

Smallholder Fish Production in Nigeria

A technical and economical feasibility study for tilapia cage farming and food security in Nigeria

Wageningen, 8 July 2013

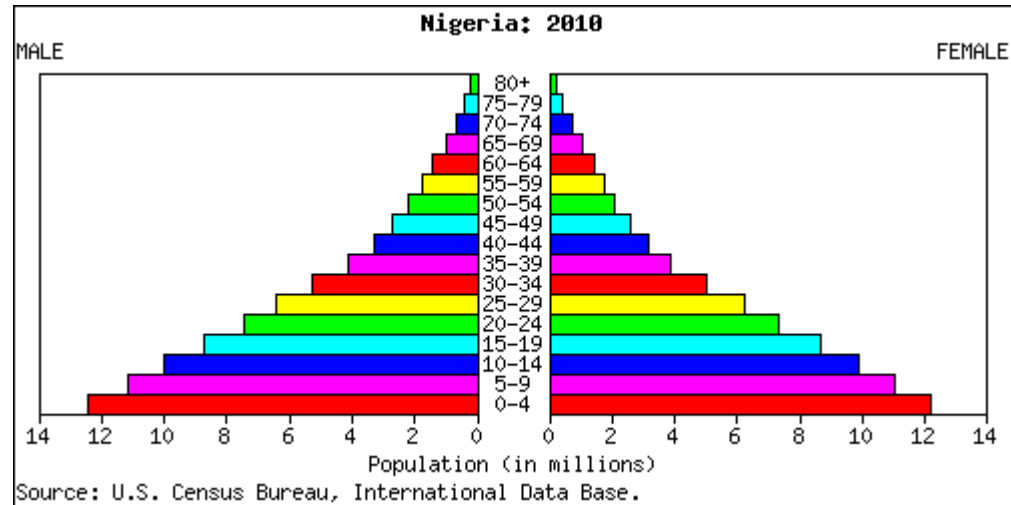
IMARES - LEI



NIGERIA: A huge market

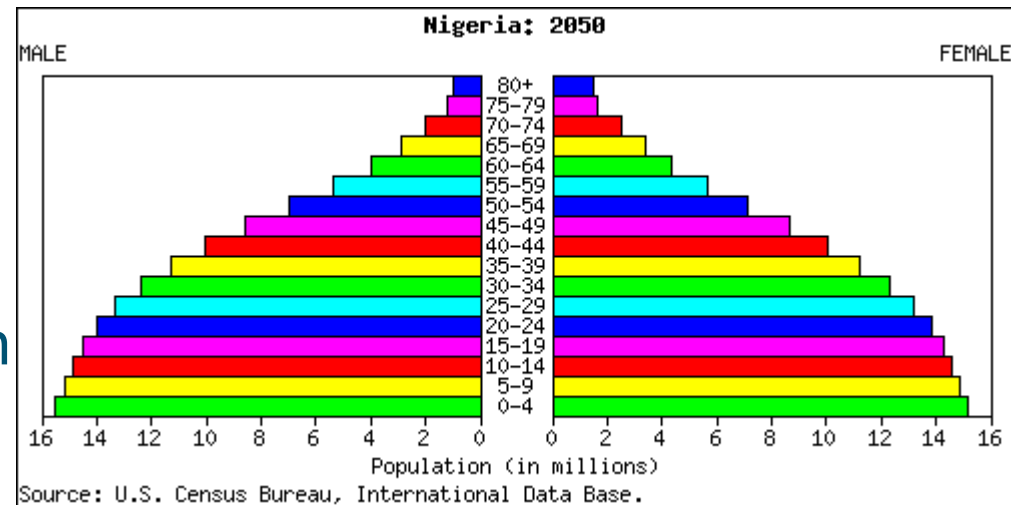
■ Country (july 2012 est.):

- nearly 170 million
- 7th most populated country in the world
- young population



■ Lagos (july 2012 est.):

- nearly 20 million
- 12% Nigerian pop.
- most populous city in the world



NIGERIA: A huge market

Year	Pop. (Million)	Per capita fish consumption (kg)	Projected fish demand at 7,5 (tonnes)	Projected fish demand at 13.5 (tonnes)	Domestic production (tonnes)
2010	158	7,5-13,5	1,185,000	2,133,000	810,000
2015	180	7,5-13,5	1,350,000	2,430,000	@@@
2020	204	7,5-13,5	1,530,000	2,754,000	@@@

Estimation of fish consumption per capita varies widely from 7,5 kg to 13,5 kg per year. This is still below the world average.

