

Self-recruiting Species in Aquaculture: Their Role in Rural Livelihoods

Case Study V1: Phu Cuong Village, Minh Phu Commune, Soc Son District

1. Introduction

1.1 Schedules and Persons Involved

This study was carried out between May 29 and June 1, 2001. The RIA1-AIT team first visited the village on May 29 and worked on the PRA process on May 29-30. After collating and translating information obtained at RIA1 on May 31, the team returned for a 'debriefing' with villagers on June 1. The RIA1-AIT for the fieldwork consisted of

1. David Little
2. Jack Morales
3. Caroline Soubry
4. Kim Van Van
5. Nguyen Chien Van
6. Nguyen Huu Hoa
7. Bui Ngoc Thanh
8. Harvey Demaine (part)

1.2 District Commune Description

Soc Son district is the northern most district of Hanoi City. It lies some 40 km north of Hanoi city centre and surrounds Noi Bai International Airport. The total area of the district is 506.5 km² and the population 240,950 people. Despite its location, 87.4% of the households of the district are engaged in agriculture and the average per capita income of the district is a rather low VND2.596 million (US\$180). 8.6% of the households in the district are classified as poor.

The district was chosen as representative of the drier fringe of the Red River delta and is sometimes classified as midland. The district slopes steadily from west to east. The western edge of the district in fact has a line of small hills, rising to around 550 feet above sea level with 5 communes situated in this area. The other 15 communes are entirely lowlands, but a group of 6 communes in the east lie alongside the Bridge river and suffer from over bank flooding from the river. It was decided to select three communes along a transect from west to east, Minh Phu in the foothill area; Phu Linh in the intermediate lowland areas and Bac Phu in the lowest lying area along the river. The characteristics of these communes are summarised in Table 1.

Table 1: Natural and Social-Economic Characteristics of Selected Communes

Variable	Minh Phu Commune	Phu Linh Commune	Bac Phu Commune
Topography	Midland	Lowland	Very Lowland
Total Area (km ²)	20.35	14.42	10.80
Land Area (ha)	682.4	1067	731.0
Agricultural Area (ha)	203.5	463	731.0
Agricultural Households (%)	96	97	98.5
Population Density	466	529	776
Poor Households (%)	16.6	3.5 (old), 8.5 (new)	14.0
Water Surface Area Used (ha)	7.5	4 lakes	38.0
Water Surface Area Unused (ha)	25	No data	43
Aquaculture Systems	Extensive	Extensive	Extensive
Species	Grass, silver, common and Indian carps	Grass, silver, common and Indian carps	Grass, silver, common and Indian carps
Wild fish	No data	No data	River catfish

Source: Soc Son Departments of Statistics and Agriculture and Rural Development; Selected Commune Offices.

1.3 Selection Process for the Village

Once the tentative commune sample framework had been established, the RIA1-AIT team began its work by making an appointment with Mr Tien, the Deputy Head of the District Department of Agriculture and Rural Development in Soc Son district for the morning of May 29. He in turn facilitated an introduction to Mr Quach Van Trong, staff of the Commune Office in Minh Phu Commune. With Mr. Pho, Chairman and Mr. Thu, Vice Chairman of the People's Committee, details of the constituent villages of the commune were obtained. Minh Phu Commune comprised 9 villages as follows:

- | | |
|-------------------|--------------|
| 1. Thanh Tri Doai | 384 families |
| 2. Thanh Tri Dong | 215 families |
| 3. Phu Ha | 334 families |
| 4. Phu Linh | 209 families |
| 5. Thach Son | 156 families |
| 6. Phu Thinh | 242 families |
| 7. Phu Huu | 125 families |
| 8. Phu Cuong | 130 families |
| 9. Khu Lam Tuong | 115 families |

It was stated that Thanh Tri Doai village contained the greatest number of poor households, especially women-headed households with small children. However, the size of the village was a constraint for PRA. Other smaller villages had fewer poor households in total, but proportionately similar. One of these, Phu Cuong, was then randomly chosen.

The team immediately secured an appointment with village leaders in Phu Cuong including

1. Mr. Le Van Thao (Village Head)
2. Mr. Nguyen Van Khang (Head of the Co-operative)
3. Mr. Nguyen Kim Son (Accountant),

on the basis of which an appointment was made to begin work that same afternoon.

