Assessing and Overcoming Barriers to Implementing Integrated Solutions in Thailand

Kaoru AKAHOSHI

Research Manager, Institute for Global Environmental Strategies

11th March, 2025

ASEAN: home to many successful examples of the solutions

Cleaner cooking in Laos PDR

Clean Diesel in Thailand

….also scope to spread success throughout the region.

We also understand that there are various barriers to implementing SLCP control measures.

We try to assess feasibility of Those measures.

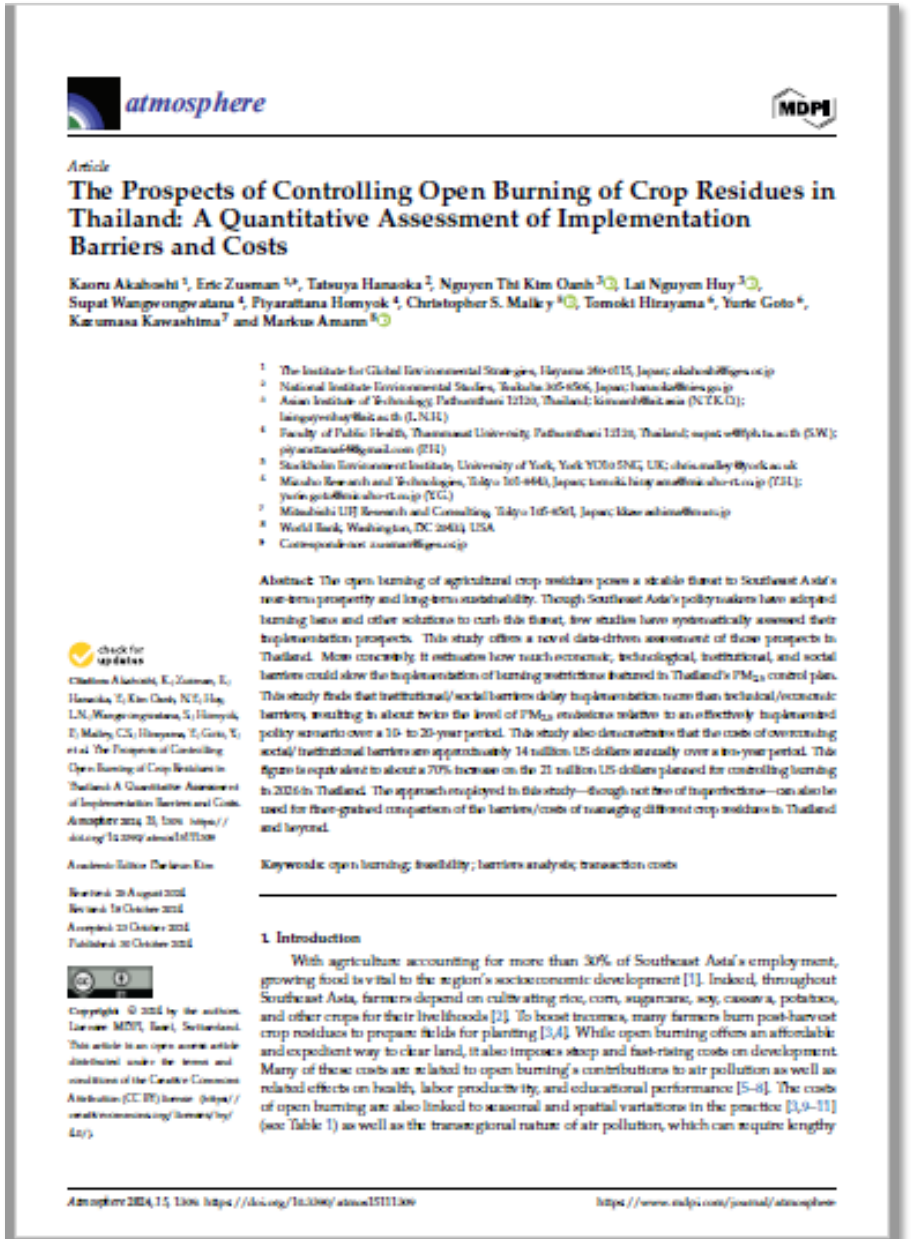
To better understand how to reduce short-lived climate pollutants (SLCPs), we've done three main studies (S20 Project)

1. Finding Barriers 🚧
We're identifying everything that **prevents** us from cutting SLCPs, using research and expert surveys.

