Integration of small scale fish farmers (SSFF) and processing industry in developing countries: Case study of aquaculture value chain in Brazil

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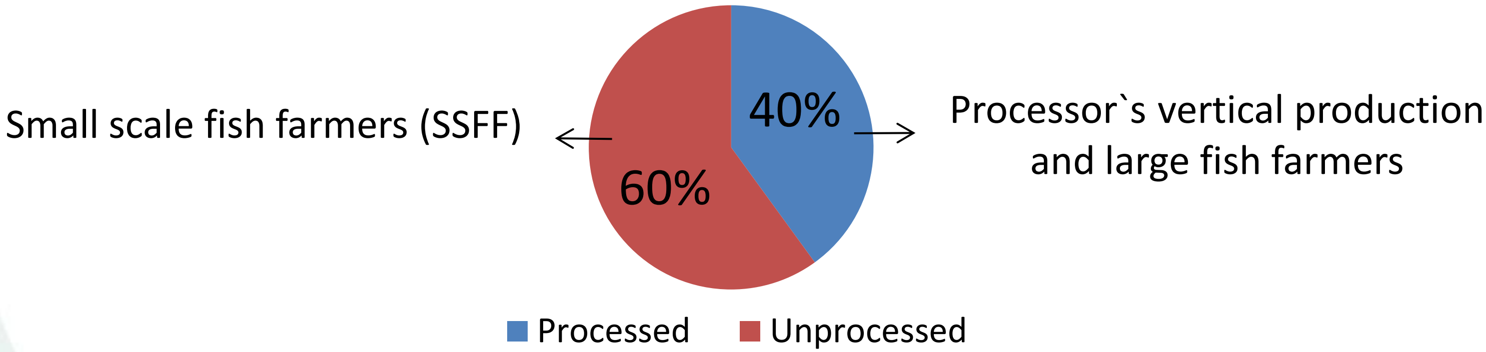
Key figures of Brazilian aquaculture

780,000 tones (2017) → mostly tilapia and amazonian fishes

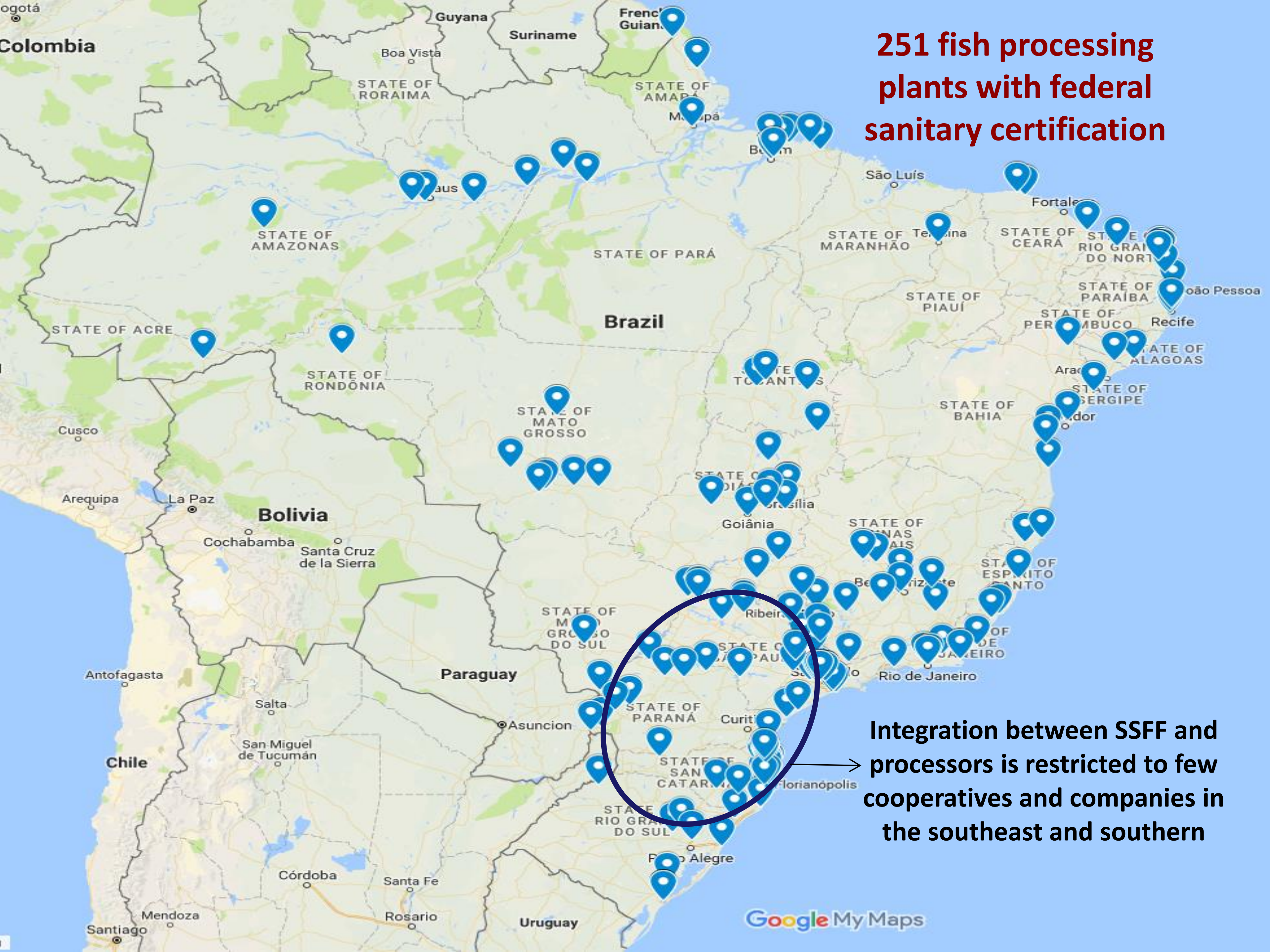
- 357,000 tones of tilapia → 4º largest world tilapia producer

