General Information

- Indonesia has 33 provinces, 17,500 islands with 230 millions populations (the fifth in the world)
- Indonesia’s coastal length not less than 81,000 km
- Mariculture activities covers approximately 8.4 million ha
- Majority of marine finfish farmers is lack of experience in mariculture business
- Marine finfish commodities: humpback grouper (Chromileptes altivelis), tiger grouper (Epinephelus fuscoguttatus), Epinephelus coioides, Plectropoma maculates, Epinephelus polyphecdion, Epinephelus lanceolatus, and asean sea bass (Lates carcarifer).
Table. 1. Status of mariculture activities in Indonesia in 2007

<table>
<thead>
<tr>
<th>No.</th>
<th>Description</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Mariculture area (Ha)</td>
<td>84,481</td>
</tr>
<tr>
<td>2.</td>
<td>Number of households (number)</td>
<td>88,281</td>
</tr>
<tr>
<td>3.</td>
<td>Number of farmers (person)</td>
<td>232,274</td>
</tr>
<tr>
<td>4.</td>
<td>Mariculture production (MT) :</td>
<td>1,752,349</td>
</tr>
<tr>
<td></td>
<td>-Seaweed</td>
<td>1,728,475</td>
</tr>
<tr>
<td></td>
<td>-Groupers</td>
<td>6,370</td>
</tr>
<tr>
<td></td>
<td>-Sea bass</td>
<td>523</td>
</tr>
<tr>
<td></td>
<td>-Others</td>
<td>16,981</td>
</tr>
</tbody>
</table>

Production

- total grouper production targeted at 30,000 MT at the end of 2009 or increased at 25.75% since 2005 which is recorded at 12,000 MT.
- grouper seed production targeted at 156 million seeds in 2009. Seed production in 2005 was only 62.4 million seeds.
Production (cont…)

- volume of sea bass was 7,200 MT in 2005 increase to 12,500 MT in 2009.
- the production increased at 14.79% per annum.
- export data including volume and value as well as data for seed production not available.

Markets

- groupers and sea bass from Indonesia are sold as life product and the market limited only in South-East region especially Hongkong and Singapore
Clustering Approach

- grouper is cultured mainly for export oriented.
- seabass is cultured mainly for domestic market.
- the government implements aquaculture development zone approaches for easy management, obtaining economic scale, easily prevent disease outbreak, having efficient production inputs.
- In the zone, the fish farmers are encourage to cooperate, to integrate production inputs, to have proper operational production process, to have product processing and marketing, to have proper environmental management, to obtain value added, and to have efficient, competitive, sustainable and prosperous business system.

Clustering (cont...)

- Under the development clustering approach, the productivity and quality are enhanced are by keep improving the: (1) aquaculture infrastructure and production input technology, (2) aquaculture pollutant effected control, (3) post harvest technology, (4) genetic engineering, (5) cultivated species enrichment, (6) technology application, and (7) aquaculture system management.
Production and Marketing Constraints

(1) high cost of investment; at least Rp 50 million/unit/cycles,
(2) time consuming; more than a year,
(3) less economic for export shipment; location of aquaculture activities are scattered and the scale of business are dominated by small scale
(4) lack availability of seed and feed,
(5) high cost of commercial feed, and
(6) lack of fish farmers’ capability and competency

TNA SURVEY FOR GROUPER AND SEA BASS FARMERS

• Surveyors : Reza S. Pahlevi, Abdullah, Kurnia
• Locations :
  - Grouper culture: Ringgung, Pulau Puhawang, Tanjung putus villages, Lampung Selatan District, Lampung Province
  - Sea bass culture : Tanjung kertang, Setoko villages, Batam Municipality, Kepulauan Riau Province
• Respondents :
  - small holder grouper farmer in Lampung
  - small holder sea bass farmer in Batam
TNA SURVEY (Cont....)

