EE475 Natural Resource Economics

Forest Resources

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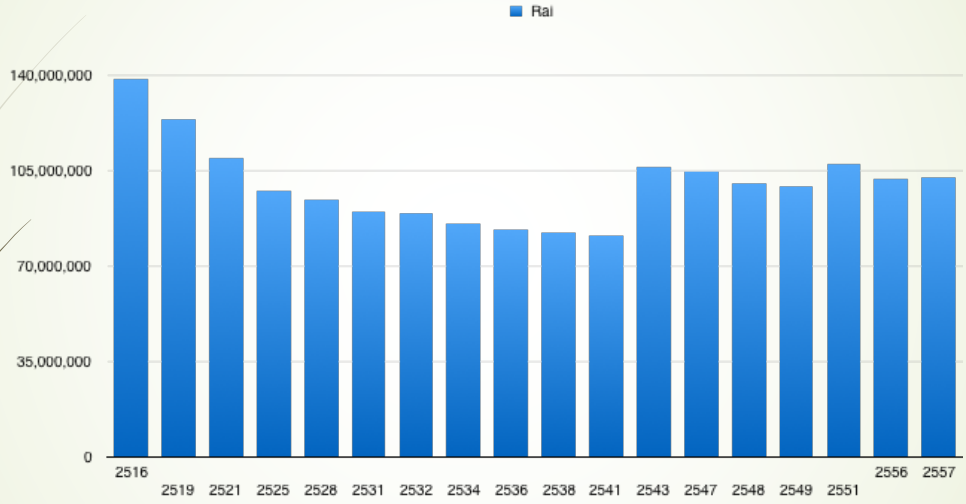
Outline

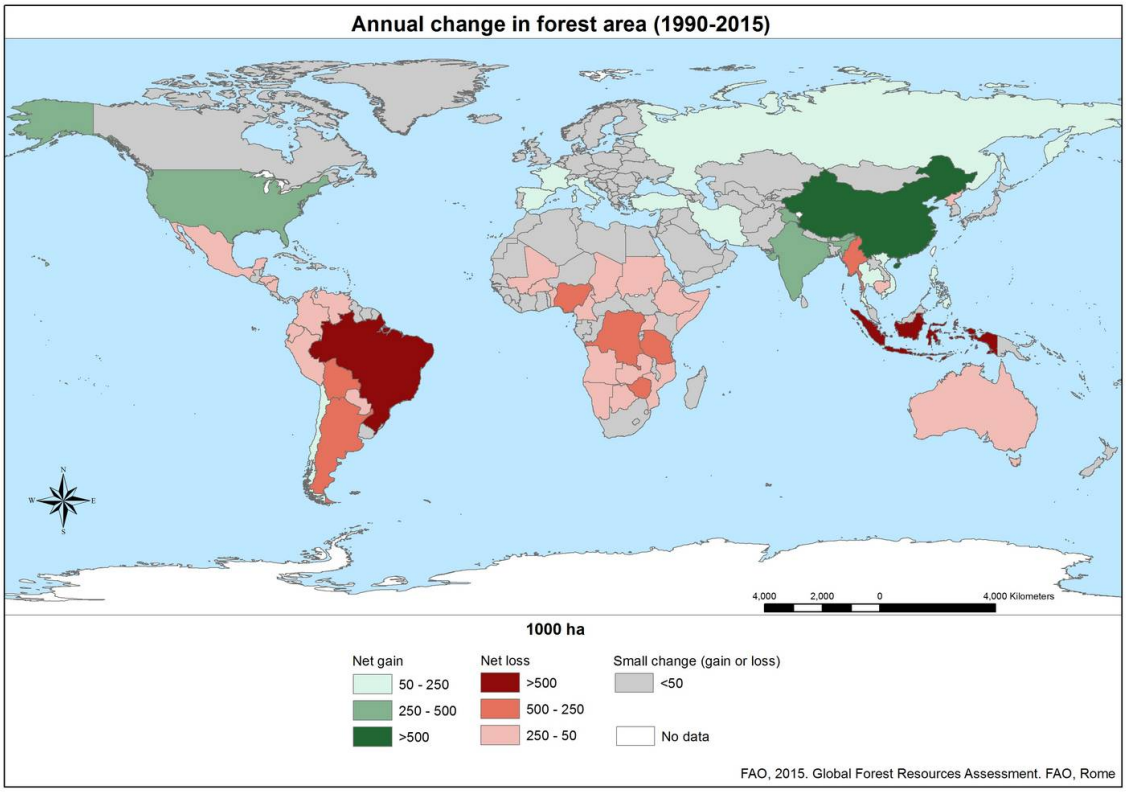
- Some statistics
- Benefits of Forest
- Some issues regarding forest area in Thailand
  - Lost of forest in the Central plain
  - Forest and politics
  - Forest encroachment
- International issues
- Government actions and measures