In Brazil, minimal fish processing in certified plants is mandatory (i.e. fish cleaning and evisceration)

Processing rate = **40% of the total production**



251 fish processing plants with federal sanitary certification



Integration between SSFF and processors is restricted to few cooperatives and companies in the southeast and southern

Why is integration between SSFF and processors necessary?

- Risks associated to absence of fish processing
  - **Sanitary risks** for consumers related to the poor hygienic standards and absence of appropriated cold chain
  - Impossibility to **access supermarkets** and other more demanding markets due to the lack of sanitary certification
  - **Sanitary regulation** for fish is getting reinforced in Brazil
- Lack of alternatives to process fish
  - Initiatives aiming to implement **collective/public fish processing plants** for SSFF has failed
  - Individual SSFF have no output and capital to enable an **own fish processing plant**

Research question

Considering the importance of the processors as an feasible alternative to process fish from SSFF, *what are bottlenecks hindering the integration between these actors in Brazil?*

Methods

- Descriptive research based on case study
- Qualitative data gathered by semi-structured face-to-face interviews with value chain agents (i.e. processing plants, fish farmers, organizations)
  - Oriented sample → 113 agents, including all processors
- Approach of Global Value Chain (GVC) and their six basic dimensions:

Input-output structure

Geographic scope

Governance structure

Upgrading strategies

Institutional context

Industry stakeholders

Gereffi and Fernandez Stark (2016)

