Evaluating the benefits of integrated rice-duck farming as organic system in Bangladesh

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Fact Sheet of Bangladesh

Population: 160 million

Area: 143,800 sq.km

Rice cultivation: 82% of total cultivated area

Energy-dependence on rice: 30-40%
<table>
<thead>
<tr>
<th>Country</th>
<th>Production (million metric ton)</th>
</tr>
</thead>
<tbody>
<tr>
<td>China</td>
<td>185</td>
</tr>
<tr>
<td>India</td>
<td>129</td>
</tr>
<tr>
<td>Indonesia</td>
<td>54</td>
</tr>
<tr>
<td>Bangladesh</td>
<td>40</td>
</tr>
<tr>
<td>Vietnam</td>
<td>36</td>
</tr>
<tr>
<td>Thailand</td>
<td>27</td>
</tr>
<tr>
<td>Myanmar</td>
<td>25</td>
</tr>
<tr>
<td>Pakistan</td>
<td>18</td>
</tr>
<tr>
<td>Philippines</td>
<td>15</td>
</tr>
<tr>
<td>Brazil</td>
<td>13</td>
</tr>
<tr>
<td>Japan</td>
<td>11</td>
</tr>
</tbody>
</table>

**World Total**: 700

*Source: FAO*
Top Organic Rice Producer Countries

Organic farming in Bangladesh - An overview

• Non-certified (default organic) is practiced in Bangladesh (1980s)
• It could not expand adequately due to not getting support from government
• NGOs & private organizations tried level best to expand
• Consumers awareness of health & environmental issues – demand of Safe & Organic food is growing significantly
• Current status on the OF cropped area is not available, but based on some information, the area coverage is 1162 ha (Organic-world.net, 2009)
• Food shops sells organic produces mainly to rich & elites, since prices are beyond the capacity of most urban people
• Production & marketing of organic produces are mainly done by contract farming and does not ensure fair prices for the producing farmers
• No organic accreditation and certification body
Organic rice: Is it a practical option for Bangladesh?

- Self-sufficient in rice production
- Poor soil health
- Excess or improper use of agro-chemicals during green revolution, 1 kg of added nitrogen fertilizer would produce 20 Kg of grain, but now it only produces 8 to 10 Kg.

A good soil should have an organic matter content more than 3.5 percent. But in Bangladesh, most soils have less than 1.7 percent, and some soils have even less than 1%.
History of Integrated Rice-Duck Farming

- 3000-4000 years before - Traditional Asian duck grazing in paddy field
- 1644 - During the China dynasty in China farmers moved ducks from the rivers onto flooded rice fields
- 1988 - Dr. Takao Furuno of Japan developed and modernized the system with the basis of “Enclosure”
- 1992 - Starts spreading into other Asian countries from Japan
- 1998 - I learned the technology as a JICA trainee from Dr. Takao Furuno
- 2000 – Introduced for the first time in Bangladesh under IRRI-PETRRA project

Now practicing in many countries including Japan, Korea, China, Vietnam, Philippines, Bangladesh, India, Laos, Thailand, Myanmar, Sri Lanka, Iran, Tanzania etc.
Benefits of Rice-Duck Farming in Perspective of Bangladesh

- Reduce cost of inputs (chemical fertilizer and agro-chemicals)
- Insect and weed control
- Reduce cost of labor
- Increase yield of paddy
- Improving soil health
- Conservation of natural environment
- Promote duck farming
- Add nutrition (protein) for households
- Facilitated women involvement
- Generate more income
- Improve rural livelihood
Recent issues in Bangladesh Agriculture and Rice-Duck Farming

- Food Security
- Climate change
- Soil health and excess use of chemicals
- Livelihood improvement
Methods

Fig. “Power of Duck” by T. Furuno
Weed control

Rice – Duck plot

Farmer’s plot
<table>
<thead>
<tr>
<th>Location</th>
<th>Cropping Season</th>
<th>Weed population(no/m²)</th>
<th></th>
<th>Sole-Rice farming</th>
<th>Control</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Rice-Duck farming</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bheramara, Kushtia</td>
<td>Boro 2009-10</td>
<td>4</td>
<td>39</td>
<td>81</td>
<td></td>
</tr>
<tr>
<td></td>
<td>T. Aman 2010</td>
<td>-</td>
<td>27</td>
<td>58</td>
<td></td>
</tr>
<tr>
<td>Iswardi, Pabna</td>
<td>T. Aman 2010</td>
<td>2</td>
<td>36</td>
<td>64</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Boro 2010-11</td>
<td>4</td>
<td>46</td>
<td>75</td>
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</table>
Insect control

