
The eco-function of GIAHS and it's eco-compensation in “Honghe Hani Rice Terraces System”, Yunnan Province

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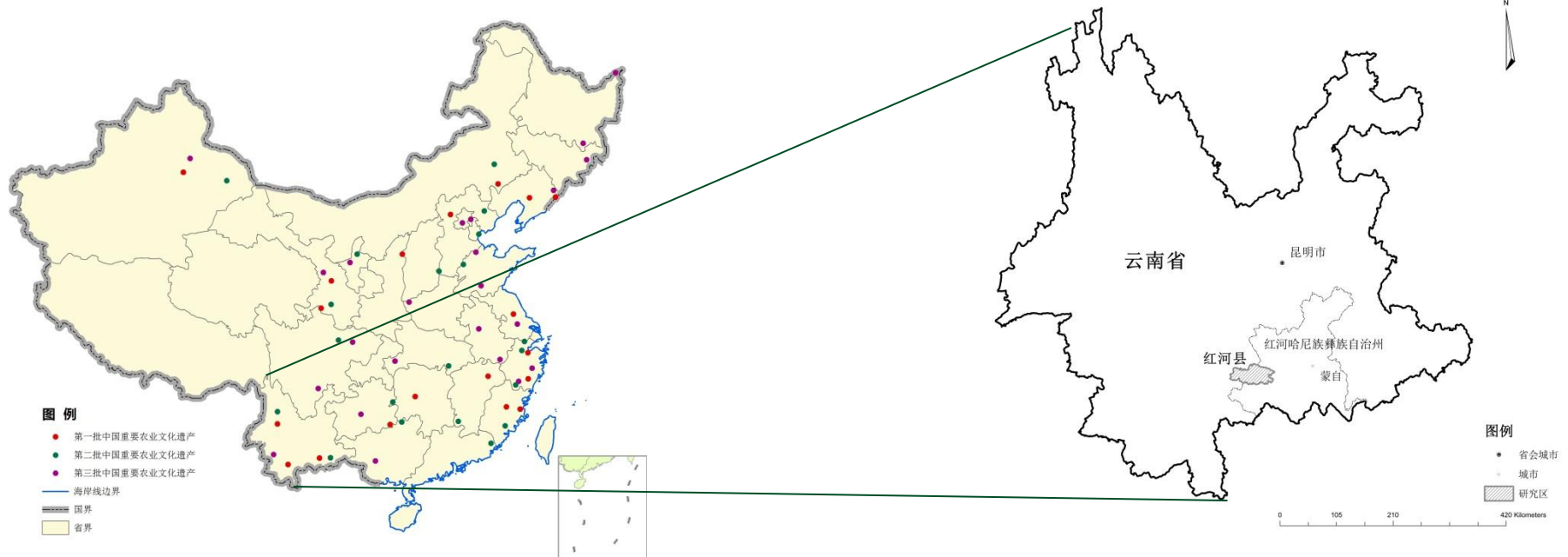
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Content

