

INITIAL RESULTS OF THE PILOT STUDY TO IMPROVE THE PRODUCTIVITY, WHILE MINIZING ENVIRONMENTAL IMPACTS OF FISH FARMING IN HA LONG BAY, VIETNAM



- Tomáš J Oberding* *, Patrice Gautier, Trieu Ngoc Huong, Marc Campet, S. Benamozig
- *Representing IndoChina Junks
- World Aquaculture Society, Praha, September 2012

Topics

- Ha Long
- Participants
- The Project
- Results
- Next steps



Ha Long

- UNESCO World Heritage Site
- New 7 Wonders of the World
- Old coal mining area
- Tourist Mecca
 - ~1969 limestone islands
 - 1,553 km²



Ha Long

- ⦿ Floating villages
- ⦿ Limited regulation and enforcement
 - Led to Increased pressure on environment from higher density of visitors
- ⦿ Economic development
 - Trade with neighboring China (on main highway)
 - Tourism companies having made arrangements with villages
 - Villages starting grow out farms for various fish

Floating Villages

- Unique villages centered on fishing
- Villagers often too poor to afford housing on land
- Little to no facilities exist, waste water simply exist the homes
- Moderately self contained as villages even have schools

Current Practices

- ⦿ Feed is from trash fish
- ⦿ Leads to decrease natural fisheries stocks
- ⦿ Waste decreases already questionable water quality
- ⦿ Several Species Farmed
 - Grouper (*Serranidae*),
 - Cobia (*Rachycentron canadum*),
 - Red Snapper (*Lutjanus campechanus*),
 - Anabas or climbing perch (*Anabas testudineus*).
 - Barramundi (*Latescalcarifer*) also called Asian Sea Bass,
 - Adaptable to the environment in Ha Long
 - Access to various sources of supply (either via Chinese or Vietnamese traders).

Current Practices (in theory)



Sanitary and disinfection

- Cages frequently monitored
 - checked 2 times /week to clean the fouling
 - increase the exchange of oxygen
 - control for disease

Health and medicine administration

- Checks of fish health
- If disease extant
 - Attempt to determine disease and treat
 - Medicine or washing fish in fresh water

Biology and Health



- Mostly fed via trash fish caught by fishermen
- Very limited use of medications was found
- High mortality rates are very common (average: 80%)
 - High loss period was predominantly when change from hot season to cold
 - Attributed to change in temperature and oxygenic concentration

Current Situation

- High investment made by farmers in their stock in terms of start-up, stock purchase and maintenance costs
- No actual data recorded by farmers
- Input supplies are a major hindrance to production
 - Processed feed and animal health advisors currently not accessed
 - Trash fish and stock supplies are volatile and generally undersupply issues exist

Concerns about current practices

- Use of trash fish
 - Uncontrolled reduction of wild fish - posing risks to biodiversity
 - Very inefficient
 - Majority drops freely in the water
 - Cause of major organic pollution



Pilot Project



The Players

- For BATIK: Mrs S. Benamozig & Ms Hang
- For INDOCHINA JUNK: Mrs Trieu Ngoc Huong
- For ASVELIS: Mr. Patrice Gautier, Ms Nguyen Thi Mai, Mr. Bui Duc Tri
- For OCIALIS: Mr. Marc Campet & Mr. Dao Duy Phong
- FARMER: Mr. Vu Van Nam, Mrs Huong.

The villages

- ③ 3 floating villages: Vung Vieng, Cong Dam, Cap Na.
 - Households visited in the two target villages (Vung Vieng and Cong Dam)
- ③ Control noticeably poorer
- ③ All small-scale;
 - <50 to several thousand



The Villages

- ⦿ Proved difficult to estimate annual production reliably
 - Nature of farming
 - Nonexistent data recording
 - Fluctuations in supply, demand and mortality
- ⦿ **Approximately 74,000 young fish are bought or caught per annum**

The villages

#	Farmer	Number of fish	Age of fish (month)	Number of cage	Feed used
1	Mr.Nam	2,500	4	2	Processed feed
2	Mr.Dung	3,000	7	4	Trash fish
3	Mr.Thanh	10,000	7	12	Trash fish
4	Mr.Quyen	3,000	7	4	Trash fish