Rice – Duck plot
Table: 2. Comparative effects of integrated rice-duck farming and traditional sole-rice farming on the yield of rice

<table>
<thead>
<tr>
<th>Location</th>
<th>Cropping Season</th>
<th>Yield (ton/ha)</th>
<th>Rice-Duck System</th>
<th>Sole Rice farming</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bheramara, Kushtia</td>
<td>Boro 2009-10</td>
<td>6.25</td>
<td>5.10</td>
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<tr>
<td></td>
<td>T. Aman 2010</td>
<td>5.03</td>
<td>4.28</td>
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<tr>
<td>Iswardi, Pabna</td>
<td>T. Aman 2010</td>
<td>4.75</td>
<td>4.10</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Boro 2010-11</td>
<td>5.66</td>
<td>4.42</td>
<td></td>
</tr>
</tbody>
</table>
### Table 3. Comparative results of economic analysis (per hectare) community rice-duck and sole-rice farming systems

In BDT; 1 Euro = 102 BDT

<table>
<thead>
<tr>
<th>Location</th>
<th>Cropping season</th>
<th>Farming system</th>
<th>Gross return</th>
<th>Total Variable</th>
<th>Gross margin</th>
<th>Net Margin of rice-duck over sole rice</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Bheramara, Kushtia</strong></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Boro 2009-10</td>
<td>Rice-Duck</td>
<td>189012</td>
<td>84815</td>
<td>104197</td>
<td>49444</td>
<td></td>
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<tr>
<td></td>
<td>Sole rice</td>
<td>94138</td>
<td>39385</td>
<td>54753</td>
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<tr>
<td>T. Aman 2010</td>
<td>Rice-Duck</td>
<td>155841</td>
<td>76663</td>
<td>79178</td>
<td>35203</td>
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<td></td>
<td>Sole rice</td>
<td>85679</td>
<td>43975</td>
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<tr>
<td><strong>Iswardi, Pabna</strong></td>
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<tr>
<td>T. Aman 2010</td>
<td>Rice-Duck</td>
<td>163614</td>
<td>81877</td>
<td>81737</td>
<td>32918</td>
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<tr>
<td></td>
<td>Sole rice</td>
<td>84609</td>
<td>35790</td>
<td>48819</td>
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<tr>
<td>Boro 2010-11</td>
<td>Rice-Duck</td>
<td>196794</td>
<td>89395</td>
<td>107399</td>
<td>45843</td>
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<tr>
<td></td>
<td>Sole rice</td>
<td>99383</td>
<td>37827</td>
<td>61556</td>
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</tr>
</tbody>
</table>
SWOT (Strength-Weakness-Opportunities-Threats) analysis

Strength:
- environment-friendly farming system
- farmers acceptance
- higher income

Weakness:
- ducklings availability in new areas
- better market price not ensured
- farmers lack of initial investment

Opportunities:
- new technology for organic rice production
- entrepreneurship opportunities

Threat:
- diseases and animal attack to ducklings
Conclusion

For the extension the technology it is necessary to ensure the –

- community participation,
- favorable ecosystem,
- duckling availability,
- farmer’s initial capital,
- premium price.
Opportunities of Organic Rice Farming in Bangladesh

- Bumper rice production and government is now planning to export rice due to less storage facilities.

- High demand of organic rice in domestic and export markets.

- More income because of the high price (more than 25% of inorganic produces).

- Suitable land and climate for year round produces.

- OF is labor intensive, but Bangladesh has the comparative advantage due to availability of sufficient labour at reasonable wages.
Future Plans

- Introduce Japanese Teikei system (producer-consumer distribution) model.
- Introduce the Integrated Rice-Fish-Duck-Azolla farming
- Duck hatchery set-up in new areas
- Emphasize given to traditional fine and aromatic rice
- Form farmers cooperative and own revolving fund for solve the fund problem
- Coordination with Media (both electronic-television and radio and print-newspapers) for awareness raising of farmers and consumers
Recommendation

- Include the rice-duck farming technology in the government agricultural extension policy and curriculum in the courses of agricultural universities.

- Establish Organic Products Certification Agency

- Forming the National Organic Agricultural Institute (NOAI) or Institute of Low-Input Sustainable Agriculture (ILISA)
International Rice-Duck Farming Conferences

1st 1996 : Fukuoka, Japan
2nd 1997 : Hong Soonmyung, Korea
3rd 1998 : Cần Thơ, Vietnam
4th 2004 : Zhnjing, China
5th 2006 : Korea
6th 2009 : Cebu, Philippines
7th 2011 : Sylhet, Bangladesh
Integrated Rice Duck Farming
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