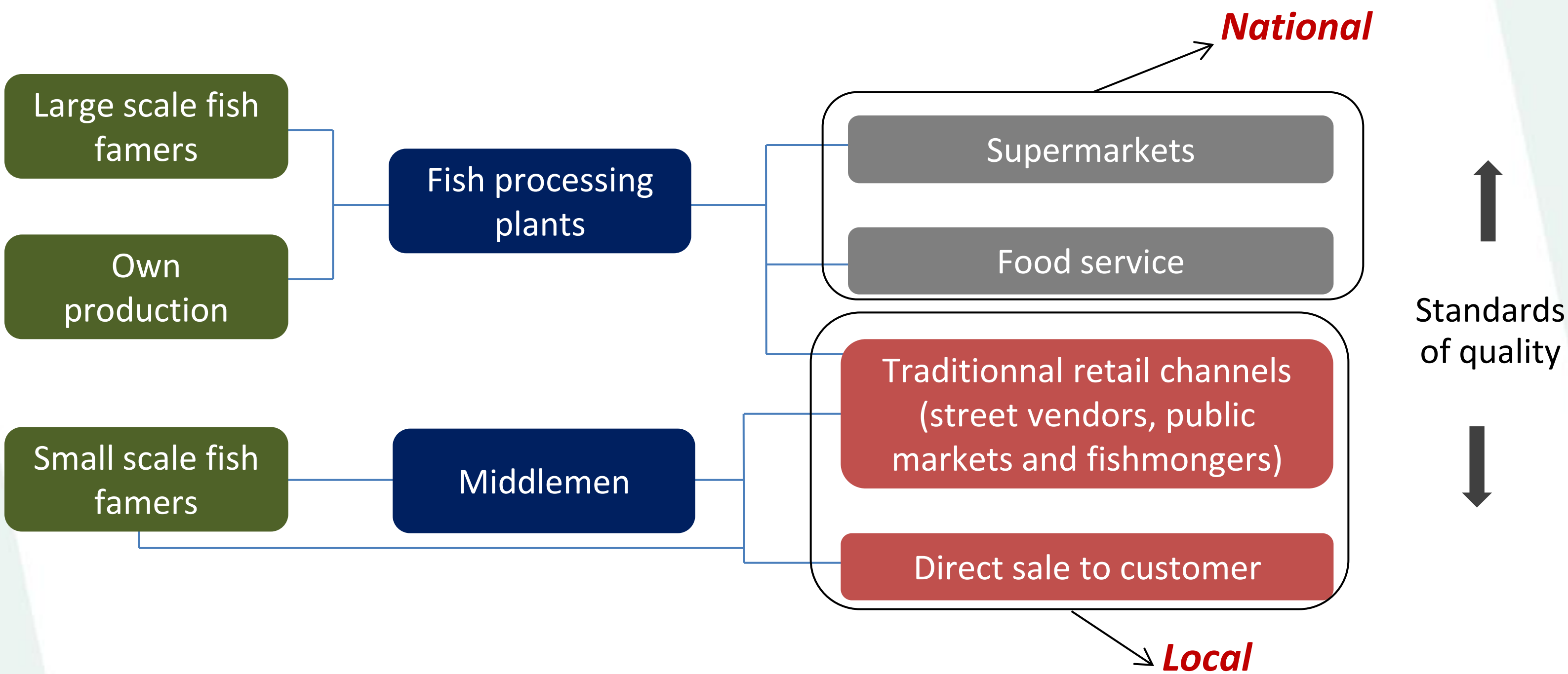
Case study of Tocantins state

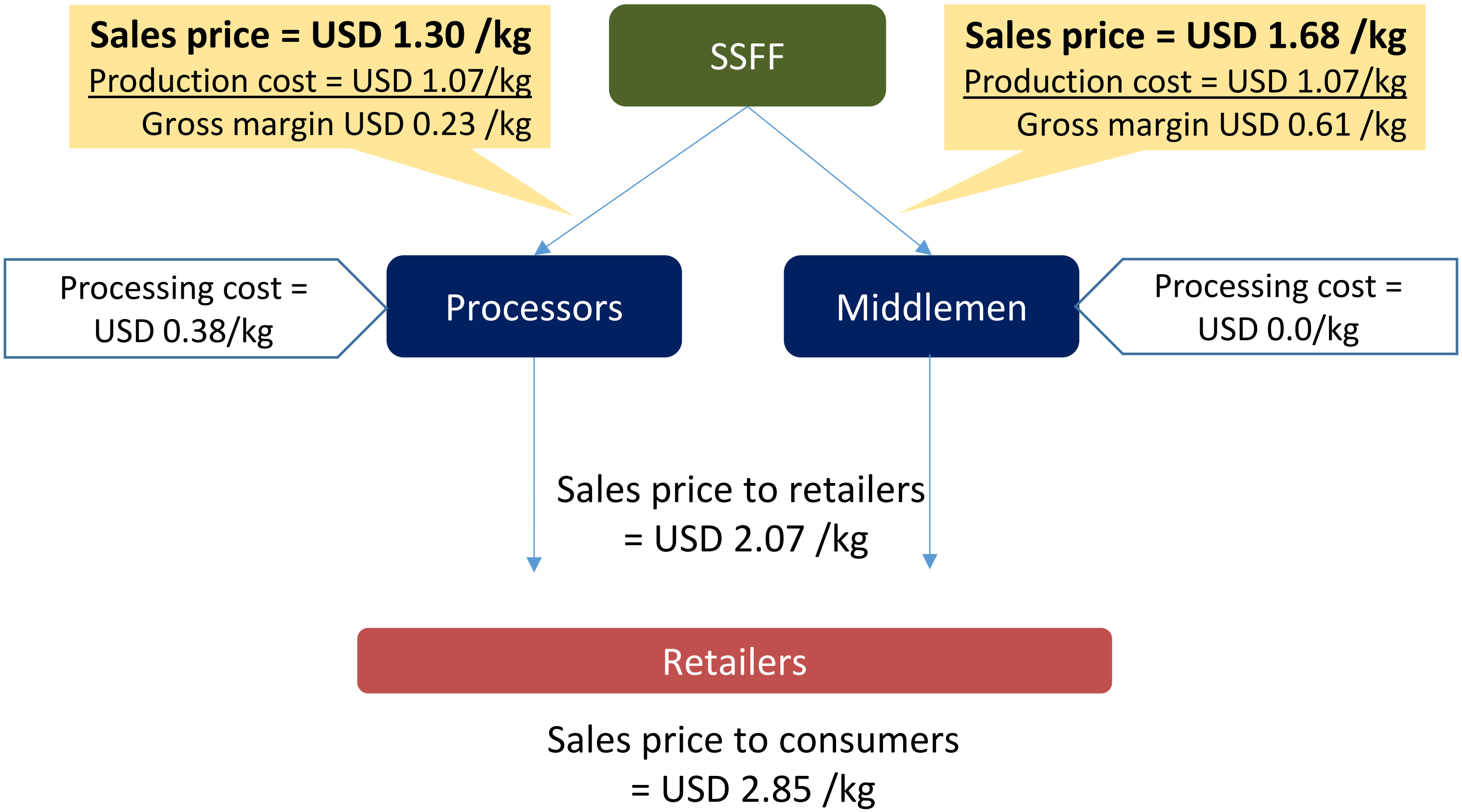
- **4** fish processors and **1,000** fish farmers, mostly SSFF
  - The main farmed species is the Amazonian Tambaqui (*Colossoma macropomum*), cultivated in earthen pounds

