



**Rotational Farming, Biodiversity and Food
Security and Climate Change in Northern Thailand**
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Guide line for presentation

- Introduction: over view population, Location of study, local wisdom and the practices of Karen people on NRM
- What is Rotational Farming?
- Analysis of research finding
- Conclusion: challenges, opportunities and recommendations

Introduction:

Thailand comprises of 77 provinces.

It covers an area of 513,115 km² and has a total population of 62,418,054 people.

IPs in Thailand are referred as “hill tribes”, sometimes as “highland people/communities”.

Population 925,825 and across 21 provinces in the north and west of Thailand.

IPs/ Ethnic groups in Thailand

- Only ten ethnic groups officially recognized “hill people” living in the north and west of the country are: the Karen, Hmong, Akha, Lahu, Lisu, Mien, Lua, H’tin, Khmu, and Mlabri.
- There are many ethnic groups not official recognize yet e.g. Dara-ang, Kachin, Shan ect.
- Karen are the biggest group around 411,670 who most of them still strongly base on cultivate the rotational farming.

Forest Resource situation in Thailand

Area of the country:	51.3 m ha
National target for forest cover: 40%	20.5 m ha
Forested area:	17.2 m ha
Forest area need to be rehabilitated	2.3 m ha

National Forest Policy (1985) targeting 40% (20.5 m ha)

Conservation Forest 25 %

Economical Forest 15 %

(3.3 m ha to achieve national target)

Reserved Forest (11.8 m ha)

Conservation or protected forest (10.6 m ha)