2. Setting the Context

2.1 Mapping the Current Resource Context

Figure 2.1 presents the village resource map. This was drawn by the Village Head and the Village Accountant, in whose house the meeting was taking place. Phu Cuong village sits on a ridge of upland surrounded concentrically by upland fields and paddy land. The paddy land to the south of the village appears to be rather more low-lying and includes the one small 'lake', which has been rented for aquaculture by one household. The main area of aquaculture ponds also appear to be in this part of the village.

2.2 Mapping the Development of the Village (Timeline)

Figure 2.2 shows the timeline of key points in the village development. Information was supplied by Mr Pham Van Hien, a 72-year old man. Mr Hien stressed political events. Phu Cuong village was established in 1918. At that time there were 18 households occupying an area of 190 mau of land (68.4 ha); by 1930, this had increased to 30 households, but the available land area had decreased to 104 mau (37.4 ha). In the following thirty years the village was badly affected by conflict. In 1943, there was an uprising in nearby Phu Thinh village, which caused fighting with the occupying French army and in 1950 the village was completely cleared and occupied by the French as a strategic garrison ("white wall") By 1960, there were still only 36 households in the village.

Fighting with the United States began in the early 1960s. An artillery unit was established in Phu Cuong village and it managed to shoot down an American F105 plane in 1972. Subsequently the unit was moved to Noi Bai airport.

The only economic item of note mentioned by Mr Hien was the foundation of the co-operative in 1960. At this point the co-operative took control of the land and the whole village worked together and divided the production evenly. The main village road was constructed in 1970. Economic issues were taken up to a greater extent by a second informant, a woman. She noted that after the end of the American war through to 1980, the economy was extremely; there was not enough food and children were unable to go to school. However by 1985, agricultural land had been contracted out to individual families and farmers only contributed part of their produce in tax. From that date, the economy had improved; in 1988 the government distributed land to individual farm households and in 1996 electricity reached the village.

**2.3 Mapping the Social Context:
Well Being Ranking Criteria**

R a n k	Trial 1 Birth control & other lady	Trial 2 Le Van Thao, Head of village	Trial 3 Ngo Minh Tien, Labour party of village
1	Lack of knowledge for accounts & working & many children. Some very old, some widows & some women with children but no husband. Some lack food about 6 months/year They have to get loans with high interest All have no TV Get support from government Average same land as others	Often old & alone Problems with nerve illness. Lack of investment Lack food about 2 months Children often finish primary school Often lack of facilities for getting social information	Most are young married couples recently separated from family. Lack facilities & knowledge to produce so lack everything.
2	Know more how to work than gp 1. Some risks so lack of finance & investments to produce Most have separated from big families - just married with young kids Often work off farm as wage labour Often lack food about 2-3 months	Have older children - can go out for wage labour to increase income. Better than group 1 for economics & social About 20% of households lack food 4 houses have no TV, others have B&W or domestic TV	Have a house & simple materials to produce but still lack investment Most have enough food. Main income from agriculture, some from livestock
3	Children often finish secondary school, some in higher education Have not enough money to support their children to learn higher. Most know how to work, but often lack of investments & facilities. Some lack food about 1-2 months/year	Have enough food Lots of wage labour in free time. Children can go to school For health & social conditions are better than gp 1 & 2	Finished basic building Fair income. Older children who can go to find work to increase family income Have spare money Young children are looked after very well. Have TV & radio
4	Know how to produce. Sometimes must get a loan to produce, but they can pay back Most have B&W TV Some policy families in this group - supported by government	Have enough food Most have colour TV, others have B&W Main income from agriculture, other income from subwork, livestock & other trade	Have very good house. Children can study in higher education Most are workers, teachers, commune staff. Others have benefits from parents or grandparents

5	Have enough materials, TV, radio. Some have motorbike & colour TV. Children can study in higher education Have spare money so often buy meat Construction is fairly good Most are farmers	Stable economics, good materials & social economic conditions. Have good knowledge for trading, take care of children very well. Children can study in college & university	
6	Have enough materials, motorbike, spare money, good house (even 2 floors). Some have telephone, good knowledge. Children study in higher education		

- Social Structure of the Community: Community includes 9 villages, each village has some groups. The positions in community: Chairman, vice chairman, accountant, chairman of party labour, vice chairman party labour, Young union, Women Union, Old People union & Army Union. The positions of persons in each village are the same, but at level of village.

