# Mangrove Dependency and the Livelihoods of Coastal Communities in Thailand

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# Overview

- In Thailand, mangrove forests are important to the livelihoods of coastal communities.
- However, many coastal livelihoods have been threatened by the rapid mangrove deforestation that has occurred since the 1970s.
- This paper highlights the impacts of mangrove loss on the labor allocation decisions of rural households from four representative case study villages in coastal areas of Thailand.
- Continuing mangrove deforestation not only has a significant impact on the allocation of labor in mangrove-dependent households but also affects the intra-household division of labor.
- Key policies: institutional reform to improve and support community-based management of mangroves and improved education and training for female members of mangrove-dependent households.

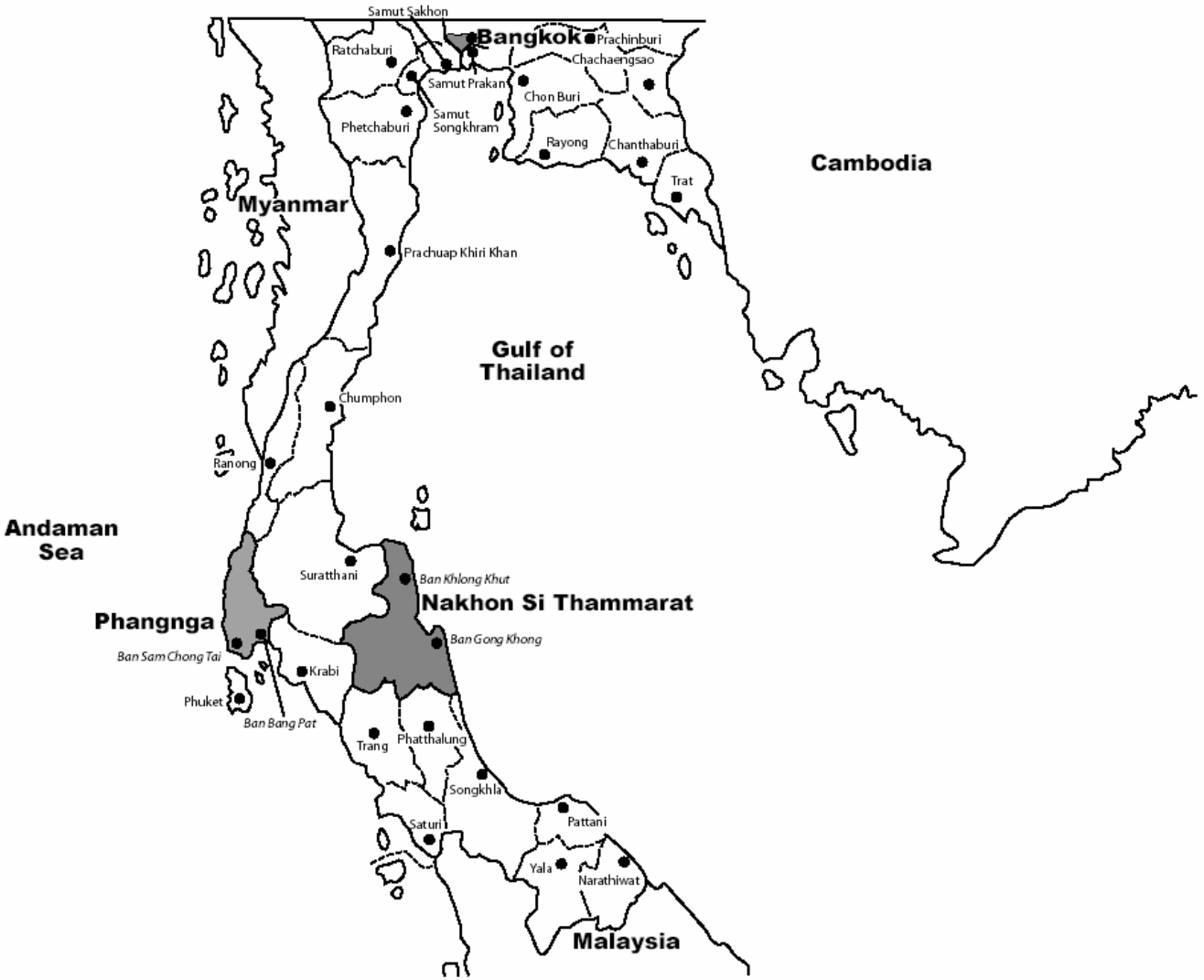
# Shrimp Farm Expansion and Mangrove Loss in Thailand