148 national parks

111 forest parks

60 wildlife sanctuaries

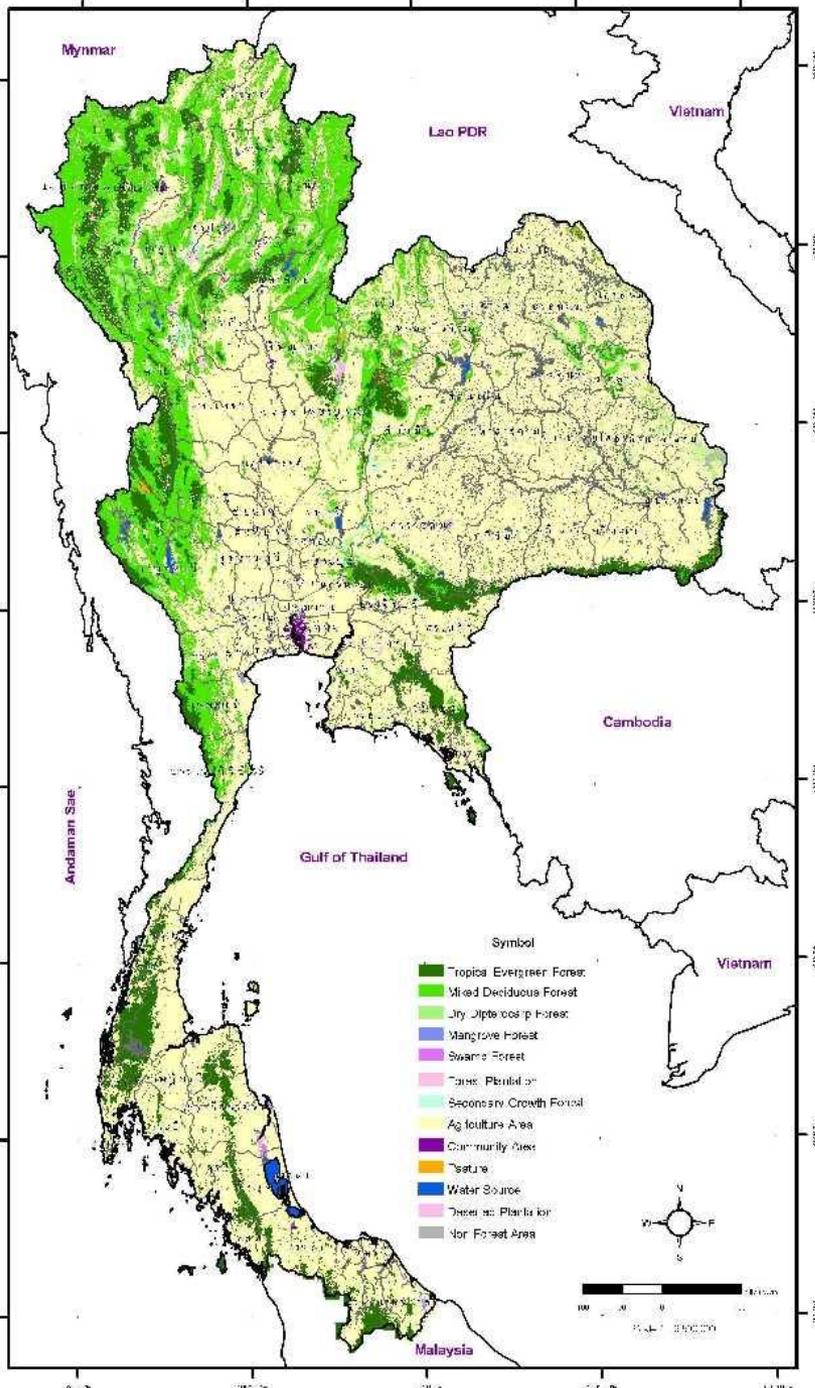
65 non-hunting areas

16 botanical gardens

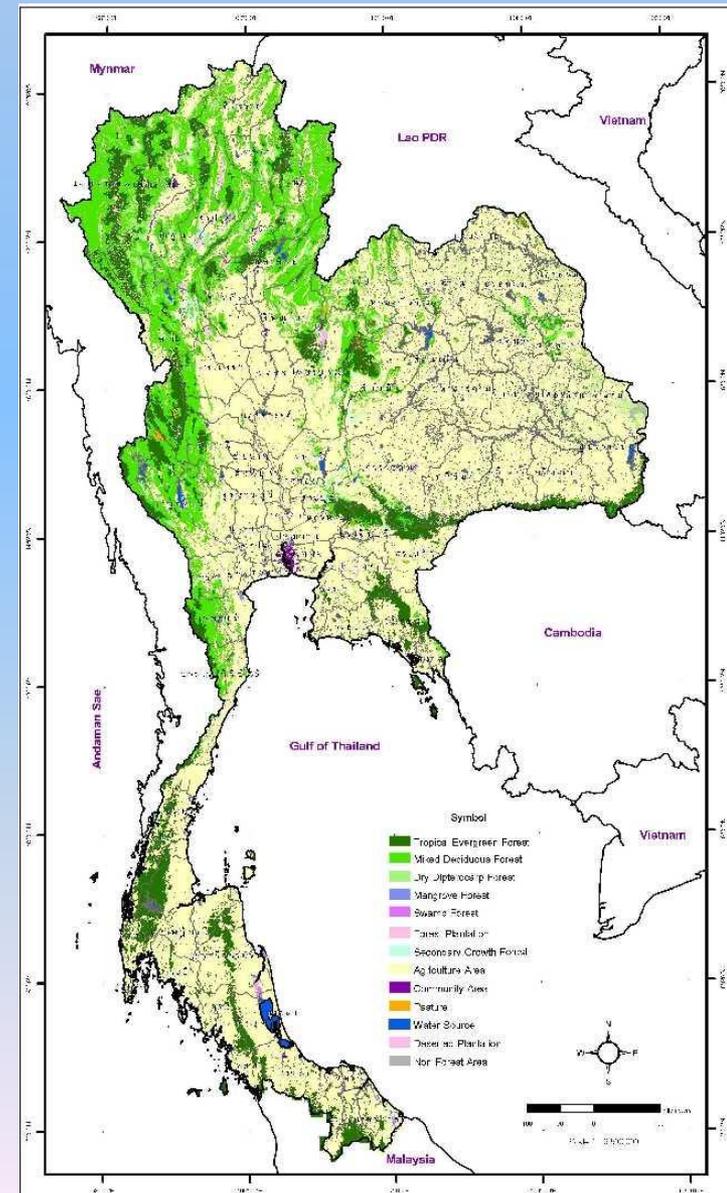
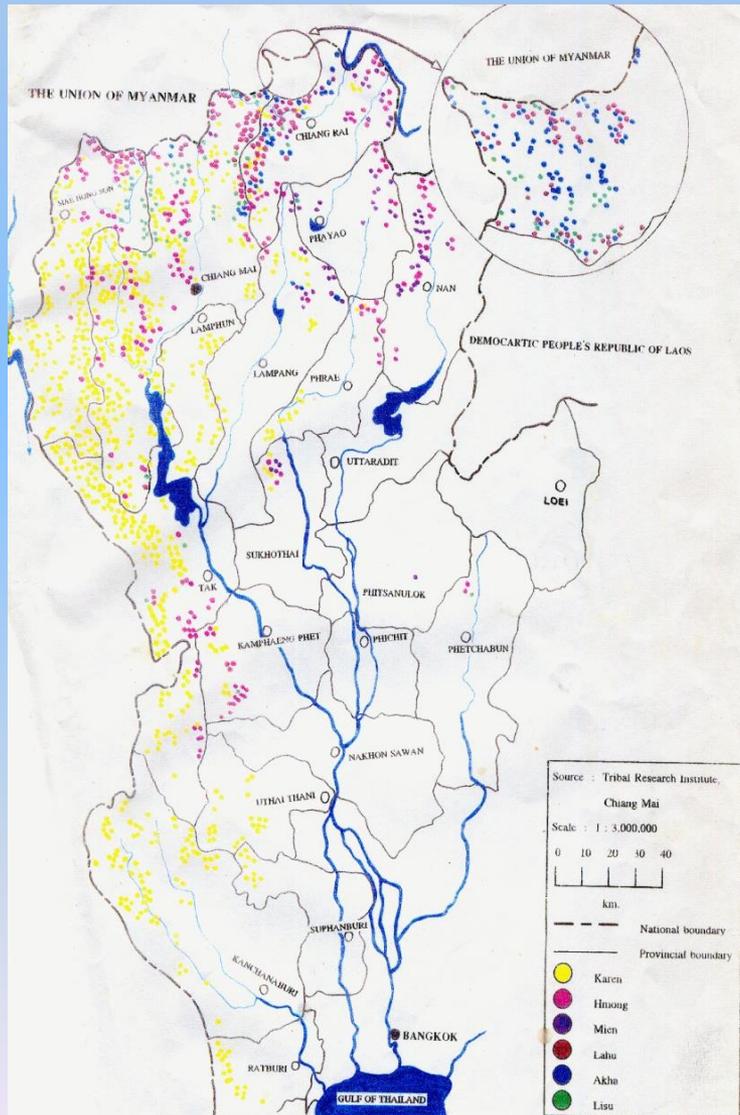
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Since the logging was banned in 1989

Existing forest area in 2011 was 33.09 %



Highlanders Settlements and Forested Areas in Thailand



Current Situation of IPs in Thailand

- IPs in Thailand are facing the stereotyping and discrimination policy from government from the last five decades.
- Until today the IPs of Thailand continue to suffer from the historical stereotyping and discrimination.
- Underlying many laws, policies and programmes, IPs as being drug producers and posing a threat to national security and to the environment.

The Wisdom of the Karen in N R M

“Live with the water, care for the river, live with trees, care for the forest. Live with the fish, care for the spawning grounds, live with the frog, care for the cliff.”

“Deif hti rai kauj Ritual” is the heart of Natural Resource Management of Karen

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เดปอญ

“ป่าสะตือ”

ท่ามกลางการช่วงชิงทรัพยากร

Umbilical
Cord Trees &
Forest



Integrated resource management for Karen livelihoods



What is Rotational Farming (RF)?