2.4 Summary/ Key Points

- Phu Cuong village sits on a ridge of upland surrounded concentrically by upland fields and paddy land.
- The village has been established for 83 years & developing.
- Wealth Ranking criteria:
 - Poor Households:
 - + Lack of knowledge, often old live a lone, young married, some widows, some women have children without husband.
 - + Lack of : food about 2-6 months/year, facilities, furniture, farm equipment & investment.
 - + Their children often finish primary school.
 - Fairly Poor: + Have a house & simple materials but still lack investment.
 - + Lack food less 2 months/year
 - + Wage labour.
 - Medium: + Enough food, but still not enough money.
 - + Their children often finish secondary school.
 - Fairly Rich:
 - + Know how to produce, spare some food & enough money, finish basic building, enough facilities, furniture.
 - Rich Households:
 - + Good knowledge, their children can go to high education, college or university.
 - + Enough materials, good houses, even motorbikes, telephone, spare some money.
 - + Most of them get other income out of agriculture.

3. Activity Profile of the Village

3.1 Seasonal Calendar

Figures 3.1 –3.4 present the annual calendar of activities for the different social groups in the village. There are small but not significant differences in the perception of the weather, with some groups emphasizing temperature and others rainfall or wind. Nor are the differences in the social events mentioned especially significant; it may be noted that there are festivals and ceremonies in almost every month, some of them traditional, others promoted by the state.

In relation to economic activities, the calendar for all groups shows double-crop rice cultivation being practised by all groups. Winter – spring rice is planted in February and harvested in May; summer-autumn rice follows immediately from July/August, with harvest in September/October. All groups are also engaged in field crop cultivation, again over two seasons. Maize, beans, peanuts, sweet potatoes and Irish potato are also planted in February and harvested in May-June; a second crop of winter maize is planted in October and harvested in January, this crop is after harvesting second rice crop. The richer households appear to have a more diversified cropping system during this period. This may also be true of fruit orchard cultivation.

All groups were also engaged in livestock cultivation, although the poorer households tended to lump this together with fish culture, suggesting the relatively lesser importance of fish culture for the poor. In the validation meeting, it was suggested that the profile of livestock might be different between the groups, with the poor concentrating on rearing of pigs and chickens, while the better-off had a wider range of stock including cattle and ducks.

From this analysis, there are clear peaks in the labor demands and income flow from agriculture. Families are extremely busy in February, May, July and December-January, while the main income streams appear particularly concentrated in May-June and December-January, especially just before the Tet New Year. Interestingly poor men claim to be busy throughout the year, largely in relation to carrying out construction labour in Hanoi and other locations more locally, although rice men are similarly engaged. Poor women tend only to take on such employment locally because of the burden of their household activities. It is the poor men who seem to suffer most from health problems, mentioning specifically respiratory problems at the change of seasons and tiredness.

3.2 Group Activity Profile

Some of these differences are reflected in the group activity profiles.

Poor Women

Name \ Activities	Nguyen Thi Anh	Nguyen Thi Canh	Nguyen Thi Thu	Nguyen Thi Toan	Nguyen Thi Thong	Nguyen Thi Hang	Dao Thi Ty	Total
Rice	4	4	6	5	3	4	4	30
Field crops	7	8	6	5	5	3	8	42
Garden	3	2	4	5	3	4	0	21
Livestock	5	5	4	4	6	5	5	34
Fish culture	0	0	0	0	1	0	0	1
Wage labour	1	1	0	1	2	4	3	12
Total	20	20	20	20	20	20	20	140

Poor Men

Name \ Activities	Ngo Dang	Le Quang	Q. Thang	Ng. Chuc	D. Luc	Total
Rice	4	3	4	4	4	19
Field crops	2	2	2	3	3	12
Fruit	4	5	4	6	4	23
Livestock	3	4	3	3	3	16
Fish Culture	0	5	1	0	0	6
Wage labour	7	1	6	4	6	24
Total	20	20	20	20	20	100

