FISH: A Project to Stimulate Development of a Commercial Aquaculture Industry in Uganda: Can It Be Used as a Model for Africa?

Bill Daniels* and Karen Veverica
FISH
(Fisheries Investment in Sustainable Harvest)

1) Overview of FISH
2) How is FISH different for other development projects?
3) Challenges
4) Accomplishments
5) Can FISH Work as a Model for Africa?
Goal

- To ‘jump-start’ commercial aquaculture development in Uganda through development of model fish farms for farmer-to-farmer technology transfer
How?

- Using proven, feed-based technologies and best management practices (BMPs) for viable commercial hatchery and grow-out production of Nile tilapia and clarias catfish (*C. gariepinus*) in ponds and cages
THE TEAM

Mr. Rashid Asiimwe
Cage Production

Ms. Karen Veverica
FISH Chief of Party

Dr. Nelly Isyagi
Pond/Hatchery
Formation of Teams Around Project Objectives

National Agricultural Research Organisation

FISH Team

Makerere University

International Center for Aquaculture and Aquatic Environments
Project Coverage Area
LVHD (400/m³) Cage Technology based on ASA-China
Hatchery Systems
How is FISH Different from Other Development Projects?

1) Many projects focus on production (often at subsistence level) and/or marketing

2) FISH covered ALL aspects of an aquaculture industry (Inputs to Outputs)

3) Focused on commercial-level development
Harvesting

From LVHD Cages
Transport
Production Planning-Tilapia
Source of Nile (SoN Farm)

- Breeding Pond
- Hapa
- Harvest
- Production cage
Marketing & Processing
How is FISH Different from Other Development Projects?

4) Acted as facilitator

5) Private sector-driven (Inputs & Facilities)
Therein Lies the Challenge: How to Get the Private Sector to Invest?

1) Requires investment in specialized equipment & technically-skilled managers and personnel

2) Requires access to financial resources and investment in human capital development

3) Building an industry:
   - Requires well established technology cutting across sectors and
   - Has inherent risks in believing in and committing resources to a future vision.
Challenges

1) Finding Farmers who BELIEVE and can LEAD
   - Best farmers live on farm or highly involved daily

2) Lack of skilled labor-the training dilemma
   - Had to shift heavily to hands-on training

3) Lack of reliable extension service (aquaculture)
   - NAADS does not provide continuous service

4) Conflicting information from ‘Experts’
   - Lots of consultants with very limited hands-on
   - Who to believe?
Challenges: Training

a) On-farm training alone was not adequate
b) Needed to work side-by-side with farmers over one year
c) Required farmers keep records and discuss them
   - Made farmers ‘immune’ to false claims from ‘experts’
   - Helped farmers understand and make wise decisions
Farmers-
The Real Experts
Challenges

5) Simultaneous development of support industries
   - Almost no inputs available
   - Those that were there had no quality control

6) Chicken or the Egg: Feed Production
   - Developed sinking feed while demonstrating imported floating feeds
   - Lack of floating feed greatly limited cage production
The Impact of FISH

- 3,244 trainee-days were provided to 600 different individuals. Women (31%)
- 30 fish farms have adopted improved cage and pond technologies and now provide quarterly inventory and sales reports. (end target = 20)
- In 2007, client sales of fish seed increased 6-fold for tilapia seed and 9-fold for catfish seed from 2006 levels (total sales of seed in 2007 were 1.84 million; End-of-project target 1 million total).
The Impact of FISH

• Factory-made formulated fish feed (pelleted) began in 2006 and reached 200 tons per year by 2007. The first extruded fish feed was produced in April 2008. End of project target 40 tons of extruded feed.