A knowledge intensive practice that strongly relies on a diversity of crops



Sustainable and culturally rich

BUT

misunderstood and **criminalized** as cause of deforestation and environmental degradation and climate change.



The New Year, in February, marks the beginning of the RF cycle when each family performs wrist string tying ceremony.

First, clear the fields to prepare them for farming



Trunks are slashed but will regenerate again soon





Preparing the firebreak around the field before burning.



“Sowing the mother rice” ritual, carried out by young people before sowing the rice.



**A week or two after
burning the field, young
sprouts grow-up quickly
from the tree trunks.**









The *bgau quv* ritual includes an offering to the spirit-owner of the mountains and rivers, an offering to mother rice, an offering to the spirit of fire, and a ritual to remove bad influences from the field.



Harvest Season



Rice threshing



The harvest is completed by carrying the rice to the barn.

The Rotational Farming Fallow System



Hsgif auf mei
(fallow of year one)



Hsgif wa
(white fallow in year two)

In the 1st and 2nd year: plants for food 16 kinds, 7 kinds of wildlife, and 7 kinds of herbs.



Hsgif bauf
(Young fallow)



Hsgif yauv ploj
(Adolescent fallow)

The 3rd and 4th year fallows: 10 kinds of plants for various uses, 4 kinds of bamboo, 13 kinds of wildlife and 12 kinds of wildfowl.



The 5th and 6th year fallow : 75 kinds of plants for food, wood & herbal medicine, 12 kinds of wildlife, and 30 kinds of wildfowl.



The 7th to 10th year fallows: 35 kinds of food plants, trees for various kinds of use and herbal medicine, and 19 kinds of wildfowl.



In 5th -7th fallow land: Several new stems grow up from the same root system around a few tree trunks that were cut earlier.

The importance of regenerating fallow forests for Rotational Farming

- Fallows are essential to rotational farming– without the regenerating fallow forests, productivity in rotational farming cannot be assured.
- Rotational farmers, therefore, *nurture the forests* into their fallow periods during the cultivation phase
- Fallow forests are the *backbone* of rotational farming

RF Enhances Biodiversity as Natural Seeds Bank

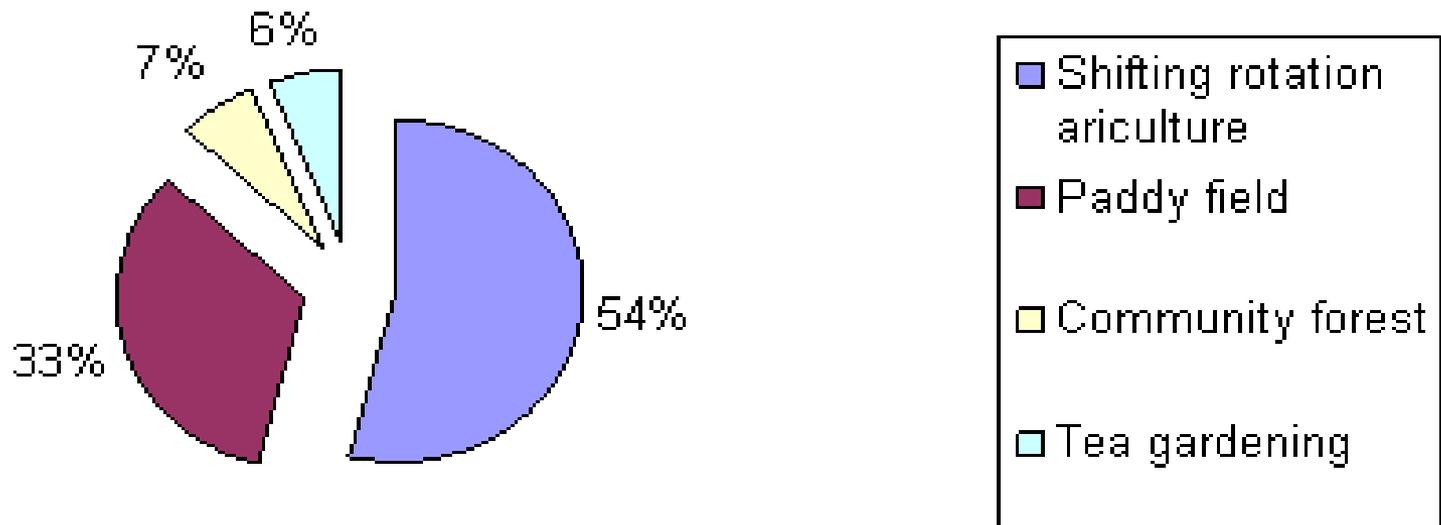
- Collection of traditional seeds and plant varieties, including spontaneous plants.
- **207 species are found** in the RF fields (Anan et.al, 2004).
- System used for hundreds of years, it is a **Natural Seeds Bank**