Although trade statistics are lacking, it is mentioned that Nigeria imported around 1.1 million tonnes of fish in 2010 (FAO).

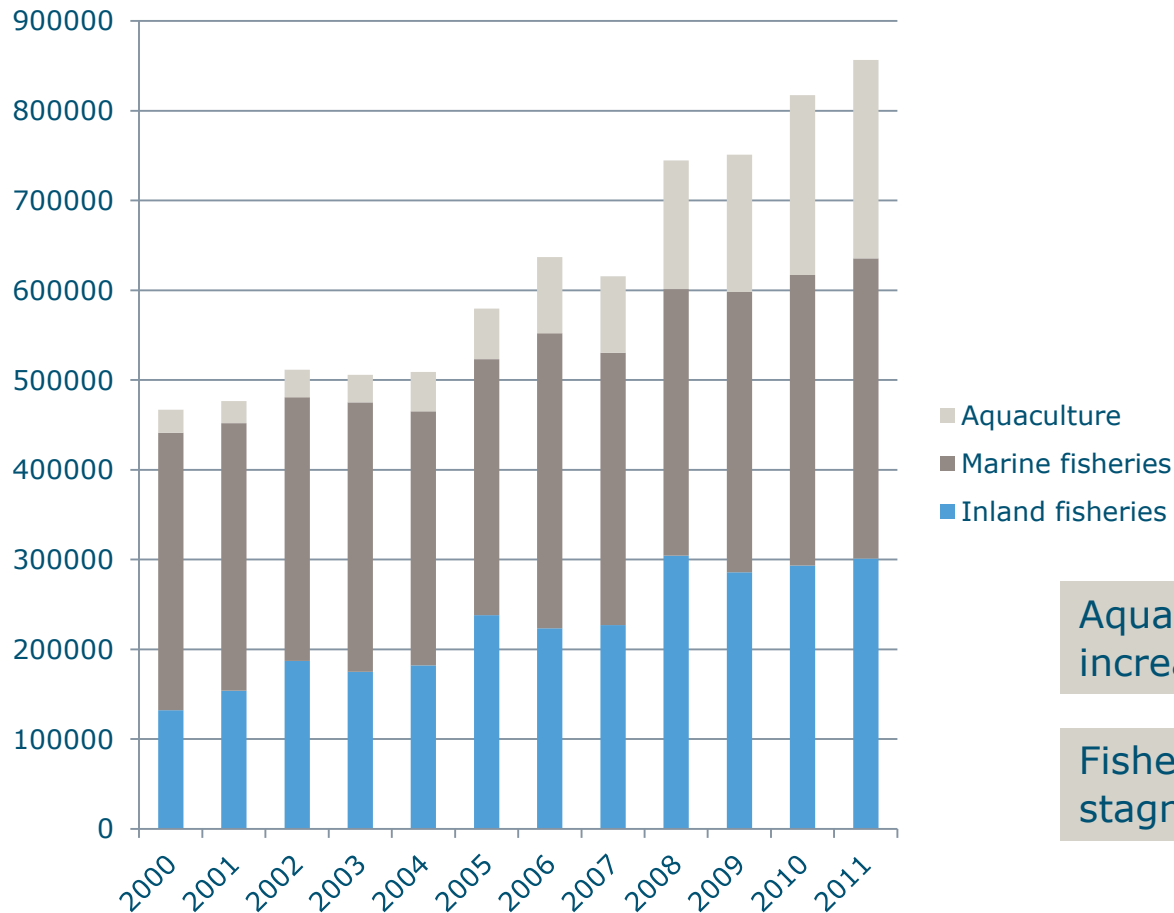
NIGERIA: A huge market

Nigeria Fisheries Data (2010)

- Total Annual Fish Demand: 2.66 Million Tons
- Domestic Production: 0.80 Million Tons
- Aquaculture Production: 0.20 Million Tons
- **Quantity Imported: 0.80 Million Tons**
- **Supply Deficit: 1.06 Million Tons**
- Value of Imports: N100 Billion (USD 625 Million)