The Project

⦿ Duration

- 4 Month Project August-December 2011,
 - 10-12 months, prelim ran 4 due to funding issues

⦿ FEED:

- Different types of processed feeds.
 - Nutrilis and Nanolis products were selected
 - Developed specifically for tropical fish farmed in cages without water pollution

⦿ CAGES:

- 2.5m x 3m x3m



The Project

◎ FINGERLINGS

- Private fish hatchery in Vung Tau.
 - 4 gram/head and 5cm without disease
 - 16 Hour flight and travel time
 - Mortality due to lack of O₂

◎ Controls

- Limited
 - Controls were on the same farm

The Project

Farmer	No fish	Weight of fish (g/head)	Density (head/m³)
Mr.Nam	25,00	4	56
Mr.Dung	3,000	3	67
Mr.Thanh	10,000	3	185
Mr.Quyen	3,000	3	67

The Project

- ⦿ Environmental Factors measured every month
 - Temperature
 - Salinity
 - Dissolved oxygen concentration
 - PH

- ⦿ MEDICATION:
- ⦿ Hadaclean for parasite treatment and Vitamin
 - treated by washing in fresh water

The Project results



Environmental Factors

Month	Temp (°C)	Salinity (ppt)	DO (mg/l)	pH
December	32	25	6.36	7.7
October	29	26.5	6.55	7.6
November	27	25.5	6.93	7.4
December	22	25.5	7.5	6.8

Weight Gain in Control

Raising	Average body	Average body	Daily weight gain	Daily length gain
Month	weight (gram)	length (cm)	(g/head/day)	(cm/head/day)
0	2.5	3	0	0
1	14	7	0.38	0.13
2	42	12	0.93	0.17
3	95	16	1.77	0.13
4	135	18.5	1.33	0.08
Average			0.88	0.1

Weight Gain in Fed

Raising	Average body	Average body	Daily weight gain	Daily length gain
Month	weight (gram)	length (cm)	(g/head/day)	(cm/head/day)
0	4	5	0.00	0.00
1	11	8.5	0.23	0.12
2	53	16	1.40	0.25
3	105	18	1.73	0.07
4	140	19.3	1.17	0.04
Average			0.91	0.10

Weight Gain Statistics



- t Stat 0.134494
- P(T<=t) two-tail 0.896334

Issues

- ◎ Feed fed
 - Consistent feeding a problem
 - At times fish not fed 3 days
- ◎ Control fish
 - Quality, quantity not stable
 - Very short storage life - Rancid and unpalatable
 - May accelerate transmission of parasites and diseases
 - Generally recommended trash fish are cleaned, beheaded and gutted before feeding.
 - Farmers did not adhere to this practice at all
 - Feeding uncleaned, whole or chopped fish
 - Likely cause of disease and water quality issues