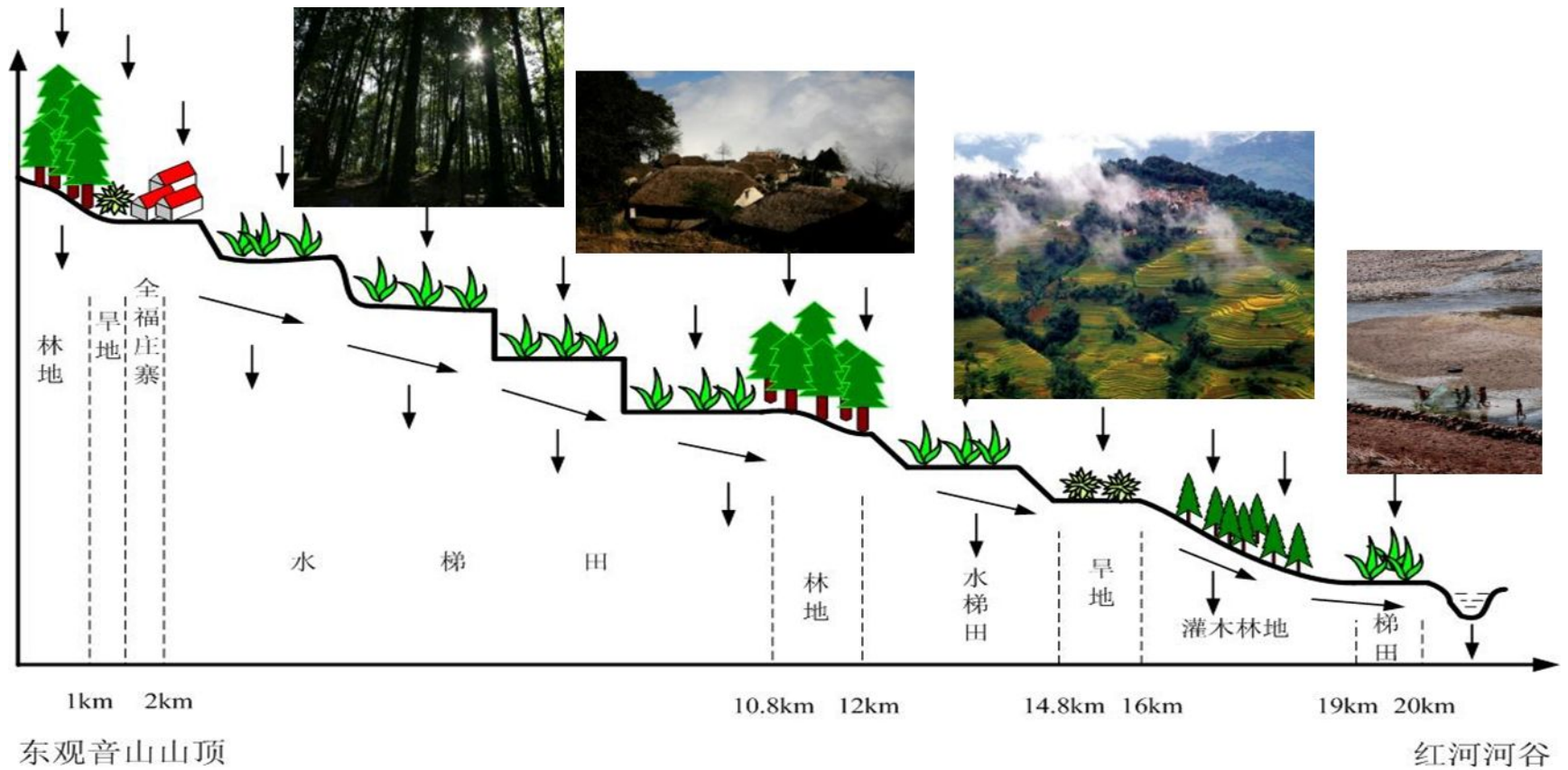
- ❑ **Honghe Hani Rice Terraces System**
- ❑ **Eco-function evaluation**
- ❑ **Eco-compensation mechanism**



Hani Rice Terraces (2010. 6)



Landscape Structure



Rice-fish system



Table 1 The density of weeds in R-F (rice-fish eco-agriculture) and HR (hybrid rice monoculture)

Weed species	Density	
	HR	R-F
<i>Ceratophyllum demirsum</i>	32 ^a	7.6 ^b
<i>Potamogeton distinctus</i>	12 ^a	0 ^b
<i>Sagittaria pygmaea</i>	12.6 ^a	0.2 ^b
<i>Hydrila verticillata</i>	6.2 ^a	0 ^b
<i>Monochoria vaginalis</i>	7.9 ^a	0 ^b
<i>Rotala indica</i>	6.4 ^a	0.6 ^b
<i>Salvinia natans</i>	3.8 ^a	0 ^b
<i>Ottelia alismoides</i>	3 ^a	0 ^b
<i>Utricularia aurea</i>	2.4 ^a	1 ^b
<i>Eleocharis yokoscensis</i>	4 ^a	0 ^b
<i>Sagittaria sagittifolia</i>	2.2 ^a	0 ^b
<i>Marsilea quadrifolia</i>	1.6 ^a	0.8 ^b
<i>Echinochloa crusgalli</i>	0.2 ^b	0.2 ^b
<i>Eleocharis plantagineif</i>	0.2 ^a	0 ^b

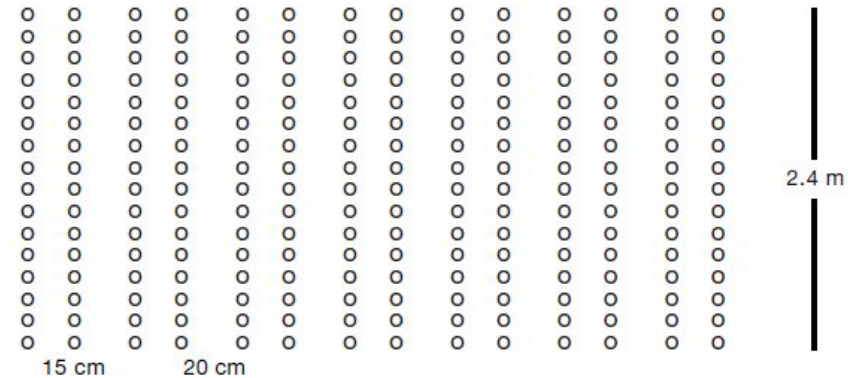
Note: the same row followed by common letters (a, b) is not considered significantly different on a 0.05 level.



