# Promoting plant residue utilization for food security and climate change mitigation in Thailand

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# Presentation outline

- Introduction
- Study area
- Research methods
- Results and discussion
  - Policy analysis and gap identification
  - Existing management practices in farmland
  - Potential to involve elementary schools and students
  - Policy recommendation
- Conclusion

# Introduction

- Food insecurity remains in Thailand
  - drought, flood
- Small-scale farmers are more susceptible

# Unsustainable farming practice in Thailand

- Deforestation
- Burning of plant residues
- Excessive use of agrochemicals
- Intensive farming on hill slopes

- Low productivity
- Human insecurity (land slides, torrent floods, etc)
- Unsustainable livelihoods (food, income, etc)
- Health risks

# Impact of burning of plant residues

- Release of greenhouse gas and small particles
- Induction of respiratory problem
- Risk of wildfire when the fire are uncontrolled
- Loss of available nutrients and organic matters
- Depletion of soil biota

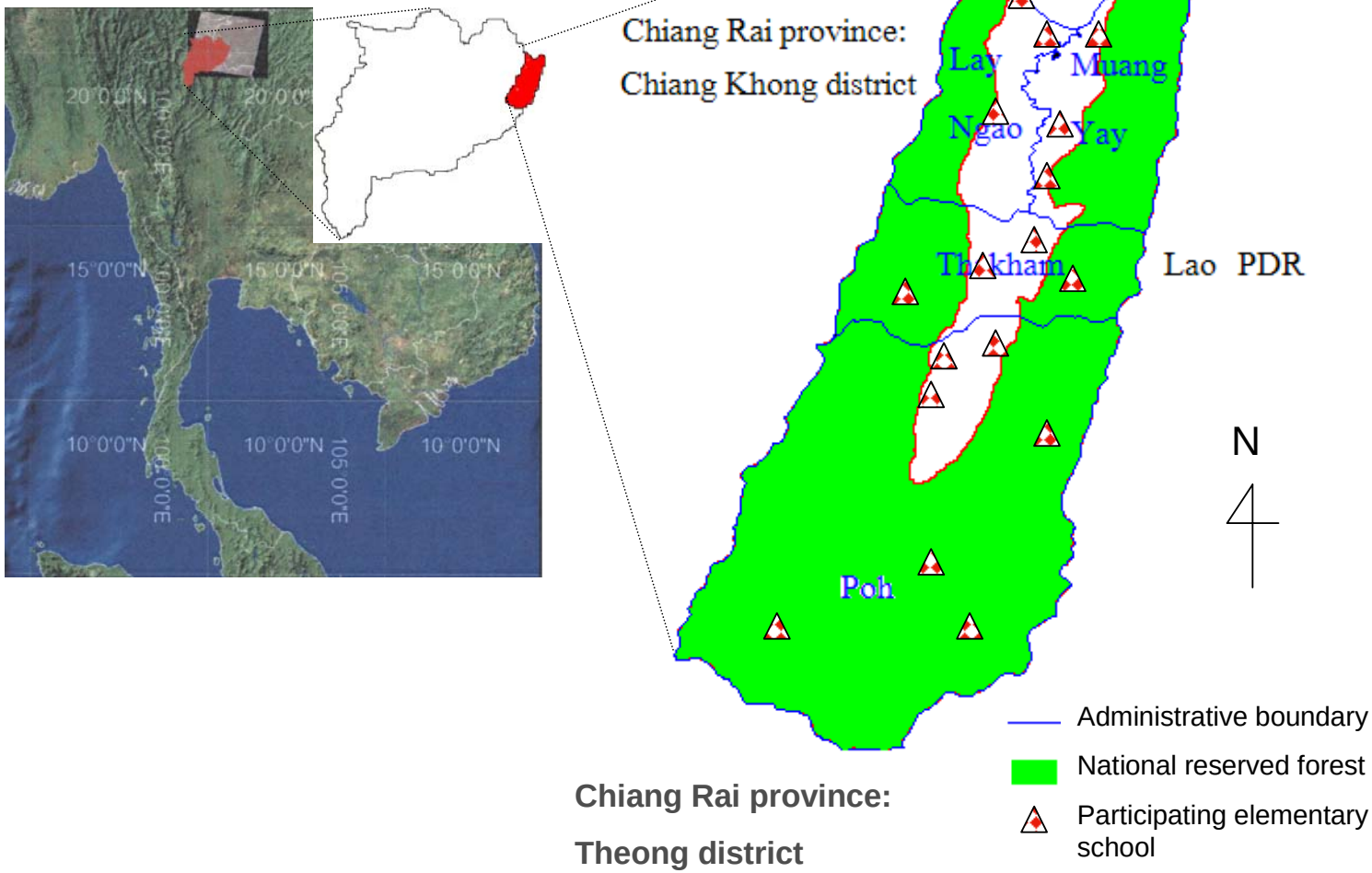
# IPCC guidelines

- Include non-$CO_2$ emissions from burning of plant residues in national greenhouse gas emission inventories
- In Thailand, burning of rice straw produces 0.25 mil. tons of non-$CO_2$ GHG annually (Kittiyopas, 2008)