Forest area in Thailand

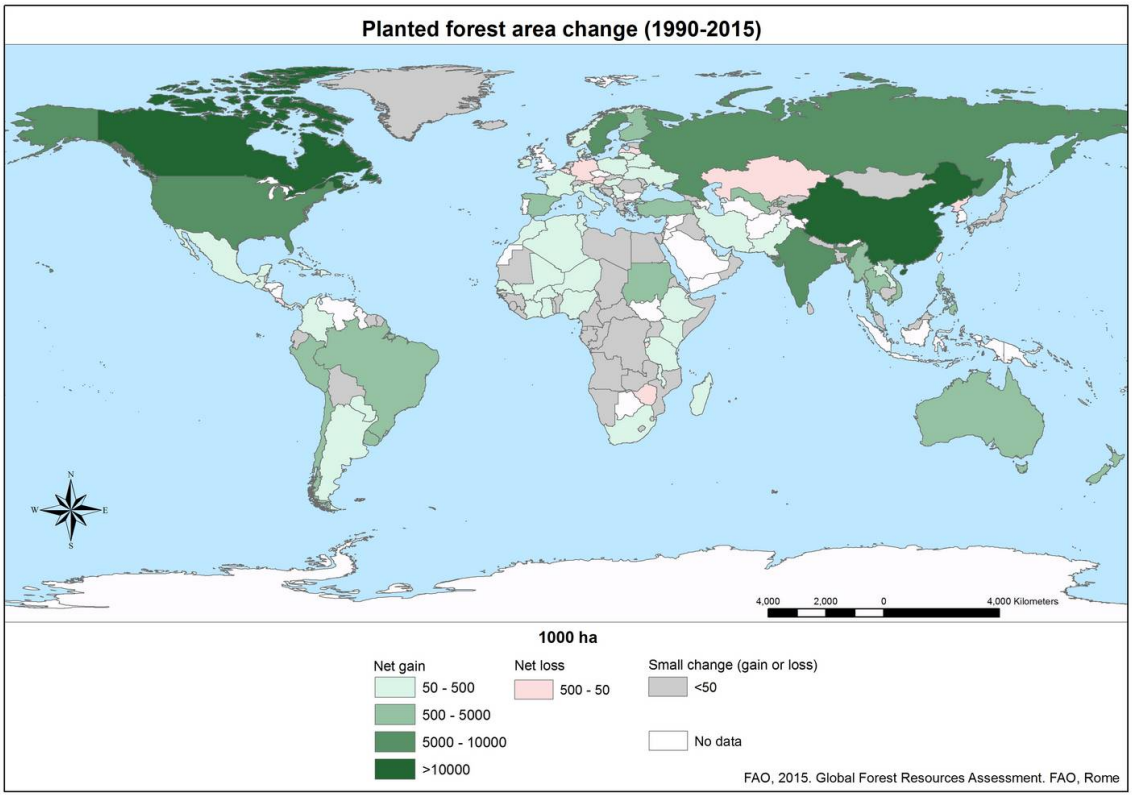


31.57%

ที่มา : สำนักจัดการที่ดินป่าไม้ กรมป่าไม้

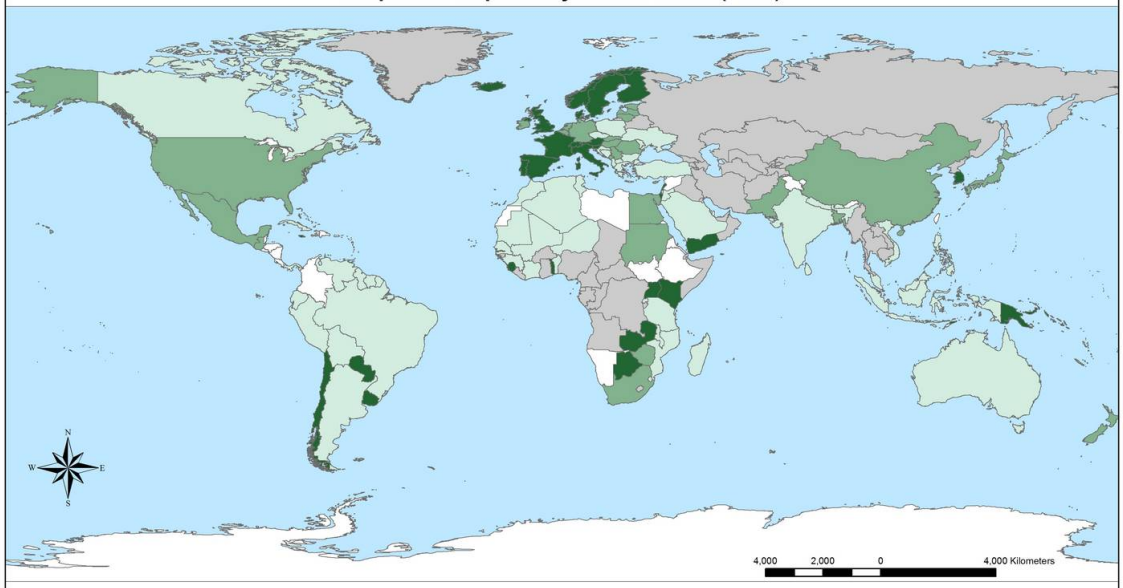


Planted forest area change (1990-2015)



FAO, 2015. Global Forest Resources Assessment. FAO, Rome

Proportion of privately owned forest (2010)