2. Measuring Their Impact 📉
Then, we're figuring out how much these barriers **slow down** new policies and technologies.

3. Costing the Solutions 💰
Finally, we're estimating the **cost** to overcome these barriers/obstacles.

Basically, we're systematically identifying the problems, seeing how much they hurt, and figuring out what it takes to fix them.



atmosphere

MDPI

Article

The Prospects of Controlling Open Burning of Crop Residues in Thailand: A Quantitative Assessment of Implementation Barriers and Costs

Kaoru Akahoshi [1], Eric Zusman [1,*], Tatsuya Hanaoka [2], Nguyen Thi Kim Oanh [3], Lai Nguyen Huy [3], Supat Wangwongwatana [4], Piyarattana Homyak [4], Christopher S. Malley [5], Tomoki Hirayama [6], Yurie Goto [6], Kazumasa Kawashima [7] and Markus Amann [8]

Abstract: The open burning of agricultural crop residues poses a sizable threat to Southeast Asia's near-term prosperity and long-term sustainability. Though Southeast Asia's policymakers have adopted banning bans and other solutions to curb this threat, few studies have systematically assessed their implementation prospects. This study offers a novel data-driven assessment of those prospects in Thailand. More concretely, it estimates how much economic, technological, institutional, and social barriers could slow the implementation of burning restrictions featured in Thailand's $PM_{2.5}$ control plan. This study finds that institutional/social barriers delay implementation more than technical/economic barriers, resulting in about twice the level of $PM_{2.5}$ emissions relative to an effectively implemented policy scenario over a 10- to 20-year period. This study also demonstrates that the costs of overcoming social/institutional barriers are approximately 14 million US dollars annually over a ten-year period. This figure is equivalent to about a 70% increase on the 21 million US dollars planned for controlling burning in 2026 in Thailand. The approach employed in this study—though not free of imperfections—can also be used for finer-grained comparison of the barriers/costs of managing different crop residues in Thailand and beyond.

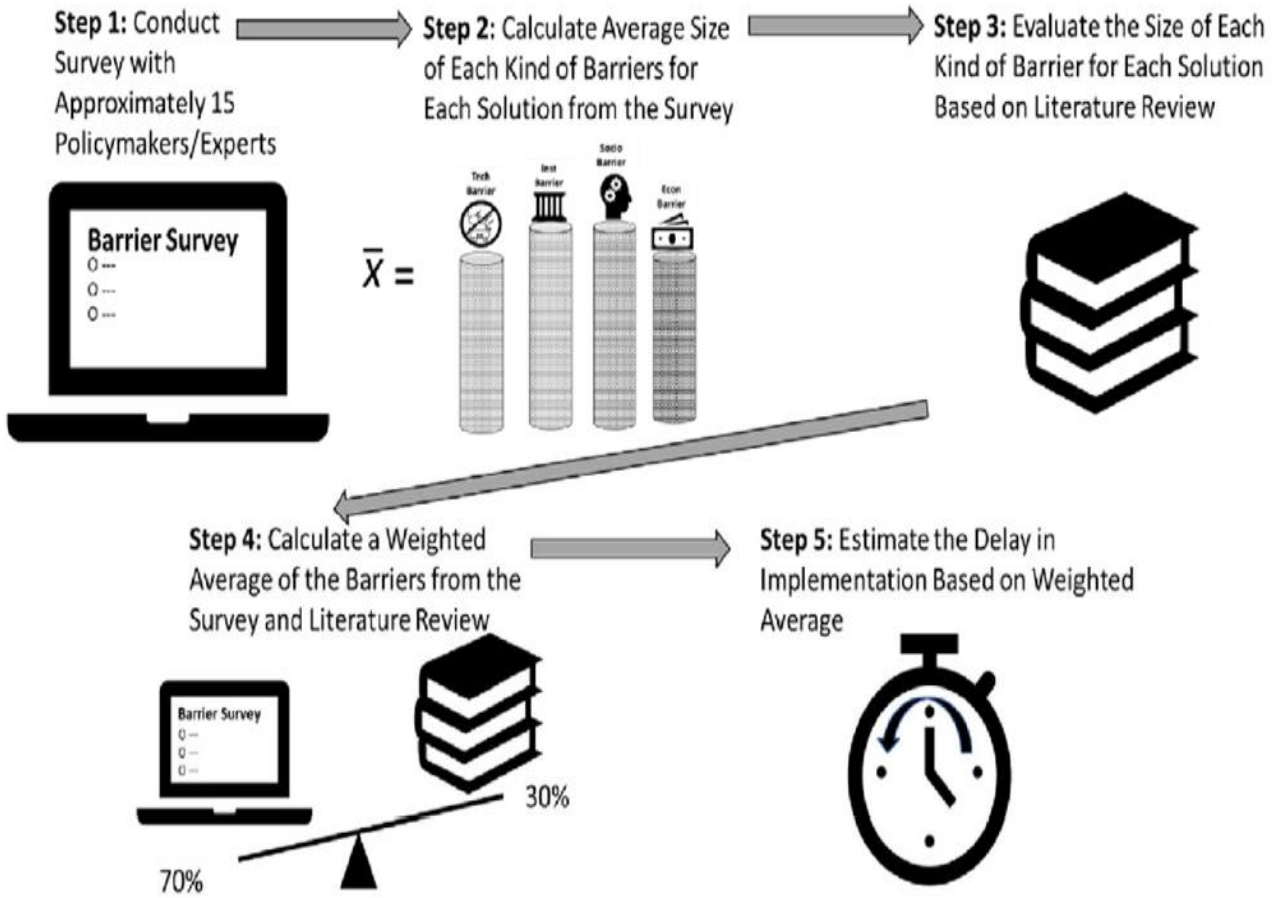
Keywords: open burning; feasibility; barriers analysis; transaction costs