# Objectives

1. Analyse government policy on burning of plant residues
2. Investigate existing management practice of plant residues
3. Identify potential to involve schools and students
4. Propose effective policy to promote plant residues management that benefits relevant stakeholders and conserves the environment

# Study site


Lao PDR
Chiang Rai province:
Chiang Khong district
Lay
Muang
Ngao
Yay
Thakham
Lao PDR
Poh
N
Administrative boundary
National reserved forest
Participating elementary school
Chiang Rai province:
Theong district

# Research methods

1. Field survey
2. Review of national and district policies
3. Capacity development program (action research)
4. Development of new model to manage plant residues for food security, income generation and climate change mitigation

# Capacity development program

1. Illuminating workshop (19 elementary schools)
2. Field visit and demonstration of practice
3. Brainstorming and drawing contest
4. Model farm practice in schools
5. Monitoring and evaluation by visiting participating schools (after 6 month)
6. Student's presentation in exhibition hall

# Result and discussion

# 1. Policy analysis and gap identification

- **National policy**
  - Prohibiting burning of plant residues
  - Promoting use of organic fertilizer and biological substances for farming
- **Provincial policy (Chiang Rai)**
  - Enforcement burning of plant residues involving local stakeholder for observation and penalty application
- **District policy (Wiang Kaen)**
  - Subsidising mulch plowing in project area (16 ha; 49US$/ha)
  - Promoting use of organic fertilizer
  - Promoting composting of food waste and manure
  - Promoting sustainable agricultural development for health

# SWOT analysis on the current policy for non- burning practice

| Strength | Weakness |
|---|---|
| • Strong support of government (indicates awareness)<br>• Established enforcement and penalty system | • Less concern for farmers situation<br>• Little economic support and incentives to farmers |
| **Treats** | **Opportunities** |
| • Occasion of unknown source and uncontrolled fire<br>• Increase price of fuel, increase cost of plowing | • Price increase of chemical fertilizer<br>• Demand for organic food |

# 2. Existing management practice of plant residues

- Burning of plant residues in upland field is common
- Some farmers are piling residues before burning
- Use of plant residues for soil cover in orchard

# Why do farmers burn the residues?

- Land clearance
- Eliminating pathogens and pests
- Reducing risk of uncontrolled fire

# Why not compost the residues?

- Do not want to take economic risk in composting
- No direct income from composting
- Do not want to lose land area for cultivation
- No labor to work on composting

# 3. Potential to involve elementary schools & students

- Farmers are not capable or not interested in composting of plant residues
- 22 schools distributed across the district
- Schools have personal resources, education system, good relation with farmers, space for composting, and need food for students lunch

# Evidence of students capability

- Active participation in workshop
- Well express the knowledge through drawing
- Well applying learning technology utilizing plant residues in model farm
- Good performance in presentation of their activity
- Expand the activity to awareness raising of the community

# Student activities: Attending workshop and visiting model farm

# Student activities: Drawing of model farm

# Student activities: Producing compost from plant residues

Huay Han School

Ban Muang Yay School

# Student activities: Use of plant residues for ground cover

Ban Huay Ian School

Somthawin Chintamai Border Police School

# Student activities:
# Use of sand bank and rocky area for cultivation

Ban Huay Ian School

Ban Huay Han School

# Student activities:
# Presentation and exhibition of student activities

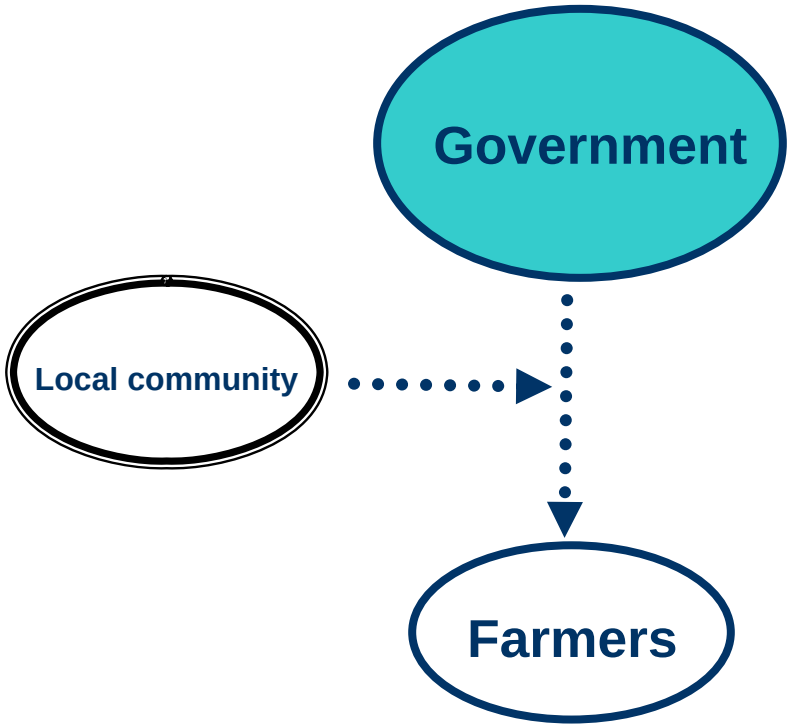
# Advance of schools in promoting use of plant residues

