

# INSURANCE FOR FISHERY AND AQUACULTURE ADAPTATION TO CLIMATE CHANGE EXPERIENCES FROM CHINA AND VIETNAM

**Tipparat Pongthanapanich**

Fisheries and Aquaculture Department, FAO Rome, Italy

Case Principal Authors

**Prof Kim Anh Thi Nguyen**

Nha Trang University, Viet Nam

**Prof Yuan Xinhua**

Wuxi College of Fisheries, Freshwater Fisheries Research Center, China



Food and Agriculture Organization  
of the United Nations



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**Jhunter, pearl farm in Savu Savu, Fiji. Hatcheries destroyed by Cyclone Winston, Feb 2016.**

**A million dollar damage!**

Photo credit: Masanami Izumi, 28 July 2016.



## Most vulnerable countries to climate change

- **Bangladesh, Cambodia, China, India, The Philippines, Viet Nam** were the most vulnerable countries worldwide to CC.
- **Most aquaculture countries in Asia are very vulnerable, with Viet Nam, Bangladesh, China, Thailand among the most vulnerable considering all aquaculture environments - freshwater, brackish and marine.**

Handyside, N.T., Ross, L.G., Badjeck, M.C. and Allison, E.H. 2006. The effects of climate change on world aquaculture, a global perspective. Final Technical Report. Stirling, U.K. Stirling Institute of Aquaculture, U.K. 151p.

Handyside, N.T., Ross, L.G. and Teller, T. 2015. Vulnerability of aquaculture related livelihoods to changing climate at the global scale. Fish and Fisheries.

## China's Fishery Sector, 2014

- **65 million tons total fishery production**  
**1/3 of total world production**  
**70% from aquaculture => 2/3 of world's**
- **1086 billion CNY**  
**4% of GDP**
- **4 million tons export**  
**6 % of total production**
- **20 million jobs** in fishery and aquaculture sectors

China Fishery Yearbook (2015)

## Fishery loss by disaster, China

6-year total = CNY 132 billion (USD 23 billion)

Year	2009	2010	2011	2012	2013	2014
Disaster area of aquaculture (10 <sup>3</sup> ha)	863	1335	1678	1087	1079	832
Fishery production loss (10 <sup>3</sup> MT)	1161	1700	2274	1385	1622	1318
Sunk boats (no.)	486	598	646	874	847	1255
Life loss (person*)	240	242	142	164	165	88
<b>Direct economic loss (CNY billion)</b>	<b>15.2</b>	<b>20.5</b>	<b>25.8</b>	<b>23.7</b>	<b>25.7</b>	<b>21.1</b>
<b>(USD billion)</b>	2.5	3.4	4.3	4.0	4.3	3.5

\* Dead, missing and seriously injured

China Fishery Yearbook 2015

## **Vulnerability of Vietnam's agriculture**

- **In past 10 years natural disasters have cost 1.5% of GDP.**
- **Temperature rise of 0.50C over the past 30 years in Can Tho.**
- **Frequency of typhoons & depressions increases: from 7 to 8 per year**
- **The 2015-16 ENSO resulted in the lowest groundwater level and most extensive salinity intrusion in 90 years in the Mekong River Delta.**

"The drought and salinity intrusion in the Mekong River Delta of Vietnam" Assessment Report, CGIAR Research Centers in Southeast Asia 25-28 April 2016. Ben Tre, Tra Vinh, Kien Giang, Vietnam

## **National Pilot Project on Aquaculture Insurance in Viet Nam 2011-2013**

## Pilot project 2011-2013, Viet Nam Implemented in 3 Sectors

- Rice => productivity index insurance
- Buffalo, dairy cow, pig, poultry
- **Black tiger shrimp, whiteleg shrimp, pangasius**
  - **Named-peril crop insurance**: damage-based indemnity insurance
  - **Against natural hazards** (typhoon, drought, flood, saltwater intrusion, tsunami) and **some diseases**
  - Considered indirect effect of climate change on the spread and occurrence of disease. For example: *Vibrio* species grow preferentially in warm waters ( $> 15^{\circ} \text{C}$ ) and at low salinity ( $< 25 \text{ ppm}$ )



## Organizations and roles

### Central Steering Committees

- Ministry of Finance
- Ministry of Agricultural and Rural Development (MARD)

### Local Steering Committees and Technical Support Units

- People's Committee
- Department of Agriculture and Rural Development
- Sub-Department of Aquaculture