1. Introduction

With agriculture accounting for more than 30% of Southeast Asia's employment, growing food is vital to the region's socioeconomic development [1]. Indeed, throughout Southeast Asia, farmers depend on cultivating rice, corn, sugarcane, soy, cassava, potatoes, and other crops for their livelihoods [2]. To boost incomes, many farmers burn post-harvest crop residues to prepare fields for planting [3,4]. While open burning offers an affordable and expedient way to clear land, it also imposes steep and fast-rising costs on development. Many of these costs are related to open burning's contributions to air pollution as well as related effects on health, labor productivity, and educational performance [5–8]. The costs of open burning are also linked to seasonal and spatial variations in the practice [3,9–11] (see Table 1) as well as the transregional nature of air pollution, which can require lengthy

IGES
公益財団法人
地球環境戦略研究機関

Five steps approach to estimating barriers and delays



【Category of barriers】

Technological	**Access to cleaner technology/fuels and technologies/infrastructure enabling implementation.**
Economic	**Costs of cleaner technology fuels as well as policies (i.e. subsidies) that lower prices of resource-intensive options.**
Institutional	**Lack of interagency coordination/capacity as well as design flaws in policies promoting cleaner options.**
Social	**Limited acceptance/awareness of benefits from the clean alternatives as well as a shortage of awareness raising mechanisms/stakeholder engagement mechanisms.**

【BC reduction measure analysis target】

Country: Thailand

- **Transportation: vehicle inspections and maintenance, promotion of E-vehicles, exhaust gas regulations**
- **Household energy: improvements to cooking stoves and electrification**
- **Agriculture: reduction of open burning of agricultural waste**