- Over 1961-96, Thailand lost around 20,500 $km^2$ of mangrove forests, or about 56% of the original area, mainly due to shrimp aquaculture and other coastal developments.
- Ill-defined property rights have accelerated the rapid conversion of mangroves to shrimp farms in Thailand.
- Conversion of mangroves by shrimp farm is largely irreversible; without careful ecosystem restoration and manual replanting efforts, mangroves do not regenerate even in abandoned shrimp farm areas.
- Thailand's shrimp output has been maintained by the expansion of shrimp farming activities to the far Southern and Eastern parts of the Gulf of Thailand, and across to the Andaman Sea (Indian Ocean) Coast.

# Mangrove Use and Labor Allocation in Four Coastal Villages

- The four case study villages are:
  - Ban Khlong Khut and Ban Gong Khong in Nakhon Si Thammarat Province on the Gulf of Thailand.
  - Ban Sam Chong Tai and Ban Bang Pat in Phang-nga Province on the Andaman Sea (Indian Ocean).
- These four villages have experienced similar rates of mangrove loss, again mainly due to conversion to shrimp ponds, as have occurred nationally in Thailand.
- Some households in these four communities derive their income and subsistence directly from mangrove forests, in terms of fish collection, wood products and firewood.
- Other households benefit indirectly from the protection and support the mangroves give to coastal fisheries.

# Figure 1. Case Study Villages, Thailand



# Summary Statistics for Outside Employment – By Household Type

| | Fish Only N = 32 | | Collect Only N = 63 | | Fish and Collect N = 104 | |
|---|---|---|---|---|---|---|
| | Male | Female | Male | Female | Male | Female |
| Outside employment Number (N) (% of total) | 12 (38%) | 6 (19%) | 31 (49%) | 20 (32%) | 18 (17%) | 7 (7%) |
| Mangrove-dependent income share of total income | 82% | | 75% | | 93% | |

# Summary Statistics for Outside Employment – By Village

| | Phang-nga | | | | Nakhon Si Thammarat | | | |
|---|---|---|---|---|---|---|---|---|
| | Ban Sam Chong Tai N = 55 | | Ban Bang Pat N = 41 | | Ban Gong Khong N = 52 | | Ban Khlong Khut N = 51 | |
| | M | F | M | F | M | F | M | F |
| Outside employment Number (N) (% of total) | 8 (15%) | 4 (7%) | 7 (17%) | 7 (17%) | 31 (60%) | 12 (23%) | 15 (29%) | 10 (20%) |
| Mangrove-dependent income share of total income | 95% | | 89% | | 66% | | 83% | |
| Fish only | 1 | | 5 | | 3 | | 23 | |
| Collect only | 19 | | 3 | | 34 | | 7 | |
| Fish and Collect | 35 | | 33 | | 15 | | 21 | |

# Household Labor Allocation - Summary

- For all four villages surveyed, collection of fish (mainly shellfish and crabs) from the mangrove swamps and coastal fishing are the principle sources of mangrove-dependent employment for male and female labor.
- Mangrove-based activities appear to require more male than female household labor.
  - On average across all four villages, males spend over three times as many hours on mangrove-dependent activities as females.
- Compared to males, on average females spend proportionately much more of their time in outside employment relative to mangrove-based activities.
  - Across all households, the ratio of the average hours in outside employment to hours in all mangrove-based activities ranges from 41% to 74% for females, whereas the ratio for males ranges from 11% to 28%.
- However, males receive higher wages for outside work compared to females.
  - For females, the average hourly wage received was 22.8 Baht/hour ($0.57/hour).
  - For males, the average hourly wage received was 44.5 Baht/hour ($1.11/hour).

# Mangrove Loss and Labor Allocation in the Case Study Villages

- The surveyed households in the four coastal villages are ideal for analyzing the impacts of mangrove loss on labor allocation decisions in several respects.
- The livelihoods of the surveyed households from these villages clearly depend on the surrounding mangrove ecosystems.
- Although a few households in these four villages also engage in agriculture, the main alternative to mangrove-dependent activities is employment as wage earners outside of the household.
- Thus, any depletion or degradation of local mangrove forests will affect the income earned by villagers from mangrove-dependent activities and influence their decision to participate in and supply labor to outside employment.
- This is an important issue for these villages (and indeed to all of coastal Thailand) as the local mangrove systems near these four villages are continually threatened with further depletion.

