

Three Laboratories

- PCR laboratory
- Disease diagnosis laboratory
- Water quality laboratory and Algae culture unit

4319 PCR tests done by the PCR laboratory to screening the WSSV disease in 2015
Dredging of Dutch Canal

- Majority of the farms depend on the Dutch Canal as the common source of the supply of water.
- The water intake and discharge were carried out using the same canal, which caused pollution.
- Deterioration of water quality in the Dutch Canal affected the environment, creating a positive condition for the spread of White Spot disease.
- The Dutch Canal was also silted, inhibiting water flow.
Demarcation of the Dutch canal Reservation

Mangrove Plantation
Implementation of Crop Calendar

Ministry of Fisheries & Aquatic Resources Development
National Aquaculture Development Authority of Sri Lanka (NAQDA)

Notice to Shrimp Farmers in the North Western Province

1. Zoning plan/crop calendar for post Maha seasons of the year 2011 from the month of July onwards is given below. This has been formulated by the National Aquaculture Development Authority of Sri Lanka with collaboration of the Ministry of Road Development, Electricity, Housing & Construction and Fisheries, North Western Province & Shrimp farmers organizations, in accordance with the regulations specified under the Shrimp Aquaculture Management (operation of crop cycle) 2008 of National Aquaculture Development Authority of Sri Lanka, Act No. 53 of 1998.

Zoning Plan - Crop Calendar - 2011 (Pera Maha & Maha)

<table>
<thead>
<tr>
<th>Zone</th>
<th>Subzone</th>
<th>Period for Post Larvae stocking</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zone - 1</td>
<td>Thalwila</td>
<td>July 20 - Aug. 20</td>
</tr>
<tr>
<td></td>
<td>Thuduwawa/Iranawila</td>
<td>July 20 - Aug. 20</td>
</tr>
<tr>
<td></td>
<td>Madampe</td>
<td>Aug. 20 - Sep. 20</td>
</tr>
<tr>
<td></td>
<td>Kakkapalliya</td>
<td>July 20 - Aug. 20</td>
</tr>
<tr>
<td></td>
<td>Ambakanawila</td>
<td>July 20 - Aug. 20</td>
</tr>
<tr>
<td></td>
<td>Marawala / Suduwella</td>
<td>July 20 - Aug. 20</td>
</tr>
<tr>
<td></td>
<td>Wattakkalliya/Jayabima</td>
<td>July 20 - Aug. 20</td>
</tr>
<tr>
<td>Zone - 2</td>
<td>Bangadeniya</td>
<td>July 20 - Aug. 20</td>
</tr>
<tr>
<td></td>
<td>Kusala / Kottage</td>
<td>July 20 - Aug. 20</td>
</tr>
<tr>
<td></td>
<td>Waliyankattuwa</td>
<td>July 20 - Aug. 20</td>
</tr>
<tr>
<td></td>
<td>Bogalawewtiya</td>
<td>July 20 - Aug. 20</td>
</tr>
<tr>
<td></td>
<td>Nagul Eliya</td>
<td>Aug. 20 - Sep. 20</td>
</tr>
<tr>
<td></td>
<td>Malthupanthiya</td>
<td>July 20 - Aug. 20</td>
</tr>
<tr>
<td></td>
<td>Pimentiya</td>
<td>July 20 - Aug. 20</td>
</tr>
<tr>
<td></td>
<td>Udappuwa</td>
<td>July 20 - Aug. 20</td>
</tr>
<tr>
<td></td>
<td>Pollichakulama</td>
<td>July 20 - Aug. 20</td>
</tr>
</tbody>
</table>

Zone - 3
1. Punapittha / Watawana | Dec. 01 - Dec. 31 |
2. Kotha / Kottage | Oct. 01 - Oct. 31 |
3. Kethulakantata / Maligalawa Eliya | Nov. 01 - Nov. 30 |
4. Madurankalliga South | Nov. 01 - Nov. 30 |
5. Madurankalliga / Sembatta | Nov. 01 - Nov. 30 |
6. Pollichakulama | Nov. 01 - Dec. 01 |

Zone - 4
1. Karanbha | Nov. 01 - Dec. 01 |
2. Mampurika / Eththal | Nov. 01 - Dec. 01 |
3. Palliyagavarathura / Kandakuda | Nov. 01 - Dec. 01 |

Zone - 5
1. Palaviya / Poorvasakuda | Sep. 15 - Oct. 15 |
2. Sewanathinvu | Sep. 15 - Oct. 15 |
3. Manathiu | Sep. 15 - Oct. 15 |
4. Anikunti / Malayamadu | Sep. 15 - Oct. 15 |
5. Meooya | Sep. 15 - Oct. 15 |
6. Wadithamuneti / Samagipura | Sep. 15 - Oct. 15 |
7. Wanathawiliwawa | Sep. 15 - Oct. 15 |

2. (a) The time table of shrimp farming for North Western Province will be implemented under five zones. In addition favourable, risk and high risk periods are declared for stocking of Post Larvae for respective zones. The details are as follows.