Rich Women

Name \ Activities	Quach Thi Huong	Le Thi Ly	Luu Thi Sam	Nguyen Thi Lang	Nguyen Thi Hong	Ngo Thi Tinh	Total
Rice	5	6	2	6	2	5	26
Livestock	2	4	2	4	2	3	17
Fruit	5	3	3	4	1	2	18
Fish Culture	0	2	0	0	0	0	2
Trading	0	0	2	2	9	0	13
Wage Labour	5	2	0	0	0	3	10
Raising Children	3	3	5	4	6	4	25
Teaching	0	0	6	0	0	3	9
Total	20	20	20	20	20	20	120

Rich Men

Activities \ Name	Nguyen Hai San	Du Dai Khoi	Nguyen Van Phong	Nguyen Van Me	Ngo Van Thi	Total
Garden	5	3	4	2	3	17
Fish Culture	3	2	2	4	5	16
Rice Cultivation	4	5	5	6	5	25
Field crops	3	4	3	4	3	17
Livestock	5	4	6	4	3	22
Wage Labour	0	2	0	0	1	3
Total	20	20	20	20	20	100

These are summarised in Table 3.1. It will be noted that better-off households rank rice cultivation and fruit growing high on the list and the better-off men also rank field crop cultivation highly. They place relatively little importance on wage labour, but this comes out at the top of the list for poorer men.

Table 3.1. Activities summary:

FAIRLY POOR		FAIRLY RICH	
Women	Men	Women	Men
1. Field crops	1. Wage labour	1. Rice	1. Rice
2. Livestock	2. Fruit trees	2. Children & housework	2. Livestock
3. Rice cultivation	3. Rice cultivation	3. Fruit	3. Garden & field crops
4. Gardening	4. Livestock	4. Livestock	4. Fish culture
5. Wage labour	5. Take care children	5. Trading	5. Wage labour
6. Fish culture	6. Field crops	6. Wage labour	
	7. Fish culture	7. Teaching	

Several other points are worth noting. These include:

- For poor groups: Their main purpose is earn money because both poor household women or men, they are main labour, most of women in poor women group are widow or no husband. So that the time spend for take car children is second.
- The importance of fruit trees for poor men is related to the colonization by young families of the hilly land around the village.
- The fact that poorer women did not originally mention housework as important and, even when pressed at the validation meeting, put it lower than better-off women because of the need to spend considerable time earning a basic living as they put it ‘just to feed their children’. Likewise poor women are not engaged in trading because of lack of investment capital.
- Even the land for every person in Phu Cuong village is the same area but there are difference between poor & rich group about important of role rice cultivation because for rich group have more low land than poor group.
- For wage labour activity is the first important with poor men because most of them are young men, they just get married and separated from big families. This activity is not important with rich group.

- Between poor & rich group have difference opinions about livestock: poor group concern to pig and rich group concern to cattle, pig, chicken & duck and with high quantity. Because for poor people lack investment.
- The overall low ranking of fish culture

4. Role of Aquatic Animals

4.1 Species Ranking

Figures 4.1-4.4 present the ranking of the main aquatic animals according to their importance in livelihood by the different groups (poorer men, poorer women, better-off men; better-off women) in the village. On the basic aquatic animal species were supported by all groups. Six highest important aquatic animal species were chosen.

Figure 4.1: Poor Women

Species \ Criteria	Availability	Easy to culture	Cheap to buy	Easy to catch	Good price to sell	High nutrient	Total
Snail	3	3	3	4	0	3	16
Crab	3	4	3	4	5	5	24
Big FW Clam	3	3	3	2	0	3	14
Grass carp	1	2	2	2	3	4	14
Common carp	2	3	3	2	5	6	21
Shrimp	2	2	2	3	4	3	16
<i>Mis. fossilis</i>	2	2	2	2	2	2	12
<i>Anabas tes.</i>	3	3	3	0	0	2	11
Frog	1	1	1	1	5	1	10
Small FW clam	3	2	3	3	2	3	16
Indian carp	2	2	2	1	3	4	14
Silver carp	2	1	2	2	1	1	9
Tilapia	1	2	2	2	1	2	10
<i>O. pagalense</i>	2	1	1	1	4	4	13
Total	30	31	32	29	35	43	200

