



Forest Conservation and Potential of Agricultural Land Use for Biofuel Expansion in Thailand

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Jintana KAWASAKI

Policy Researcher,

Forest Conservation Team,

Institute for Global Environmental Strategies (IGES)

The objectives of the research

- To develop and apply a comprehensive evaluation methodology to assess land suitability for production of bioenergy feedstock, considering the national renewable energy policy, climate change, and socio-economic factors.
- To contribute to land use planning for bioenergy feedstock and agricultural food crop production and forest conservation

Proposed Methodology

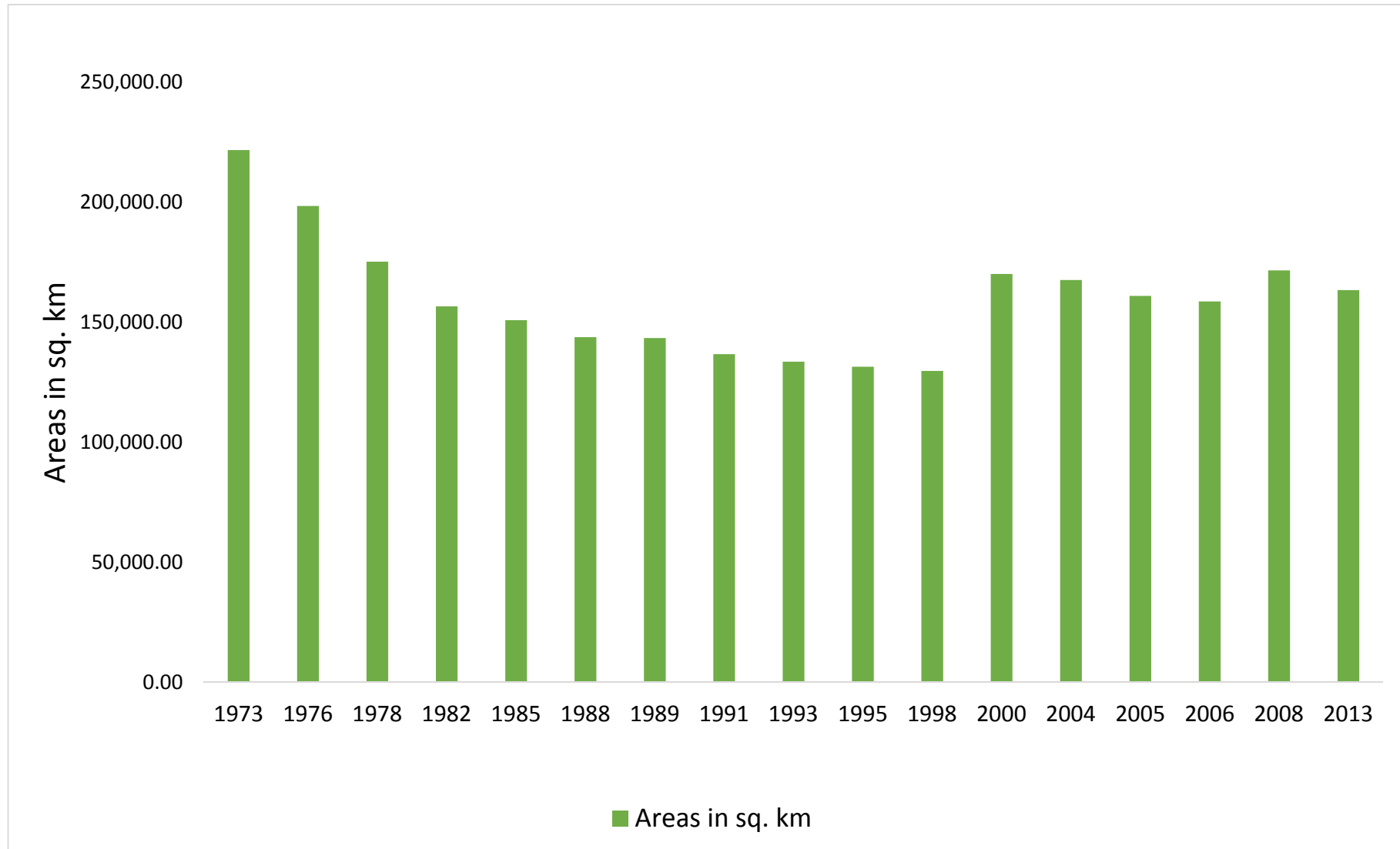
- Estimating life cycle GHG emissions of alternative good agricultural practices for sugarcane and cassava in current and near future
- Assessment of crop yield under climate and physical conditions by using DSSAT model in current and near future
- Assessment of land use changes associated with biofuel production, national renewable energy policy, climate change and socio-economic factors, and suitable land use for the biofuel production by applying GIS over the last 15 year, current, and near future