<table>
<thead>
<tr>
<th>Zone</th>
<th>Favourable period</th>
<th>Risk period</th>
<th>High risk period</th>
</tr>
</thead>
<tbody>
<tr>
<td>01, 02</td>
<td>January to June</td>
<td>July to September</td>
<td>October to December</td>
</tr>
<tr>
<td>03, 04, 05</td>
<td>Oct. to March</td>
<td>April to June</td>
<td>July to September</td>
</tr>
</tbody>
</table>

(b) Considering the facilities available at the farm and culture method adopted, grading of the shrimp farms will be carried out in due course. Maximum duration for stocking of Post Larvae in the favourable period is only two months and if required to stock during risk period, stocking or post larvae should be done within one month period. However, crop cycle should be completed within the 6 months period allowed.

(c) The boundaries of each Zone and sub zone could be obtained from the Shrimp Farm, Extension & Monitoring Unit of NAQDA, based in Battalulouya.

(d) Any farm (Excluding Zone 5) should not be stocked during high risk period (Special permission granted to the Zone 5 only for this cycle, considering special reasons).

3. (a) Shrimp farmers in each sub zone are allowed to carry out stocking and farming activities within a period of six months from the date of commencing the crop cycle.

(b) Post Larvae should not be stocked without a permit, issued by the relevant Zonal office of Shrimp Farm Extension & Monitoring Unit of NAQDA.

Under the rehabilitation programme of the shrimp farming industry in the North Western Province, which is being implemented, action has already been initiated by an Inspection Committee to regularize and certify shrimp farms. All shrimp farms should take immediate action to obtain Aquaculture Management Licences from NAQDA, prior to the date specified by the above Inspection Committee. NAQDA will take legal action under Fisheries and Aquatic Resources Act No. 2 of 1996 against any shrimp farmer who fails to do so and attempts to commence activities in their respective shrimp farms without an Aquaculture Management Licence.

For further details - Shrimp Farm Extension & Monitoring Unit
Battalulouya
Tel - 032-3326666

Chairman
National Aquaculture Development Authority of Sri Lanka
Implementation of Better Management Practices

- Better Management Practices
  - Shrimp farming
  - Shrimp hatcheries
  - Shrimp harvesting
  - Brood Stock Collectors
  - Feed & Chemical suppliers, feed and feeding

- With the implementation of Crop calendar strictly monitored the Better Management Practices (BMP) which have been formulated in consultation with all the stakeholders in the industry.

a. BMP for normal harvest
   i. Before harvest
      1. Water change for the ponds one week prior to harvest is recommended. This will enhance molting and enables clean healthy shrimps at harvest.
      2. Antibiotics and disinfectants should not be applied to the ponds immediately before harvest.
      3. It is not suitable to stop feeding three to four days prior to harvest and stopping a single feeding time before harvest will be sufficient.
   ii. At harvest
      1. The harvesting should be done in the morning or evening with minimum sunlight and heat in order to prevent dehydration or shrimp stress.
      2. The harvesting time period should not exceed more than six hours.
      3. The physical damages to shrimps should be minimized at harvest.
      4. Clean, dry, disinfected stools should be used for harvest.
      5. Greater care should be focused on the general hygienic practices of workers employed for the harvest.
      6. Entry of animals such as dogs and cats should be prevented at the harvesting site.
      7. Harvested shrimp should not be kept in the net or pond bottom for longer periods.
iii. After Harvest
   1. Shrimps should be immersed in a solution of ice, water and salt immediately after harvest and then immersed in 0.2 – 0.5% sodium metabisulphite solution for 1 to 2 minutes. The application of sodium metabisulphite should be done according to the requirement of purchaser.
   2. Shrimps should be packed in clean plastic containers with ice at a ratio of 2:1 (ice and shrimp). Plastic containers are better than styrofoam containers for the storage and transport of shrimps as plastic containers are easy to clean and durable than styrofoam containers.
   3. In the process of weighing, sorting, grading of shrimps the temperature needs to be maintained below 4°C.