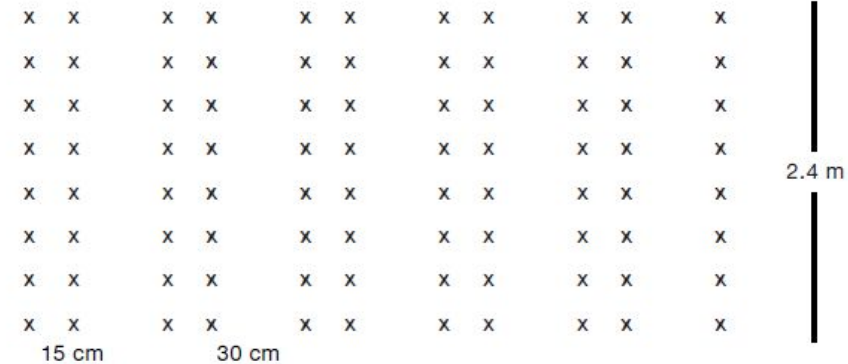
Diversified rice crops



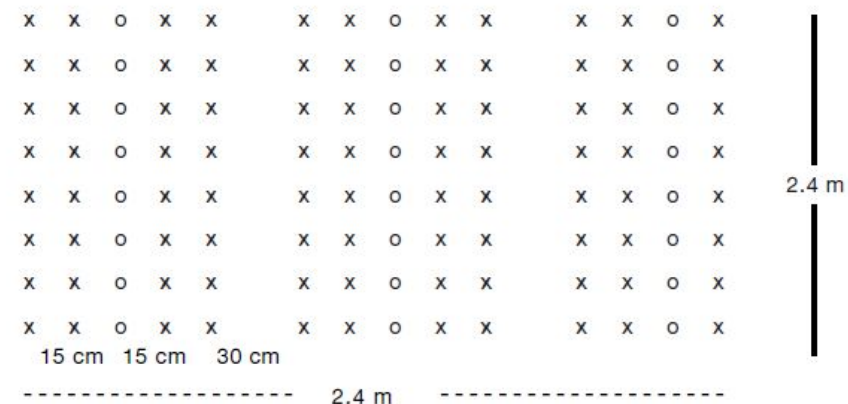
Glutinous monoculture



Hybrid monoculture

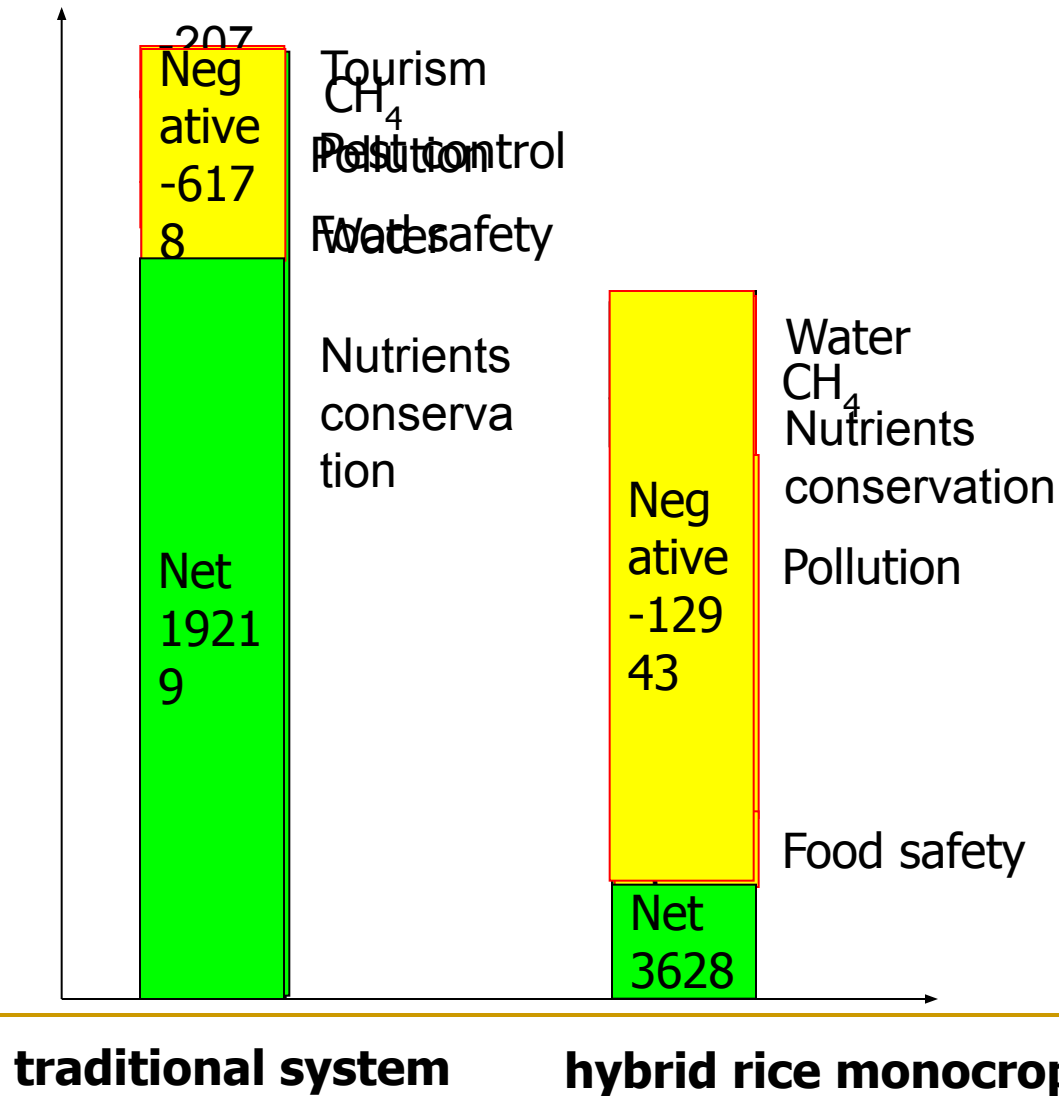