Proposed Methodology (continue)

- Assessment of role of forest communities in forest conservation and management



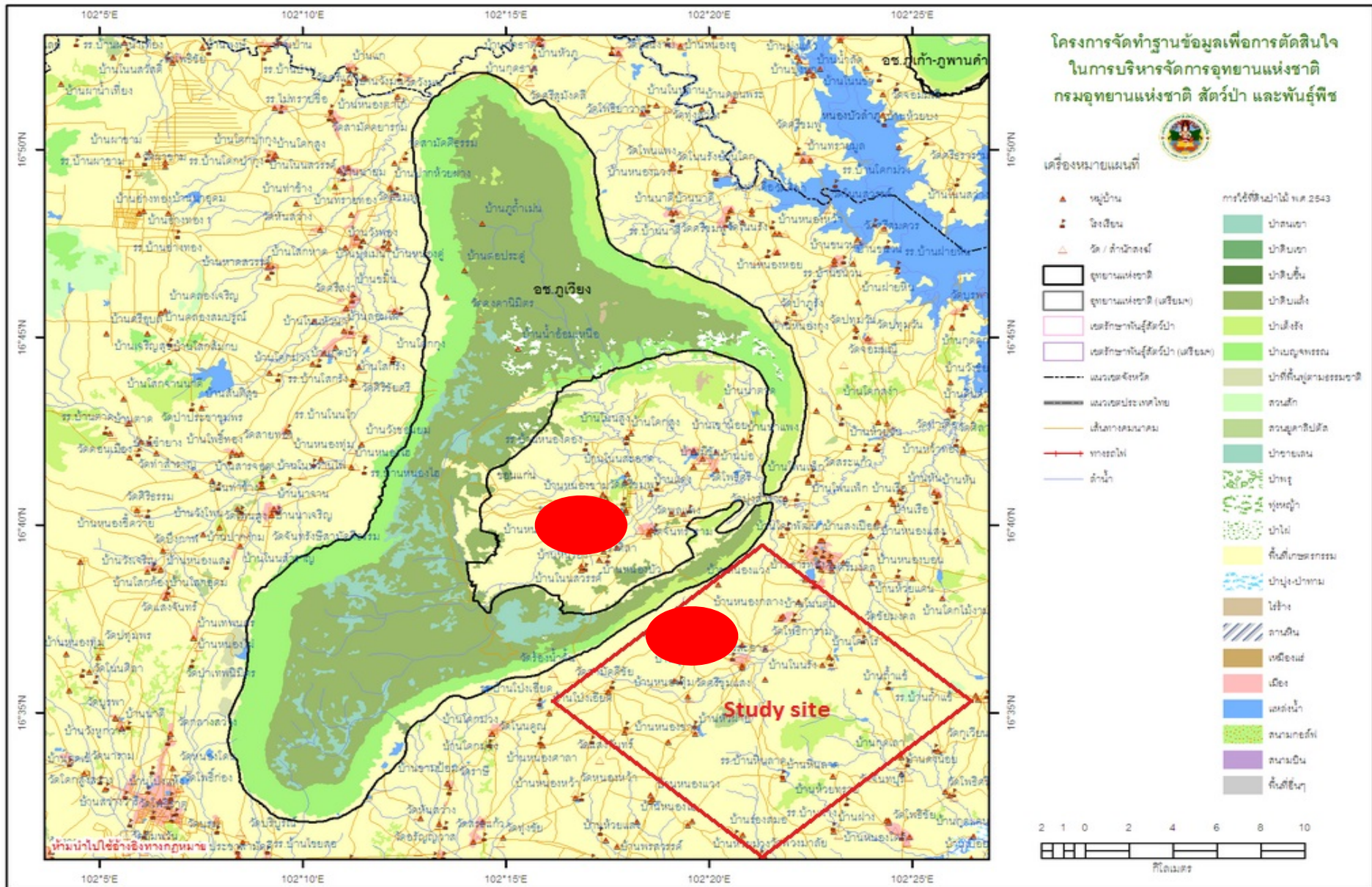
Thailand's forest areas (1973-2013), Source: RFD, 2014a



