THE CHALLENGE  Shrink forest, growing danger

Thailand’s forests are disappearing at an alarming rate. Thailand was once covered with dense forests and home to more than 1,700 known species. However, the country has rapidly and continuously lost its forest cover for the past 40 years, from 43.2% (1973) to 31.6% (2015). Thailand’s annual deforestation rate is estimated at 0.8%, equivalent to 140,000 hectares per year. One of the culprits to such rapid deforestation, ironically, are the people who are most dependent on forests. Pressured by economic factors, indigenous communities (hill tribes) in northern Thailand have been accused for cutting down trees for massive commercial plantations (i.e., maize). This practice has led to devastating outcomes, both environmentally and socially:

- Soil erosion, water shortages, and loss of biodiversity
- Economic marginalization of forest-dwelling communities, vulnerability to crop failures and price fluctuations, over-reliance on middlemen

A PROVEN SOLUTION  That Needs Scaling Up

Agroforestry, an agricultural practice in which crops are grown interspersed with native trees, provides a win-win solution to a difficult choice between conservation and agricultural land use. Shade-grown coffee farming is a representative example of agroforestry. It is considered to be one of the most effective ways to preserve the forests. One hectare of shade-coffee plantation holds 58% more carbon stock than in a sun-grown coffee farm and have significantly higher water retention. Moreover, forest-dwelling communities can anticipate a double dividend of biodiversity and economic prosperity from shade-coffee farming, driven by an increasing market demand for specialty coffee (est. market size US$32 bln.).

Shade-coffee farming was introduced in Thailand several decades ago as an alternative to replace opium cultivation. Despite all known benefits of shade-coffee farming, the existing coffee forests in Thailand are under constant threat of being slashed and burnt for crop plantations. The main obstacles are:

- Inefficient Operations: Mostly individual farmers growing coffee in small areas (<5 hectares), lack of appropriate processing facilities, unconsolidated & unstandardized processing
- Leads to Limited Scale: Unable to sell at the volume & quality level demanded by buyers
- Making shade-coffee farming economically unsustainable

CASE IN POINT

Jakrapong Mongkolkeeree is a farmer and a hill tribesman in Tak province. He began practicing shade-coffee farming in the late 1990s, after witnessing his hometown burn into maize plantations. In 2003, he founded a cooperative with fellow villagers, which grew into a group of more than 100 smallholder coffee producers. The coop provides training and free coffee seeds to farmers who wish to convert from corn farming to shade-coffee. It purchases beans for 17,800k/kg, higher than the price paid by middlemen (~8,000k/kg). The coop is also experimenting with new breeds of coffee trees that yield twice as much crop and more resistant to diseases. However, the coop is facing difficult challenges. Due to limited processing capacity and marketing channels, it is able to purchase only 10% of total harvest in the area; the rest is sold to middlemen, leaving very little margin for farmers. In the recent years, Jakrapong has been witnessing shade-coffee farmers abandon or clear the forests to switch to maize farming.

PADEE’S INTERVENTION MODEL

PADEE will work with existing coops to scale up shade-grown coffee farming by improving operation efficiency, securing markets and reaching premium coffee quality; thereby ensuring farmers enough economic benefit to sustain their forests.

① Centralized, state-of-the-art processing (milling/drying/storage) facility co-owned by communities (coops) and PADEE will:
- Enable farmers to process triple the current volume
- Produce export-quality beans (less likely to damaged during processing)
② Connecting large specialty fair-trade coffee buyers will:
- Secure a steady income for farmers
③ Partnerships with research institutions and organic coffee certifiers will:
- Improve R&D and provide technical assistance to produce export-grade coffee
- Secure a price premium, thus motivate farmers to sustain shade-coffee farming practices

PADEE Social Impact Bond (SIB)

PADEE adopts the Social Impact Bond model as its financing vehicle and pioneers the application of PES (Payment for Ecosystem Services) scheme to attract businesses as outcome payers. We aspire to transform forest conservation -previously heavily dependent on government subsidy and donations- to ecosystem services that can be invested in and purchased by the private sector.

OPERATIONAL FLOW

① Investors provide upfront and continuing costs of the project through PADEE SIB, an SPV managed by the PADEE Management Company. PADEE MgmtCo. serves as an intermediary that selects and provides investment/working capital (in the form of a forgivable loan) to Farmers’ Cooperatives. A portion of the loan will be invested in building the centralized coffee processing facility. The facility will be co-owned by PADEE and farmers’ coops during the investment horizon; if targets are successfully met, the coops will be given full ownership. PADEE MgmtCo. will connect coops with large domestic and international coffee buyers, in return for a revenue share of coffee sales.
② Farmers who wish to participate in the project must commit to a 3-year forest conservation plan and an exclusive purchasing agreement over their coffee crops. In return, they will receive in-kind support, technical assistance and fees involved in organic coffee certification.

Starting at the end of Year 3, an independent Auditor will assess and verify whether forest conservation plans have been executed as pledged. Audit results will be notified to PADEE and the Outcomes Payer. The outcome payer is a business corporation that has already agreed- at project inception- to purchase a certain amount of ecosystem services at a predetermined price. Based on the audit results, PADEE will issue PES (Payment for Ecosystem Services) notes to be purchased by the outcome payer.