- Production (2017) = **14,500** tons → **4,800** tons processed (processing rate 33%)
- SSFF sold in the local market through middlemen or traditional retailers as street vendors and fishmongers, bypassing the processors
  - Representative of other regions in Brazil

Results

Market channels for farmed fish in Tocantins




Sales price = USD 1.30 /kg
Production cost = USD 1.07/kg
Gross margin USD 0.23 /kg
SSFF
Sales price = USD 1.68 /kg
Production cost = USD 1.07/kg
Gross margin USD 0.61 /kg
Processing cost = USD 0.38/kg
Processors
Middlemen
Processing cost = USD 0.0/kg
Sales price to retailers = USD 2.07 /kg
Retailers
Sales price to consumers = USD 2.85 /kg

* USD 1 = BRL 3.86

Reasons behind the no integration between SSFF and processors in Tocantins state

- Low price paid by processors (US$ 1.30/kg) compared to middleman (US$ 1.68/kg) makes the transaction not attractive as SSFF have high costs of production and low technological level
- SSFF present resistance in establishing cooperatives or producer organizations in order to increase quantities to meet processors demands or to operate an own processing plant
- Despite being mandatory, sanitary control by regulatory agencies is still weak which encourages the informality by SSFF
- However, there is a tendency to reinforce this type of control in the future, which represents a great risk for SSFF

Processors are adding value by sanitary certification and consumers are getting more conscious...

"Give preference to the fish with sanitary certification seal"

"Quality fish is only the one with sanitary certification"

As consequence

- More vertical governances structures has emerged with power in processors hands, which are increasing vertical production and partnerships with large producers
- This governance enables the processors to assure quantity and quality, which allows to reach more demanding markets (e.g. São Paulo, Brasilia, Rio de Janeiro)
- Without sanitary certification and with fragmented volumes, SSFF oriented their production to local market and prices has decreased

Conclusions

- Two “***aquacultures***” in Brazil
  - One industrialized and capitalized, oriented to consolidated market
  - Another informal (and illegal), with low capital and technology, oriented to local market
- Public policies are reinforcing sanitary control but doesn´t offer alternatives to process production from SSFF

Recomendations

- ✓ Increase scale of SSFF by regrouping into cooperatives, associations, farmer´s clubs, etc. in order to reinforce volumes and reduce costs
- ✓ Provide more technical assistance in order to improve SSFF capabilities

Cooperation between processors and SSFF is crucial... but how to do it??

Vertical integration

- Adaptation of successful model used in poultry and pork sectors in Brazil
- Possibility to enable SSFF to access credit and technical support

Partnership with producers organizations

- E.g. cooperatives, associations, condominium of fish farming
- Successful initiatives by large agricultural cooperatives with tilapia in southern Brazil

Thank you

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