Figure 4.2: Poor Men

Species \ Criteria	Easy buy	Easy culture	Easy catch	Tasty	Few bones	High nutrient	Cheap	Total
Snakehead	2	1	1	3	3	4	0	14
Grass carp	3	3	0	4	0	3	1	14
<i>Mis. fossilis</i>	3	0	3	3	4	2	1	16
<i>Anabas tes.</i>	2	0	0	0	0	0	2	4
Tilapia	2	2	1	0	0	0	0	5
Common carp	2	2	1	3	1	3	1	13
<i>Carissius auratus</i>	2	0	1	0	1	0	0	4
Indian carp	2	3	0	2	0	0	2	9
Silver carp	3	3	3	1	0	0	2	12
Shrimp	3	0	3	2	3	2	2	15
Crab	2	0	3	2	0	2	2	11
<i>O. pagalense</i>	2	0	1	2	0	3	2	10

Snail	2	0	2	2	4	3	1	14
Big FW clam	2	0	3	3	4	0	1	13
Small frog	0	0	1	0	4	0	0	5
Frog	2	1	2	4	3	1	0	13
Small FW clam	1	0	4	3	0	3	3	14
Water snake	1	0	1	0	0	1	0	3
Type of frog	1	0	2	2	2	2	2	11
Total	37	15	32	36	29	29	22	200

Figure 4.3: Rich Women

Criteria Species	High value	Easy catch	Tasty	Easy culture	Cheap	Nutritious	Total
Snake head	2	1	3	3	0	4	13
Crab	2	1	3	0	2	3	11
<i>carassius auratus</i>	2	3	1	0	2	1	9
Clarias, hybrid catfish	2	1	1	3	2	2	11
River catfish	2	1	3	2	2	2	12
<i>Mis. anguillicaudatus</i>	2	1	3	0	1	2	9
<i>O. pagalense</i>	2	2	2	0	0	4	10
Shrimp	2	2	3	0	2	3	12
Grass carp	2	0	2	3	2	2	11
Silver carp	2	0	1	3	2	1	9
Tilapia	2	0	1	3	2	1	9
<i>P. koilomatodon</i>	2	1	2	0	2	2	9
Snail	2	2	2	0	2	2	10
Common carp	3	1	3	2	2	4	15
FW Clams	2	2	2	0	2	2	10
Frog	2	1	1	2	2	2	10
<i>Anabas tes.</i>	2	2	1	0	2	1	8
Water snake	1	1	2	0	0	2	6
<i>P. semifasciolatus</i>	2	2	2	0	2	1	9
<i>Mac. operculasis</i>	2	1	1	0	2	1	7
Total	40	25	39	21	33	42	200

Figure 4.4: Rich Men

Criteria Species	Tasty	catch easy	Grow fast	High value	Easy to culture	High yield	Cheap	Grows on waste	Few bones	Total
Clarias catfish	4	1	0	2	0	0	0	0	1	8
<i>Anabas tes.</i>	0	2	0	0	0	0	1	0	0	3
Crab	4	2	0	3	0	0	0	0	0	9
Shrimp	4	2	0	4	0	0	0	0	1	11
Common carp	4	0	3	6	1	5	0	4	0	23
Tilapia	0	0	4	2	1	5	1	4	0	17
Indian carp	4	0	2	6	1	5	0	4	0	22
FW clam	3	1	0	1	0	0	1	0	1	7
<i>Mis. angui.</i>	0	1	0	1	0	0	1	0	1	4
Hybrid catfish	3	0	4	4	1	5	0	4	1	22
<i>O. pagalense</i>	3	1	0	7	0	0	0	0	1	12
Frog	3	1	0	6	0	0	0	0	0	10

Silver carp	0	0	4	2	1	5	1	4	0	17
Snail	3	2	0	1	0	0	1	0	1	8
Grass carp	4	0	4	7	1	7	0	4	0	27
Total	39	13	21	52	6	32	6	24	7	200

It will immediately be apparent that the ranking is rather different between the different groups. The better-off men emphasised cultured species, but the equivalent women's group largely mentioned bought-in indigenous species (snake head, river catfish and clarias catfish). At the 'validation meeting' the women explained that they were not heavily involved in fish culture and that their main criterion was taste. By contrast, poorer men and especially poorer women gave importance to aquatic animals, which could be gathered and/or caught in the paddy fields or natural water bodies. Even some of the cultured species mentioned were sometimes fish that had escaped from ponds. For poor women said they used meat less than crab, shrimp & snail because they could catch them from field or buy them with low price. For fairly rich women often buy wild fish than culture fish due to tasty & price, even they are fairly rich but in rural they have not much money.

