Isaan biodiversity and conservation of wild food plants in rice landscapes

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Introduction (1)

Paddy rice landscapes

- Cover more than 135 million ha of arable land in Asia
- Parallel some of the most diverse 'natural' systems on Earth

↳ Possess more than 100 **useful** associated **plant species**

↓

Collection and consumption is critical to human welfare of farming households

But …

- there is little information about biodiversity in rice landscapes…
- not enough awareness about its societal importance…
- many of these food plants are considered weeds in crops to eradicate…

Introduction (2)

Local people **manage** their landscapes **–** enhancing or limiting species diversity and abundance

↓

preservation of culturally valued species

Research description

Characterizing useful plant diversity in different landscape elements in rice agro-ecosystems

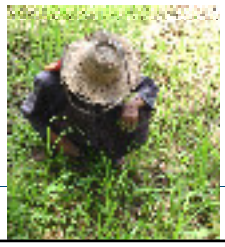
Understanding how people manage the rice landscape indigenously

↳ Collection and management of wild food plants

Research location

Northeast Thailand
Isaan people

Kalasin
1 village:
Ban Sa-at Somsi & Ban Sa-at Tai



Methodology

- Landscape element characterization:
  - 10 landscape elements
- Botanical survey: 62 sampling plots
  - species diversity and abundance
- Household survey:
  - Freelisting: useful plant diversity in rice landscapes (n=10)
  - Management of wild food plants (n=40)
  - Recall of collection events (n=40 twice)

Results: the rice landscape

Landscape elements:

- dike
- water pond
- pond margin
- hillock
- tree row
- nursery field border
- roadside

From a total of 256 **collection events**: 97 (**40%**) occur in the field area

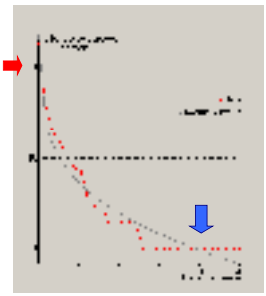
Landscape elements and freelisting elicitation

10 families elicited 52 useful plant species
26 of these plants were observed in the landscape

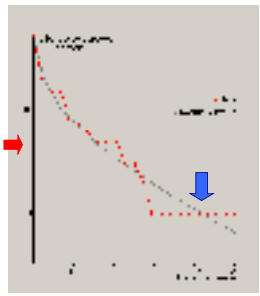
Ladscape elements	D - Simpson diversity index	Location of freelisted plants
hillock	0.15	50%
nursery field border	0.28	15%
tree row	0.35	58%
water pond	0.38	8%
roadside	0.54	15%
pond margins	0.84	27%
dike	0.97	8%

Rank abundance curves

Tree row



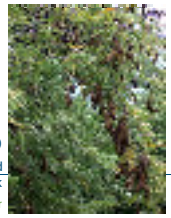
Hillock



Irvingia malayana (1)
tree row
food/timber/domestic

Marsilea crenata (2)
roadside (ditch), dike
food

Ipomoea aquatica (3)
dike, water pond, pond margin
food



Tamarindus indica (4)
nursery field border, pond margin, tree row, hillock
food, fuel, medicine, fodder

Freelisting: useful plant diversity in rice landscapes

Local name	Scientific name	Smith's salience	presence in landscape elements
ton mamuang	*Mangifera indica*	0.425	2
ton doo	*Pterocarpus macrocarpus*	0.364	2
ton yang		0.319	0
phak bung	*Ipomoea aquatica*	0.313	4
ton kaam	*Tamarindus indica*	0.311	4
mai phai	any species of bamboo	0.224	2
eucalyptus	*Eucalyptus* sp	0.210	1
ton kok	*Spondias pinnata*	0.193	2
phak tew	*Cratoxylum formosum*	0.169	0
phak waen	*Marsilea crenata*	0.136	1
phak kasek	*Leucaena leucocephala*	0.134	4
ton kratin narong	*Acacia auriculiformis*	0.130	1
phak nok	*Centella asiatica*	0.128	0
ton bak bok	*Irvingia malayana*	0.119	1
phak e-hin	*Monochoria vaginalis*	0.102	0
ton mapraw	*Cocos nucifera*	0.102	2
ton sa-bang	*Dipterocarpus intricatus*	0.100	1

Those species present in more landscape elements, have a higher salience (statistically significant 0.01 level)

