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SEAMEO SEARCA

# Forum on

# Promoting Sustainable Agriculture in the Mekong Sub-Region towards Food Security

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# RESEARCH TITLE

# Assessment the Impact of Climate Change on Aquaculture/Fisheries Household Livelihood in the Lower Mekong Delta, Vietnam

Nguyen Thi Hong Diep
College of the Environment and Natural Resources
Cantho University

# Objectives

1) To map the extent and distribution of aquaculture/ fisheries cover and changes in the Lower Mekong Delta, Vietnam using remote sensing and GIS technique.
2) To measure and assess socio-economic effectiveness of aquaculture/fisheries on households and food security to impacts by climate change.
3) To recommend food security strategies based on aquaculture/fisheries to the policy makers in order to increase household livelihood in the Lower Mekong Delta.

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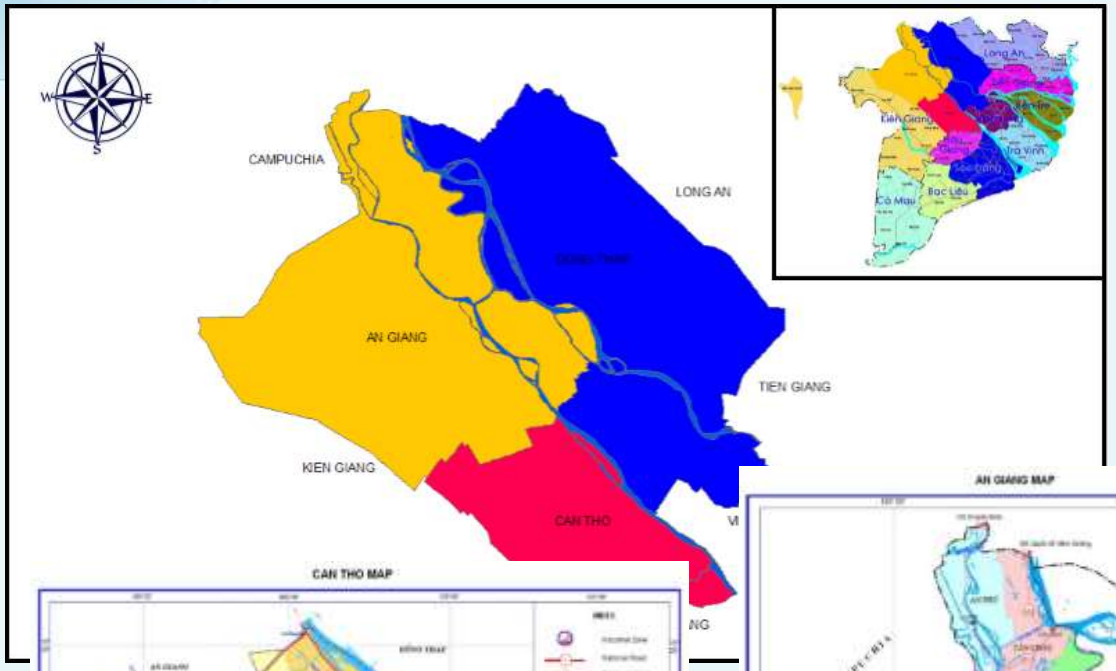
# Rationale

- To detect aquaculture distribution (ponds and cages culture) and aquaculture changing aspects (agriculture to aquaculture) in the Lower Mekong Delta
- To analyze household livelihood on main aquaculture types in the Lower Mekong Delta
- To assess climate change impact to household livelihood for solving the social problems of fisheries in the region