At the SIB’s maturity (end of Year 8), Investors will be paid back principal loan plus an incentive if project target is successfully met. If the project fails to meet the target, PADEE will pay back investors from proceeds from PES and coffee sales.

*PADEE team is currently discussing a guarantor support potential with a development aid agency.

PADEE Team is successively established, or is currently in discussion with prospective partners. ChangeVentures, a renowned Thai impact investor/social business accelerator firm, will provide operational support to PADEE SIB. The team is in discussion with two major Thai companies to adopt PES as a new CSR initiative. The project has conducted coffee tasting sessions with large Korean coffee roasters in plans to expand to the East Asian market. The team will conduct the feasibility study with USAID, based on their previous PES research projects in Thailand.
PILOT PROJECT

INVESTMENT CRITERIA  PADEE’s project areas and partners are carefully selected through rigorous due diligence.
• Geographic Focus: Northern Thailand* (Pilot project areas: Muser Hills, Tak province)
• Identifies the most susceptible areas to deforestation
• Adequate climatic condition for coffee-growing
• Land Rights: Legal documentation on land use required
• Community Commitment: Partner coops must have strong presence in local communities/ Farmer votes of >80% required to participate in PADEE pilot project

USE OF FUNDS/CASH FLOW

<table>
<thead>
<tr>
<th>Cash Outflow</th>
<th>USD(mill)</th>
</tr>
</thead>
<tbody>
<tr>
<td>PES Audit</td>
<td>0.95</td>
</tr>
<tr>
<td>Loans to Coops</td>
<td>0.42</td>
</tr>
<tr>
<td>Processing Facilities &amp; Equipment</td>
<td>0.42</td>
</tr>
<tr>
<td>Coffee plants and fertilizers, farm training, organic coffee certification fees</td>
<td>5.87</td>
</tr>
<tr>
<td>Other Expenses</td>
<td>0.25</td>
</tr>
<tr>
<td>Coffee Marketing</td>
<td>1.00</td>
</tr>
<tr>
<td>Total</td>
<td>8.49</td>
</tr>
</tbody>
</table>

EXPANSION PLAN

The PADEE SIB model can already be scaled to other provinces in Thailand and to its neighboring countries in Southeast Asia, currently ranking among the worst in deforestation. Yet their potential for agroforestry is tremendous, with climatic and geographic features similar to that of Thailand.

<table>
<thead>
<tr>
<th>Country</th>
<th>Annual Loss in Forest Area (1,000ha)</th>
<th>Annual Rate of Change(%)</th>
<th>World Average (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Myanmar</td>
<td>-310</td>
<td>-0.95</td>
<td>-2.3</td>
</tr>
<tr>
<td>Cambodia</td>
<td>-127</td>
<td>-1.22</td>
<td>-1.4</td>
</tr>
</tbody>
</table>

RISK MITIGATION

1. Partners  • Corporate PES purchasing based on voluntary CSR  • Overreliance on Farmer Coops  • Leverage data from existing projects  • Partner with organization with expertise

2. Technical expertise  • Ability to measure and monetize PES performance  • Allocate coffee specialists to ensure product quality, provide regular trainings to farmers  • Use of Climate-based insurance

3. Supply Chain  • Failure to meet quality standards due to poor techniques  • Natural disasters limit max yield

4. Market  • Fluctuation in coffee price  • Currency risk

5. Government  • Political instability  • Volatile land policies

PHASE 1

Y1 Y2 Y3 Y4 Y5 Y6 Y7 Y8

PHASE 2

Y1 Y2 Y3 Y4 Y5 Y6 Y7 Y8

IMPACT

■ A loss of one hectare of forest ecosystems is likely to create a long-term economic losses of USD $129,000 or more. PADEE’s pilot SIB aims to preserve 10,000ha of forestland, thus saving long-term economic costs of USD $1.29 billion or more.
■ PADEE’s intervention in shade-coffee business will increase farmers’ income by 30%.
■ PADEE will use additional impact indicators from IRIS and UN SDGs:

ENVIRONMENTAL
1. Increased forest cover and forest-related ecosystem services
2. Increased access to fresh water

SOCIO-ECONOMIC
1. Increased local economic activity
2. Increased income in rural households

INVESTMENT PROFILE

<table>
<thead>
<tr>
<th>Investment Type</th>
<th>Social Impact Bond</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size (Pill)</td>
<td>USD 3,000,000</td>
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<tr>
<td>Duration</td>
<td>8 years</td>
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<tr>
<td>IRR</td>
<td>3.9% (Medium), 1.9% (Worst), 4.9% (Best)</td>
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<tr>
<td>Target Investors</td>
<td>Investors: DfIs, PIs, Foundations</td>
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<tr>
<td>Regional Focus</td>
<td>Northern Thailand (Pilot: Muser Hills, Tak Province)</td>
</tr>
<tr>
<td>Target Impact</td>
<td>Main Target: Preserve 10,000ha of forest land</td>
</tr>
</tbody>
</table>

REFERENCE
3. Navin Sharma et al(2018). Bioenergy from agroforestry can lead to improved food security, climate change, soil quality, and rural development
8. USAID Mekong ARC 2015. Ecosystem Value Estimation