• Number of respondents:
  - 21 grouper farmers in Lampung
  - 20 sea bass farmers in Batam

• Survey (data collection) method:
  Observation, Interview (questionnaire),
  focus group discussion

• Data analyzed: Tabulation, description
TNA SURVEY RESULTS
### Percentage of Grouper and Seabass farmers based on Different Group of Age

<table>
<thead>
<tr>
<th>Group of Age</th>
<th>Grouper (%)</th>
<th>Seabass (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>20-30</td>
<td>38.30</td>
<td>10.52</td>
</tr>
<tr>
<td>31-40</td>
<td>47.62</td>
<td>42.11</td>
</tr>
<tr>
<td>41-50</td>
<td>14.29</td>
<td>26.32</td>
</tr>
<tr>
<td>More than 50</td>
<td>NA</td>
<td>21.05</td>
</tr>
</tbody>
</table>

### Percentage of Grouper and Seabass farmers based on Level of Education

<table>
<thead>
<tr>
<th>Education level</th>
<th>Grouper (%)</th>
<th>Seabass (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary School</td>
<td>28.57</td>
<td>47.37</td>
</tr>
<tr>
<td>Junior high school</td>
<td>28.57</td>
<td>26.32</td>
</tr>
<tr>
<td>Senior high school</td>
<td>38.10</td>
<td>26.32</td>
</tr>
<tr>
<td>University</td>
<td>4.76</td>
<td>0</td>
</tr>
</tbody>
</table>
### Percentage of Grouper and Seabass farmers based on Size of Family

<table>
<thead>
<tr>
<th>Number of Children</th>
<th>Grouper (%)</th>
<th>Seabass (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>No Child</td>
<td>14.29</td>
<td>10.53</td>
</tr>
<tr>
<td>1-2</td>
<td>47.62</td>
<td>0</td>
</tr>
<tr>
<td>3-4</td>
<td>33.33</td>
<td>38.84</td>
</tr>
<tr>
<td>5-6</td>
<td>4.76</td>
<td>21.05</td>
</tr>
<tr>
<td>&gt;6</td>
<td>0</td>
<td>31.58</td>
</tr>
</tbody>
</table>

### Percentage of Grouper and Seabass farmers based on Type of Culture Frame

<table>
<thead>
<tr>
<th>Culture Frame</th>
<th>Grouper (%)</th>
<th>Seabass (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Floating net cage</td>
<td>59.38</td>
<td>32.86</td>
</tr>
<tr>
<td>Fix net cage</td>
<td>21.88</td>
<td>25.81</td>
</tr>
<tr>
<td>Raft culture</td>
<td>12.50</td>
<td>9.68</td>
</tr>
<tr>
<td>Pen culture</td>
<td>6.25</td>
<td>32.26</td>
</tr>
</tbody>
</table>
### Percentage of Grouper and Seabass farmers based on Size of Culture Frame

<table>
<thead>
<tr>
<th>Culture Frame</th>
<th>Grouper Sq m</th>
<th>Seabass Sq m</th>
</tr>
</thead>
<tbody>
<tr>
<td>Floating net cage</td>
<td>80.50</td>
<td>9.4</td>
</tr>
<tr>
<td>Fix net cage</td>
<td>21.88</td>
<td>32.4</td>
</tr>
<tr>
<td>Raft culture</td>
<td>64</td>
<td>125</td>
</tr>
<tr>
<td>Pen culture</td>
<td>54.5</td>
<td>12.5</td>
</tr>
</tbody>
</table>

### Percentage of Grouper and Seabass farmers based on Size of Culture Area

<table>
<thead>
<tr>
<th>Size of Culture Area (sq m)</th>
<th>Grouper (%)</th>
<th>Seabass (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>50-100</td>
<td>9.52</td>
<td>10.53</td>
</tr>
<tr>
<td>100-300</td>
<td>14.29</td>
<td>68.42</td>
</tr>
<tr>
<td>300-500</td>
<td>9.52</td>
<td>5.26</td>
</tr>
<tr>
<td>&gt;500</td>
<td>66.67</td>
<td>15.79</td>
</tr>
</tbody>
</table>
Type of fish cultured

- fish farmers in Lampung, generally, cultivate hump back grouper (55.17%) and tiger grouper (37.93%).
- culture other type of grouper (6.90%).
- fish farmers in Batam culture tiger grouper (24.39) and seabass (21.95%)
- culture other type of grouper (43.91%).
- It is presumed that fish farmers in both sites perceived that culturing tiger groupers is easier than culturing the other fish mentioned above.