Direct causes of deforestation from the number of lawsuits in the RFD database

| Year | # of lawsuit reported/recorded on the RFD database | | | |
|------|--|-----------------|-------------------------|-------|
| | Encroachment | Illegal logging | Hunting/NTFP harvesting | Total |
| 2009 | 2,577 | 3,000 | 102 | 5,679 |
| 2010 | 2,857 | 3,318 | 97 | 6,211 |
| 2011 | 3,155 | 4,520 | 32 | 7,707 |
| 2012 | 2,745 | 3,939 | 51 | 6,735 |
| 2013 | 2,801 | 4,029 | 57 | 6,887 |

Study sites surrounding the Phu Wiang National Park in Khon Kaen Province

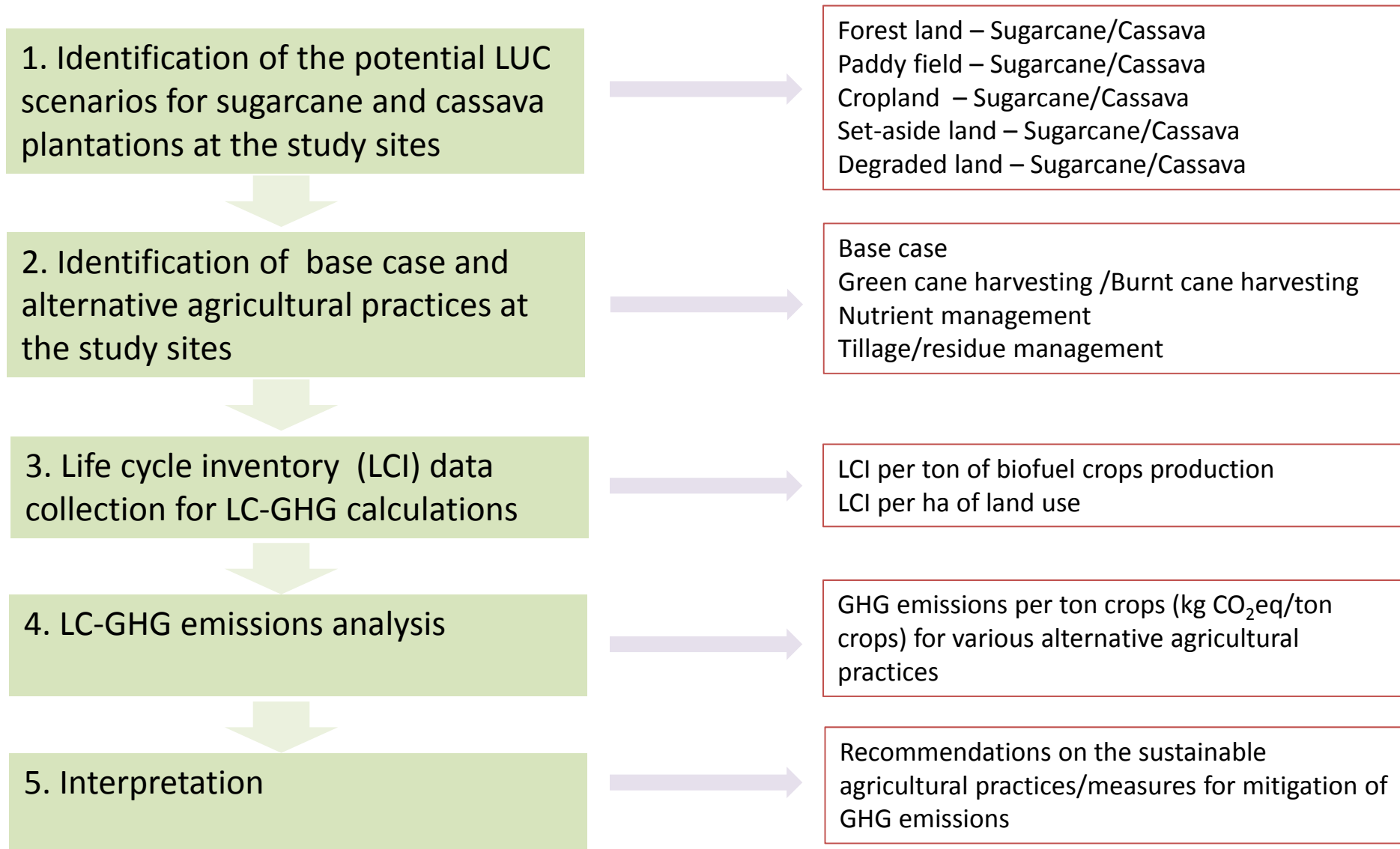