Source: Federal Department of Fisheries, Nigeria

Fish and seafood production (tonnes)

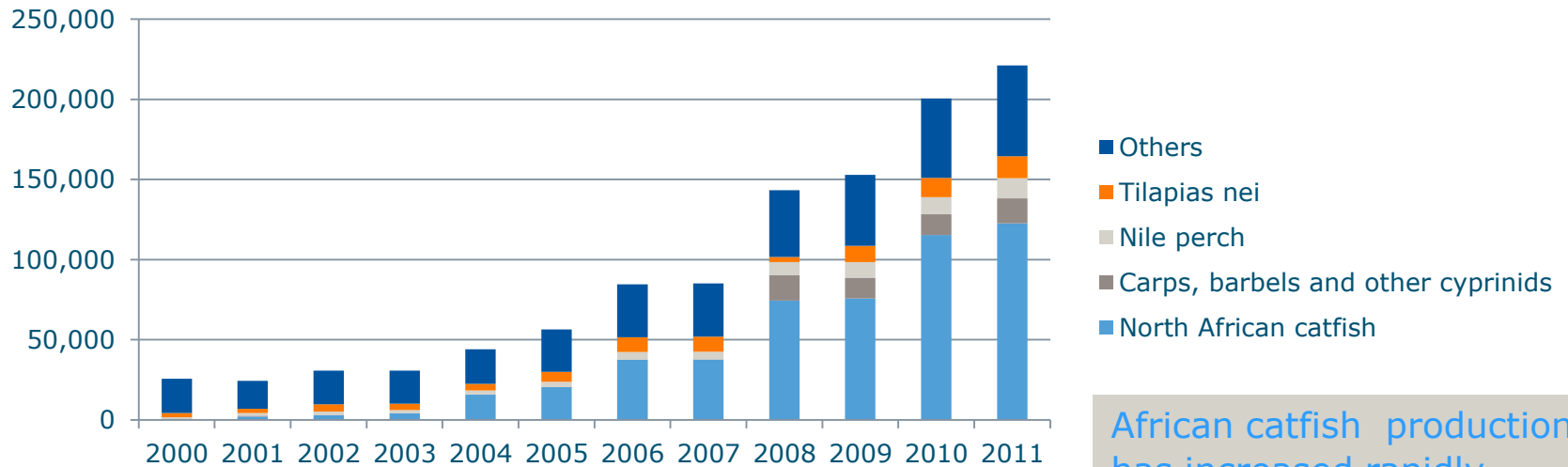


Aquaculture production is increasing rapidly.

Fisheries production is stagnating.

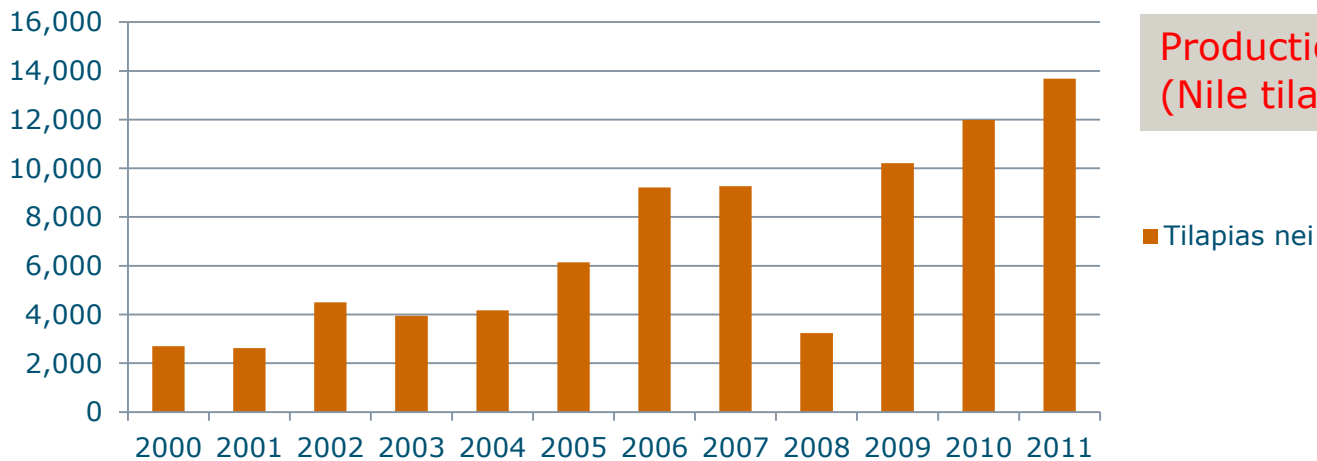


Aquaculture production (tonnes)



African catfish production has increased rapidly.