### Private

- Bao Viet and Bao Minh insurance companies
- Vietnam National Reinsurance Corporation (VINARE)

## Premium subsidies

### Premium rates (of sum insured)

- 13.73% for shrimp
- 6.83% for pangasius

### Premium subsidy rates based on poverty level

- 100% for those under the poverty line "poor"
- 80%, revised to 90%, for those just above the line "near -poor"
- 60% for those above the poverty line "non-poor"
- 20% for organizations and cooperatives

## Results

### Insurance pilot programme 2011–2013, Viet Nam

- Poor households participating => 77% of total insured
- Rice and livestock insurance => profitable
- **Aquaculture insurance faced difficulties:**
  - **Loss compensation was the highest** among the three sectors
  - **306 % loss ratio** (indemnity divided by premium earned)
  - **Disease outbreaks** (EMS and whitespot) affected 20-45 days after stocking with production damage rates of 80-100%

## Results

### Insurance pilot programme 2011–2013, Viet Nam

- Poor households participating => 77% of total insured
- Rice and livestock insurance => profitable
- **Aquaculture insurance faced difficulties:**
  - **Loss compensation was the highest** among the three sectors
  - **Major diseases**
    - => Shrimp mortality: AHPNS or EMS affected 20-45 days after stocking, 80-100% damage rates
    - => Pangasius: Liver and kidney bacterial diseases



## Results

### Insurance pilot programme 2011–2013, Viet Nam

Sector	Commodity	No. of households	Area (ha)	Sum insured (billion VND)	Premium (billion VND)	Claim (billion VND)	Loss ratio (%)
Crop	Rice	236 397 (78%)	65 297 (92%)	2 151 (28%)	92 (24%)	19 (3%)	21
Livestock	Buffalo, dairy cow, pig and poultry	60 133 (20%)		2 713 (35%)	84 (21%)	13 (2%)	16
Aquaculture	Black tiger shrimp, white-legged shrimp and pangasius	7 487 (2%)	5 803 (8%)	2 884 (37%)	218* (55%)	670* (95%)	306*
<b>Total</b>		<b>304 017 (100%)</b>	<b>71 100 (100%)</b>	<b>7 748 (100%)</b>	<b>394 (100%)</b>	<b>702 (100%)</b>	

\* The biggest from Soc Trang and Bac Lieu

Loss ratio = Indemnity divided by premium

US\$1.00 = VND20 000

Source: Ministry of Finance, Viet Nam (2014)

## Lessons from Viet Nam

### Insurance pilot programme 2011–2013

- **Aquaculture insurance is new and specialized type**
  - Farmers do not fully understand the benefits and have inadequate knowledge of how the insurance coverage worked
  - Farmers were unsure as to whether they met the operational standards required - no specific guidelines to follow.
  - Insurance staff indicated limited understanding of the mechanics of aquaculture insurance and of aquaculture.

## Lessons

### Insurance pilot programme 2011–2013, Viet Nam

- **Difficult loss adjustment and delayed claim settlement**
  - Difficult for the provincial veterinary offices to determine cause of mortality, diagnosing EMS on shrimp without any established testing procedure.
  - Lacking reliable data and information, technicians had difficulty verifying claims