Wild food plants from freelistings (1)

		freelisting (n=10)	interview (n=40)		
Local name	Scientific name	Smith's salience	know	collect	number of management practices
phak bung	*Ipomoea aquatica*	0.313	100%	100%	2
ton kaam	*Tamarindus indica*	0.311	100%	100%	1
ton kok	*Spondias pinnata*	0.193	100%	90%	1
phak tew	*Cratoxylum formosum*	0.169	100%	85%	5
phak waen	*Marsilea crenata*	0.136	100%	65%	0
phak kasek	*Leucaena leucocephala*	0.134	100%	100%	2
phak nok	*Centella asiatica*	0.128	100%	95%	4
ton bak bok	*Irvingia malayana*	0.119	100%	78%	0
phak e-hin	*Monochoria vaginalis*	0.102	88%	43%	0

*Management practices: transplanting, watering, fertilizing, protecting, pruning.

Wild food plants from freelistings (2)

- Those species collected by more people have a higher salience*
- Those species known by more people are collected by more people**, and have a higher number of management practices*,**
- Those species present in more landscape elements have a higher salience** and are known** and collected** by more people.

*Significant correlation at 0.05 level
** Significant correlation at 0.01 level

Conclusions

- Isaan knowledge and practices determine the distribution of useful plant diversity in the rice landscape, and enhance its conservation.

Acknowledgements

- Project 'Gathered plant foods and household well-being' funded by Neys-van Hoogstraten Foundation
- UNESCO-L'ORÉAL for Young Women in Life Sciences fellowship
- Wageningen University Fund
- LEB Fonds – Stichting Fonds Landbouw Export Bureau 1916/1918

Thanks for your attention

Muchas gracias por su atención

Presence in landscape elements

Local name	Scientific name	roadside	nursery	dike	pond (in)	pond (b)	hillock	treerow
ton mamuang	*Mangifera indica*						x	x
ton doo	*Pterocarpus macrocarpus*						x	x
ton yang								
phak bung	*Ipomoea aquatica*	x		x	x	x		
ton kaam	*Tamarindus indica*		x			x	x	x
mai phai	any species of bamboo						x	x
eucaliptus	*Eucalyptus* sp							x
ton kok	*Spondias pinnata*						x	x
phak tew	*Cratoxylum formosum*							
phak waen	*Marsilea crenata*			x				
phak kasek	*Leucaena leucocephala*	x	x			x		x
ton kratin narong	*Acacia auriculiformis*						x	
phak nok	*Centella asiatica*							
ton bak bok	*Irvingia malayana*							x
phak e-hin	*Monochoria vaginalis*							
ton mapraw	*Cocos nucifera*						x	x
ton sa-bang	*Dipterocarpus intricatus*							x

Management practices

Local name	Scientific name	transplant	protect	water	fertilizing	pruning
phak bung	*Ipomoea aquatica*	x		x		
ton kaam	*Tamarindus indica*					x
ton kok	*Spondias pinnata*	x				
phak tew	*Cratoxylum formosum*	x	x	x	x	x
phak waen	*Marsilea crenata*					
phak kasek	*Leucaena leucocephala*	x		x		
phak nok	*Centella asiatica*	x		x	x	x
ton bak bok	*Irvingia malayana*					
phak e-hin	*Monochoria vaginalis*					

Multiuse value

Local name	Scientific name	food	fuel	timber	medicine	fodder	handicraft	domestic	TOTAL
ton mamuang	*Mangifera indica*	x	x	x					3
ton doo	*Pterocarpus macrocarpus*		x	x				x	3
ton yang			x	x				x	3
phak bung	*Ipomoea aquatica*	x							1
ton kaam	*Tamarindus indica*	x	x		x	x			4
mai phai	any species of bamboo	x					x	x	3
eucaliptus	*Eucalyptus* sp		x	x					2
ton kok	*Spondias pinnata*	x		x					2
phak tew	*Cratoxylum formosum*	x	x						2
phak waen	*Marsilea crenata*	x							1
phak kasek	*Leucaena leucocephala*	x	x	x				x	4
ton kratin narong	*Acacia auriculiformis*		x	x					2
phak nok	*Centella asiatica*	x			x				2
ton bak bok	*Irvingia malayana*	x		x				x	3
phak e-hin	*Monochoria vaginalis*	x							1
ton mapraw	*Cocos nucifera*	x		x					2
ton sa-bang	*Dipterocarpus intricatus*			x				x	2