Production data ????
(Nile tilapia, Nile perch, ...)



Natural waters

Fresh water

- Dams and Reservoirs:
 - #917 (**300.000 ha; 30 billions m³**) across the country
 - No dams in Lagos State, well in neighbouring States
 - Irrigation, water supply, hydro-electric power generation
 - **Aquaculture** (just started)

- Lakes, rivers, floodplains, ponds

Brackish waters

■ Lagos lagoons (10 lagoons; ±70.000 ha)

- Big lagoons: Lagos (60x15km; 46.000ha), Lekki (37x23km; 24.700ha);
- Salinity: 0-22 ppt (wet-dry seasonal variation)
- Depth: Lagos (0.5-2 m; 5m; 25m (harbor part), Lekki (3.1-6.4m)
- Low dissolved oxygen concentration
- Heavily polluted (domestic sewage, industrial dumping)
- Water hyacinth invasion
- Public water (no community control)

Epe lagoon (field data)

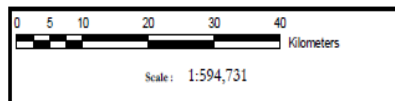
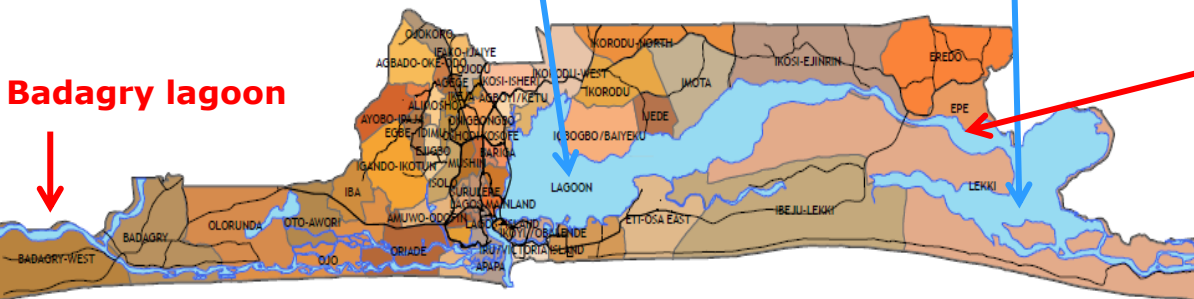
CAGE FARMING

- Temperature: 26-35°C
- Transparency: 0.31-1.50 m
- Dissolved O₂: 1.8-4.8 mg/L
- Salinity: 0.58-5.50 ppt
- pH:6.5-8.7
- Max depth: 5 m
(deep water: for transport)