Biodiversity in Rotational Farming

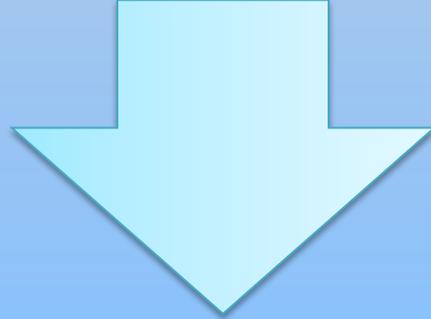


Availability of plant food in the community



Rotation farming field is a major source of household food (Prayong Doclamyai et al, 2010).

Products from RF and forest for food security



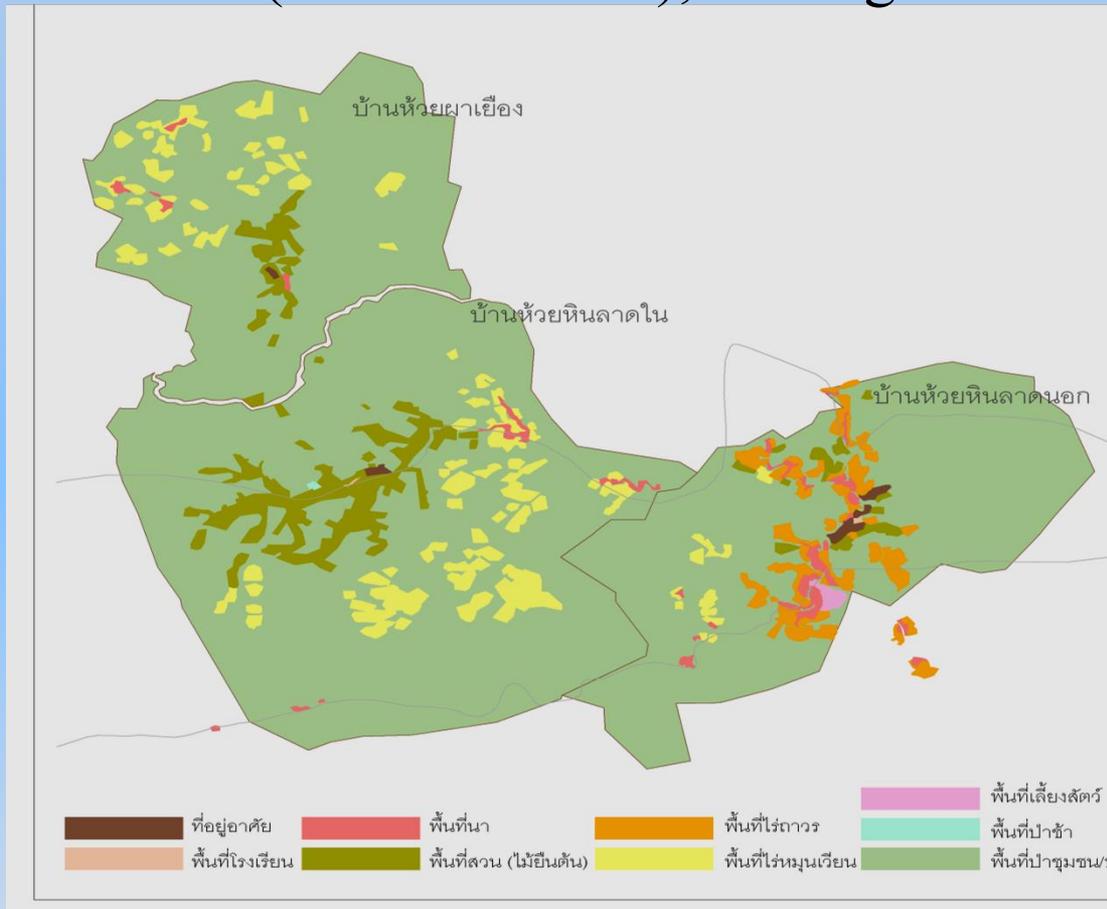
Contribution of Rotational Farming

- Integration with other systems, such as terraced paddy fields, kitchen gardens, animal husbandry, hunting and gathering, and so on
- Connection between agricultural production and the overall ecosystem
- Balance of land, water and forest
- Regeneration of fauna, flora and biodiversity, conserving both animals and plants
- RF is a major component of the sustainable management of natural resources and is based on self-sufficient production.

Contribution of Rotational Farming

- The RF as internal sources of food production for the local consumption of the community members.
- This enhances maintenance of food security, food sovereignty, sustainable use of local resources, and local biodiversity.
- Help maintain the balance of the ecosystem, can reduce greenhouse gas (GHG) emissions, and maintain food security.
- Management dynamics and continuous adaptation

Hinlad Communities (the 3 Hamlets), Chiang rai Province



Total area 29,344.70 rai (1 ha=6.25 rai)