4.2 Important Aquatic Animals - Summary:

FAIRLY POOR		FAIRLY RICH	
Women	Men	Women	Men
1. Crab	1. Misgurnus an.	1. Common carp*	1. Grass carp*
2. Common carp*	2. Shrimp	2. Snakehead	2. Common carp*
3. Snail Shrimp Freshwater clam	3. Snakehead	3. Shrimp	3. Indian carp* Hybrid clarias*
4. Clam Grass carp* Indian carp*	4. Grass carp* 5. Snail 6. Fresh water clam	4. River catfish 5. Crab 6. Clarias catfish	4. Silver carp* Tilapia*

* = cultured species (but may have escaped from pond)

4.3 Important Criteria – Summary

		Poor		Rich	
		Women	Men	Women	Men
Culture	High yield				32
	Easy to culture	31	15	21	6
	Grow on waste				24
	Grow fast				21
	High value	35			52
	Easy to catch	29	32	25	13
	Availability	30		40	
	Easy to sell		37		
Consume	Cheap	32	22	33	6
	Good taste		36	39	39
	Few bone		29		7
	Nutritious	43	29	42	

5. Aquatic Animal Seasonality and Trends

From figure 5.1-5.4 shown that for poor groups and fairly rich women like wild fish due to cheap, available, catch easy & tasty, for fairly rich men like fish culture. Poor men have

wild fish due to catch them in field, lake or pond in rainy season when fish were spawning. This point leads to more reduce natural resource. For poor women have them due to both buy in market and catch them in field. For fairly rich women get wild fish due to buy also, some from catch by men. For fish culture come mainly by harvesting or buy in market. Most people in Phu Cuong village like common carp, snake head, shrimp & grass carp.

6. Aquatic Animal Trends

From figure 6.1-6.4 show that aquatic animal trends over periods of time

Three of four groups in the village like wild fish, but recently most of wild fish were decreasing due to chemicals, pesticides used in agriculture & damaged equipment as electric shock. Only fish culture are increasing due to develop seed & technique. For poor women shown most aquatic animal were the same, for my idea this point is not correct. Most people like common carp, snake head, shrimp & grass carp. For common carp is reducing in nature but increasing in culture, for shrimp & snake head are decreasing but for fairly rich women shown shrimp is stable and all groups shown that grass carp is increasing.

7. Cross checking

7.1 Transect Walk

Head of village and some young poor men taken us to around the village with the map and shown where their field, ponds, lake, people living, which fields have wild fish & where water resource run to & canal system and where they could catch wild fish. In the village have 2-3 people traded fish fingerling.

7.2 Farmer meeting

- Shown the map of their village which some people had drawn 2 days ago and required them shown some places and asked them which parts were not correct, please drawn up. After that summary their activities and which aquatic animal they like & some questions were talked out:

- For poor women had time for take children but the first of all they had to earn money, for poor men forgot this activity then they put in at N^o 5 after livestock and rice cultivation because for them were main labour in earn money. For poor women have not traded activity due to lacking of investment. The poor men plant fruit tree both garden and hill where they have land. Rice cultivation in rich groups is more important than poor group because they have more low land where rice could be planted even most people in the village have the same land area.

- Most wild fish are decreasing due to, pesticide, chemicals used in agriculture, industrial tree in hill when rain water run into lakes, ponds and rice field contained pesticide and chemicals make damage for aquatic animal. Other reasons are drought, less used PAM method and human exploited too much both small size and spawning season with damaged equipment as electric shock.

- For poor people used wild fish more than used meat due to price and available.

8. Summary/ Key Points

- Most of groups have same ideas about weather as temperature, rain, sun, wind and storm, about social events as mid month, In. women day, Hung King festival, HCM birthday, kill insect day, children new year and Tet.
- Most groups have two rice crops: Transplant in month 1 and 6 and harvesting in month 4-5 and month 8-9. But the important of rice cultivation between groups are different: for rich groups have more low land for rice cultivation and less high land for field crop than poor groups.
- The most important for poor men is wage labour because they are main labour and main income to increasing living standard. This activity is not important with rich groups.
- Poor men often involve fishing than others.
- Most poor people and fairly rich women like wild fish, fairly men like culture fish. The criteria about aquatic animals are cheap, available, easy to catch, easy to culture, buy easy, tasty, few bones & high nutrient.
- Most wild fish are decreasing and culture fish are increasing.