Transformations in Brazilian aquaculture: technological intensification and capital concentration

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What about the Brazilian aquaculture?

» Significant growth in recent years

Aquaculture production in Brazil

- 69.6% Growth
- Total production: 562,533 tons
- Inland production
- Marine production
- Total production

» Inland production ➔ semi-intensive and extensive systems

Floating cages

Earthen ponds

14º biggest world producer

Source: FAO, 2016
Aquaculture production in Brazil (2014)

- **White legged shrimp** (78%) (*L. vannamei*)
- **Pacific oyster** (*C. gigas*) + **Brown mussel** (*P. perna*) (22%)
- **Tilapia (42%)** (*O. niloticus*) ≠'s strains (Thai/Chitralada/ Gift)
- **Tambaqui (29%)** (*Colossoma macropomum*)
- **Tambacu and tambatinga (9%)** (hybrids)
- **Carps (4%)** (≠’s spp.)
- **Spotted catfish (4%)** (*Psedoplatystoma spp.*)
- **Others (12%)**

Great diversity of species
- Manly native
- Geographical dispersion

Source: IBGE, Ministry of Fisheries and Aquaculture
Historical driving forces in the Brazilian aquaculture

» Increase in demand of seafood
  » 2005 = 6,6 kg/habitant/year  →  2015 = 10,6 kg/habitant/year (+60,6%)
  » 1 billion US$ seafood imports

» Low scale of producers
  » Most of producers with annual production of less than 5,000 tones
  » Few producers organizations
» Low technological intensity

» Innovation gap on native species

### Aquaculture production in Brazil by category of species (tons)

<table>
<thead>
<tr>
<th>Category</th>
<th>Inland aquaculture</th>
<th>Mariculture</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dourado (Salminus brasiliensis)</td>
<td>38</td>
<td></td>
</tr>
<tr>
<td>Peacock bass (Cichla ocellaris)</td>
<td>64</td>
<td></td>
</tr>
<tr>
<td>Piabanha (Other Brycon sp.)</td>
<td>255</td>
<td></td>
</tr>
<tr>
<td>Lambari (Astyanax spp.)</td>
<td>271</td>
<td></td>
</tr>
<tr>
<td>Traíra (Hoplias malabaricus)</td>
<td>1184</td>
<td></td>
</tr>
<tr>
<td>Rainbow trout (Oncorhynchus mykiss)</td>
<td>1704</td>
<td></td>
</tr>
<tr>
<td>Curimatã (Prochilodus lineatus)</td>
<td>2403</td>
<td></td>
</tr>
<tr>
<td>Other species</td>
<td>2757</td>
<td></td>
</tr>
<tr>
<td>Piau and others (Leporinus spp.)</td>
<td>4434</td>
<td></td>
</tr>
<tr>
<td>Pirapitinga (Piaractus brachypomus)</td>
<td>4599</td>
<td></td>
</tr>
<tr>
<td>Matrinxã (Brycon amazonicus)</td>
<td>10718</td>
<td></td>
</tr>
<tr>
<td>Pirarucu (Arapaima gigas)</td>
<td>11763</td>
<td></td>
</tr>
<tr>
<td>Pacu (Piaractus mesopotamicus)</td>
<td>14553</td>
<td></td>
</tr>
<tr>
<td>Spotted catfish hybrids (Pseudoplatystoma spp.)</td>
<td>20437</td>
<td></td>
</tr>
<tr>
<td>Carps (Cyprinus carpio)</td>
<td>20886</td>
<td></td>
</tr>
<tr>
<td>Oysters, scallops and mussels (Crassostrea sp., Nodipecten...)</td>
<td>22092</td>
<td></td>
</tr>
<tr>
<td>Tambacu, Tambatinga (Colossoma hybrids)</td>
<td>40267</td>
<td></td>
</tr>
<tr>
<td>White legged shrimp (Litopenaeus vannamei)</td>
<td>65018</td>
<td></td>
</tr>
<tr>
<td>Tambaqui (Colossoma macropomum)</td>
<td>139209</td>
<td></td>
</tr>
<tr>
<td>Tilapia (Oreochromis niloticus)</td>
<td>198664</td>
<td></td>
</tr>
</tbody>
</table>

36 (28 species and 8 hybrids)  
(≈5 exotics vs 23 natives)

Source: IBGE, 2014
Technological intensification

» Tilapia is leading innovation and attraction of investors in Brazil
  » Basis to further technology development for other species
  » Providing well trained personnel and equipments

» Main technologies in tilapia industry in Brazil:
  » Vaccine (only medicine for aquaculture in Brazil)
  » Breeding and genetics
  » Large volume floating cages
  » Automatization of fish removal and feeding
  » Biofloc and recirculation system
  » Fish processing and packaging
Technological transfer from tilapia to native species

Breeding and genetics

Large volume cages

Processing and packaging

Pirarucu (*Arapaima gigas*)

Tambaqui (*Colossoma m.*)

Tambaqui (*Colossoma m.*)
and Matrinxã (*Brycon amazonicus*)

Spotted catfish (*Psedoplatystoma spp.*)

Tambaqui (*Colossoma m.*)

Photos: Embrapa, Manso Aquicultura
Capital concentration

- Aiming to increase production scale and productivity
- Investment lead by Brazilian companies and cooperatives, Foreign Direct Investment (FDI)

Some examples of Brazilian companies and FDI (2013-2016):

<table>
<thead>
<tr>
<th>Investor</th>
<th>Value (US$)</th>
<th>Specie</th>
<th>Activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regal Springs (USA)/Axial Private Investment Holding (Brazil)</td>
<td>51 millions</td>
<td>Tilapia</td>
<td>Vertical integration</td>
</tr>
<tr>
<td>Aquagen-EWGroup(Norway)/Aquabel (Brazil)</td>
<td>???</td>
<td>Tilapia</td>
<td>Breeding and genetics</td>
</tr>
<tr>
<td>Peixes da Amazônia/Kaeté Private Equity (Brazil)</td>
<td>5 millions</td>
<td>Native species</td>
<td>Vertical integration</td>
</tr>
</tbody>
</table>
## Investment by cooperatives

Large agricultural cooperatives → *Aquaculture as economic diversification*

<table>
<thead>
<tr>
<th>Name</th>
<th>Main sectors</th>
<th>Total turnover US$ (all sectors)</th>
<th>Investment in aquaculture</th>
</tr>
</thead>
<tbody>
<tr>
<td>COOPACOL</td>
<td>Grains, poultry, pork</td>
<td>0.9 billion</td>
<td>15 millions</td>
</tr>
<tr>
<td>C.Vale</td>
<td>Poultry, pork, milk</td>
<td>1.8 billions</td>
<td>24 millions</td>
</tr>
</tbody>
</table>
Main findings

» Brazilian aquaculture is becoming more competitive
  » Increase in productivity and scale

» Better position to face seafood imports in the domestic market

» Some concerns...
  » What future for small scale farmers?
    » *Organization (i.e. coops, associations) is crucial!!!
Thank you!
Obrigado!
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