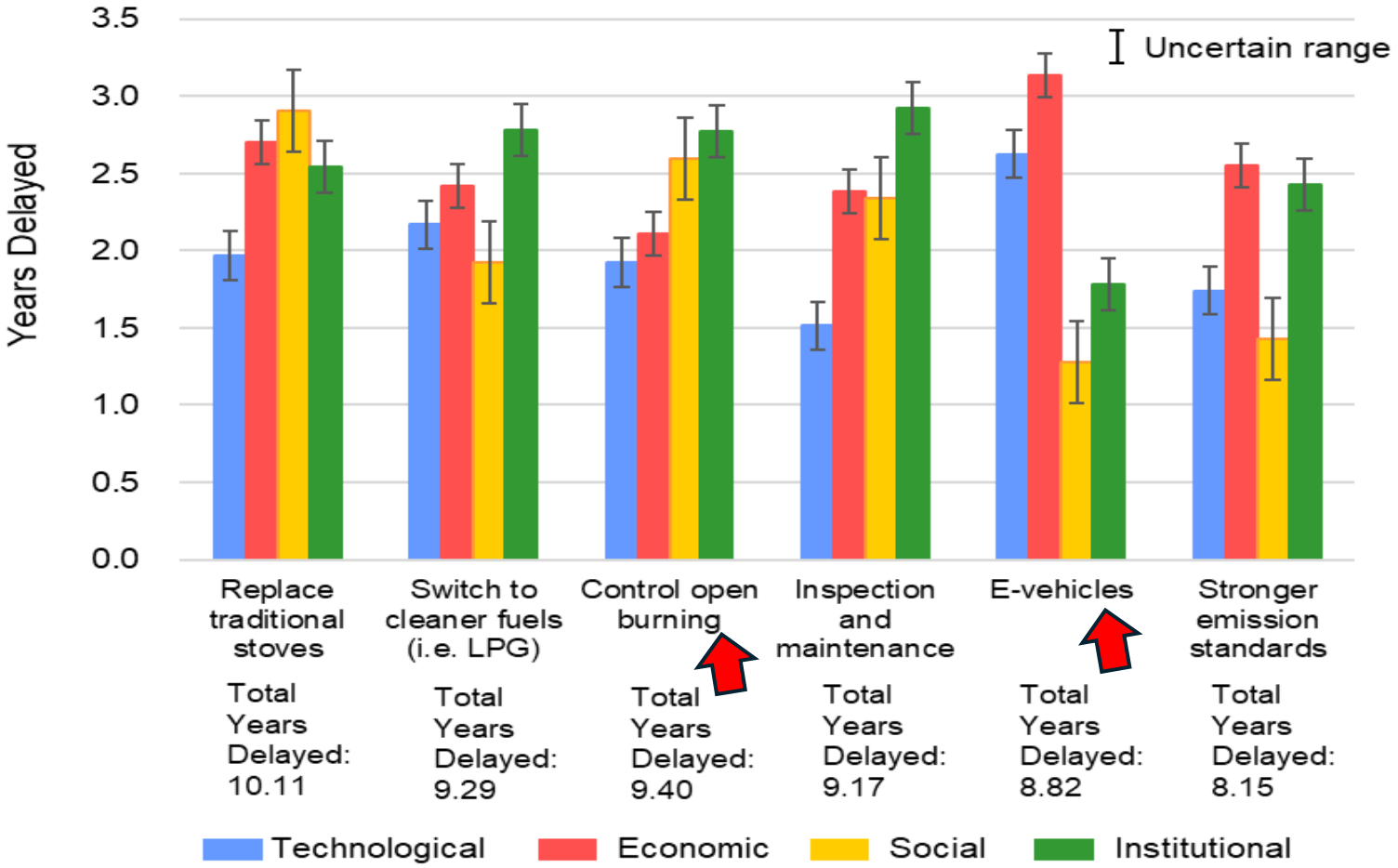
IGES 公益財団法人 地球環境戦略研究機関

Estimation of delay due to barriers (how many years will the barriers delay the implementation of key measures?)

Findings

- Technical and economic barriers are greater for the popularization of electric vehicles and strengthening of emission standards.
- For the other measures, **institutional and social barriers are greater** than the total of technical and economic barriers.
- The institutional and social barriers would cause a delay in implementing measures of between five and six years over a 15-year period.

Estimated Delays in Implementation of Major BC Reduction Measures in Thailand (2020-2035)



Source: Zusman et al. Truth about Co-benefits(2025) DOI 10.1088/2515-7620/adae5e

Estimation of the measures and costs required to overcome the barrier

Case: Open Burning Control Measures in Thailand: Estimating the cost of overcoming barriers (transaction costs)

Use percentage of costs for energy use programme for cookstoves (top-down method)