(1) Registration
   1.1 All Supplier/Importer/Manufacturer/Local producer should be registered under the Department of Animal Production & Health.
   1.2 Inspections should be carried out by the Department of Animal Production & Health.

(2) Labelling
   2.1 Labelling must be in three Languages.
   2.2 Proper guidelines for using chemicals must be included.
   2.3 The following items should be Included in the label.
      i. Common name with the active ingredients & strength/Trade name/Scientific name.
      ii. Name & the address including country of the manufacturer.
      iii. Instructions and details for repacking (Address & Telephone No.)
      iv. Batch No / Stock No.
      v. Date of manufacture/Date of packing/ Date of Expiry/Volume and weight.
      vi. Instruction for storage & transport.
      vii. Purpose of usage.
      viii. Dosage.
      ix. Withdrawal period of the product.
      x. Prior protection Instruction.

Special signs should be printed with attraction as follows;
   o Danger - to be stored in a safe place away from children.
   o Separate logo for the Registration should be included.
   o Separate logo should be used for the products to the shrimp Industry.

Code of good farming practices

1. Design
   1.1 Each farm should have a sufficient sedimentation area, a minimum of not less than 10% of the total area of its culture pond (or ponds). This can be either a dugout pond or a natural depression (waterhole). Its purpose is to hold water discharged from the culture pond for sedimentation of suspended matter, and if necessary for treatment, before releasing to the draining system outside the farm.
   1.2 The sedimentation area should also be identified in the plan. No shrimp should be stocked in the sedimentation area.
   1.3 It is recommended that as a better option, water-recycling systems be installed in farms, especially those exceeding 4 ha in extent.

2. Treatment of water
   2.1 Water taken to the reservoir from the water source should be filtered through a screen containing 576 mesh per square inch. Water should be retained in the reservoir for not less than 7 days before taking in to the culture pond. It is recommended that water in the reservoir be treated with chlorination at the rate of 30 ppm. on the fourth day, followed by aeration on the fifth day and onwards.

3. Culture Operations
   3.1 Pond should be stocked with post-larvae not less than 20 days old post-larvae (PL20). The post-larvae used for stocking should be screened for viral infection which was identified by SMEMU using PCR equipment. The standard stress test on post-larvae should be performed only on randomly selected samples and not on the entire stock.
   3.2 It should be noted that ponds be stocked at a density of 4-6 post-larvae per square meter. However, ponds may be stocked up to 10 post-larvae per square meter if provided with mechanical aeration. Stocking density should exceed 10 post-larvae per square meter under any circumstance.
   3.3 Measures should be taken to maintain pH of water in culture ponds at 7.8 - 8.5. Hydrolyzed lime should be used to increase the pH of pond water only when it drops below 7.5. Hydrolyzed lime may also be used on soils with a pH of less than 5 during pond preparation. In all cases, use of hydrated lime should be avoided.
   3.4 After filling the ponds, the water may be fertilized depending on the soil fertility.
New Regulations

Shrimp Aquaculture Management (operation of crop cycle) Regulation 2008
Registration of Aquaculture Societies Regulations 2009

PART I: SECTION (I) — GENERAL

Government Notifications

THE NATIONAL AQUACULTURE DEVELOPMENT AUTHORITY OF SRI LANKA ACT, No. 53 OF 1998

REGULATIONS made by the Minister of Fisheries and Aquatic Resources, under Paragraph (c) of Sub-section (2) of Section 37 of the National Aquaculture Development Authority of Sri Lanka Act, No. 53 of 1998.

FELIX PERERA,
Minister of Fisheries and Aquatic Resources.

Colombo,

Regulations

1. These regulations may be cited as the Registration of Aquaculture Societies Regulations, 2009.

2. The provisions of these regulations shall apply to all licensed Aquaculture Societies operating in Sri Lanka on the date of the coming into operation of these regulations.

3. (a) Every licensed Aquaculture Society operating in Sri Lanka shall apply to the Director General for registration with the National Aquaculture Development Authority of Sri Lanka.

(b) The Director General shall upon registering such Societies issue a Certificate to each Society confirming the services. He shall also maintain or cause to be maintained a Register of all Societies which have been so registered.