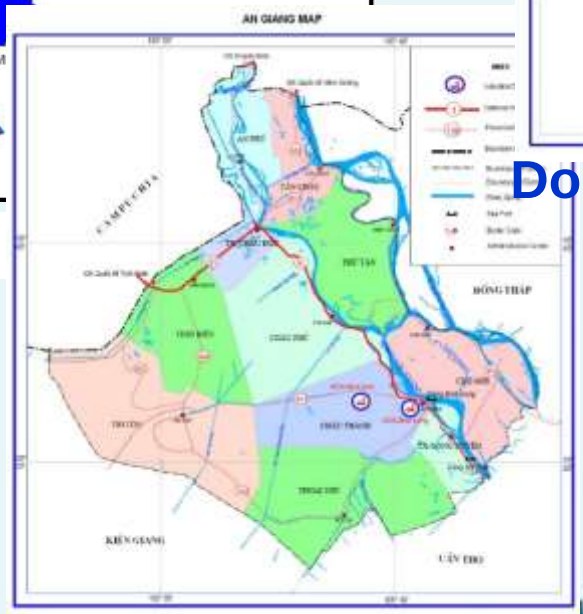
# Study area





Dong Thap province


Can tho province




An Giang province

# Study area

Figure 13. Fish cage culture

Red tilapia fish

Silver pomfret fish

# Study area

Figure 14. Fish pond culture

Catfish culture

Snakehead fish

Giant freshwater prawn