Risk of forest areas in the Phu Wiang National Parks was observed.

Illegally cut down Thailand Rosewood (*Dalbergia cochinchinensis* Pierre) was found in the study sites.

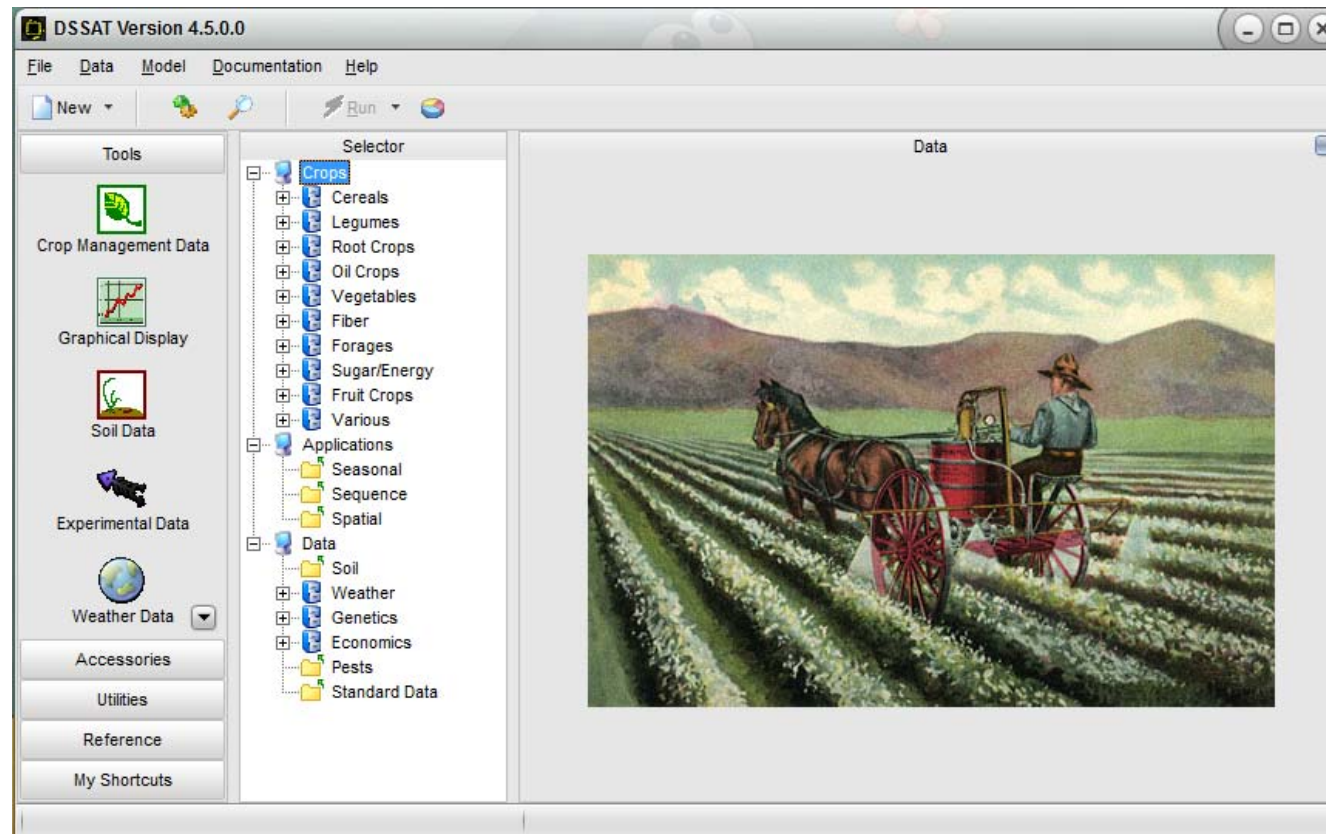


I. Lifecycle GHG emissions calculation of sugarcane and cassava under alternative good agricultural practices



II. Assessment of crop yields by using DSSAT model

The Decision Support System for Agrotechnology Transfer (DSSAT) Version is a software application program that comprises crop simulation models for over 28 crops (as of Version 4.5)