## Lessons

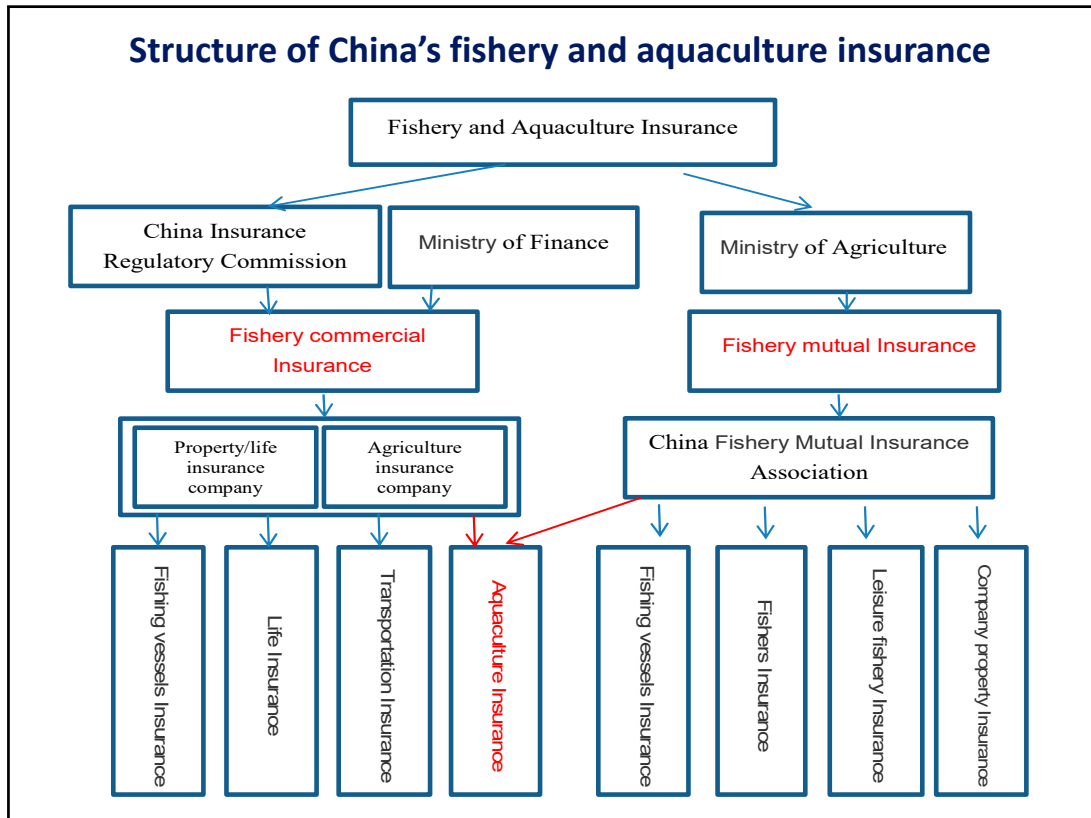
### Insurance pilot programme 2011–2013, Viet Nam

- **High transaction cost**
  - Wide application over farming areas, small and mostly fragmented plots
  - Differences in farming practices in each locality and weakness in the monitoring of shrimp farming practices.
- **Reinsurers had great difficulty underwriting the risk when it was revealed that the aquaculture insurance pilot was incurring significant losses.**

## Recommendations

- **Training for insurance field staff**
- **Improve farmers' understanding of insurance as a risk management tool**
- **Standardize good farm practices and incentivize compliance with the practice.**
- **Develop systematic data collection accessible to insurance operatives**
- **Group insurance as an alternative**
  - Informal groups -- farmer clusters
  - Formal groups -- cooperatives/mutual
- **Financial support from government needed especially for the establishment of an insurance system**
- **International assistance, experts and international reinsurers needed to scale up the market**

## Fishery and Aquaculture Insurance in China



## Short profile

- **1982:** Fishery insurance was first operated by the **People's Insurance Company of China (PICC)** => life insurance, injury and damage of fishing vessels caused by typhoon, storms and other natural disasters
- **1995:** PICC provided **aquaculture insurance** covering 1.87% of the total fish farming area in China
- However, the loss ratios were too high and created serious deficit in the insurance company. Aquaculture insurance was stopped in most pilot areas.
- **Solution...**new insurance model

## Mutual insurance

China Fishing Vessel Owner's Mutual Insurance Association HQ was established in Beijing, July 1994

- Renamed **China Fishery Mutual Insurance Association (CFMI)** in 2007
- Operates through its provincial/local offices.
- **Coverage for capture fishery:** cost of assistance in saving stricken vessel, fees for examining vessel's hull if it ran aground or hit a rock, **salary and living expenses while vessel is being repaired**, economic loss caused to other **parts of the boat**, goods on board, **harbor and landing port**, medical cost for treatment of **injury from accident**, **loss of life** insurance and **assistance to funeral expenses**, **life-saving expenses** during collision, **legal expenses** during litigation
- **2014: Insured > 1 million fishers, 70000 fishing vessels**
  - Premium income = CNY 1.6 billion
  - Total sum insured = CNY 280 billion
  - Mutual shared 95% of total fishery insurance business in China