4. In these regulation—

“Aquaculture Society” means any society or committed established for the purpose of undertaking any activity connected with the sustainable development of aquaculture;

“Aquaculture” shall have the same meaning as in the Fisheries and Aquatic Resources Act, No. 2 of 1996;

“Director General” means the Director General of National Aquaculture Development Authority of Sri Lanka appointed under Section 13 of the National Aquaculture Development Authority Act, No. 53 of 1998.
Brackish Water Shrimp Hatcheries (Issue of Post Larvae) Regulations of 2010

NATIONAL AQUACULTURE DEVELOPMENT AUTHORITY OF SRI LANKA ACT, No. 53 OF 1998

1. These Regulations may be cited as “the Brackish Water Shrimp Hatcheries (issue of Post Larvae) Regulations of 2010”.

2. No person shall issue or transport Post Larvae from Brackish Water Shrimp Hatcheries, or stock in culture ponds, cages or pens, except under authority of a license issued in that behalf by the Director - General of National Aquaculture Development Authority of Sri Lanka (hereinafter referred to as the Director-General).

3. Every application for a license under regulation 2 shall be made to the Director - General substantially in Form “A” set out in the Schedule hereto and shall be accompanied by a fee of rupees one thousand. The Director - General may where necessary require an applicant to furnish further information.

4. The Director - General shall, on consideration of the matters contained in the application and information, if any, either issue a license for the issuance or transportation of Post Larvae from Brackish Water Shrimp Hatcheries, or stock in culture ponds, cages or pens or for reasons to be recorded by him refuse to issue a license. The Director - General shall in writing inform the applicant of his decision and in case of a refusal to grant a license, he shall state him reasons therefore.

5. Every license issued shall be substantially in Form “B” set out in the Schedule hereto and such license shall, unless revoked earlier, be valid for a cultivation cycle declared by the cultivation time table from the date of issue and shall be subject to such terms and conditions specified therein.

6. The Director - General may revoke a license issued under regulation 4, if he is satisfied that the licensee has violated any of the terms and conditions of such license.
Expansion of Shrimp Farming

A. Zonal Plans for Batticaloa and Trincomalee
B. Establishment of a Shrimp Hatchery, Putthukudiriuppu Batticaloa

C. Demonstration Shrimp farm, Batticaloa

<table>
<thead>
<tr>
<th>Year</th>
<th>Hatchery Production (Mn)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2011</td>
<td>9.68</td>
</tr>
<tr>
<td>2012</td>
<td>30.42</td>
</tr>
<tr>
<td>2013</td>
<td>35.00</td>
</tr>
<tr>
<td>2014</td>
<td>20.45</td>
</tr>
<tr>
<td>2015</td>
<td>20.99</td>
</tr>
</tbody>
</table>
D. Cluster shrimp farming in Vakerai

Shrimp production

2012 – 31.80 Mt
2013 – 81.95 Mt
2014 – 92.21 Mt
2015 – 96.87 Mt
### Present status of shrimp aquaculture industry in Sri Lanka

#### Shrimp Farming Area in Puttalam and Batticaloa

<table>
<thead>
<tr>
<th>Year</th>
<th>Area (ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2005</td>
<td>696</td>
</tr>
<tr>
<td>2006</td>
<td>1137</td>
</tr>
<tr>
<td>2007</td>
<td>1505</td>
</tr>
<tr>
<td>2008</td>
<td>1098</td>
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<tr>
<td>2009</td>
<td>1386</td>
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<tr>
<td>2010</td>
<td>1240</td>
</tr>
<tr>
<td>2011</td>
<td>1641</td>
</tr>
<tr>
<td>2012</td>
<td>1544</td>
</tr>
<tr>
<td>2013</td>
<td>1695</td>
</tr>
<tr>
<td>2014</td>
<td>2081</td>
</tr>
<tr>
<td>2015</td>
<td>2164</td>
</tr>
</tbody>
</table>

All these strategies supported to increase the shrimp production.
<table>
<thead>
<tr>
<th>Year</th>
<th>Quantity (Mt)</th>
<th>Value (Rs.Mn)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000</td>
<td>4855</td>
<td>5041</td>
</tr>
<tr>
<td>2001</td>
<td>3941</td>
<td>4300</td>
</tr>
<tr>
<td>2002</td>
<td>3368</td>
<td>3286</td>
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<tr>
<td>2003</td>
<td>4467</td>
<td>4165</td>
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<tr>
<td>2004</td>
<td>2462</td>
<td>2359</td>
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<tr>
<td>2005</td>
<td>1800</td>
<td>1769</td>
</tr>
<tr>
<td>2006</td>
<td>1837</td>
<td>1987</td>
</tr>
<tr>
<td>2007</td>
<td>2023</td>
<td>2487</td>
</tr>
<tr>
<td>2008</td>
<td>854</td>
<td>1082</td>
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<td>2009</td>
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<td>1625</td>
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<tr>
<td>2014</td>
<td>2001</td>
<td>3375</td>
</tr>
<tr>
<td>2015(Up to Nov)</td>
<td>1190</td>
<td>1776</td>
</tr>
</tbody>
</table>
Future Developments