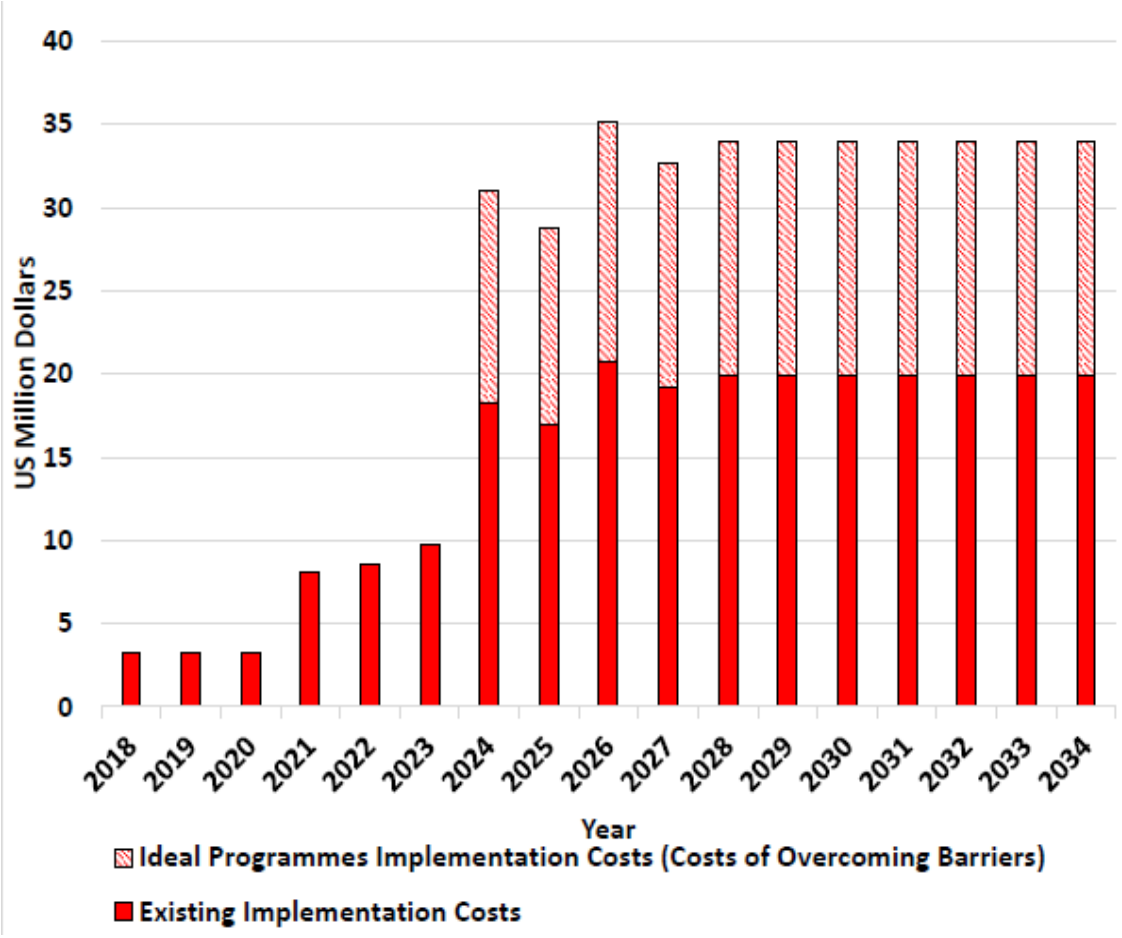
Step 1:
Gather cost data on business-as-usual (BAU) policies/institutions for implementing cookstove/transport solutions

Step 2:
Divide costs into costs for 1) policy implementation for institutional barriers; and 2) awareness raising to overcome social barriers

Multiply staff salaries for policymaking functions/awareness raising for transport (bottom-up method)

Step 3:
Estimate costs of implementing "ideal" policies/institutions with potential to overcome institutional/social barriers

Step 4:
Calculate costs of overcoming institutional/social barriers by subtracting BAU from ideal costs



＊In this research, transaction costs refer to the costs associated with the implementation and implementation of policies.

Akahoshi et al. The Prospects of Controlling Open Burning of Crop Residues in Thailand(2024) doi.org/10.3390/atmos15111309

Key messages

- ◆ Overcoming social and institutional barriers, which have not been fully considered so far, is essential for achieving SLCF/P emission reductions and co-benefits.
- ◆ A multidimensional assessment framework is useful for policy planning and decision-making.
- ◆ Transaction costs need to be considered when formulating policies.
  - ✓ Promoting the development of an environment for introducing technologies and implementing policies in an integrated manner is important.
  - ✓ Investment in strengthening institutions and organizations and awareness-raising programs is essential.

Significance of this research

- ● We developed a method for linking qualitative research on policy implementation with quantitative research on benefits.
- ● This approach can be applied to other sectors, policies and technologies.
- ● Contributing to improving probability of scenarios.

The Environment Research and Technology Development Fund S-20-3 [JPMEERF21S12013 and JPMEERF21S12030] of the Environmental Restoration and Conservation Agency with resources provided by the Ministry of Environment of Japan.

IGES
公益財団法人
地球環境戦略研究機関

BAQ 2026
BETTER AIR QUALITY CONFERENCE
11-13 MAR • BANGKOK

Thank you
Arigato!

akahoshi@iges.or.jp
Institute for Global Environmental Strategies, IGES