Agroforestry practices to overcome prices volatility: the case of rubber in Phatthalung province, Thailand.

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Some agroforestry systems

- Rubber-Guava
- Rubber-Gnetum
- Rubber-Longkong
- Rubber-Mangosteen
- Rubber-Livistana
- Rubber-Salacca
Introduction: the decline of rubber price impact directly farmers incomes

Thailand is the top world producer of natural rubber mainly produced by smallholders (90%).
Natural rubber prices have always been fluctuating, but never as much as 2010-2015 period: from 5.56 USD/dry kg (SMR20 Kuala Lumpur) in 2011 to 1.5 USD/dry kg in 2015.
The “golden period” stopped in 2012 directly impacting farmers’ income

Two main strategies:
1 association of fruit and timber trees with rubber (or shade tolerant cash crops) in agroforestry systems (AFS)
2 development of off-farm activities.

A new context: The government is now encouraging rubber farmers to diversify (through ROAT/ex ORRAF)

3 rubber based cropping systems are identified:
1 monoculture plots,
2 “simple AFS” (rubber trees and a few other perennial species)
3 agroforests, or “complex AFS” with rubber trees and many other perennial species including several layers of canopies.
Methodology

Phatthalung province (South Thailand)
5 focus groups were organized in 4 districts gathering 50 people as preliminary survey for collecting global information on agroforestry systems.
32 individual farms were therefore selected and surveyed
Farm typology, rubber based cropping systems typology
Creation of “average farm” built for each type to simulate scenarios with Olympe software

3 simulations with the following hazards: i) proportion of agroforestry areas in the farm, ii) hypothesis on different “rubber prices and iii) hypothesis of mangosteen prices (current prices are low).

→ Comparison of farms performances (agricultural income) to equivalent farms without agroforestry practices, in order to identify threshold effects.

→ The ultimate objective is double: i) identify the most resilient and robust systems facing downside volatility of natural rubber prices and ii) discuss those systems with farmers as viable alternatives in the frame of a local innovation platform
Phatthalung province

- Rubber cultivation since the 90's
- Previous EU: natural forest, orchards or paddy fields
- Higher altitude

- Rubber cultivation since the 90's
- Previous EU: intensive sugar cane production or paddy fields
- Adverse soil conditions

- Rubber cultivation since the 70's
- 2nd rotation coming up
- Previous EU: intensive cassava or rice
- Agroforestry practices

- Rubber cultivation since the 50's
- Third rotation
- Watered

Annual rainfall 1200 mm
Dry season 5-6 months

Annual rainfall 1500 mm
Dry season 4 months

Annual rainfall 2000 mm
Rainy season 11 months

- Research station or study site from SRT
- Research station or study site from universities
- Watered

Si Banpot
Sri Nakarin
Pak Phayun
Tamod
Pa Bon

District étudié
Main results

A farm typology with 8 farm types:

- Type AR: Rubber producers, below the minimum wage (6 farmers out of 32)
- Type AO: Diversified producers, below the minimum wage (3/32)
- Type B: Farmers depending on another source of income, below the minimum wage (6/32)
- Type CR: Rubber producers, over the minimum wage (3/32)
- Type CO: Diversified producers, over the minimum wage (5/32)
- Type D: Farmers over the minimum wage with off-farm activities (1/32)
- Type E: Farmers far over the minimum wage due to mainly on-farm activities (4/32)
- Type F: Farmers far over the minimum wage with off-farm activities (4/32)
Farmers’ strategies on diversification

Tous les planteurs

Planteurs en-dessous du revenu minimum
- Planteurs dont le revenu est essentiellement agricole
  - Planteurs qui vendent essentiellement du caoutchouc naturel
    - Type AR
- Planteurs dont le revenu est essentiellement extra-agricole
  - Planteurs qui vendent essentiellement d'autres produits
    - Type AO
  - Planteurs qui vendent essentiellement du caoutchouc naturel
    - Type CR
  - Planteurs qui vendent essentiellement d'autres produits
    - Type CO
- Planteurs légèremment au-dessus du revenu minimum
  - Planteurs dont le revenu est essentiellement agricole
  - Type B
  - Planteurs dont le revenu est essentiellement extra-agricole
    - Type D
  - Planteurs qui vendent essentiellement du caoutchouc naturel
    - Type E
  - Planteurs qui vendent essentiellement d'autres produits
    - Type F

Planteurs largement au-dessus du revenu minimum
- Planteurs dont le revenu est essentiellement agricole
  - Type E
- Planteurs dont le revenu est essentiellement extra-agricole
  - Type F
5 main AFS cropping systems

- Type MatAFVeg: mature rubber only associated with **vegetable species**, 
- Type MatAFFr: mature rubber associated with **fruit and some vegetable** species, 
- Type MatAFTb: mature rubber only associated with **timber** species, 
- Type MatAFMx: mature rubber associated with **fruit, vegetable and/or timber** species, 
- Type MatAFLv: mature rubber associated with **livestock and other plant species**.
3 farm variants for the prospective analysis

At farm level, we created 3 farm variants for each farm type to show the impact of any choice of agroforestry on economic farm results:

- **1 Variant Combination of AFS and monoculture plots (Comb) in the farm which represent the current situation with 23% to 65% of AFS according to types,**
- **2 Variant Agroforestry specialization (AF): the same farm types if we replaced all monoculture plots by their agroforestry equivalent,**
- **3 Variant Monoculture specialization (Mono): the same farm types if we replaced agroforestry plots by their monoculture equivalent.**

- With an “average” rubber price → significative impact of different levels of agroforestry on farm gross margin (gross agricultural income).
Gross margin/ha/year for various AFS types and rubber monoculture (Matmono).
Comparison of 3 farm variants 'Mono', 'Comb' and “AF” for the eight farm types, with an «average» rubber price (RubA) (Indicator: Farm Gross Margin).
(%Comb refers to the rubber share of the total farm area in the current situation, for each farm type).
Threshold rubber prices for the eight farm types (variant Comb), in an low rubber price context (RubL) (Indicator: Farm Gross Margin)
Conclusion

Farmers who chose agroforestry did do it:
1 for social reason: having fruits in abundance for family and visitors
2 for economic reasons when rubber prices are low.
   → fruits can represent 5 to 60% of the farm gross margin/ha in 2015 (with rubber price at 1.3 US $ /kg)
   → Rubber provide an almost daily income source, which makes cash flow management easier so rubber harvest is maintained.
   → agroforestry is slowly shifting from one function to another, partly to adapt to a new economic context.
   → Even if income diversification is considered as a common feature to improve global farm resilience, it is still a novelty in the context of southern Thailand with growing interest in combining production on one plot in order to save land in a context of local land scarcity.
   → AFS systems may be as well technically more adapted on slope land and in former irrigated rice fields.
Nest step?

- To integrate fruits/vegetables/timber prices evolution in future analysis to improve sensitivity analysis to price evolution
Thanks for your attention

Rubber and « salak » palm trees

Rubber and « pakliang », Gnetum