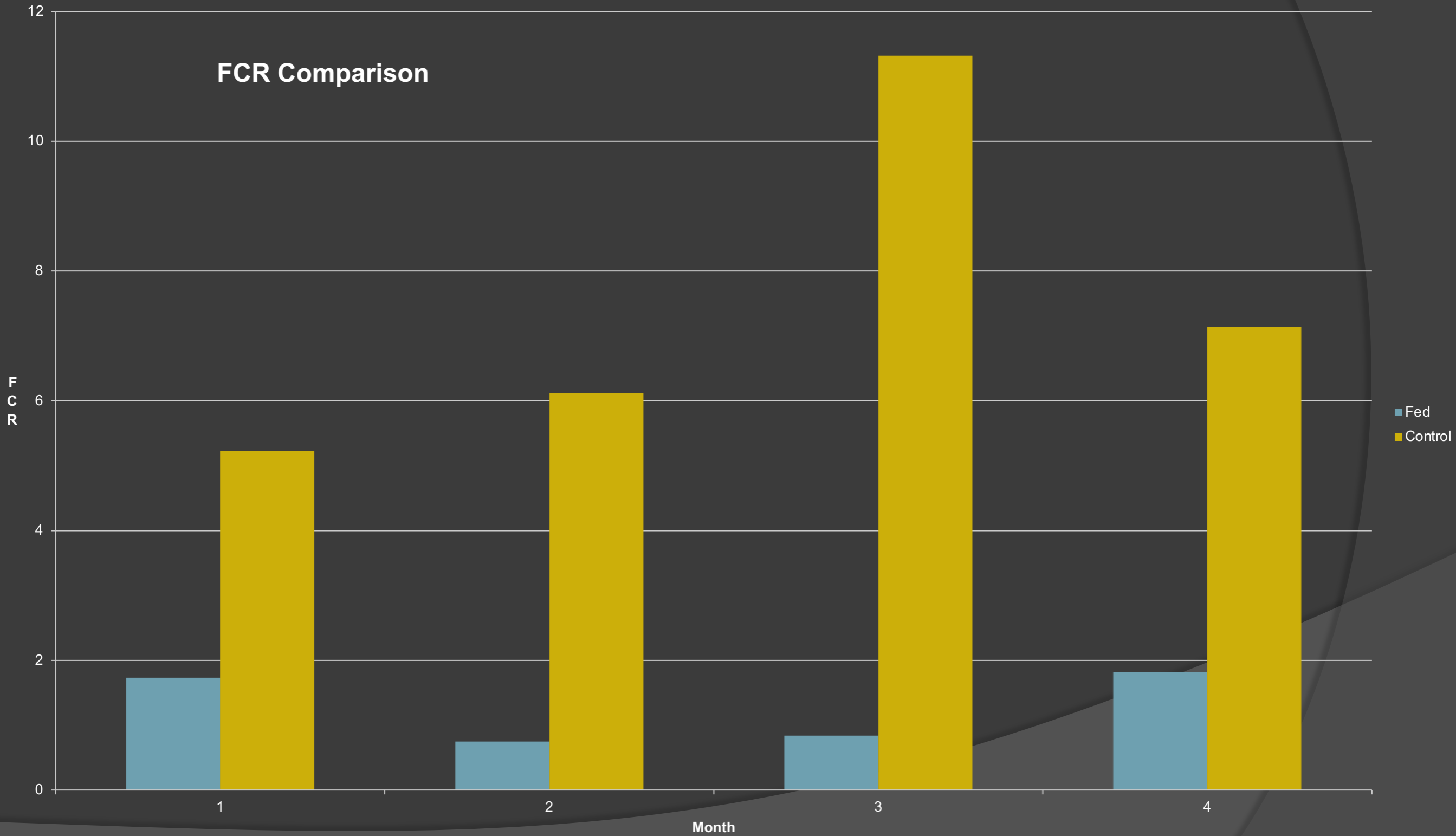


FCR

Month	FCR	Control FCR
0	0	0
1	1.73	5.22
2	0.75	6.12
3	0.84	11.32
4	1.82	7.14
Average	1.72	7.45

FCR

FCR Comparison



FCR Statistics

- t Stat -4.4742
- P(T<=t) two-tail 0.020809
- Avg Fed FCR: 1.72
- Avg Control FCR: 7.45



Total Feed Comparison

Month	Total feed (kg)	Total trash fish (kg)
0	0	0
1	28.57	600
2	37.85	1,200
3	55	1,800
4	49.25	2,100

Economics

Fingerling

Total feed
expense

Medicine and
disinfection

Cage

Worker

	Fed	Control
Costs (VND)	27,307,408	56,520,000
Income (VND)	32,310,000	59,280,000
Profit (VND)	5,002,592	2,760,000

The Project Economics

- Need 1.1 kilograms of factory feed (34,000 VND) to produce 1 kilogram of farmed fish, but need 7.45 kilogram of trash fish (44,700 VND) for same
- After 4 months,
 - Fish still small (140g/head)
 - Cannot be sold at this stage
 - Good early indication