# Changes in Mangrove Area and Outside Employment

- Both males and females appear to have "backward-bending" supply curves with respect to the number of hours spent in outside employment, implying that higher wages lead to income effects that are greater than the substitution effects.
  - As males and females receive higher wages for outside employment, the total number of hours that they spend engaged in such work actually declines.
  - Consistent with the situation where members of a households receive sufficiently low market wages yet its minimum subjective requirement of income for subsistence cannot be achieved without outside employment.
- For both males and females, the dominant impact of a change in mangrove area on the total amount of labor supplied to outside employment is not through a direct effect on hours worked but through an indirect impact on hours worked via the wage rate.
  - Mangrove loss reduces the wages that females receive from outside employment, causing females to increase the hours that they work.
  - In contrast, mangrove deforestation increases the wages that males receive from casual work, and as a result, they will work less hours in such employment.

# Mangrove Deforestation and Labor Allocation

- The total effect of a loss in mangrove area is to reduce the supply of male labor to outside employment but to increase the supply by female members.
  - Across all households, a 1% decline in mangroves will cause the numbers of hours that males work in outside employment to decline by 0.7% while increasing the number of hours worked by females by 1.88%.
- An important response of the mangrove-dependent households to such deforestation appears to be to increase the division of labor between male and female members of these households.
  - The supply of labor from female members to outside employment opportunities increases while the supply from males decreases.

# Mangrove Dependency and Participation in Replanting

- All mangrove-dependent households in the four case study villages allocate some time to replanting activities.
  - Males spend more time on these activities than females.
- Hypothesis: once households realize that, as mangrove area declines they will experience impacts on their livelihoods leading to income losses, the households will participate in the replanting of mangroves.
- Whether households choose to be involved in mangrove conservation is also likely to vary with:
  - household characteristics, location, land ownership and tenure issues.
  - awareness of and attitudes to existing conservation efforts, and
  - concerns over the threat of the environmental impacts of shrimp farms.
- The decision to participate in mangrove conservation may vary between the male and female members of the household.

# Male and Female Participation in Mangrove Replanting

- The decision by males to participate in replanting is influenced positively by:
  - household awareness of community conservation efforts and utilization rules
  - the degree of dependence of the household on mangrove-based income
  - whether households are aware of the negative environmental impact of shrimp farms.
- The decision by females to participate in replanting is influenced by:
  - the degree of dependence of the household on mangrove-based income
  - distance to the mangroves from the household (negative influence)
  - the area of mangrove utilized by the household
  - the number of children under 6 years of age (negative influence)
  - household awareness of community conservation efforts and utilization rules.
- The decision as to whether males and females should participate in mangrove conservation appears to be made jointly by the entire household.

# Policy Implications – Mangrove Management

- There is an urgent need to address the main institutional failure concerning management of local mangrove resources in coastal areas of Thailand.
  - The present law and formal institutional structures of resource management do not allow coastal communities to establish and enforce their local rules effectively.
  - In Ban Sam Chong Tai Village in Phang-nga, the local community is very active in the conservation of mangroves, but the other three villages are less active.
- A new institutional framework for coastal mangrove management in Thailand that could make a difference to these and other coastal communities might contain the following features
  - Remaining mangrove areas should be designated into conservation (i.e. preservation) and economic zones.
  - Shrimp farming and other extractive commercial uses (e.g., wood concessions) should be restricted to the economic zones only.
  - Local communities should be allowed access to both zones, as long as their harvesting and collecting activities are conducted on a sustainable basis.
  - The establishment of community mangrove forests should also occur in both the economic and conservation zones, under the principle of user rights.
  - The community mangrove forests should be co-managed by the government and local communities.
  - The government should provide technical, educational and financial support for the local community organizations participating in managing the mangrove forests.

# Policy Implications – Female Education and Training

- A second policy initiative would be to focus on improvements in education and skills training, especially for females.
- The very low average female wage rate across all households suggests that outside employment for all females involves little or no skills.
- Mangrove-dependent households currently rely on their female members participating in outside employment.
- As this trend will only increase as mangrove deforestation continues, then improved education and skills training for young females in the households may be increasingly important for the future income-earning potential and welfare of these households.