# Study area

Rice Crop and Fish Pond culture

# Methodology

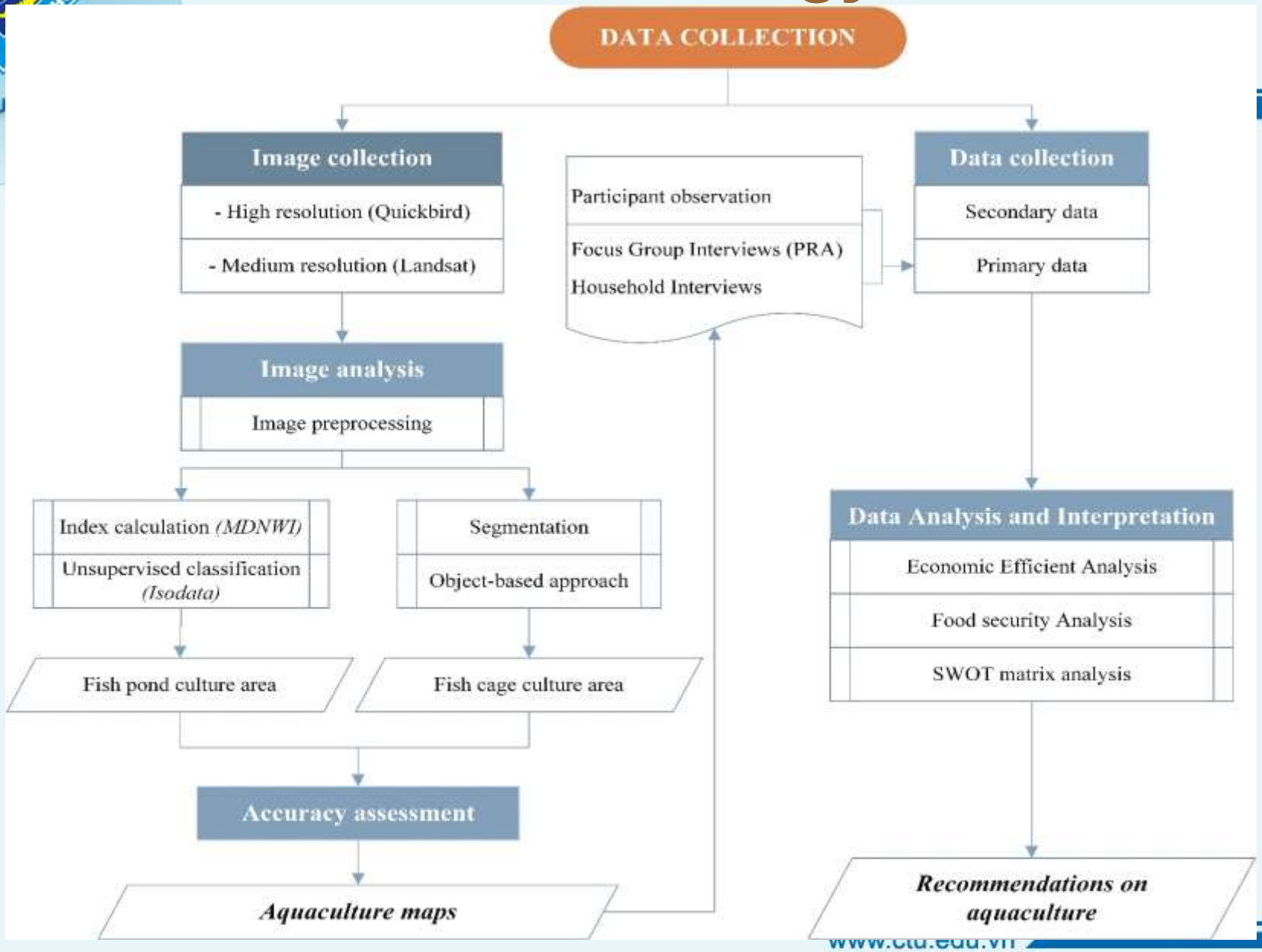



Figure 7. Flowchart of study area

# Results

## 1. Mapping aquaculture/fisheries distribution

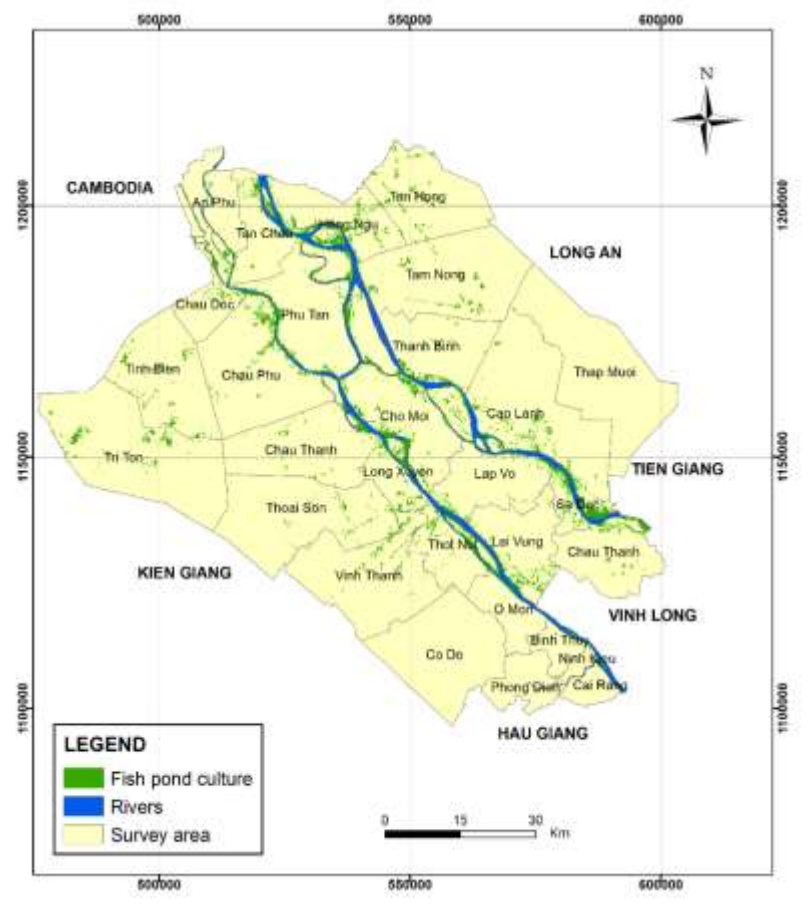



Figure 8. Aquaculture distribution map

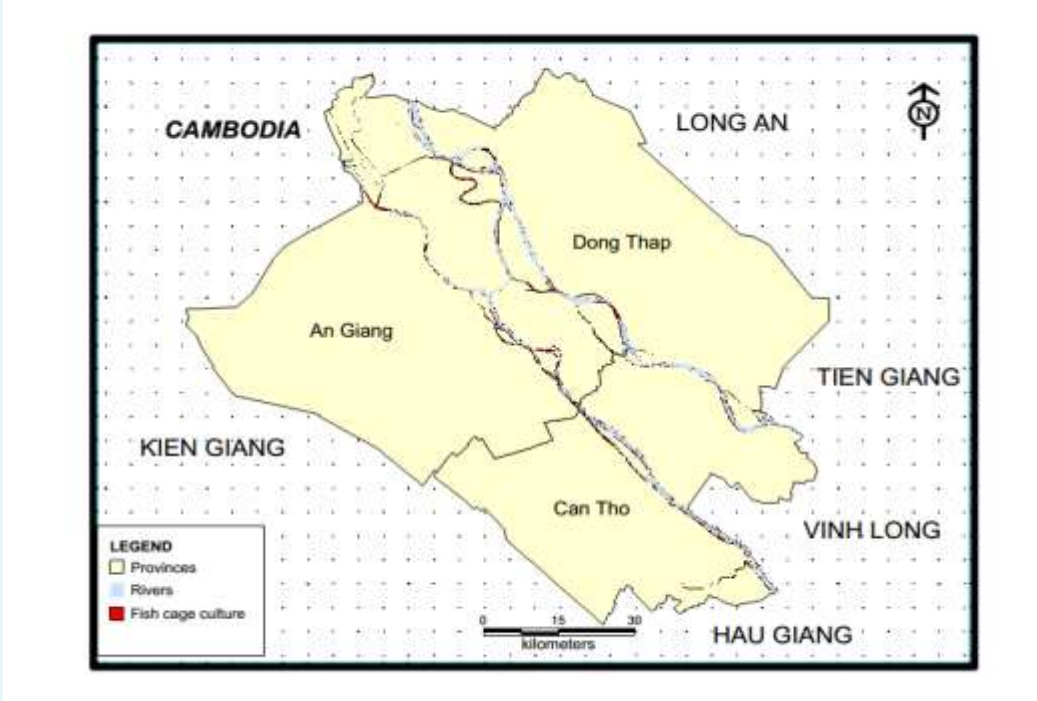