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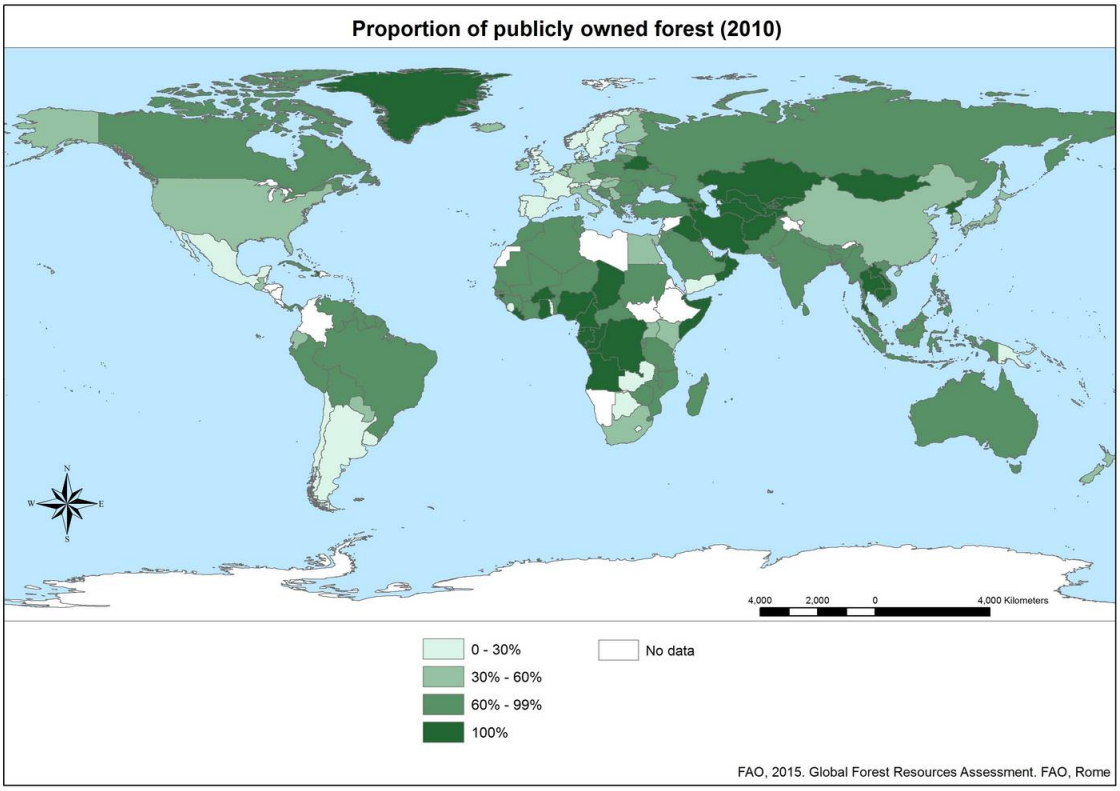


Benefits of Forest

- Ecological Benefit
  - Important part of water, oxygen, carbon, nitrogen, cycles in the ecosystem
  - Water sources
  - Climate impact of the forest
