

# A Multispecies Understanding of Disease in Aquaculture

Yu Huang  
Graduate student  
Environmental Anthropology, UW  
Harrell, Anth 210  
11/1/11

### Top 15 aquaculture producers by quantity in 2008 and growth

	Production			Average annual rate of growth		
	1990	2000	2008	1990–2000	2000–2008	1990–2008
	<i>(Thousand tonnes)</i>			<i>(Percentage)</i>		
China	6 482	21 522	32 736	12.7	5.4	9.4
India	1 017	1 943	3 479	6.7	7.6	7.1
Viet Nam	160	499	2 462	12.0	22.1	16.4
Indonesia	500	789	1 690	4.7	10.0	7.0
Thailand	292	738	1 374	9.7	8.1	9.0
Bangladesh	193	657	1 006	13.1	5.5	9.6
Norway	151	491	844	12.6	7.0	10.0
Chile	32	392	843	28.3	10.1	19.8
Philippines	380	394	741	0.4	8.2	3.8
Japan	804	763	732	–0.5	–0.5	–0.5
Egypt	62	340	694	18.6	9.3	14.4
Myanmar	7	99	675	30.2	27.1	28.8
United States of America	315	456	500	3.8	1.2	2.6
Republic of Korea	377	293	474	–2.5	6.2	1.3
Taiwan Province of China	333	244	324	–3.1	3.6	–0.2

Source: **The State of World Fisheries and Aquaculture 2010, FAO, p21**

# My dissertation

- Title:

**Cultivating “Science-Savvy” Citizens: Empowerment and Risk in Shrimp Aquaculture Development in China**

- Objectives:

Study the making of scientific aquaculture---**science as a process**, not a thing

Examine how scientific aquaculture represents a project of both **empowerment** and **risk** for extension officials and shrimp farmers

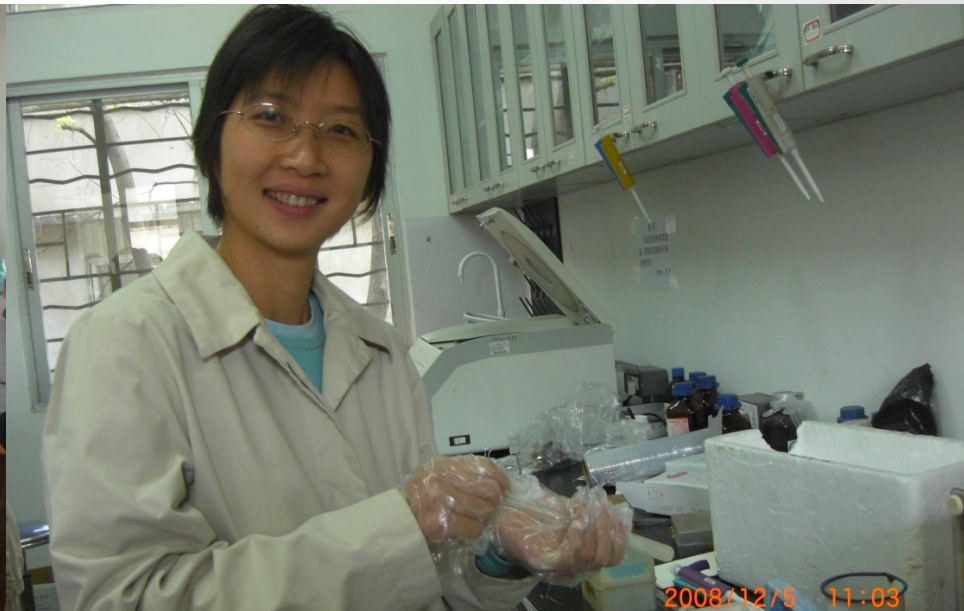
- Field sites:

- 1) **Shrimp farming villages** in Guangdong Province, China
- 2) Following **aquaculture extension programs**, such as job retraining program for fishermen, fish veterinary training workshop, and “science and technology entering the household”









# This Talk

- 1. How did scientific aquaculture shift its focus from promoting “high-yields” to farming for “food safety” ?
- 2. The different understandings of disease and life for farmers and scientists.

# High-yields

- 1993 White Spot Syndrome Virus (WSSV) Outbreak  
Shrimp production in China dropped from 240,000 tons to only 40,000 tons (Song et al. 2006).

