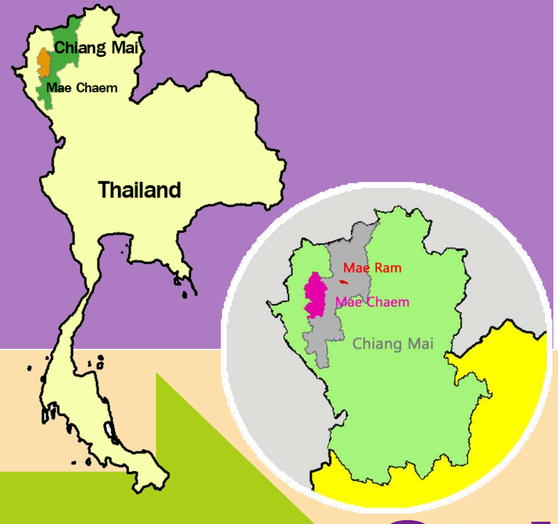


Northern Thailand

Mean Annual Rainfall: 1,300 mm

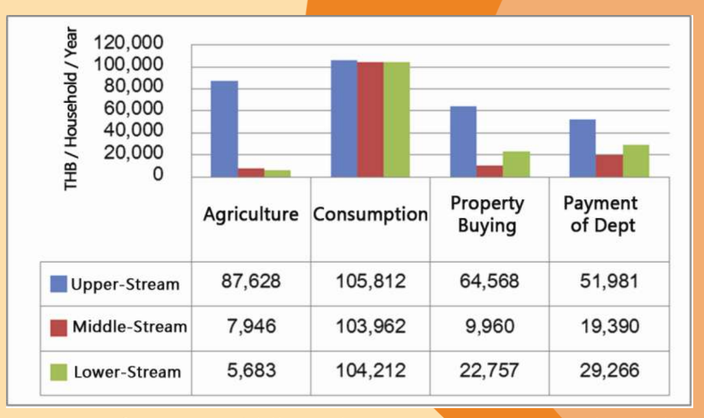
Stakeholders of tree (+ or –) change

Communities located in upper watershed zones of northern Thailand do not have any land ownership documents, and although the State allows them to continue living and producing in these areas, they are forbidden from further expanding agricultural areas into forests. The reasons are:

1. Local community production is now linked through markets to urban consumption, which provide incentives for major expansion of agricultural production.
2. The State accepts that it is impossible to re-settle highland communities or them to lowland areas because it will cause major conflict and social problems. Thus, the State strategy is to control land use and prohibit the expansion of agricultural area.
3. The State has been seeking cooperation from villagers in controlling use of natural resources. Its view is that villagers can have more confidence that the State will not take away their land, in return for their helping state agencies to conserve forest. By now, the State is somewhat less antagonistic, and many villagers have given up hope for rights to own their land resources.

Today people in upper watershed study areas are still living without land ownership documents and have only informal local land tenure arrangements. Thus, communities have decreased use of some lands and have not expanded agricultural areas, in order to avoid conflict with the State. Studies found that land problems are very important to communities, especially since lack of rights in their land means they cannot engage in commercial production and are limited to growing rice for household consumption and/or working outside the agriculture sector. Although they now have various occupations and higher incomes than in the past, their expenses are high because impacts from links with urban-centered economic development. Moreover, there are still many local problems related to land tenure and land use that are caused by lack of clarity and security.

DO YOU KNOW?



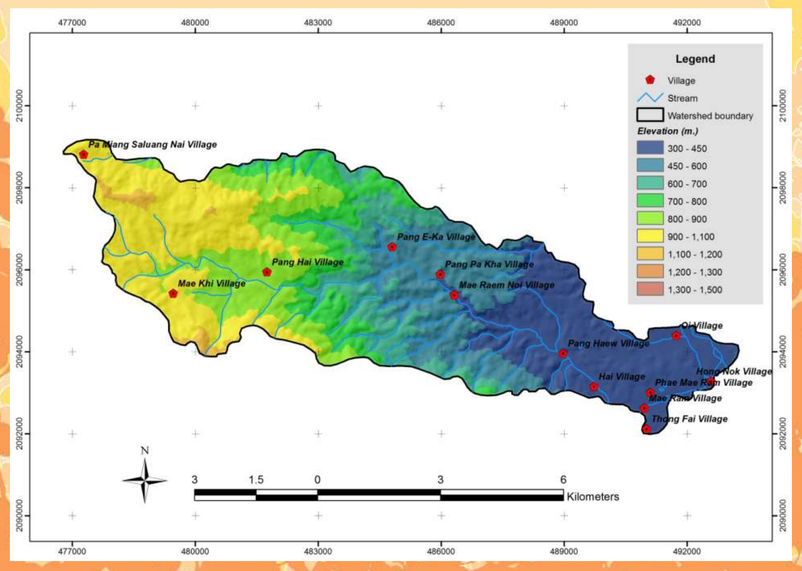
	Agriculture	Consumption	Property Buying	Payment of Dept
Upper-Stream	87,628	105,812	64,568	51,981
Middle-Stream	7,946	103,962	9,960	19,390
Lower-Stream	5,683	104,212	22,757	29,266

Expense of Upper, Middle and Lower-stream watershed villages

land tenure

The study "Dynamics of Land Tenure & Property Rights under State Forest Conservation and Agricultural Commercialization in Mae Ram Sub-Watershed of Chiang Mai Province" focused on understanding relationships among land tenure, property rights, conservation policy and changing modern production systems. Study sites were in 3 villages:

- ***Mae Khi village*** (upper-watershed community with lands situated in highly complex mountain terrain at altitudes of 900-1,500 masl)
- ***Pang E-Ka village*** (middle-watershed community located in lower mountain valley slopes and some floodplain areas with uncomplicated terrain at elevations of 600-900 masl)
- ***Pang Haew village*** (lowland community occupying largely valley floodplain areas located at elevations of 300-600 masl)



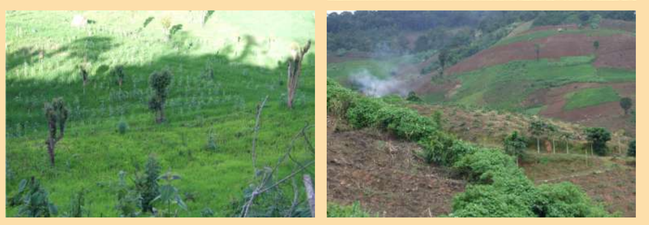
Reference :

Prabudhanitisarn, S. and Sainoi, C. 2013. *Dynamics of Land Tenure and Property Rights under State Forest Conservation and Agricultural Commercialization in Mae Ram Sub-Watershed of Chiang Mai Province, Northern Thailand. Chiang Mai: World Agroforestry Centre. 91p.* ***Funding : CRP6.2***

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.*

land use practices

- Traditionally-Managed Forest Fallow Rotational Cultivation (8-12-year forest fallow cycle; 5-7-year forest fallow cycle)
- Household-Managed Fallow Rotations (5 year cycle; 3 year cycle)
- Fixed field cropping (Paddy rice, Upland rice, soybeans and maize)
- Vegetable crops (Highland major, Highland specialty, Lowland vegetables)
- Simultaneous Agroforestry (Complex agroforests, Simple agroforestry)



impacts of local agroforestry

Landscape Management Strategies

Strategy 1: *Traditional forest fallow rotations + permanent forest.*
As long as these systems maintain forest fallow cycles between 5 to 10 or more years in length, they appear to offer modest but reasonable returns to producer labor with relatively modest environmental impacts.

Strategy 2: *Fixed field upland crops + permanent forest.*
For lands placed in permanent agriculture, most all above-ground carbon storage and a significant portion of below-ground C storage would probably be lost, plant biodiversity would be reduced by about 50 percent, and increased soil compaction would result in relatively low methane absorption, water infiltration and stream discharge buffering, and probably increased risk of soil erosion.

Strategy 3: *Intensive vegetables + permanent forest.*
For the agricultural field component of this approach, impacts include loss of most all above-ground carbon storage and plant species diversity, relatively high soil compaction and soil erosion risk, and relatively low methane absorption, water infiltration, and stream discharge buffering capacity.

Strategy 4: *Agroforest + permanent forest.*
The proportion of the landscape occupied by these types of systems would probably usually be greater than proportions used for at least more intensive forms of segregated permanent field agriculture. This would be mitigated by their relatively lower levels of environmental impact.

Key Biophysical and Economic Properties of Component Land Use Practices in Mae Chaem (Preliminary ASB Matrix)

	Methane	Carbon Stock		Biodiversity		Agro-Sustainability Factors				Main Crop		Private	Social	
	Absorption	Above	Below	spp	PFC	Soil BDens	Fertility	Weeds	Pests	Yield	Labor	Profit	Profit	Land
	gm/ha/day	ton/ha	ton/ha	no.	index	gm/cc	inputs used			ton/ha	day/ha	$/day	$/day	$/ha
Natural Forest														
Hill E-G max	4.8	253	122	69	703	0.78								
Hill E-G ave	2.1	118	94	56	562	0.93								
Hill Pine	1.6	79	73	55	575	1.08								
Mixed Deciduous				82		1.10								
Dry Deciduous	2.4	60	60	37	359	1.27								
Rice – Traditional Rotational Forest Fallow Sequential Agroforestry System														
10-year cycle	4.9	51*	107*	63**	513**	1.10	-	labor	-	0.3*	29*	1.43	1.22	2*
6-year cycle	5.0	16*	60*	64**	498**		-	labor	-	0.2*				
+ old trees		54*	60*			1.02	-	labor	-					
Rice – Fixed Household Field Systems														
hh 5-year 'priv' fallow	5.7						-	labor	-	0.2*	16*	1.52	1.47	5*
hh 3-year rotate		3*	48*	43**	445**	1.22	fert	herb+lab	-	0.9*	116*	0.75	0.72	(49)*
Perm Field	2.4	2	22	33	249	1.33	fert	herb+lab	±chem	1.4	213	0.24	(0.01)	(203)
Rice – Flooded Paddy	(689.0)			30	192		fert	herb+lab	±chem	3.5	219	1.79	1.38	28
Field Crops														
Soybean						1.33	fert	herb+lab	±chem	1.5	117	1.51	2.65	230
Maize	2.4	7	92			1.40	fert	herb+lab	-	3.5	82	1.23	3.72	209
Vegetable Crops														
Cabbage/Carrot							fert	herb+lab	chem	16.1	166	8.49	33.13	5,107
Lett/GrPpr/Pumpkin		0.3	82				fert	herb+lab	±chem	6.7	212	7.23	15.47	2,973
Taro/Ginger							fert	labor	±chem	2.7	232	(1.47)	1.45	175
Shallots				7	58	1.43	fert	herb+lab	chem	13.9	113	9.70	14.27	1,468
Simultaneous Agroforestry														
Fruit/veg	2.3	5	153			1.19								
Home Garden				47										
Coffee w/shade		51	127	30	216	1.12								

*NOTES: *value for overall system including fallow fields **value of most mature stage in forest fallow cycle*

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