  - Natural Barriers

Benefits of Forest

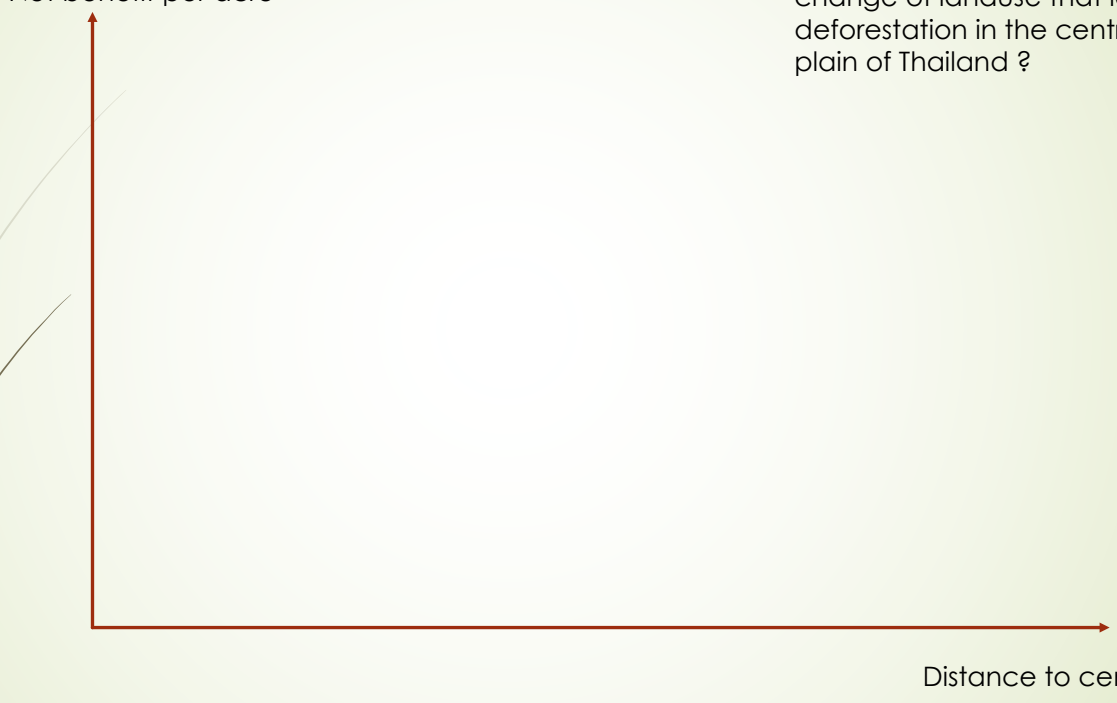
- Individual and Community benefits
  - Forest Products
    - Timber forest product (TFP)
    - Non-Timber Forest Product (NTFP)
  - Necessities
  - Income
  - Cultural aspect