## CFMI and its major associations

Name	Location	Established
<b>China Fishery Mutual Insurance Association HQ</b>	<b>Beijing</b>	<b>1994 and rename in 2007</b>
Guangdong Fishery Mutual Insurance Association	Guangzhou	1993
Zhejiang Fishery Mutual Insurance Association	Hangzhou	2004
Shandong Fishery Mutual Insurance Association	Jinan	2006
Jiangsu Fishery Mutual Insurance Association	Nantong	2008
Hebei Fishery Mutual Insurance Association	Qinhuangdao	2009
Liaoning Fishery Mutual Insurance Association	Dalian	2011
Fujian Fishery Mutual Insurance Association	Fuzhou	2011
Hainan Fishery Mutual Insurance Association	Haikou	2013 (stopped in 2015)
Ningbo Fishery Mutual Insurance Association	Ningbo, Zhejiang	1996

## Mutual insurance

### Preferred scheme by fishers and fish farmers

- Public-private partnership (PPP) model, non-profit, self-support, low operating cost, low premium
- Buyers (fishers and farmers) as stock holders own the mutual agency -- look after their own interest, carry out inspection and damage assessment
  - Overcome information asymmetry and reduces moral hazard
- Relieves government responsibility for disaster compensation

## Mutual as social responsibility programme

- **Insurance** is complemented by the social responsibility programme of the mutual.
- The programme is designed to **raise awareness** of risks to assets, life, production and their management.
- Services under the programme include weather forecasts, human disease epidemic alerting system, safety measures and equipment.

## Mutual as social responsibility programme

### Example: Zhejiang province

- ZFMI provided CNY 6 million worth of **life saving facilities** that included 6 610 sets of life-jacket, 554 sets of life buoy, 550 fire extinguishers, and 700 rescue boats. It also helped set up medical service centres near landing areas.
- ZFMI **grants small business loans to members** in partnership with the region's commercial banks. It also **provides guarantee to the mortgage of fishing vessel** to facilitate loan approval.

### Commercial insurance companies engaged in aquaculture insurance, China

Company	Region	Commodity	Type of insurance products*	Year
People's Insurance Company of China (PICC)	Jiangsu,	Freshwater finfish	Traditional	2013
People's Insurance Company of China (PICC)	Dalian, Liaoning	Marine ranching	Wind-index	2013
People's Insurance Company of China (PICC)	Guangdong	White shrimp	Traditional	2013
Anxin Agricultural Insurance Co. Ltd	Shanghai	Finfish and white shrimp	Traditional	2013
PICC Anhui	Anhui	Finfish (carps)	Traditional	2013
People's Insurance Company of China (PICC)	Rongcheng, Weihai, of Shandong	Seaweeds	Wind-index	2014
People's Insurance Company of China (PICC)	Hubei	Freshwater crayfish	Traditional	2014
Anhua Agricultural Insurance Company Ltd	Jilin	Pond finfish farming	Traditional	2014
Sunlight Mutual Insurance	Guangdong	Shrimp	Traditional	2014
Guoyuan Agriculture Insurance	Anhui	Finfish	Traditional	2014
Groupama Avic Insurance	Sichuan	Carps and sturgeon	Traditional	2014
Pacific Property Insurance	Hainan	Sea cage culture	Wind-index	2014
China United Property Insurance Company Limited	Jiangsu	White shrimp	Traditional	2015
People's Insurance Company of China (PICC)	Dalian, Liaoning	Puffer fish indoor system	Traditional	2015
Pacific Property Insurance	Ningbo	White shrimp	Typhoon-index	2015
Pacific Property Insurance	Suzhou	Freshwater mitten crabs	Temperature-index	2015
PICC Guangxi	Qinzhou	Oyster	Wind-index	2015
Pacific Property Insurance	Dalian	Sea cucumber	Temperature-index	2015

\* Traditional scheme, named **peril crop insurance** (damage-based indemnity insurance, not yield-based/MPCI scheme), is crop insurance in which the insurance claim is calculated by measuring the percentage damage in the field soon after the damage occurs. The damage measured in the field, less a deductible expressed as a percentage, is applied to the pre-agreed sum insured. The sum insured may be based on production costs or on the expected revenue.

## Traditional crop insurance

### Insurable perils and coverages operated by CFMI

Type	Coverage
Full damage insurance for fishing vessel	Damages caused by accidents or disasters, and the boat sunk or missing, or could not be repaired for function any more.
Comprehensive insurance for fishing vessel	Damaged fishing vessel, contracted fishing gears, and equipment on board
Life insurance for fishers	Insurance for death or injury of fisher and medical expenses
Liability of fishing vessel owner and additional medical insurance	Group life insurance for workers on-board, including loss of life, medical insurance for injury, disability compensation for accidents/disasters-related injury
Aquaculture insurance	Insurance for production loss caused by typhoon, flood, low temperature/ frost, red tide, water pollution and diseases.