Figure 9. Fish cage culture distribution map

# Results

## Aquaculture/fisheries changes

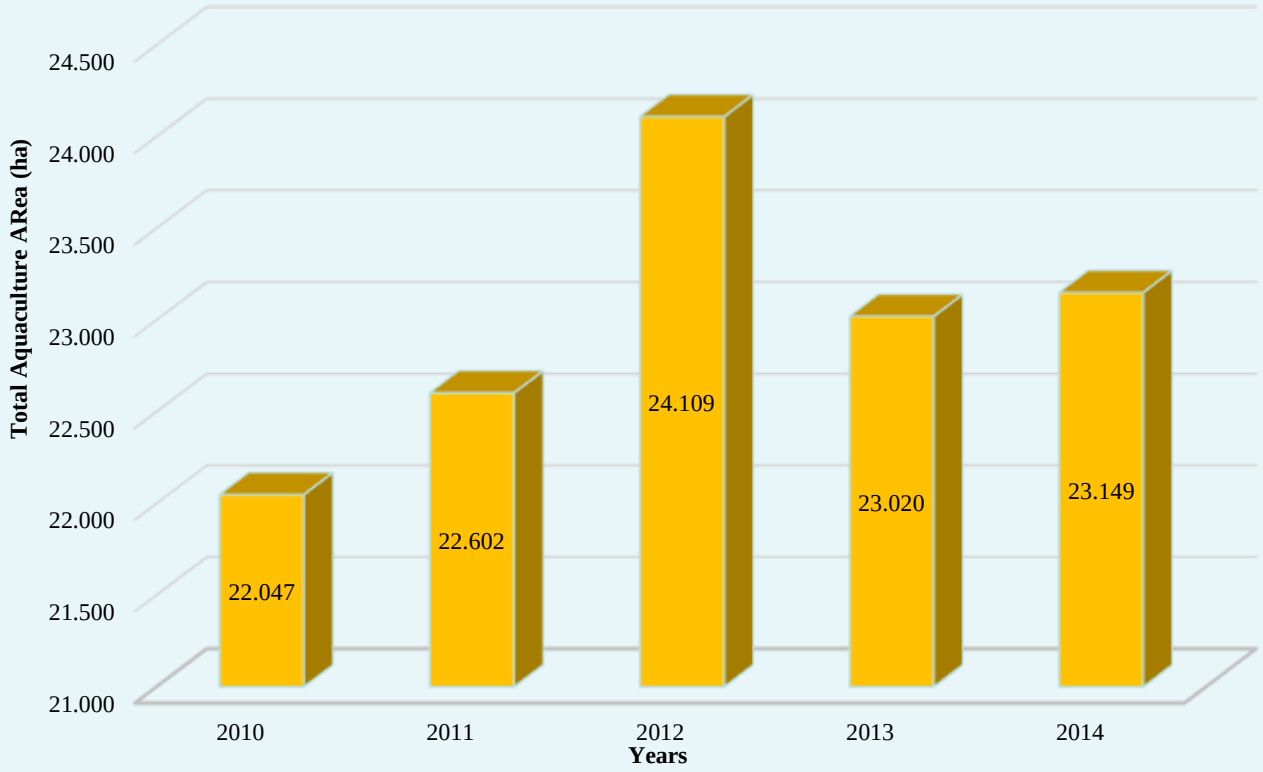



Figure 10. Statistic of aquaculture areas in Can Tho, An Giang and Dong Thap provinces (Sources: Fisheries Department of An Giang, Dong Thap and Can Tho, 2014