Benefits of Forest

- Benefits at Macro level
  - Export Products – teak, rubber wood, Siamese rosewood
  - Water source for all economic sectors
  - Absorbing Green House Gas, reducing costs of climate change mitigation

Some issues regarding forest area in Thailand

- The Bowring treaty and its counterparts
  - Rice became the number 1 export product of Thailand, feeding not only Thai people but people in the colonies of powerful nations.
  - Overseas businesses moving into Bangkok, other service sectors such as banking emerged in Bangkok.
  - Awareness about ecological benefits of the forest was very limited.



How can we explain the change of landuse that led to deforestation in the central plain of Thailand ?

Some issues regarding forest area in Thailand

- Forest Concession – Since 1941 (2484 B.E.)
  - State gave rights to private sector to utilize timber in Thai forest and mangrove forest.
  - The concession also required the concessionaire to reforest the area but the enforcement was weak.
  - Concessionaires illegally logged outside their areas.

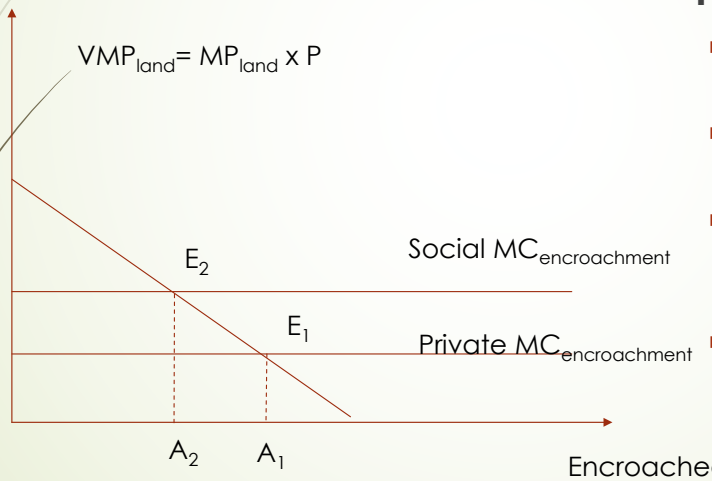
Some issues regarding forest area in Thailand

- Forest Concession
  - All forest concessions were abolished in 1989 due to land slide event in 1988 in Katoon sub-district, Phipoon district, Nakorn Si Thammarat province.
  - The problem was not the land slide, logs that came with the slide. That destroyed villages and killed at least 700 people.

Some issues regarding forest area in Thailand

- **Forest and local politics:**
  - People who were granted forest concession accumulated wealth to the point that they became politically influential, like a mafia or local elite, in the area.
- **Establishment of conservation areas or national parks as well as dam construction:**
  - Minority groups and locals had lived their long before such establishment or construction.
  - They were relocated and not properly subsidized.
  - Some have been fighting for their rights, e.g. case of Pak Mun dam, movement for the community forest bill.