Source of Seed

Source of fish seed stocked in Lampung mostly comes from government hatchery (85.71%) and private hatchery (14.29%).

source of fish stocked in Batam comes from government hatchery (42.11%) and private hatchery (26.32%).

However, there is 31.58% of respondents acknowledged that their seed caught from waters surrounding their farm.
Percentage of Grouper and Seabass farmers based on Labour

<table>
<thead>
<tr>
<th>Number of Labour</th>
<th>(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>No Labour</td>
<td>14.29</td>
</tr>
<tr>
<td>1-2</td>
<td>25</td>
</tr>
<tr>
<td>3-4</td>
<td>27.5</td>
</tr>
<tr>
<td>5-10</td>
<td>25</td>
</tr>
<tr>
<td>&gt;10</td>
<td>5</td>
</tr>
</tbody>
</table>

Wages

• The average salary monthly salary in both sites which is between Rp 1,000,000 and 2,000,000 is 7.5%, and between Rp 500.00 and Rp 1000.000 is 80.00% and farmers provide lesser monthly salary below Rp 500,000 is 12.50%.
Productivity

In Lampung,
the average production of grouper/crop (6 to 8 months): 210.2 kgs;
the average selling price: Rp 332,000/kg.
The average income of fish farmers is Rp 69,720,000/crop.

In Batam,
the average production of seabass per crop is 365.5 kgs;
the average selling price is Rp 99,000 per kg.
The average income of fish farmers is Rp 36,185,000 per crop.

Grouper will take for a year and 18 months; we recommend to stock various species in varies time.

Scale of business

- Generally, grouper and seabass culture in the Provinces of Lampung and Riau Kepulauan are small scale.
- Each farmers varies from 1 to 9 units and from 4 to 36 cages.
- Size of cage varies from 8 m³ (L:2m, W: 2m, and D: 2m) to 9 m³ (L:3m, W:3m, and D:3m).
- Investment cost for grouper and seabass culture is Rp 42,000,000- with 5 years economic life time.
- The investment cost is used for frame and netcage construction, wooden boat, and guard house construction.
Operational cost

- Annual operational cost for seabass varies from Rp 13,000,000 to Rp 15,000,000. This operational cost for seabass covers for seeds Rp 600,000, feeds Rp 4,000,000, labours Rp 10,000,000.
- Annual operational cost for grouper varies between Rp 30,000,000 to Rp 40,000,000.
- The operational cost for grouper covers: 1600 seeds for 4 cages (400 seeds per cage). The seed cost is Rp 8000 /pcs (tiger grouper), 12,000 per pieces (humbuck grouper) or it will cost at 4 to 5 million rupiah), feed will cost at 4 to 5 million rupiah (trash fish), artificial feed 4 million rupiah, labours 8 million rupiah, fuels 2 million rupiah, Rp 300,000 retribution.
- Normally, if the farmers borrow money from the Bank or funding institution, the interest will be around 6-14% per annum.

Business Management

- 92.50% of farmers from both sites conducted work plan and only 7.50% did not.
- 85% conducted business analysis and calculating business needs and income, only 15% of did not.
- 77.50% of the respondents calculates labour needs,
- 82.50% planed for their capital, and
- 65% conducted financial booking system.
- 77.50% of fish farmers in Lampung and Batam gains their capital from their own, and
- only 10.00% get loan from Bank, and
- 7.5%, from supporting program from Fisheries Service Office and
- 5% from a cooperative unit which is a micro finance institution in village level.
- Majority of respondents indicates that they certainly need capital strengthening to run their business.
Work attitude

70% work based on proper working rules and procedures,
80% conduct a cooperative and creative culture,
85% of them always conduct evaluation whenever facing problems,
70% of them set priority of work through fisher group.