Mixture

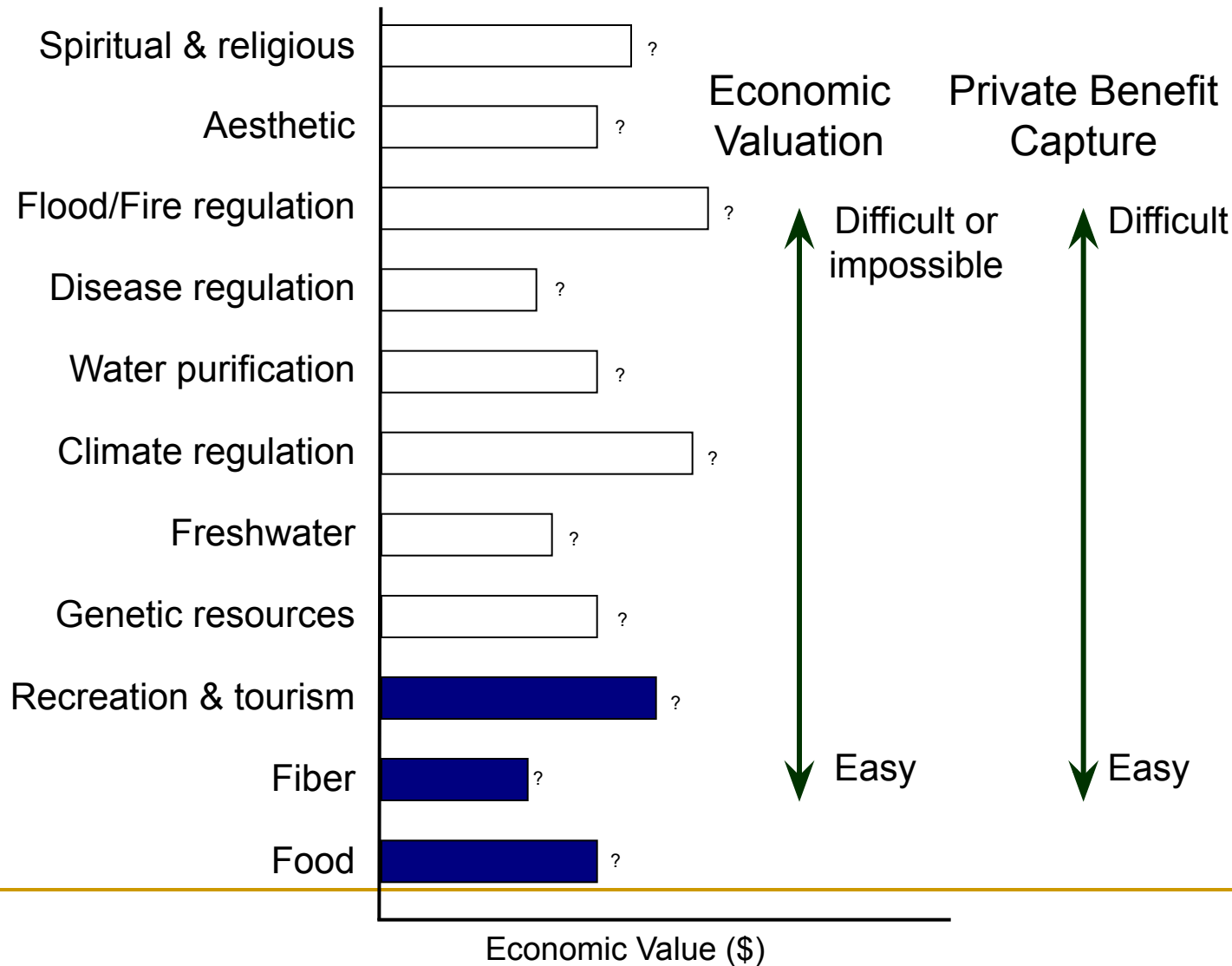


Eco-services Comparison

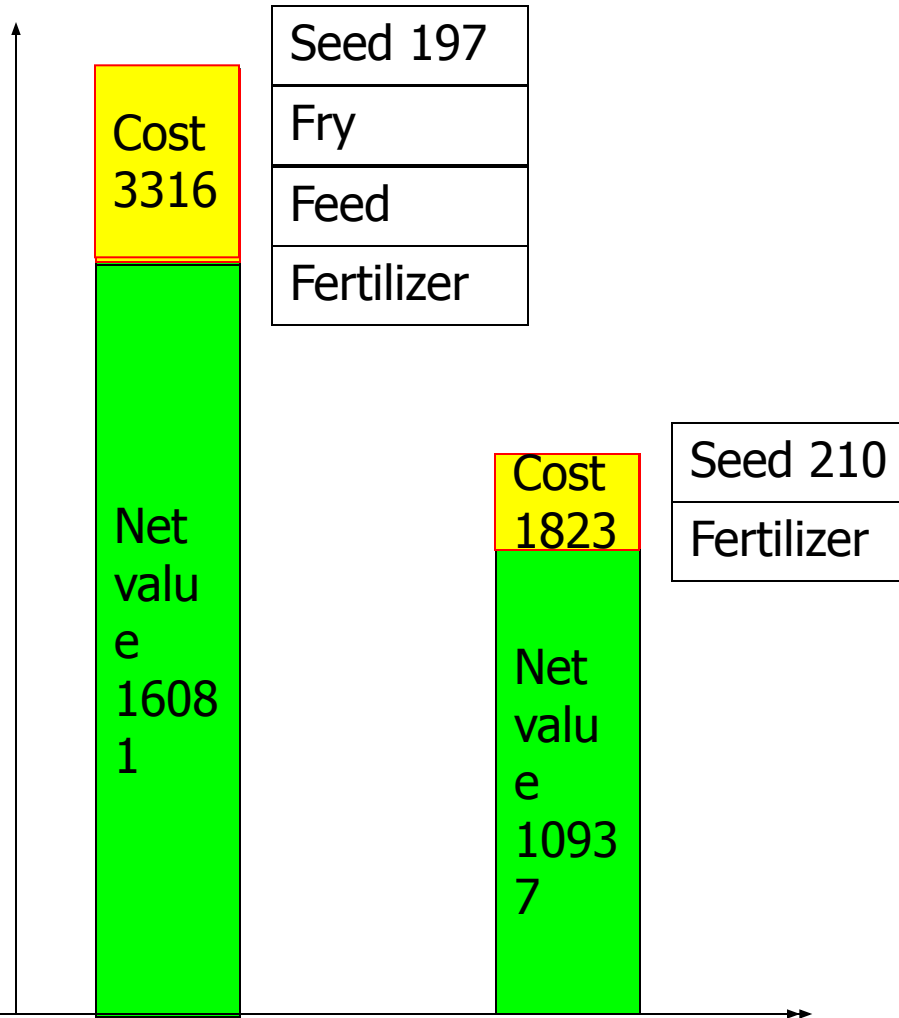
Yuan/hm²/a



Many eco-functions are public goods



Economic value