# Results

## 2. Socio-economic effectiveness of household livelihoods

Figure 11. Household interview

Figure 12. Group discussion

# Results

## 2. Socio-economic effectiveness of household livelihoods

*Table 2. Financial indicators for fish cage culture*

| Items | Silver pomfret fish | Red tilapia fish | Significant |
|---|---|---|---|
| **Total expenses (million VND/100m$^3$/crop)** | 85.95±67.75 | 158.4±48.04 | * |
| **Total revenue (million VND/100m$^3$/crop)** | 87.14±56.17 | 184.03±54.63 | * |
| **Income (million VND/100m$^3$/crop)** | 1.2±17.12 | 25.63±15.18 | * |
| **Profit margin** | 0.05±0.17 | 0.14±0.07 | * |

** Significant different 5%, ns is no significant (Anova test)*

# Results

## 2. Socio-economic effectiveness of household livelihoods

*Table 3. Financial indicators for fish pond culture*

| Items | Snakehead fish | Catfish | Giant freshwater prawn | Rice crop | Sig. |
|---|---|---|---|---|---|
| **Total expenses (million VND/ha/crop)** | 5,618.55±3,586.52 | 102,351.77±793,525.31 | 171.51±99.13 | 18.83±7.14 | ns |
| **Total revenue (million VND/ha/crop)** | 6,766.5±4,501.08 | 118,148.59±917,865.85 | 255.07±107.15 | 44.37±8.06 | ns |
| **Income (million VND/ha/crop)** | 1,147.95±1,531.3 | 15,796.83±124,354.18 | 83.56±80.63 | 25.54±10.83 | ns |
| **Profit margin** | 0.17±0.19 | 0.12±0.18 | 0.31±0.27 | 0.56±0.2 | * |

** Significant different 5%, ns is no significant (Anova test)*

# Results

## 2. Socio-economic effectiveness of household livelihoods

*Table. Production and yield of Striped Catfish farming in An Giang, Dong Thap and Can Tho provinces*

| Items | An Giang (n=14) | Dong Thap (n=26) | Can Tho (n=30) | Sig. |
|---|---|---|---|---|
| **Production (tons/vụ)** | 180.14±127.13$^{a}$ | 276.76±223.33$^{ab}$ | 460.83±505.00$^{b}$ | * |
| **Yield (tons/ha/vụ)** | 273.66±169.64 | 298.92±147.27 | 430.87±325.03 | ns |
| **Selling prices (1,000 VND/kg)** | 20.8±1.94 | 20.91±1.34 | 20.94±1.42 | ns |

** Significant different 5%, ns is no significant (Anova test)*

# Results

## 2. Socio-economic effectiveness of household livelihoods

*Table 4. Economic efficiency of Striped Catfish farming in An Giang, Dong Thap and Can Tho provinces*

| Items | An Giang (n=14) | Dong Thap (n=26) | Can Tho (n=30) | Sig. |
|---|---|---|---|---|
| **Total expenses (million VND/ha/crop)** | 5,369.49±3,501.77[a] | 4,762.33±3,099.25[a] | 8,605.23±6,266.75[b] | * |
| **Total revenue (million VND/ha/crop)** | 6,074.65±3,194.48[a] | 5,899.09±3,633.50[a] | 9,450.2±7,300.27[b] | * |
| **Income (million VND/ha/crop)** | 705.16±1,281.25 | 1,136.76±1,796.82 | 844.88±1,049.84 | ns |
| **Profit margin** | 0.15±0.27 | 0.15±0.2 | 0.08±0.10 | ns |

** Significant different 5%, ns is no significant (Anova test)*

# Results

## 2. Socio-economic effectiveness of household livelihoods

*Table 5. Production and yield of Red tilapia farming in An Giang và Dong Thap provinces*

| Items | An Giang (n=31) | Dong Thap (n=31) | Significant |
|---|---|---|---|
| **Production (tons/crop)** | 31.97±25.15 | 41.58±37.03 | ns |
| **Yield (tons/100m$^3$/crop)** | 5.35±1.88 | 5.36±0.8 | ns |
| **Selling prices (1,000 VND/kg)** | 33.26±0.97 | 33.67±0.93 | ns |

** Significant different 5%, ns is no significant (Anova test)*

# the research results

## 2. Socio-economic effectiveness of household livelihoods

*Table 6. Economic efficiency of Red tilapia farming in An Giang và Dong Thap provinces*

| Items | An Giang (n=31) | Dong Thap (n=31) | Significant |
|---|---|---|---|
| **Total expenses (million VND/100m$^3$/crop)** | 150.87±50.83 | 165.94±44.61 | ns |
| **Total revenue (million VND/100m$^3$/crop)** | 177.81±62.51 | 190.25±45.62 | ns |
| **Income (million VND/100m$^3$/crop)** | 26.94±15.38 | 24.31±15.11 | ns |
| **Profit margin** | 0.14±0.06 | 0.13±0.07 | ns |