- Ecological Interpretation of the cause of disease:  
The outcome of intensification  
Global transportation of broodstocks

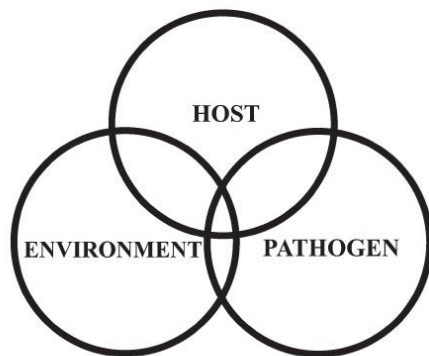
- Developmentalist interpretation:  
Culprit: virus

•

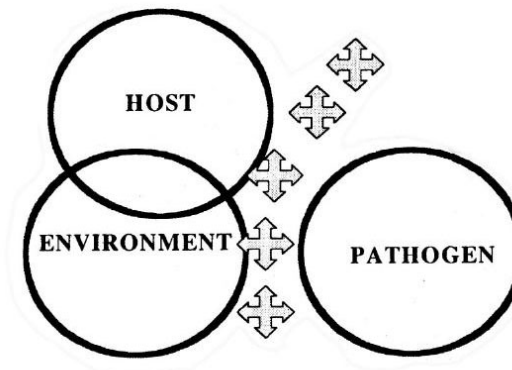
•

- The question for science extension officials:  
How could farmers maintain “high-yields” despite the persistence of virus?
- Farmers lacked the knowledge of a pathological view of nature.

pathogen + host + environment = disease



pathogen exclusion = no disease



(Source Lightner and Pantoja 2008: 127)

**Introduction of the culture of  
Pacific White Shrimp (*Litopenaeus vannamei* )  
Specific Pathogen Free (SPF) broodstocks**

<b>Species</b>	<b>Culture</b>	<b>Yields</b>	<b>Stocking Intensity</b>
Black tiger shrimp (1990-1999)	Polyculture	1,500-3,000 kgs/ha	Semi-intensive 450,000- 750,000/ha
Pacific white shrimp (2000-present)	Monoculture	7,500- 15,000 kgs/ha	Intensive 2-3 mil/ha

# Semi-intensive farming of Black tiger shrimp in the 1990s

- Polyculture with fish, geese, ducks
- low-lying earthen pond, 5-8 hectares
- Frequent exchange with tides
- Little control of water quality



# Disease Control for Pacific White Shrimp

- Wild broodstocks → Specific Pathogen Free (SPF) broodstocks
- polyculture → monoculture
- Low-lying earthen pond → high-lying mulch-covered pond
- Fresh feed (clams) → compound feed
- Knowledge of water quality regulation, such as water sterilization, fertilization, microalgae growth enhancement, and reduction of Ammonia ( $\text{NH}_3$ ) and Nitrites ( $\text{NO}_2^-$ ).



# Intensive Farming of Pacific White Shrimp from 2000 to present



# An alternative understanding of disease and food safety

- SPF broodstocks are cultivated in a biosecure environment, but not necessarily susceptible to grow in a low biosecurity local environment.  
F2 not susceptible to rains
- Culprit not the pathogen, but the environment



# Exchange water

- Scientists consider the exchange between farm water and tide water a nightmare.
- What's the difference between “good water” and “bad water”?

## **Scientists**

Bad water: containing pathogen and toxic wastes  
(Ammonia and Nitrites)

## **Farmers**

The border between good water and bad water is not clear-cut.

Sterilization might also kill good organic matters.

Toxic wastes can be fertilizers.

Monoculture ≠ monospecies

Pond cannot be separated with nature



# Case : Dealing with Tilapia



# My shrimp farming

- Experiment as the foundation of scientific authority
  - 1) Experiment reveals “matters of fact”
  - 2) Numbers yield better knowledge.
  
- My refusal of adopting a stereotypical experiment
  - 1) I was suspected to do an experiment for marketing shrimp drugs.
  - 2) Nourishing shrimp instead of objectifying shrimp
  - 3) Risk is a part of every day life.





# Food Safety Concerns

- EU Antibiotic Residue Detection

In 2002 EU banned animal food products from China on detection of antibiotics chloramphenicol >MRPL 0.3 ppb

- Jan 2002, EU banned animal-origin food imports from China including rabbit meat, poultry meat, honey, mollusks, crustaceans, frozen shrimps and prawns, and pet food.



# U.S. Media's Exposure of China's Food Safety "Scandals"



Home News Travel Money Sports Life

Money Markets Economy Companies/Execs Personal Finance Taxes Media

GET A QUOTE: Enter symbol(s) or Keywords GO DJIA 12,090.03 -79.85 NASDAQ 2,745

## Chinese fish crisis shows seafood safety challenges

Updated 7/1/2007 11:57 PM | Comments 134 | Recommend E-mail | Save | Print | Reprints & Permissions 40



Enlarge By Calum MacLeod, USA TODAY

Yongyan Aquatic Food Group has invested in equipment from U.S. companies that tests for drug residues.

By Julie Schmit, Calum MacLeod, Elizabeth Weise and Barbara Hansen, USA TODAY

CHANGLE, China — At the Meihua Aquatic Processing Factory here, hundreds of workers in white coats and masks chop up squid headed for the U.S. market.