Management Practices

80% of respondent understood in ideal environmental condition for mariculture.
35.00% conducted monitoring on water quality.
70.00% understood Good Aquaculture Practices
72.50% understood quality feed and seed
87.50% understood feed management practices
90.00% understand to control fish grow
100% maintained their cages
Post production practices and Market access

• Harvested fish is transported by fish collector with special carrier vessel equipped with water recirculation and proper aeration system to ensure the fish alive during transportation.

• Export destination countries include: Singapore, Malaysia, Hong Kong, Korea, China and Japan.

Problems

• Seabass and grouper farmers suffer from lack of seed supply.

• seed mostly comes from Java Island which is characterised by low quality product and slow growth rate.

• bacteria and virus infected cultured grouper is another aspect concerned.

• Another problem seen in the field is related to the potential deterioration of the sea waters due to domestic waste product as result of crowded villages surrounding the waters.
Aquaculture technology adoption

• Aquaculture technology adoption is respectively facilitated by Centre for Marine Culture Development located in Lampung and Batam.
• The farmers are encouraged to involve in training course delivered gradually in specific level for specific farmers.
• The material for the training course covers, namely: grouper/seabass culture technique, hatchery technique, pest and seed control, feeding, and sea water testing and marin water control. Other materials covered in the training course include Good Aquaculture Practices (GAP), Business Management, Financial Management, Administration, Productive Work Ethique.

Markets

• Growing grouper and seabass in surveyed areas normally takes around 8 to 9 months, humback grouper especially needs longer time which is 15-18 months. Seabass normally takes 7-9 months to reach a minimum marketable size for export purpose which is 500 grams per pieces.
• The price of tiger grouper lays between Rp 70,000-80,000/kg, humback grouper at Rp 250,000 to 300,000/kg and seabass Rp 45,000 to Rp 50,000/kg.
• Market chain of grouper is relatively simple. The farmers are normally just inform the fish collector. After reaching a certain quota level in certain location, the fish collector will come and collect the fish. Methods of payment can be cash after the fish are scaled or late payment. Payment time for the late payment method is based on the agreement between the farmer and the buyer which is commonly a week after the fish has been collected. Method of payment is normally through transferring the money to the farmers bank account.
• It is common, grouper farmers in a certain area establish a group.
Access of information

- To access the information on grouper and seabass price, generally fish farmers use a cellular phone (Hand Phone) through sending text or sms to fish collector. Radio and television are other means used by fish farmers to access the current market information. While, to gain access on aquaculture technology, diseases and other issue related to aquaculture, the farmers normally ask the provincial/district/development centre unit and extension officer in the site.

Important Issues

- Mari-culture zone should be established in Lampung Bay and Batam to guarantee that these area is particularly aimed for mari-culture activities.
- Water environmental control is immediately required due to control intensive new shrimp pond development and more crowded population.
- It is required to establish a networking on information and marketing on grouper and seabass seeds so that fish farmers will enable to obtain quality seeds and other aquaculture inputs.
- Providing capital support for small scale grouper and seabass farmers.
- Training needs assessment is necessary in designing a competency training system.
Partnership with Unit Pelayanan dan Pengembangan (UPP).

- To increase the income of fish farmers in Lampung and Kepulauan Riau, it is required to establish a business cooperation through a partnership. The partnership has been well established between exporters and fish farmers. This relationship is a form of mutual benefits for both parties.
- Partnership between fish farmers and UPP is also a common practice in many districts. Some particular benefits being cooperate with UPP perceived by fish farmers include: accessible management, efficient productive cooperation. In some areas the role of UPP can be among others as production management, inputs production supplier and fish product marketer.

Analysis of Training needs of farmers for sustainability:

- In Lampung fish farmers that have involved training is 61.90% and never involved in the training course (38.10%). Whereas in the case of fish farmers in Batam, fish farmers that have involved in training is 42.11% and never involved in training course is 57.89%.
- Grouper and seabass farmers know how they gain information either aquaculture technology, business management information as well as market information, in general the gain the information from government institution (Provincial fisheries service office and mariculture centre) is 62.50% and from other sources such as friend, mass media and others accounted for 37.50%.
- Majority of the grouper and seabass farmers in Lampung required information related to aquaculture management.
Training material

• Generally in both sites material needed for training in detail is as follows:

• Grouper and Seabass business management
  – Business plan development
  – Aquaculture business analysis
  – Cost and revenue calculation
  – Workforce needs calculation
  – Capital needs planning
  – Loan and financial sources accessibility
  – Business transaction record

• Entrepreneurship development
  – Aquaculture workplan development
  – Working standar and procedure arrangement
  – Cooperation development, innovative and creative in working place
  – Creating effective and productive working environment
  – Evaluating performance for improvement and problem solving
  – Developing fish farmers group institution.