To assess the impact of climate change on crop yields:
Rice, Cassava , Sugarcane

Methodology used for assessment

1. Data Collection and Create database

- Weather data (daily data)
- Soil data (Soil series)
- Management
- Land use (rice, cassava, sugarcane)
- Genetic coefficient (rice, cassava, sugarcane)

2. Create Simulation mapping unit (SMU) by GIS technique

3. Crop yield simulation

4. *Evaluation

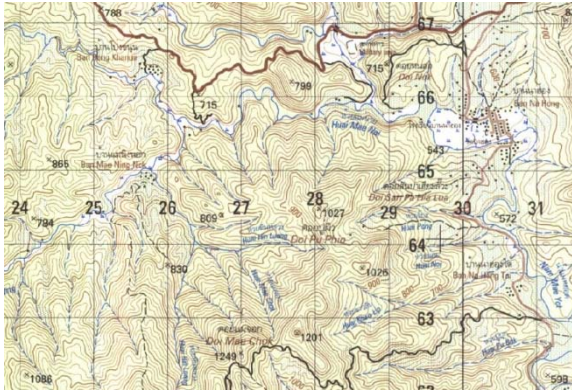
- Simulating the effects of climate change on crop production
- Crop yield assessment under alternative crop management scenario simulation.

III. Assessment of land use changes associated with biofuel production, national renewable energy policy, climate change and socio-economic factors, and suitable land use for the biofuel production by applying GIS

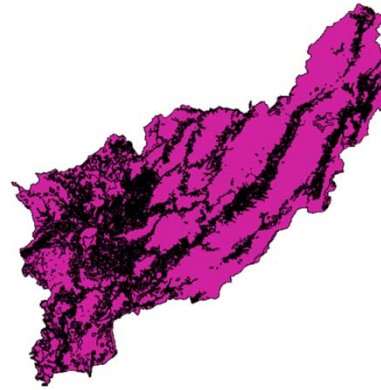
- To assess forest land reduction and land use change over the last 15 years in Khon Kaen Province**
- To identify the suitable land use for biofuel feedstock production and risk of forest area associated with increasing of biofuel feedstocks in current and near future (year 2021/22)**



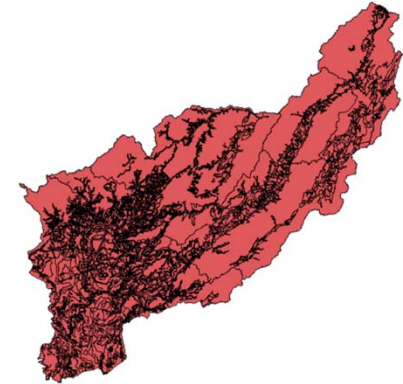
Equipment



Topography



Land use map



Soil map



Ortho photo



Satellite

| Station | WGS84 UTM | Direction of station above N | 180.0° | Notes |
|--------------|------------------|------------------------------------|--------|-------|
| 00 Station | 4200 | Height of transmitter above N | 150.00 | Notes |
| 00 Latitude | 49° 27' 46.0" N | Height of transmitter above ground | 1.00 | Notes |
| 00 Longitude | 122° 47' 23.0" W | Height of sensor above ground | 0.75 | Notes |
| 00 | | Height of rampage | 1 | Notes |
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Moisture regimes



GPS

IV. Assessment of role of forest communities in forest conservation and management

- To analyze changes of community agricultural land and forest land associated with biofuel expansions, economic and social factors, national renewable policy and national forest management planning
- To study role of communities and activities in forest management

Study sites in Khon Kaen Province

Communities live in the land abutting on a protected forest area surrounding the Phu Wiang National Park

Main crops mostly found in the study sites are rice, sugarcane and cassava



Thank you very much