- Integrating this learning into science education program of schools
- Involvement of students from the first to final grades of school to participate in model farming, composting, and vegetable production
- Producing compost and vegetable for school lunch and household consumption
- Some schools produce compost and vegetable for sale
- Developing school network in the district

# Policy recommendation:

- Integrated management of plant residues for food security, income generation and climate change mitigation
- Need to involve a larger number of actors

# Existing plant management model

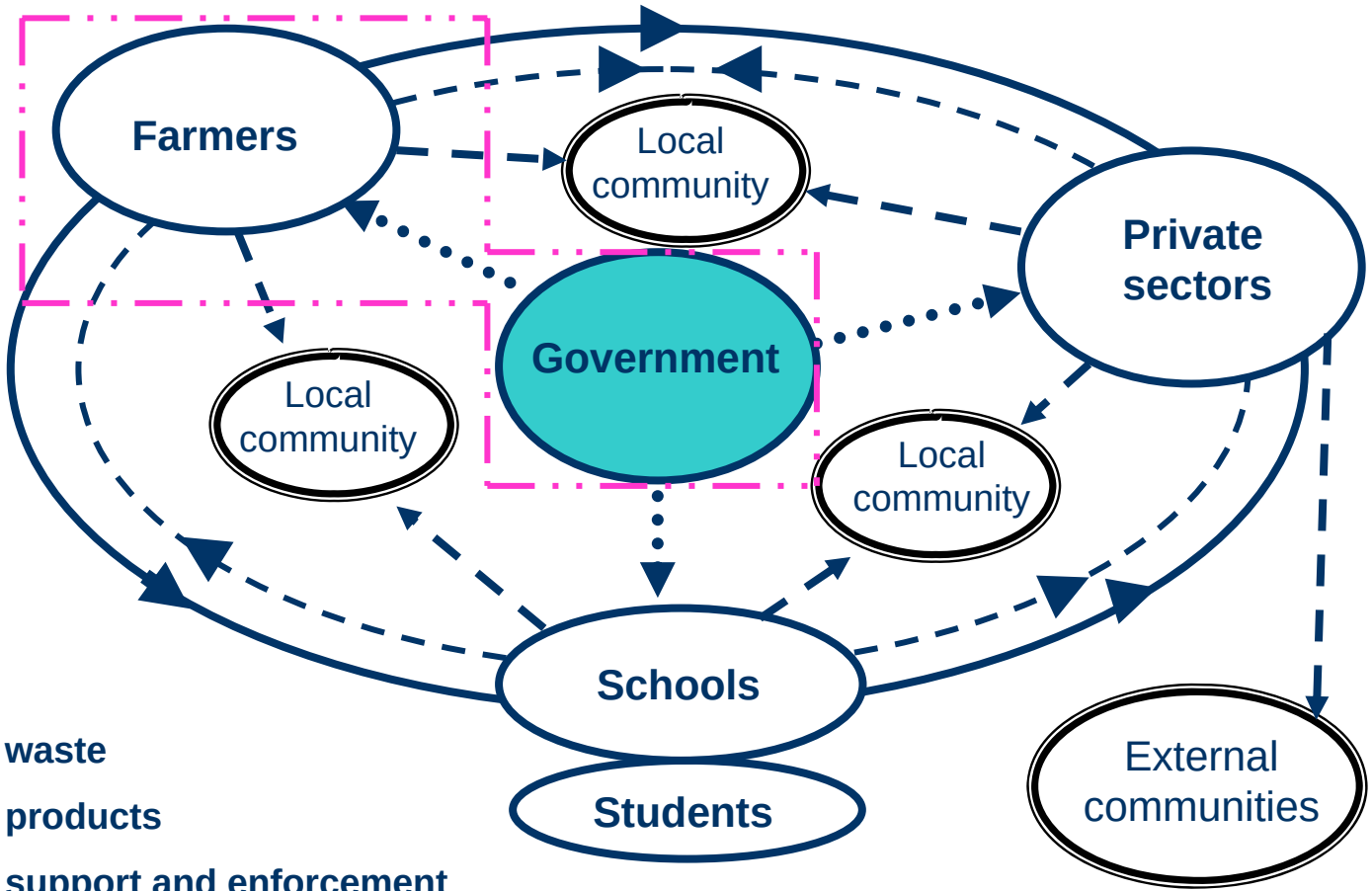



Flow of waste

Flow of products

Flow of support and enforcement

# Proposed plant residues management model



# Conclusion

- Burning is the easiest and most affordable practice for farmers to manage plant residues
- Enforcement is not appropriate to apply with small-scale and low-income farmers
- Schools have a certain capacity to manage plant residues
- Extension of school activities requires support of government and other stakeholders
- Involvement of schools to manage the plant residues to compel their benefits on food security, science education, income generation, and also regional benefits on climate change mitigation would be an effective model


Thank You for Your Attention