## Weather index insurance Wind index

- Based on the relationship of wind and degree of damage.
- If the wind scale exceeds the contracted index record, compensation is paid.
- Wind speed records certified by local meteorological station.
- **Seaweed, sea cucumber and scallop ranching, oyster**



## Weather index insurance Wind index – cases

### 2014. Four seaweed farming companies in Shandong insured 16 000 mu (1066 ha)

- Sum insured value = CNY 320 million
- Premium = CNY 16 million
- 4 claims for damages filed
- Indemnity paid = CNY 8 million
- Loss ratio = 50 %

### 2013-2014. Sea cucumber and scallop ranching for the Dalian Zhangzidao Group, 2000 km<sup>2</sup> by PICC

- Sum insured value = CNY 400 million
- Premium = CNY 20 million
- In 2014, 20 windstorms occurred with wind scales >19.5m/s  
Indemnity paid = CNY 28.4 million

1 m/s = 3.6 km/hour

PICC = People's Insurance Company of China

## Weather index insurance Wind index – cases

### 2015. Oyster (*Crassostrea ariakensis*) Qinzhou, Guangxi

- PICC and Guangxi Bureau of Husbandry and Fishery jointly operated the insurance programme
- Insurance period 1 year
- Premium rate was 7% of sum insured
  - Farmers paid 30% => CNY 189/mu
  - Government subsidized 70% => CNY 441/mu
- Insured value = CNY 9 000/mu
- Compensation at wind speed
  - Reach 26m/s => indemnity paid 5%
  - Faster than 60m/s => paid 100 % but limit is CNY 9000/mu

1 m/s = 3.6 km/hour

## Weather index insurance Temperature index - case

### Mitten crab (*Eriocheir sinensis*) farms, Lake Tai Hu in Suzhou, Jiangsu by PICC

- Air temperature is  $> 37.5^{\circ}\text{C}$  for 3 or more consecutive days, farmers are indemnified.
- Premium = CNY 110/mu of crab culture pen
- Indemnity = CNY 50/mu for each high temperature day, for a maximum of CNY 1000/mu
- 2013, there were 11 days of high temperature records of  $38^{\circ}\text{C}$ .
  - Farmers paid indemnity of CNY 550/mu  $\Rightarrow$  less than 7% of the value of production loss

## Cooperative + Commercial Shrimp insurance in Shanghai: a good story

### Anxin Agricultural Insurance Co. Ltd. & Shrimp Farmers Coop

- Sum insured value CNY 2500/mu
- Premium 18% or CNY 450/mu
- **Company gives bonus to coop if loss ratio was less than 60%**
- Coop organized insurance programme:
  - help members with advice and materials
  - provide technical support to the Company on loss adjustment
  - promote good farming practices and the closed system: prevent water contamination and entry of pathogens and reduce the use of drugs and chemicals.
  - Contracted a reputable company for quality seed

## Cooperative + Commercial Shrimp insurance in Shanghai: a good story

### Anxin Agricultural Insurance Co. Ltd. & Shrimp Farmers Coop:

#### Result, 2015

- The programme contributed to improved production and profitability.
  - 2015: Net return of the coop was CNY 8022/mu (CNY 2800 more than that of 2014).
- Loss ratio = 53%
- **Anxin gave 7% of the premium income as bonus to the Coop**
- The money was distributed to members to buy chemicals and probiotics for water quality improvement

## Lessons from China

### 1. Institutional and policy support

- **Central government commitment, clear policy guides and regulations**
  - As a public investment it **ultimately reduces the burden on government finances for disaster relief**, recovery and rehabilitation, which are invariably very costly.
- Subsidy -- Government commitment at all levels (central, provincial, municipal) is concretely expressed in the allocation of funding for subsidy of premiums.
  - **Good incentive for fishers and farmers** to join the programmes. In Sichuan, Jiangsu and Shanghai, the high percentage (60-80%) of premium subsidy for aquaculture proved to be a strong incentive for participation.
- **Sustains the viability of commercial insurance firms** and mutual insurance associations.