Badagry lagoon



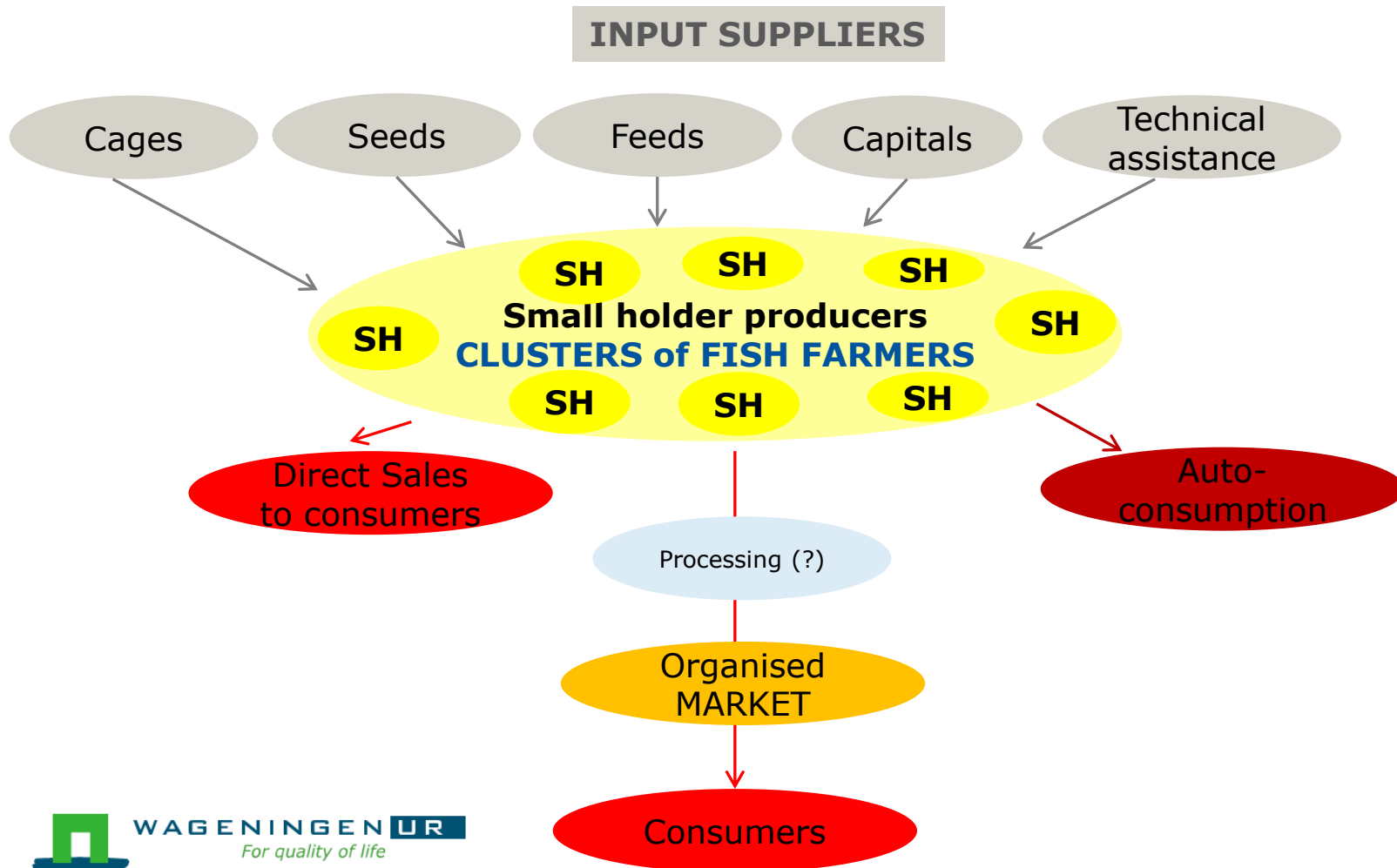
CAGE FARMING



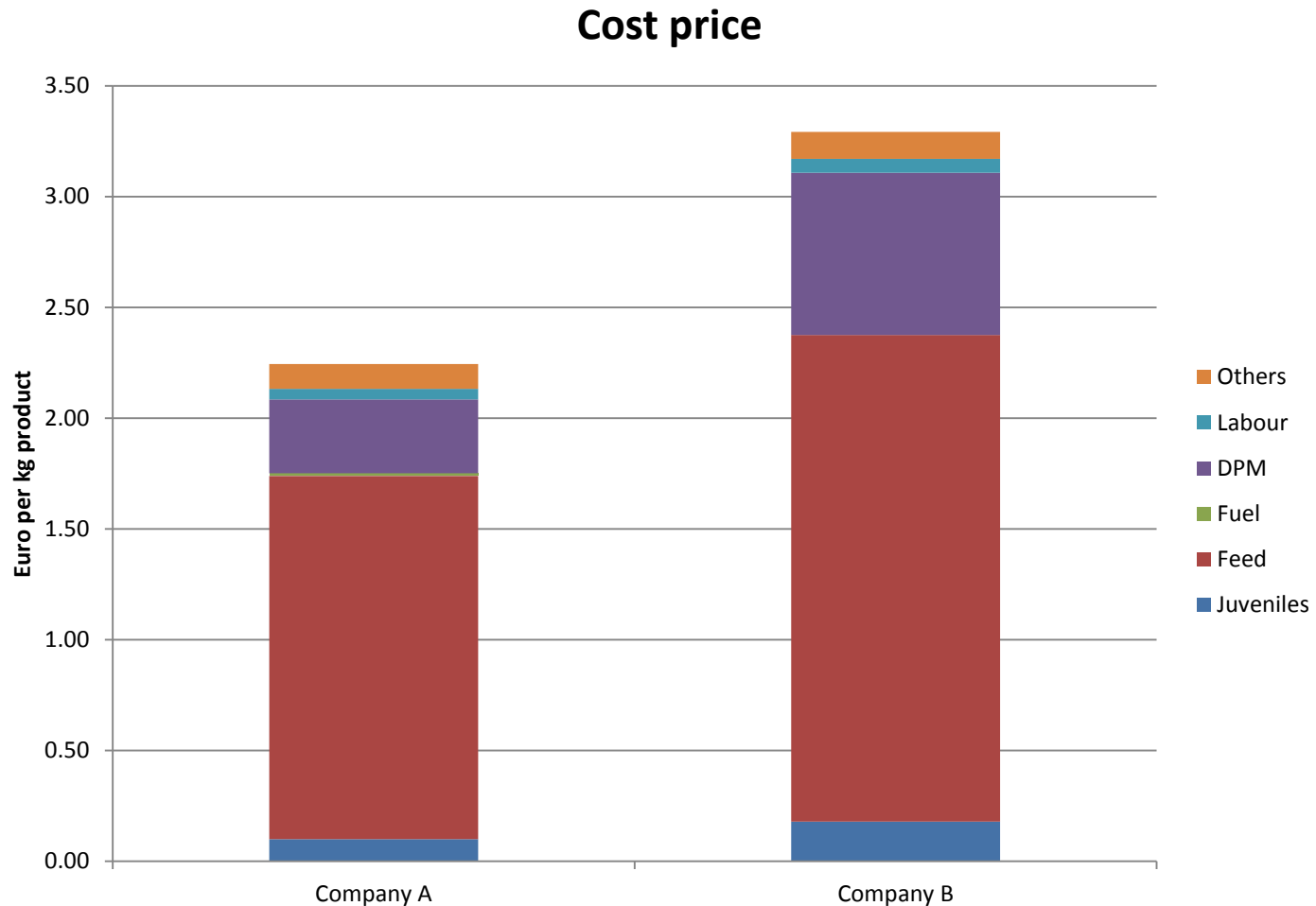
Opportunities for the BoP involvement

- Job creation in the whole value chain (VC)
- Income generation and affordable proteins
- Many actors in the primary sector=> big volumes
- Better coordinated control of the market
- Impacts upstream and downstream in the VC
 - Agriculture production of feed ingredients locally
 - Fish marketing and processing
 -

The scenario and technical feasibility of upscaling Tilapia cage farming in natural waters



