Potential to Increase Global Tilapia Production

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Tilapia: the most important aquaculture fish of the 21st century

• Tilapias are second only to the carps as a farmed food fish.
• But tilapia have unique characteristics that will facilitate its continued growth to someday surpass carp production.
• Where and how will tilapia production increase?
Major farmed fishes

Metric tons per year


Tilapia
Catfish
Salmon
## Comparison of major farmed fishes

<table>
<thead>
<tr>
<th>Species</th>
<th>Geography</th>
<th>Consumers</th>
<th>Fish meal</th>
<th>Systems</th>
<th>Freshwater or Marine</th>
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<tbody>
<tr>
<td>Salmon</td>
<td>Regional</td>
<td>Global</td>
<td>Moderate</td>
<td>Cages</td>
<td>Requires both</td>
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<td>Carps</td>
<td>Global</td>
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<td>Minimal</td>
<td>Ponds &amp; cages</td>
<td>Freshwater only</td>
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<tr>
<td>Catfish</td>
<td>Global</td>
<td>Global</td>
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<td>Ponds &amp; cages</td>
<td>Freshwater only</td>
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<td>Sea bass, cobia, snappers</td>
<td>Global</td>
<td>Global</td>
<td>High</td>
<td>Cages, recirc systems</td>
<td>Marine only</td>
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<tr>
<td>Tunas</td>
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<td>High</td>
<td>Cages</td>
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<tr>
<td>Tilapia</td>
<td>Global</td>
<td>Global</td>
<td>Minimal</td>
<td>Ponds, cages, raceways, recirc systems</td>
<td>Either</td>
</tr>
</tbody>
</table>
Subsistence and Export Commodity

- Tilapia is unique in its role as a livestock animal grown by subsistence farmers in developing countries around the world..
- And it is widely grown and exported to high value markets to be served in expensive restaurants and grocery stores
- Commodity or specialty crop - BOTH, like chicken
World Tilapia Production of 3,200,000 mt in 2010
2008 Tilapia exports from China

Sales volume = 224,359 mt

- US
- Mexico
- Sub-Saharan Africa
- Russia
- EU
- Others
### Top Ten Seafoods (U.S.) per capita (lbs)

<table>
<thead>
<tr>
<th></th>
<th>2000</th>
<th>2001</th>
<th>2002</th>
<th>2003</th>
<th>2004</th>
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<td>Shrimp 4.1</td>
<td>Shrimp 4.4</td>
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<tr>
<td>Shrimp</td>
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<td>Tuna 2.9</td>
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<td>Pollock 15</td>
<td>Pollock 16</td>
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<td>Cod 0.6</td>
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</tbody>
</table>

- **bold** indicates the top seafood for each year
Percentage of US finfish grocery sales
US Consumption of tilapia from domestic and imported sources

Tilapia (000's of kg of live weight)

- Domestic
- Imports
US Tilapia consumption (imports and domestic)

- 306,410 mt of live weight (equivalent) – 2005
- 368,295 mt of live weight (equivalent) – 2006
- 437,000 mt of live weight (equivalent) – 2007
- 453,264 mt of live weight (equivalent) – 2008
- 465,953,089 mt of live weight (equivalent – 2009)
US Sales of tilapia

- Imports in 2010 will be $760,000,000
- US production of 20,000,000 lbs at farm
- 2010 US tilapia farm-gate sales will be over $60,000,000

2010 US Tilapia Sales estimate = $760,000,000 + $60,000,000 = $820,000,000
Tilapia

• Model for how aquaculture industry should develop
• Global demand, variety of production systems and geographic regions, some vertically integrated
• Environmentally sustainable – “Green Aquaculture” (no fish meal required in the diet, no antibiotics, many farms use effluents for crops)
• Vaccines available for Strep infections.
Where will additional stocks of tilapia come from to maintain increased supplies?

- Faster growing fish with better fillet yield from selective breeding programs.
- More fish from existing farms – more intensive
- Integrated farming with effluents going to field crops
- Polyculture with shrimp and other fish
- Additional new farms in major producing countries
Selective breeding and genetic improvements

• Excellent breeding programs
  - G.I.F.T. - Malaysia
  - Genomar - Brazil and Norway
  - Chitralada – Thailand
  - TabTim – Thailand (CP Group)
  - GIFT Excell - Philippines

• YY Supermale - Philippines and Swansea, Egypt and Indonesia
The YY male technology

THEN

NOW

Normal crosses produce equal proportion of males and females

YY males produce only male progeny

(GMT®)
Continued growth globally

Taal Lake, Philippines, 2007

Taal Lake, Philippines, 2009

More cages, better breeds, better feeds and checking water quality
Regions of rapid production growth

• Vietnam – conversion of catfish cages to tilapia in Mekong, and culture in all regions
• Indonesia – cage culture, polycultures, rice culture
• Malaysia – government support and private sector investment
• Brazil – lots of available water, labor, land, feed
• Thailand – better reporting, shrimp polyculture
• Egypt – continued intensification
• Sub-Saharan Africa - commercialization
Integrated Farming Systems

Tilapia farm effluents to irrigate and fertilize field crops: Grapes, wheat, olives, barley, sorghum, cotton, melons, peppers

Safford, AZ       Marana, AZ
Desert Springs
Tilapia, Olives, wheat, alfalfa

Tilapia and citrus in Hainan, China
Polyculture

Gracilaria

Shrimp

Tilapia
Improvements in packaging

IQF Fillets in re-sealable packages
New product forms
Smoked tilapia

Sashimi grade tilapia
Tilapia and food service

- On almost all cruise ships
- Starting to appear on airlines
- Increasingly with schools, hospitals and prisons
- Several prisons have their own tilapia farms

Courtesy: Eric Roderick
Tilapia in Long John Silver’s
McDonald’s and other fastfoods could double tilapia global demand
Byproducts - Tilapia Leather
Global Tilapia Market Trends

Prices have been constant, only fresh fillets have increased significantly, will not see increases beyond inflation
Global Aquaculture Tilapia Sales

• For year 2000 = US $ 1,744,045,000
  (FAO FishStat 2007)

• 2005 sales = $ 2,457,312,000
  (FAO FishStat 2007)

• 2010 sales > $ 5,000,000,000
Future global tilapia aquaculture

![Graph showing the increase in metric tons of tilapia aquaculture from 2002 to 2011 (est).]
Conclusions

• Global tilapia production exceeded 3,078,000 metric tons in 2009 and will be 3,200,000 in 2010.

• Constantly improving farming, processing and packaging for food safety, quality assurance, traceability and environmental safeguards (with little increase in price).

• Other aquaculture species will follow the tilapia model.