• Five new enterprises in fish processing and two in fish farming gear production have been started and 4 private consultants to Uganda fish farmers have been assisted in providing quality technical advice for a total of 11 new enterprises as of 2007. End of project target:15
<table>
<thead>
<tr>
<th>Cage Volume</th>
<th>Fish/m³</th>
<th>No. stocked</th>
<th>Final Avg weight (g)</th>
<th>FCR</th>
<th>% Survival</th>
<th>Culture Period days</th>
</tr>
</thead>
<tbody>
<tr>
<td>2m³</td>
<td>446</td>
<td>892</td>
<td>457</td>
<td>2.29</td>
<td>70.58</td>
<td>202</td>
</tr>
<tr>
<td>4m³</td>
<td>495</td>
<td>1980</td>
<td>565</td>
<td>2.13</td>
<td>73.78</td>
<td>225</td>
</tr>
<tr>
<td>1m³</td>
<td>8000</td>
<td>8000</td>
<td>47</td>
<td>1.20</td>
<td>40</td>
<td>141</td>
</tr>
<tr>
<td>1m³</td>
<td>400</td>
<td>400</td>
<td>151</td>
<td>1.97</td>
<td>85.50</td>
<td>150</td>
</tr>
<tr>
<td>1m³</td>
<td>400</td>
<td>400</td>
<td>148</td>
<td>1.93</td>
<td>94.50</td>
<td>150</td>
</tr>
<tr>
<td>1m³</td>
<td>400</td>
<td>400</td>
<td>129</td>
<td>3.27</td>
<td>72.5</td>
<td>150</td>
</tr>
<tr>
<td>1m³</td>
<td>400</td>
<td>400</td>
<td>131</td>
<td>2.55</td>
<td>85.25</td>
<td>150</td>
</tr>
</tbody>
</table>
## Costs for Cage (4 m³)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th>US$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Production: kg/m³</td>
<td></td>
<td>180</td>
</tr>
<tr>
<td>Feed (Ush/kg)</td>
<td></td>
<td>600</td>
</tr>
<tr>
<td>FCR</td>
<td></td>
<td>2.2</td>
</tr>
<tr>
<td>Fingerlings (20 g)-Ush</td>
<td></td>
<td>100</td>
</tr>
<tr>
<td>Fish Market Price (Ush/kg)</td>
<td></td>
<td>1,800</td>
</tr>
</tbody>
</table>
Variable Costs for Cage (4 m³)

<table>
<thead>
<tr>
<th></th>
<th>% Variable Costs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fingerlings, 440/m³, 100 Ush ea</td>
<td>176,000</td>
</tr>
<tr>
<td>Feed, at FCR = 2.2 and 600 Ush/kg</td>
<td>950,400</td>
</tr>
<tr>
<td>Total Variable</td>
<td>1,126,400</td>
</tr>
</tbody>
</table>
## Fixed Costs for Cage (4 m³)

<table>
<thead>
<tr>
<th>Item</th>
<th>Ush</th>
<th>$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cage, frame and cover plus floats,</td>
<td>221,000</td>
<td>$138</td>
</tr>
<tr>
<td>Ropes, anchor</td>
<td>25,000</td>
<td>$16</td>
</tr>
<tr>
<td>Boat to use on a series of 10 cages</td>
<td>24,500</td>
<td>$15</td>
</tr>
<tr>
<td><strong>subtotal fixed (investment)</strong></td>
<td><strong>270,500</strong></td>
<td><strong>$169</strong></td>
</tr>
</tbody>
</table>
## Income for Cage (4 m³)

<table>
<thead>
<tr>
<th></th>
<th>Ush</th>
<th>$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total variable</td>
<td>1,126,400</td>
<td>$704</td>
</tr>
<tr>
<td>Fish sales</td>
<td>1,296,000</td>
<td>$810</td>
</tr>
<tr>
<td>NET if farmer pays var costs, per cycle</td>
<td>169,600</td>
<td>$106</td>
</tr>
<tr>
<td>NET if amortize cage over 4 cycles (2yrs)</td>
<td>101,975</td>
<td>$64</td>
</tr>
</tbody>
</table>
Future FISH: Building Momentum