

Northern Thailand

Mean Annual
Rainfall: 1,300 mm



Trees link to ecosystem services?



LANDSCAPE BEAUTY/CULTURAL & RELIGIONS VALUES

SACRED FORESTS

Sacred groves or sacred forests are areas of forest that are protected because of religious beliefs, and they constitute an important aspect of cultural life in various communities throughout the world. In northern Thailand, sacred forests can be found in areas managed by many minority communities, including the sacred spirit forests of ethnic Karen and Lawa communities. Spirit forest or worship forest is used for religious purposes as a place to celebrate forest and mountain spirits whom Karen and Lawa people believe can bestow prosperity and good fortune to the community.

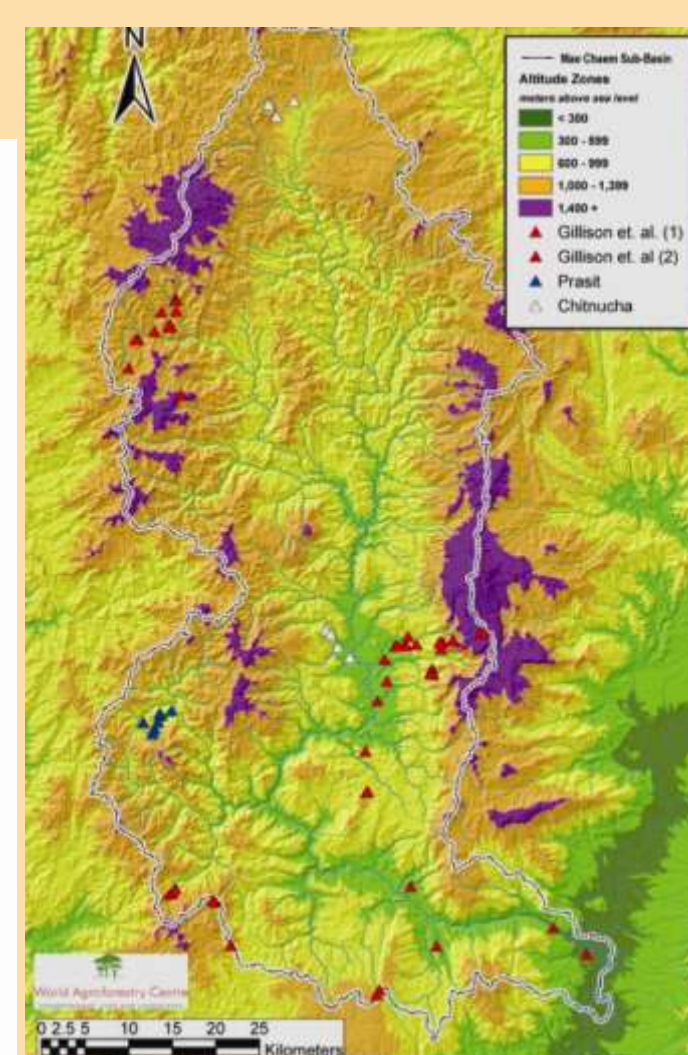
DO YOU
KNOW?

CARBON STOCKS

A study of carbon stock levels of various components of land use mosaic patterns in the Mae Chaem watershed was conducted during 1999-2000. The study employed rapid assessments using standard ASB methods at thirty-five sites, including 9 sites of the methane dynamics study (below), 25 sites of a biodiversity survey conducted by Andy Gillison et.al., 4 sites under a study on agronomic sustainability, and 3 additional sites. In order to facilitate comparison with other land use types, time-averaged values were calculated for forest fallow rotational systems.