Some issues regarding forest area in Thailand

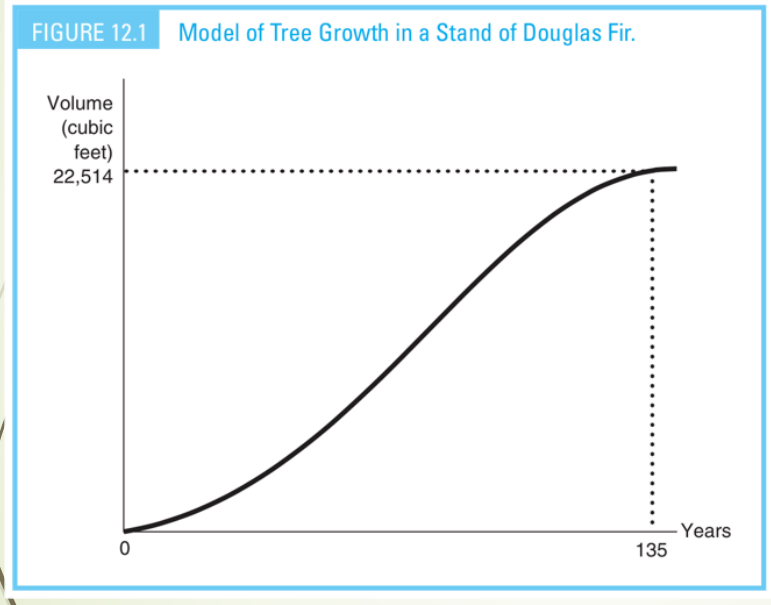


- **Forest Encroachment**
  - Poverty and Inequality of land ownership
  - Higher demand for agricultural products
  - Inefficient law enforcement, thus low perceived cost of encroachment.
  - Uninternalized negative externalities

Economics of Forest Harvesting

- Not so relevant to the context of Thailand since we have no private forest. In the U.S. and Japan, however, there are private forests.
- Forest is a renewable resource.
- What is the difference between forest resource (timber) and other renewable resources (e.g. fishery, surface water, etc.)?

Economics of Forest Harvesting



Source: Tietenberg and Lewis 2012, p.296

Economics of Forest Harvesting: Single-harvest model

- Assumptions
  - Price per 1 m3 of wood = 1 dollar
  - Cost of harvesting 1 m3 of wood = 0.30 dollar
  - Cost of planting the trees = 1000 dollar
- What is the difference between the cost of harvesting and cost of planting?

TABLE 12.1 Economic Harvesting Decision: Douglas Fir

Age (years)	10	20	30	40	50	60	68	70	80	90	100	110	120	130	135
Volume (cubic feet)	694	1,912	3,558	5,536	7,750	10,104	12,023	12,502	14,848	17,046	19,000	20,614	21,792	22,438	22,514
Undiscounted ($r = 0.0$)															
Value of Timber ($)	694	1,912	3,558	5,536	7,750	10,104	12,023	12,502	14,848	17,046	19,000	20,614	21,792	22,438	22,514
Cost ($)	1,208	1,574	2,067	2,661	3,325	4,031	4,607	4,751	5,454	6,114	6,700	7,184	7,538	7,731	7,754
Net Benefits ($)	−514	338	1,491	2,875	4,425	6,073	7,416	7,751	9,394	10,932	12,300	13,430	14,254	14,707	14,760
Discounted ($r = 0.01$)															
Value of Timber ($)	628	1,567	2,640	3,718	4,712	5,562	6,112	6,230	6,698	6,961	7,025	6,899	6,603	6,155	5,876
Cost ($)	1,188	1,470	1,792	2,115	2,414	2,669	2,833	2,869	3,009	3,088	3,107	3,070	2,981	2,846	2,763
Net Benefits ($)	−560	97	848	1,603	2,299	2,893	3,278	3,361	3,689	3,873	3,917	3,830	3,622	3,308	3,113
Discounted ($r = 0.02$)															
Value of Timber ($)	567	1,288	1,964	2,507	2,879	3,080	3,128	3,126	3,046	2,868	2,623	2,334	2,024	1,710	1,449
Cost ($)	1,170	1,386	1,589	1,752	1,864	1,924	1,938	1,938	1,914	1,860	1,787	1,700	1,607	1,513	1,435
Net Benefits ($)	−603	−98	375	755	1,015	1,156	1,190	1,188	1,132	1,008	836	634	417	197	14
Discounted ($r = 0.04$)															
Value of Timber ($)	469	873	1,097	1,153	1,091	960	835	803	644	500	376	276	197	137	113
Cost ($)	1,141	1,262	1,329	1,346	1,327	1,288	1,251	1,241	1,193	1,150	1,113	1,083	1,059	1,041	1,034
Net Benefits ($)	−672	−389	−232	−193	−237	−328	−415	−438	−549	−650	−737	−807	−862	−904	−921