## Lessons from China

### 2. Diversified insurance schemes

- **The index insurance showed promising results.**
- It was suggested to develop more schemes tailored to different species and culture systems.
- In fishery insurance, the **fishers should select the insurance programme according to their understanding of and ability in risk management.** For instance:
  - In Jiangsu, the life and medical insurance was preferred by the inland fishers
  - In Zhejiang, the marine fishers mainly purchased insurance on the owner's liability, vessel damage, life and medical.
- **Develop new insurance products** that are acceptable and beneficial to insurers and insured.

## Lessons from China

### 3. Awareness of insurance as a risk management strategy

- Fishers and farmers used to consider insurance as necessary only for loss of life, injury and catastrophe, not as a risk management measure.
- CFMI has realized the importance of insurance awareness
  - Among other efforts, it publishes a magazine on China Fishery Mutual Insurance.
  - Success stories are released to the mass and social media.
- Fishery Extension Stations now promoting insurance to fishers and fish farmers.
  - Conduct visits to successful insurance cases

## Lessons from China

### 4. Innovative insurance models

- **PPP** -- The commercial insurance companies cooperate with the local government, fishery administrative and aquaculture cooperatives in the provision of aquaculture insurance.
- The models **“Mutual + Commercial”** and **“Cooperative + Commercial”** have proved successful in finfish aquaculture insurance in Anhui province and shrimp aquaculture insurance in Shanghai.
- The commercial insurance companies benefit from using the expertise of fishery and aquaculture cooperatives in risk identification and assessment.
- **CFMI** -- strong and experienced authority for mutual insurance with regional and provincial outreach.

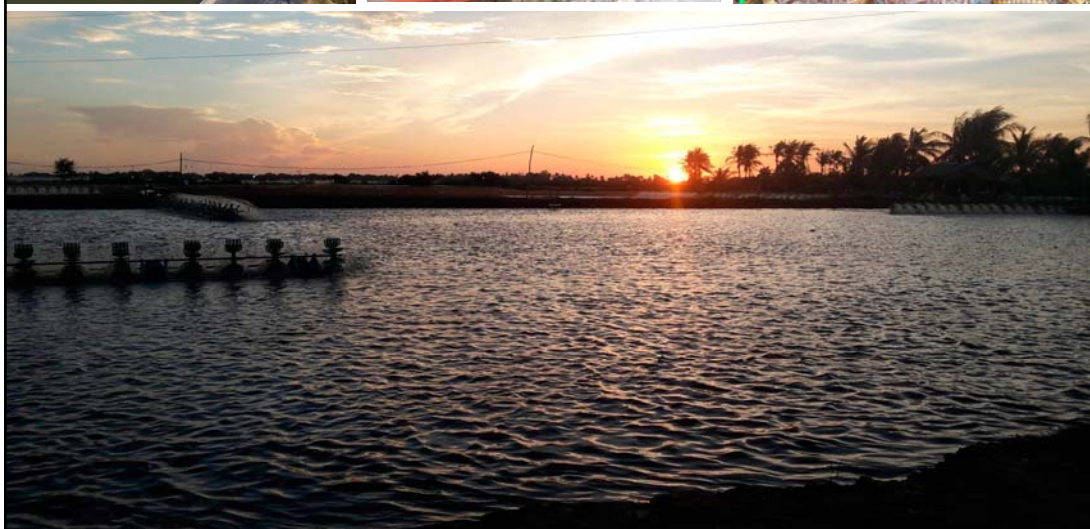
## Lessons from China

### 5. Wider pool of insured

- It is always important to the business of insurance, both for the insurer and the insured, to have a wider pool of insured.
- More participants resulted in a high premium income, usually a lower loss ratio, and insurer's viability so it can sustain its service.

## SUMMARY

- **Fishery and aquaculture are risky businesses**
- **Insurance is one of the financial tools that help spread the cost from weather and biological risks from farmers to insurers and insurers to reinsurers.**
- **However, access to insurance cover is still limited, especially for small and medium enterprises**
- **Well-designed insurance products that serve needs of the farmers and fishers are needed**
- **Innovative design of insurance programmes can promote good practices – e.g. shrimp insurance in Shanghai**
- **PPP model such as “mutual” is likely to be feasible in providing insurance services especially to groups of small farmers.**
- **Co-financing is needed especially during the pilot stage.**



Location: Thanh Phu District, Ben Tre Province, Vietnam  
Photo credit: Nguyen Van Ngoan