Estimated Carbon Storage of Various Land Use Types in Mae Chaem

	Above-Ground Carbon				Soil	Total	Above	surface
	green	litter	tree	dead	0-30	Carbon	Share	Soil BD
	... tons hectare ⁻¹ ...				cm		% total	gm cm ⁻³
Natural Forest								
Hill E-G (max)	1.7	6.1	190.9	54.0	252.7	122.4	375.1	0.97
Hill E-G (ave)	1.5	3.6	88.2	25.2	118.4	93.7	212.1	0.93
Hill Pine	1.3	2.9	69.3	5.3	78.7	73.0	151.7	1.08
DryDeciduous	1.3	1.3	49.0	8.3	59.9	59.9	119.7	1.27
Sequential Agroforestry (rotational forest fallow)								
-10yr cycle (time ave)	3.3	3.8	31.0	12.8	51.0	107.4	158.4	1.18
-6yr cycle (time ave)	2.7	2.6	10.8	-	16.1	60.1	76.2	1.02
-3yr cycle (time ave)	1.9	1.1	-	-	3.0	47.8	50.7	1.22
Simultaneous Agroforestry								
Fruit trees - vegetables	1.2	1.0	2.4	-	4.6	152.9	157.5	1.19
Coffee-shade AF	0.6	1.7	25.2	23.8	51.4	127.4	178.7	1.12
Annual Crops								
UplandRice field	1.7	0.6	-	-	2.3	22.4	24.7	1.33
Maize	6.4	0.3	-	-	6.7	92.0	98.7	1.40
Veg	0.2	0.1	-	-	0.3	82.1	82.5	1.43



Carbon stock study sites



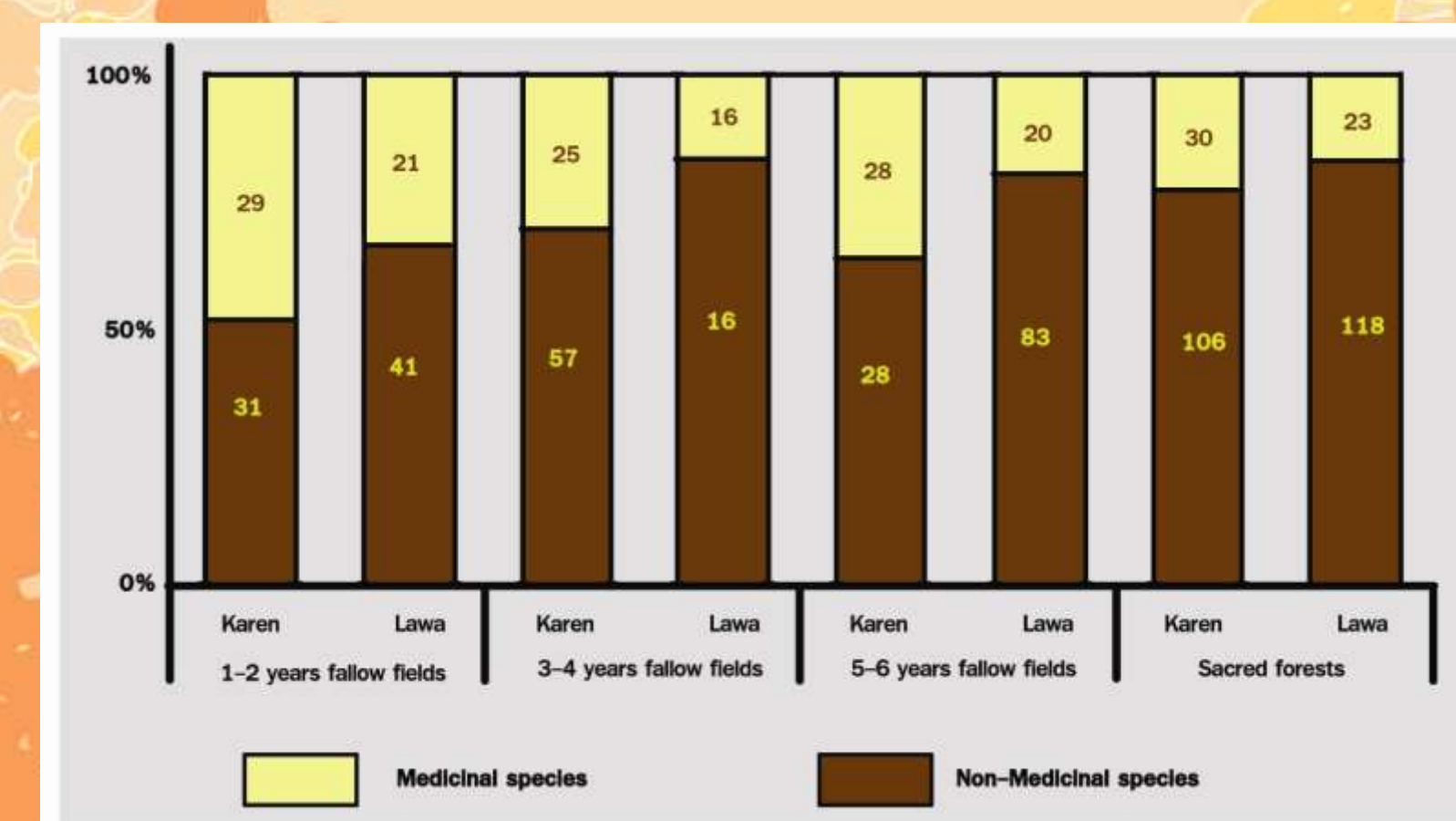
Sacred forest at Ban Mae Hae Tai Karen village, Chiang Mai, Thailand