** Significant different 5%, ns is no significant (Anova test)*

# the research results

## 2. Socio-economic effectiveness of household livelihoods

*Table 7. Area, production, yield and selling prices of Rice crop in An Giang, Dong Thap and Can Tho provinces*

| Items | An Giang (n=10) | Dong Thap (n=9) | Can Tho (n=18) | Sig. |
|---|---|---|---|---|
| Area ($m^2$) | 13,365±14,795.42 | 16,711.11±15,904.12 | 18,894.44±10,255.93 | ns |
| Production (tons/crop) | 42.25±40.44 | 17.24±29.45 | 36.54±31.7 | ns |
| Yield (tons/ha/crop) | $8.57±0.82^{a}$ | $9.72±1.25^{b}$ | $9.81±1.41^{b}$ | * |
| Selling prices (1,000 VND/kg) | $4.06±1.3^{a}$ | $4.84±0.46^{b}$ | $4.61±0.18^{ab}$ | ns |

** Significant different 5%, ns is no significant (Anova test)*

# Results

## 2. Socio-economic effectiveness of household livelihoods

*Table 8. Economic efficiency of Rice crop in An Giang, Dong Thap and Can Tho provinces*

| Items | An Giang (n=10) | Dong Thap (n=9) | Can Tho (n=18) | Significant |
|---|---|---|---|---|
| Total expenses (million VND/ha/crop) | 17.22±2.65 | 15.99±3.63 | 21.15±9.24 | ns |
| Total revenue (million VND/ha/crop) | 38.56±4.48[a] | 46.91±8.91[b] | 46.33±7.88[b] | * |
| Income (million VND/ha/crop) | 21.34±4.25 | 30.93±7.54 | 25.19±13.66 | ns |
| Profit margin | 0.55±0.08 | 0.66±0.08 | 0.52±0.27 | ns |

** Significant different 5%, ns is no significant (Anova test)*

# Results

## 3. Food security

*Table 9. Average production per capita per month*

| Items | Production (kg/year) | Population (person) | Production per capita (kg/person/month) | Total samples |
|---|---|---|---|---|
| **Agriculture production** | 1,619,254 | 291 | 463.70 | **63** |
| **Aquaculture production** | **59,121,090** | **544** | **9,056.54** | **119** |

*Table 10. Food production per capita per month*

| Provinces | Rice production (tons/year) | Aquaculture production (tons/year) | Population (persons) | Rice production per capita (kg/person/month) | Aquaculture production per capita (kg/person/month) |
|---|---|---|---|---|---|
| **An Giang** | 2,631,200 | 308,000 | 2,152,342 | 101.87 | **11.92** |
| **Can Tho** | 924,950 | 193,316 | 1,237,000 | 62.31 | **13.02** |
| **Dong Thap** | **2,080,000** | **460,000** | **1,667,800** | **103.93** | **22.98** |

# Results

## 3. Climate change impacts

*Table 11. Climate change impacts*

| Factors | Frequency | Ratio (%) (n =206) |
|---|---|---|
| **Increasing temperature** | 158 | 76.70 |
| **Increasing rainfall** | 39 | 18.93 |
| **Salinization** | 0 | 0.00 |
| **Drying** | 63 | 30.58 |
| **Flooding** | 39 | 18.93 |

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# Results

## 5. SWOT matrix analysis

| Strengthen | Weakness |
|---|---|
| 1. Experience in aquaculture<br>2. Owner land – no rent land for culture<br>3. Advantages in natural condition<br>4. Fingerling fish qualification<br>5. Aquaculture planning and encourage culture | 1. Unstable production market<br>2. Fish disease and high mortality rate<br>3. Have no pond for treatment<br>4. Lack of technology to change to the other aquaculture farming |
| **Opportunities** | **Threats** |
| 1. Good transportation<br>2. Usually training<br>3. Near main river for water resource supply<br>4. Product consumption agency<br>5. Food feeding supplying | 1. Water pollution (alcohol, pesticide) from agriculture<br>2. Unstable price<br>3. No supporting for product consumption<br>4. Depend on natural condition<br>5. Fish disease |

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# Research Gap

- Focusing on freshwater area and main aquaculture types
- Three provinces of the Lower Mekong River


THANK
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