• Grouper and seabass culture technology
  – Material and equipments needs arrangement and planning

Training material (Cont...)

– Construction, assembling and setting Floating net cage and other equipment
– Identifying suitable waters and environment for grouper and seabass
– Accessing and monitoring marine water quality
– Understanding Good Aquaculture Practices especially for grouper and seabass culture
  – Identifying quality and health fish seed and source of quality seeds
  – Understanding good method for seed stocking of grouper and seabass and their optimal density
  – Natural and artificial feed supply
  – Natural and artificial feed feeding
  – Fish culture monitoring
  – Aquaculture technique and net and equipment maintenance
  – Identification and control for fish pests and diseases
  – Sampling and grading methods
  – Harvest equipment provision
  – Harvesting methods
  – Handling and transportation
  – Accessing technology
Training material (Cont...)

Fish marketing
  Operating information technology facilities
  Accessing market information
  Selecting prospect buyer and exporter
  Marketing and selling of harvested fish
  Understanding the methods and procedure for payment of selling transaction
  Understanding negotiation methods and committing with the established agreement

Summary

• The survey sites was taken in
  1. Lampung Province with sampling sites: mariculture area in Ringung, Pahawang Island and Tanjung Putus.
  2. Kepulauan Riau Province located in Batam Island, the village of Tanjung Kertang and Setoko.
• The survey results showed that aquaculture activities of grouper and Seabass in the two sampling sites are generally small scale fisheries conducted by fisheries households.
Summary

• In general, the grouper and sea bass farmers has conducted mariculture by implementing simple technology adopted by Main Centre for Mariculture Development in Lampung and Mariculture Development Centre in Batam. However, to increase the production and productivity as well as their income, it is required to train intensively to be able to implement Better Management Practices.
• The problems currently encountered by fish farmers are among others, hatchery technology, feed, diseases, and water quality deterioration.
• Aquaculture business, business transaction, record keeping and related activities also remains poor. As a result, it is required to have such training in this particular field.

Summary

• Pertaining with the above mentioned, data and information obtained with regard to the TNA for fish farmers can be identified. The TNA can be grouped into four groups, namely: 1) business management, 2) work culture in aquaculture, 3) aquaculture technique, and 4) handing and marketing of fish product.
• The TNA is very needed to arrange material and curriculum for training fulfilled standard of competency for professional and productive fish farmers.
• Through this TNA report, it is expected the aquaculture system can fulfill the expectation of small scale aquaculture in respect with the improvement of fish farmers income and welfare.
Proposed strategies to improve profitability from the system

• Government should provide floating net cage unit for free or rent it in very low price for a period of time
• Provide seed and feed with lower price than the actual market price (quantity and quality).
• Provide soft loan through any empowerment programs.

Proposed strategies (cont..)

• Increase fish farmers penetration on access of information and technology dissemination.
• Change perception of fish farmers from “producer” per se towards “entrepreneur” (Businessman).
• Promote implementation of BMPs and GAP
• If possible, government should set up “minimum price”
• Improve fish farmers’ capacity building trough training for farmers in 2 locations (Lampung and Batam).
KERAPU LUMPUR (Ephinephelus tauvin) Greasy Grouper
KERAPU MACAN (Ephinephelus fuscoguttatus) Brown-marbled Grouper
KERAPU BEBEK (Cromileptes altivelis) Humpback Grouper
KERAPU SUNU (Plectropomus leopardus) Leoprad Coral Grouper
NAPOLEON (Cheilinus undulatus) Humphead Wrasse
SEA BASS (Lates calcarifer)

THANK YOU