- Establishment of Aquaculture Industrial Parks

  Proposed land area is around 1110 ha in Batticaloa District
“I also propose to set up an Aquaculture Park in Batticaloa District by providing an enabling environment for the potential private sector investors to develop coastal aquaculture without causing environmental degradation. Aquaculture Park provides an 'investment ready' platform for organizations that want to set up commercial quaculture operations. This Aquaculture Park will be developed and managed as a PPP. I propose to allocate Rs 100 million for the initial activities.”
Proposed land area is around 1500 ha in Mannar District
Objective

To improve the environment for aquaculture investments and sustainably meet food security and economic development targets without causing environmental degradation by providing suitable environment for the potential investors to develop coastal aquaculture.

Out puts

- Increase aquaculture production: 9500 Mt
- Direct and indirect jobs: 8000
- Increase income: Rs. Mn 7000
• Establishment of shrimp nauplii production and distribution centre, Indewari farm
Although shrimp production is sustained at satisfactory level at present shrimp prices of the export market has been dropped.

- Shrimp Feed price increased.
- Production Cost increased.
Loan Scheme proposed in the Budget 2016 for Development of Shrimp Aquaculture Industry

“The Shrimp industry has been faced with difficulties in the immediate past which has remained unattended. However, given the potential in the shrimp industry I propose to provide capital and working capital requirements of the shrimp farmers, hatchery operators and processors through the proposed ADB supported SME credit line. I also propose to provide guarantees through the SME credit guarantee fund to those who are engaged in shrimp farming.”
Proposals for Loan Scheme

- Capital Investments for New Shrimp Hatcheries and upgrading existing hatcheries
  - Maximum Capital Investment – Rs. 100 MN

- Working Capital for Shrimp Hatcheries
  - Maximum Working Capital (per annum) - Rs. 30 MN

- Capital Investments for New Shrimp Farms excluding in NWP and upgrading existing farms to intensification
  - Maximum Capital Investment – Rs. 150 MN

- Working Capital for Shrimp Farms
  - Maximum Working Capital (per annum) - Rs. 30 MN
• Alternative Species Culture in Shrimp Ponds
  – *Maximum Capital Investment* –Rs. 120 MN

• Processing Plants

  *Loan for Capital Expenditure.*
  – This should be given for purchase of machinery and also construction of factory buildings. This is process of value addition.
  – 50% of the amount to be given as a grant and the balance as a soft loan to be repaid in 5 years or more.
  – Loan to be given in US$.
  – Maximum amount per company should be US$ 1 Million.
  – Increase of cold room capacity specifically to stabilize prices during the time of excess harvest reaching the Colombo fish market to safeguard the international prices..
  – Also to processes to hold the stock during the times of international market price instability.
• Processing Plants

   Loan for working Capital

   – To be given as a revolving Credit line to be repaid within 6 months. This is for purchasing of raw shrimps from the farmers
   – Maximum amount per company should be US$ 1 Million.
   – To be given in US$ with an interest rate of 2%.
   – Interest to be paid monthly.
   – Proposal for repayment of the total amount should be 1% of the turnover as a cash build up and to be repaid in 2 years.
   – The above facility to be restricted to 7 current Shrimp Processing plants presently in operation.
   – Facilities to be given through Bank of Ceylon.
   – There should not be restrictions on companies with foreign shareholding
Proposal for Upgrading Shrimp Aquaculture in Sri Lanka through Government Direct Intervention

- NBT and PAL (The waiver of these taxes will result in a direct saving in cost of production as prawn feed represents 50% in cost of production which will benefit the farmer directly and it will provide a relief to the farmers.)

- Cluster Shrimp Farm Development

- Implementation of Incentive Scheme for Farmers who Sale their Product to the Export Market

- Introduce a Subsidized Rate for Electricity Supply

- Permit *Penaeus vanamei* Farming in the Aquaculture Industrial Park, Batticaloa.
Thank You