1. ROI

	ROI	ROI rate
Tradition	1:5.8	485%
Hybrid	1:7.0	599.9%

2.Opportunity of labor Yuan/a

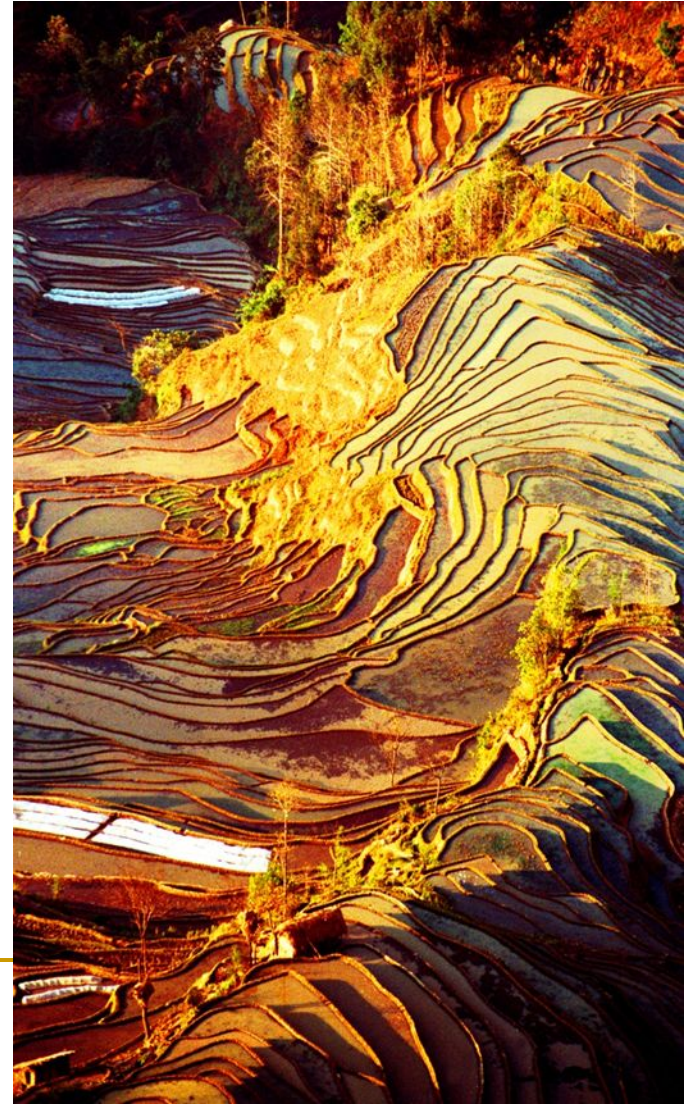
	Industry	Tradition	Hybrid
Net Income	6300	3216	2188