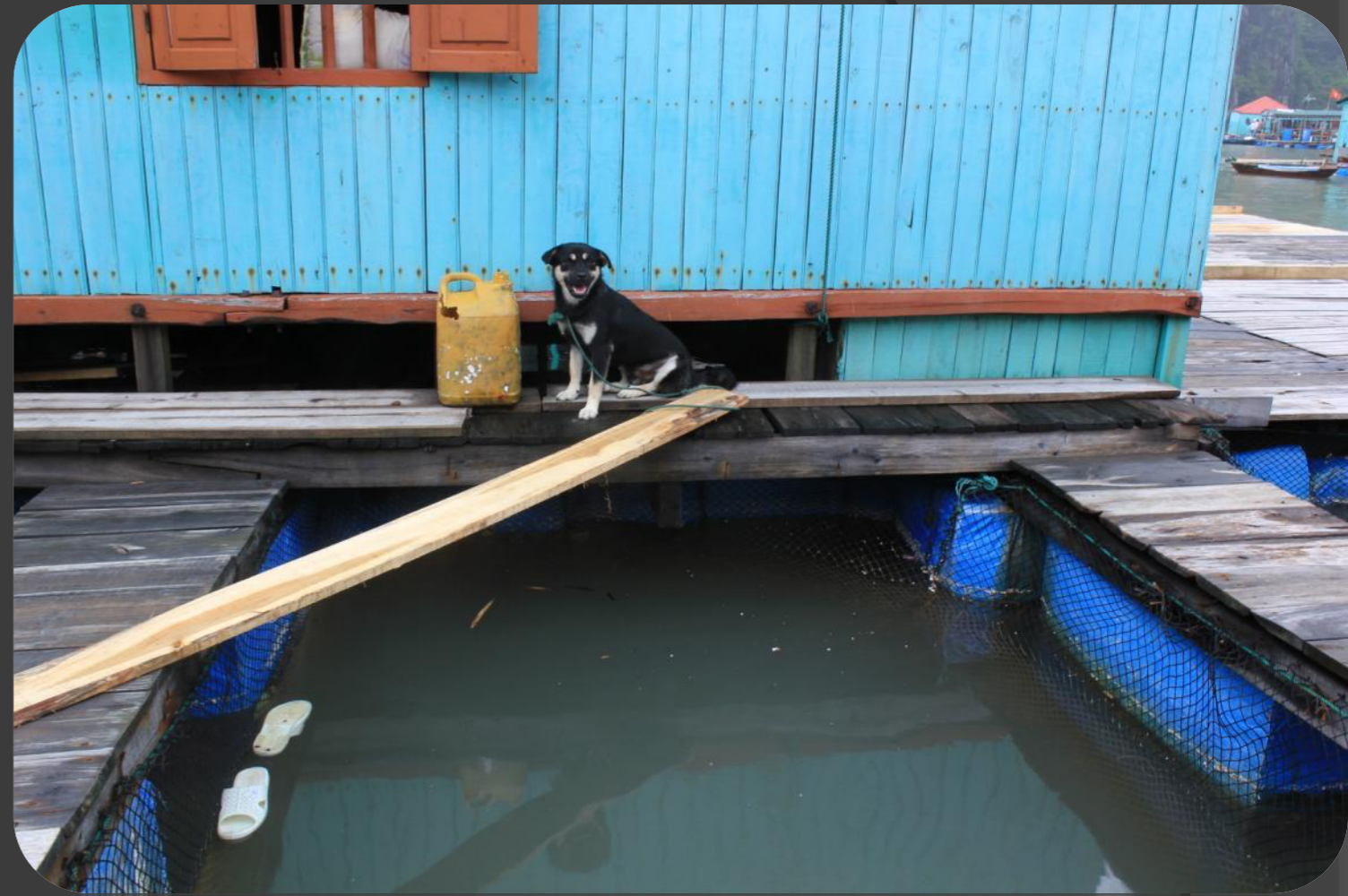
Discussion

- FCR of fish is higher with processed feed than with trash fish
- Processed feed has additional benefits-
 - Feed difficult to dissolve in water
 - Most of the processed feed is eaten before it falls to the bottom of the cage
- Initial results trial show economic efficiency of trial model higher than traditional model

Conclusions

- ⦿ Improved method of fish farming represents a major innovation for Ha Long bay
 - (1) strengthen the aquaculture sector (as a good additional activity for villagers also involved in tourism)
 - (2) reduce the environment damages of fish farming by
 - (a) reduction in the catching of trash fish
 - (b) reducing the amount of organic materials wasted in the sea waters
 - (3) provide a marketing advantage for the tourism sector
 - tourists are more likely to want to visit eco-friendly sites within Ha Long Bay

Limitations



● Needs:

- Tech support, local feed retailer (Hanoi closest OCIALIS shop)
- Micro-finance
- Quality Control
- Dissemination of information to obtain more buy-in by farmers
- Increased education programs for fisherman and farmers regarding negative impacts of traditional system

Questions?