Cost price analysis of 2 tilapia cage farms

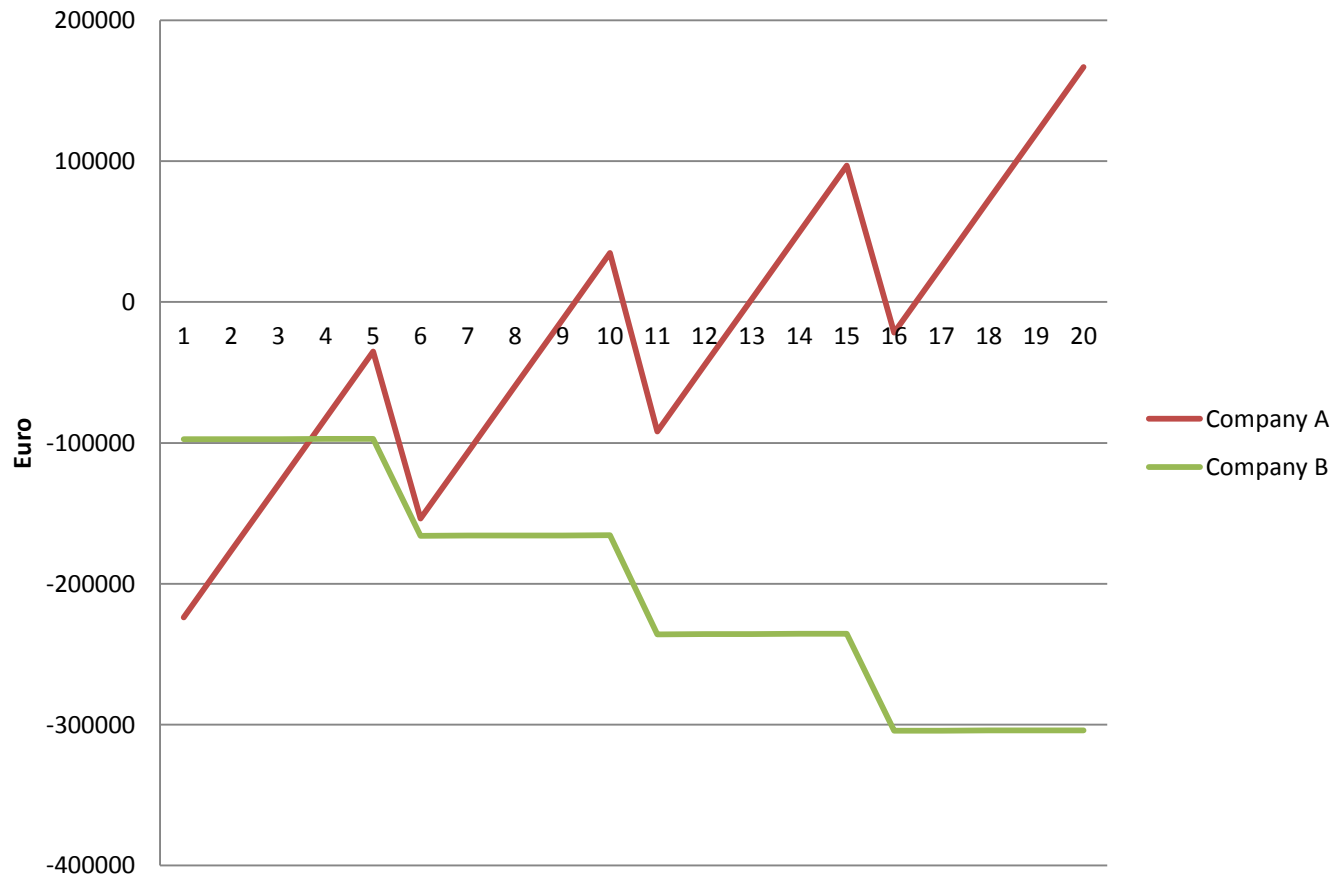


The farm gate price of fresh tilapia is presently 2.18 €/kg for company A and 2.55 €/kg for company B.



Cash flow of 2 tilapia cage farms

Cumulative cash flow over 20 years



In the basic scenario, the break-even point for company A will be reached after 10 to 13 years, with an internal rate of return (IRR) of 6.8%. Company B is at present economically not viable.



Market prices at different scenario's

Feed price	Company A	Company B
present level	2.41	3.77
-10%	2.24	3.52
-20%	2.06	3.29
-30%	1.89	3.06
-40%	1.71	2.80

Farm gate price of fresh tilapia in euro/kg, needed for an internal rate of return (IRR) of 30% at different price levels of fish feed in the two types of tilapia cage farms A and B.

Current issues - Aquaculture

- High cost of feeds (>70% production costs)
- Lack of quality fingerlings
- High bank loan interests
- Smallholders (organisation & funding)
- License to farm natural waters

Projected issues – Intensive cage farming

- Idem as above
- Sustainability – if not tackled from the start

RESEARCH AREAS to SUPPORT INDUSTRY

- FEEDS (locally produced)
 - cheap + optimal
- SEEDS
 - breeding programmes
- SUSTAINABILITY
 - carrying capacity vs feeds
 - environmental impact assessment

COLLABORATIONS

- WUR (LEI / IMARES) + NIGERIAN INSTITUTES
- DUTCH + NIGERIAN COMPANIES



Smallholder Fish Production in Nigeria

Thank you



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For quality of life