traditional system

hybrid rice monocropping

Threats

- the low yield of traditional rice varieties
- the loss of young labor forces in rural area
- the mono-cropping of high-yield hybrid rice
- the usage of the chemical fertilizers and pesticides
- the local water and soil environment pollution

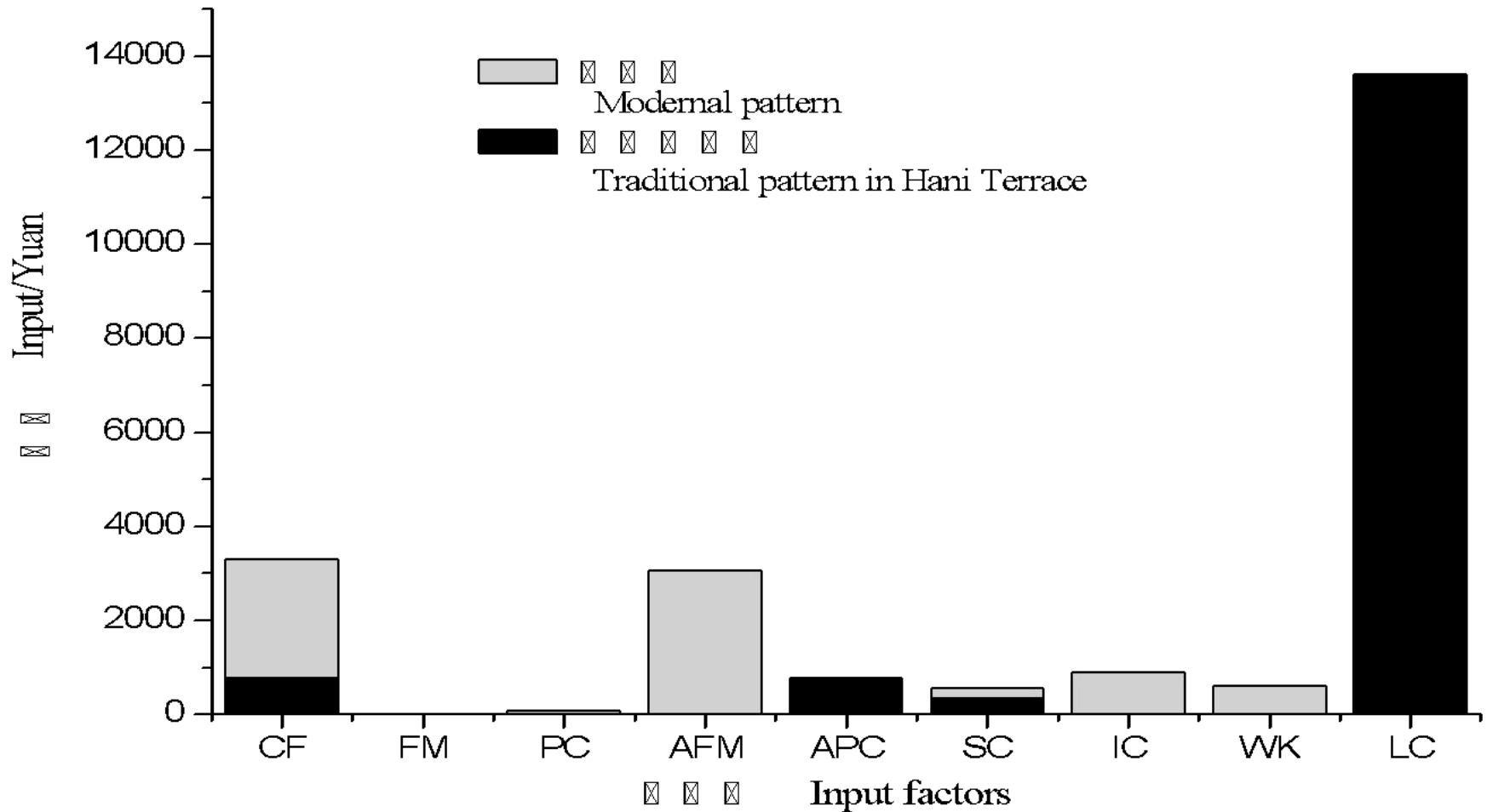