Value of timber = price × volume/$(1 + r)^t$
Cost = \$1,000 + (\$0.30 × volume)/$(1 + r)^t$
Net benefits = value of timber − cost
Price = \$1

Economics of Forest Harvesting: Infinite planting case

- Harvesting the forest can be done in infinite cycles. If each rotation is independent from each other, the single-model can be used.
- In reality, however, each rotation is interdependent with the other.
- *The opportunity cost of delaying the next cycle* exists only in the infinite-planning case and has to be taken into account when considering when to harvest the round.
- Do you think the forest will be harvested earlier or later than a single-harvest case?

Forest and International Issues

- Conservation and usage of forest area on borders
- Financial Mechanism to support forest conservation to solve climate change problem
- Using biodiversity in other countries

Government Actions

- Controlling logging and limiting usage by the state
- **Two types of forest** (according to Forestry Act B.E. 2484 (พระราชบัญญัติป่าไม้) and National Reserved Forest Act B.E. 2507 (พระราชบัญญัติป่าสงวนแห่งชาติ)
  - **Forest** - Land that is not owned by a person/legal person according to Land Act
- **National Reserved Forest** - Reserved forest to maintain the forest condition, timbers and other non-timber forest resources

Government Actions

- The departments responsible (Under Ministry of Natural Resource and Environment Thailand)
- **Royal Forestry Department**: Taking care of the usage of the forest and forestry industry, and conservation and reforestation in the non-national park area.
- **Department of National Park, Wildlife and Plant Conservation**: Conserving and rehabilitating forest resource and wildlife in conservation areas.
- **Department of Marine and Coastal Resource**: Taking care of mangrove forest.

Government Actions

- **Minimal Conserved Forest Area**
- A size of conserved area that is enough for existence and survival of wildlife and plants and maintain long-term biodiversity
- Forest area of 40% of the country's total area.

Government Actions

- **Internationally recognised conservation areas**
  - *World Heritage sites* - UNESCO
    - Huai Kha Kaeng Wildlife Sanctuary
    - Dong Phayayen-Khao Yai Forest Complex
  - Conserved wetlands under *Ramsar Convention*
  - 12 sites across Thailand (in Songkla, Krabi, Trang, Naratiwat, Ranong, Pang-nga, Suratthani, Nakhon Si Thammarat, Chiang Rai, Nong Khai, Samut Songkhram

Problems from Government actions

- Conservation areas were specified on already occupied lands.
- Inefficient and unequal land ownership, forcing people to convert forest into agricultural land
- Lack of efficiency and resources for taking care of the conservation areas, national parks and sanctuaries.

Some Economic Measures

- Monetizing the demand for preservation
  - People visit national parks because they want to benefit from the preserved nature.
  - This reflects the demand for preservation.
  - Collecting proper level of entrance fee to a preserved areas would help funding the preservation endeavor.
- Existing measures
  - Entrance fee for National parks.
  - Trust Funds for Habitat Preservation
    - Mesoamerican Reef (MAR)

Some Economic Measures

- Subsidizing conservation efforts
  - Conserving forest has operational costs as well as opportunity costs.
  - Subsidizing such efforts would increase conserved area.
- Potential / Existing measures
  - Community forest funds
  - REDD+

UN-REDD PROGRAMME

FAO UNDP UNEP