classified as follows:

- Settlement 66.06 rai

- paddy fields 229.41 rai

- Agro-forestry 1,019.80 rai

- Rotational Farming 1,298.72 rai

- permanent land use 575.20 rai

- community forest 19,616.37 rai

Capacity for carbon storage

Types of land and forest	rai	hectare	%	Capacity for carbon storage		
				Ton of carbon/ hectare	Total number of carbon storage(ton)	%
total forest area	19,498	3,119.68	84.25	212	661,372.16	91.78
Total land use area	3,547	567.52	15.33	-	59,458.84	8.22
terrace area	226	36.16	0.98	25	904.00	0.13
rotational farming	114	18.24	0.49	25	456.00	0.06
fallow from 1-10 years	1,476	236.16	6.38	-	17,167.00	2.41
Tea garden	982	157.12	4.24	179	28,124.48	3.90
fruit trees	132	21.12	0.57	158	3,336.96	0.46
corn field	585	93.60	2.53	99	9,266.40	1.29
Grass land for Animals	33	5.28	0.14	-	-	-
settlement	98	15.68	0.42	-	0.00	0.00
Total land	23,143	3,703	100.00	-	720,627.00	100.00

Carbon storage:

Finding: Carbon storage in the community forest at Huay Hin Lad Nai and two nearby communities, Huay Hin Lad Nok and Pha Young, which cover 19,481 Rai (3,120 ha) is approximately 661,372 tons. While carbon storage in farming areas (3,547 Rai or 568 ha) which cover rotational fields, paddy fields and tea gardening, is about 59,459 tons.

Total carbon storage in the community is around 720,831 tons.