Eco-label certification

- It must go through a stage of organic conversion from non-organic producing to organic producing.
- The local government should pay farmers during organic conversion period, to incentive farmers inherit traditional environment-friendly technology.

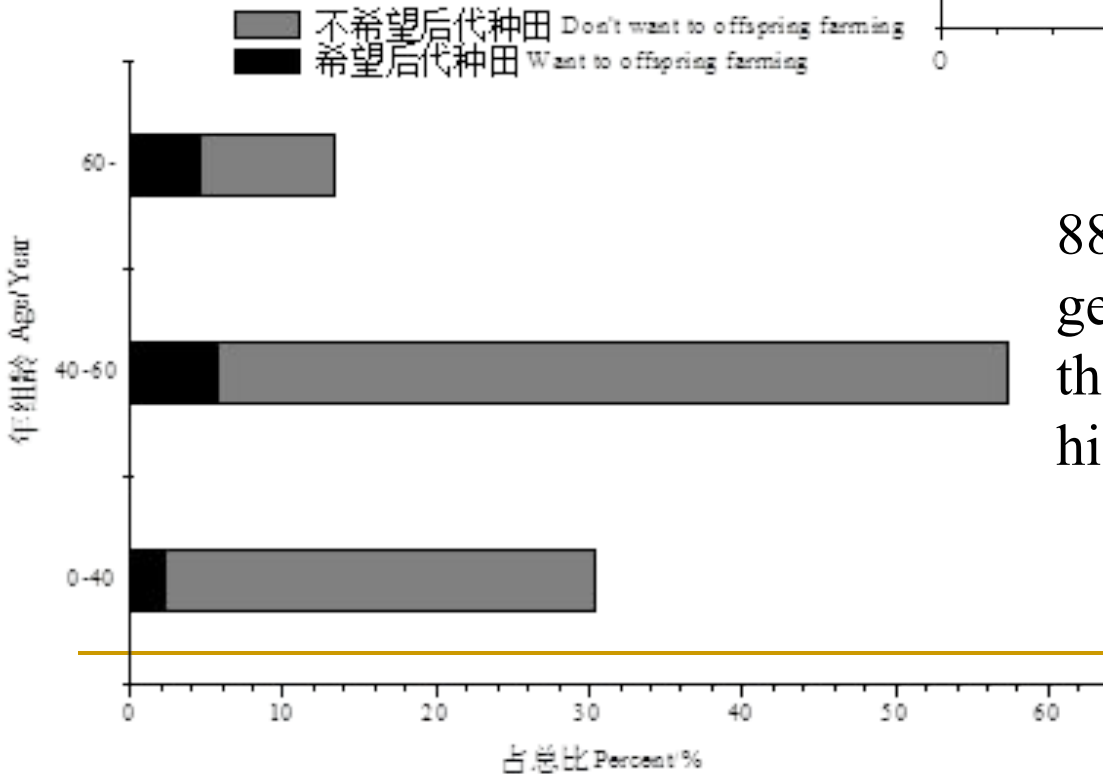
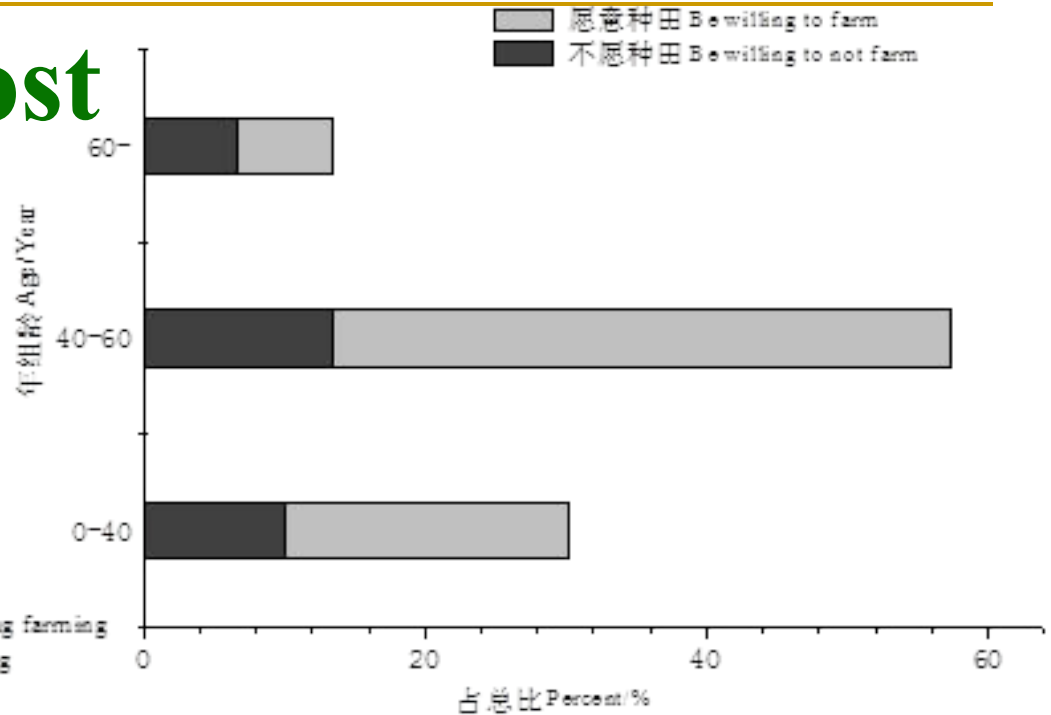