The tiled walls and stainless-steel equipment are those of a modern factory. What's this? But Meihua also represents the tarnished food-safety reputation that China is trying to shed as it risks facing U.S. consumers who increasingly are eating fish from China, the world's top seafood producer.

**U.S. ACTS: Imports of Chinese-raised fish limited**  
**CHINA REACTS: Officials say blocking imports is un**

In the past 13 months, at least two dozen shipments of catfish, eel and tilapia from Meihua were rejected for import into the USA by the Food and Drug Administration, FDA records show. The products were rejected because of actual or suspected contamination that included an actual fungal that battles fish diseases but isn't allowed by the FDA because it has been shown to increase cancer in lab animals.

Recently, there have been massive recalls linked to

Mixx it  
Other ways to  
Digg  
del.icio.us  
News.vi  
Reddit  
Facebo

SPECIAL SERIES SIGN IN TO E-MAIL OR SAVE THIS

## Choking on Growth PART VIII

A series of articles and multimedia examining China's pollution crisis.

TOXIC WATERS AUDIO SLIDE SHOW: FISHING FOR PROSPERITY VIDEO: THE WORLD'S FISH BASKET



In This Series Select an installment

Expert Round

The New York Times assembled a panel of experts to answer questions from

Ming Hung Wong  
Aquaculture in China  
On Sunday, Dec. 16, Ming Hung Wong, a specialist in the risks associated with contaminated seafood, answered questions about farming in China. Ask a Question >

In Translation

Summaries of articles in this series are available

Download a written translation of the eighth article.

Listen to a reading translation. (mp3)

Related

Times Topics: China

# The Spy Question

- Director from Guangdong Leizhou Fisheries Science and Technology Extension Center suspected me as a spy working for the U.S.
- Vertical integration:  
U.S. importers requested that Chinese “mom-and-pop” farms be incorporated or monitored by food conglomerates.
- Three uniform procedures:  
uniform shrimp juveniles,  
feed, and management



# Chinese' Response to the Food Safety Discourse

## “Save tilapia forum”

July 2009, after the outbreak of global financial crisis, farmed tilapia from China to the U.S. suffered a price slash of 30%.

- Farmers: 3-D Farming  
Land: pigs and poultry  
Water: fish  
Benefits: Reduce feed use  
Minimize environmental pollution

FAO recommended this “ecological model” a decade ago.

- Scientists and officials immediately bombarded the farmers. Why?



**罗非鱼危机与产业整合研讨会**

主 办：南方报业传媒集团 **南方农村报** 特别合作  
协办单位：广州市海维饲料有限公司 广东罗非鱼良种场(国家级) 海南省富水产品有限公司 广东雷兴集团湛江恒兴水产科技有限公司

近十年来，我国罗非鱼产量以平均每年13.4%左右的速度递增，2008年虽遭遇罕见冻灾，产量仍达到120万吨，其中出口22.6万吨，分别占全球总量的近50%与70%，稳居世界首位。2008年初水产品出口额首次突破百亿美元，继续位居大宗农产品出口首位。随着国际金融危机持续蔓延，对我国经济的负面影响日益加深，水产业作为外向型农业面临重大挑战。从去年底到现在，水产品主要消费国经济普遍低迷，出口企业的外贸订单大幅减少，直接导致收购价持续下跌，产业链各环节利润骤减，亏损面进一步扩大。

作为中国罗非鱼生产第一大省，广东有条件探索水产品产销各环节共融的机制，保障养殖户长期稳定增收。期待在WTO框架下，通过罗非鱼产业探讨外向型农业政策的现实取向。举办此次研讨会，旨在探讨如何有效规避出口风险，开拓市场，整合产业链，向政府建言献策，共同促进中国罗非鱼产业的健康发展。

**主要议题：**

- 当前形势分析与产业组织建设
- 罗非鱼产业与外向型农业政策
- 食品安全与养殖质量效益提升

会议时间：2009年7月19日星期日（以此为准）  
会议地点：广州番禺丽江明珠酒店广州会议厅（番禺区大石迎宾路111号）  
联系电话：020-87373998-3402 13380023345 曾先生 13925091347 孙先生 13146795899 虞先生  
电子邮箱：langhu77@163.com  
支持媒体：南方日报 南方周末 南方都市报 21世纪经济报道 南方网 腾讯网 凤凰网 天涯社区 和讯网 搜狐网 网易 21CN 农博网等



# 3-D Farming Debate

- Dr. Li, scientist on processing technology  
Tilapia raised in 3-D farms won't meet international food safety requirement.  
Bacteria excess and antibiotic residues from land animals  
Recommendation: fish fillet for microwave cooking and for MacDonald fish burger.
- Mr. Wang, food safety management official  
Establish a model of traceability system and certification to increase farmers' competitiveness

# Conclusion

- Critique of the pathological view of nature: environment and organism not separated
- Human-animal relations: multispecies ethnography