(Prayong Doclamyai et al., (2010))

Fallow land	Unit of land		Carbon storage		Burning area		Carbon emission (80%)	
	rai	hectare	(ton/hectare)	ton	rai	Hectare	(ton/hectare)	ton
Year of farming	114	18.24	25	456	-	-	2.3	-
first year fallow	199	31.84	12	478	-	-	-	-
2 nd years fallow	187	29.92	27	898	-	-	-	-
3 rd years fallow	172	27.52	43	1,238	-	-	0	-
4 th years fallow	153	24.48	59	1,469	-	-	6	-
Fifth years fallow	135	21.6	74	1,620	-	-	11	-
Six years ...	202	32.32	90	2,909	5	0.80	17	14
Seven years ...	93	14.88	106	1,577	69	11.04	22	243
Eight year...	125	20	121	2,420	11	1.76	28	49
Nine years...	101	16.16	137	2,214	14	2.24	34	76
Ten years...	109	17.44	152	2,651	15	2.40	39	94
Total carbon storage				17,643	Total carbon emission			476

Carbon Storage in Rotational Farming Agriculture and Fallow fields in Hin Lad Nai village

The net carbon storage from fallow fields, covering 236 ha, left to recover for 1-10 years account for **17,348 tons C**, while CO₂ emissions from the burning of rotation fields are only **480 tons C**.

Therefore, RF does not cause of climate change but **maintain the balance of the ecosystem**, and reduce greenhouse gas (GHG) emissions.

Landscape Management in Mae Lan Kham community



Year of fallow	Area (Ha)	C (Ton/Ha)	total carbon (Ton)
year 1	23.2	-	0
year 2	32.48	-	0
year 3	24	9.93	238.32
year 4	25.92	8.31	215.40
year 5	17.76	27.68	491.59
year 6	19.04	20.75	395.08
year 7	18.24	52.57	958.88
year 8	13.92	46.06	641.16
year 9	12.64	37.37	472.36
year 10	10.72	57.31	614.36

Carbon sequestration period year 1-9 = 3,407 Ton.C

Carbon emission year 10 (will be burn for RF)= 614 Ton.C

-Carbon net for 1 cycle (10 years) = (3,407-614) = 2,793 Ton.C (192 Ha with 10 years period)

-Carbon increment = 2.79 Ton/year (in RF 192 ha)

The finding

The study showed that each age class of rotational field has diverse capacity for carbon storage. The rotational field of 3 years onwards can be used in carbon calculation because the diameter of trees is larger than 4.5 centimeters. The carbon storage capacity is divided into 3 periods: year 3-4 the carbon storage is amounted for 1.3-1.6 ton per rai, year 5-6 for 3.0-3.3 tons per rai, and year 7-8 the carbon storage capacity is doubled due to their high growth rate. The structure of tree numbers and size class averagely increase the annual carbon storage of 1.02 ton per rai per year in the rotational field.

Structure, Succession Rate and Carbon Stock in RF

RF with the cycle of 8 years is likely to maintain the balance of carbon storage in the field for the period of 3-7 years and carbon emission from burning process.

The effective carbon management such as the use of wood without burning helps reduce emission, leading to carbon-balanced communities and stock enhancement.

The rotational cropping field with carbon balanced cycle must be promoted.



Challenges

1. RF farmers are **victims of discrimination** because this practice is not recognize by national law.
2. There are many Forces and **pressures to stop** or shorten this system.
3. **Some projects** of government and companies force the communities to **change** the land use **into permanent land use** to promote cash crop...
4. Immediate regulation of ministry to **prohibit burning** in Northern Thailand for 100 days (Jan-April)...?
5. May be **need** for **interdisciplinary research** and multi stakeholders participation action research on RF...?

Legal and Policy Recognition

- **Cabinet Resolution** on “Recovering the Karen Livelihood in Thailand” August 3, 2010. Recognition natural resource management of Karen people and the practice of Rotational Farming [Articles 2 (2.4, 2.6 and 2.7)].
- **International agreements** and declarations e.g. UNDRIP, CBD art.8j, 10c and ILO 111 ect.

A woman in traditional attire, including a pink headscarf and a red and black patterned dress, is working in a rice field. She is carrying a baby on her back, secured with a red cloth. The baby is wearing a light blue knit hat and pink socks. The woman is holding a large bundle of harvested rice stalks. The background shows a dense forest of tall trees under a clear sky.

**...continue...
new generations...**