Input & Output



Opportunity cost

Labors of young adults prefer to work or live in city for higher income in cities.



88.7% don't want their next generation to farm.
therefore, its opportunity cost is higher.

Eco-compensation——rice price

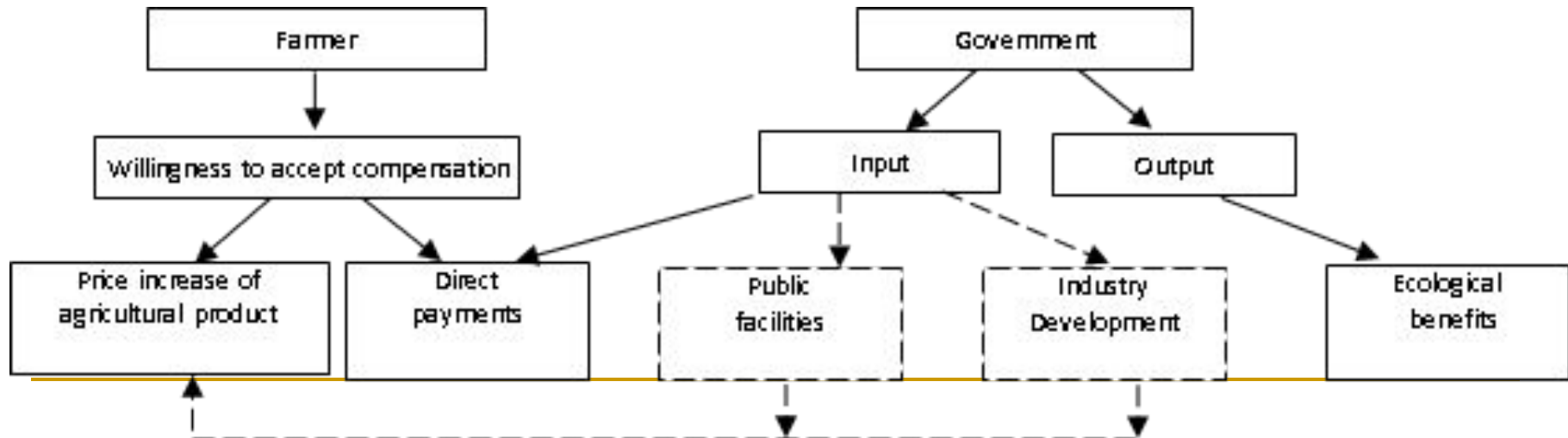
- If paddy rice price is 9.52 Yuan/kg, it is reasonable for protecting terrace landscape and traditional planting pattern in Hani terrace region
- Now, the purchase price is 3.84 yuan/kg, and the extra compensation price is just 5.68 yuan/kg



	Input	Output		Benefit
	yuan/hm ²	Kg/hm ²	yuan/hm ²	yuan/hm ²
— Tradition	15476.5	5250	14175	-1301.5
Hybrid	6470	8250	22275	15805

Eco-compensation——Integrated Approach

- Government pay farmers to shift cultivation method
- Local ecosystem would become better
- Eco-label could be used
- With the industry development, the income of agricultural activities increase
- The direct payments to farmers could be reduced



Conclusions

- Demand for environmental services from agriculture will increase.
 - GIAHS can provide a better mix of ecosystem services to meet society's changing needs.
 - If farmers are to provide a better mix of ecosystem services, better incentives will be required. Eco-compensation can help.
 - Cost-effective Eco-compensation mechanism require careful design based on the characteristics of the service and the biophysical and socio-economic context.
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