MEDICINAL PLANTS

Many ecosystem services provided by forests are important for livelihoods of indigenous people. Sacred forests are used for traditional practices by ethnic minority communities in northern Thailand and they protect these forests that are important for their culture and daily life. Forest fallow fields are a dominant feature of agricultural farming landscapes in the study region. Thus, we evaluated and compared the importance of forest fallow fields and sacred forests as sources of medicinal plants for Karen and Lawa ethnic minority communities in northern Thailand.

We registered a total of 365 species in 244 genera and 82 families. Of these 72(19%) species in 60(24%) genera and 32(39%) families had medicinal uses. Although the sacred forest housed more species overall than forest fallow fields, about equal numbers of medicinal plants were derived from the forest and the fallows. Thus, a higher proportion (Karen 48%; Lawa 34%) of the species in the relatively species-poor forest fallows were used for medicinal purposes than the proportion of medicinal plants from the sacred forest (Karen 17%; Lawa 22%). Of the 32 medicinal plant families, Euphorbiaceae and Lauraceae had the most medicinal species in Karen and Lawa villages, respectively.

Sacred forests are important for providing medicinal plant species to Karen and Lawa communities in northern Thailand, but swidden forest fallows around the villages are equally important in terms of absolute numbers of medicinal plant species, and more important if counted as proportion of the total number of species in a habitat. This points to the importance of secondary vegetation as provider of medicinal plants around rural villages, as seen elsewhere in the tropics.



Total number and proportions of medicinal plants and non-medicinal plants in four different habitats surrounding a Karen and a Lawa village in the Mae Chaem Watershed in Northern Thailand

METHANE DYNAMICS

Study of methane dynamics associated with various components of land use mosaic patterns in the Mae Chaem watershed were conducted by Chitnucha Buddhagoon, under the guidance of Dr. Attachai Jintrawet, and presented in a M.Sc. thesis under the CMU Agricultural Systems Programme. Part of the findings based on replicated monthly measurements at 12 land use sites are summarized in table below.

Preliminary Estimates of the Net Methane Flux in the Mae Chaem Watershed

		Estimated Area		Absorption Rate	Duration	Annual Absorption
		hectares	% area	gm ha ⁻¹ day ⁻¹	Days	tonsyear ⁻¹
Natural Forest	Hill evergreen	108,605	32.5	2.09	365	82.8
	Hill pine	38,313	11.4	1.61	365	22.5
	Deciduous	154,834	46.3	2.36	365	133.4
Forest fallow fields		11,428	3.4	5.17	365	21.6
Upland fields	fixed field/cabb	6,040	1.8	2.40	365	5.3
	non-cabb	7,996	2.4	2.40	365	7.0
Paddy Rice	flooded	5,818		(689.2)	195	(781.9)
	non-flooded	5,818	1.7	1.44	170	1.4
Other		1,597	0.5	n.a.	n.a.	-
Total Watershed		334,631	100.0			(507.9)

References:

- Junsongduang A., H. Balslev, A. Inta, A. Jampeetong and P. Wangpakapattanawong. 2013. Medicinal Plants from swidden fallow and sacred forest of the Karen and the Lawa in Thailand. *Journal of Ethnobiology and Ethnomedicine*. 9: 44.
- Thomas, David E., P. Preechapanya and P. Saipothong. 2004. Landscape Agroforestry in Northern Thailand: Impacts of Changing Land Use in an Upper Tributary Watershed of Montane Mainland Southeast Asia. ASB-Thailand synthesis report 1996-2004. Chiang Mai: World Agroforestry Centre. 184p.

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