Promoting Sustainable Development at the Rainforest Margin:

Economic and Ecological Trade Offs

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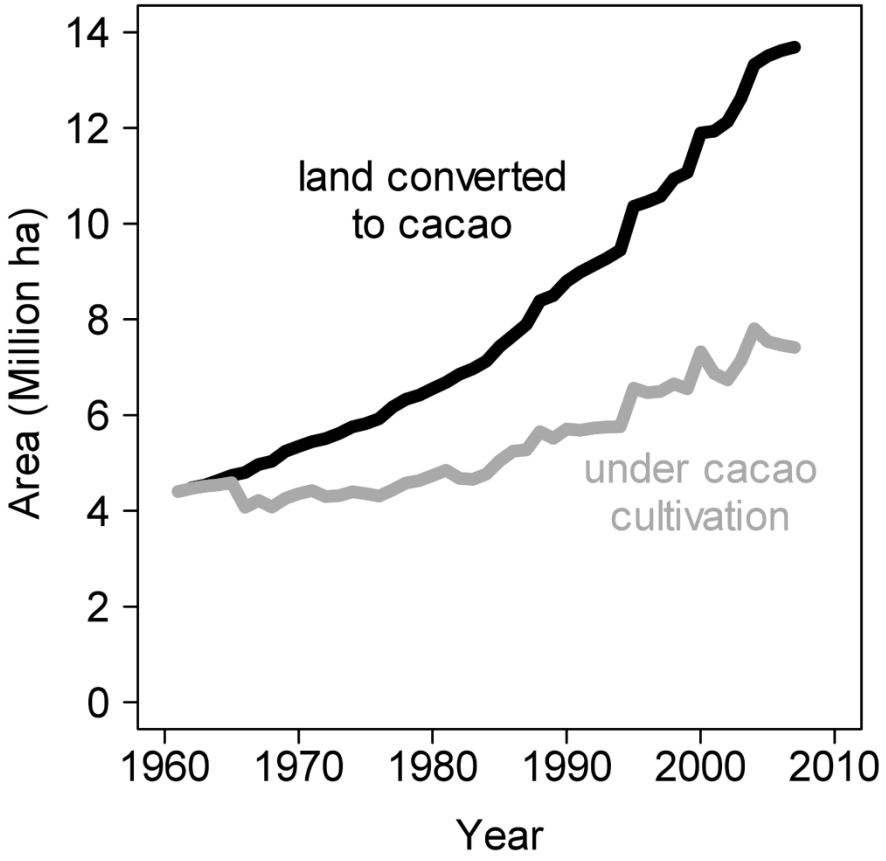
Outline

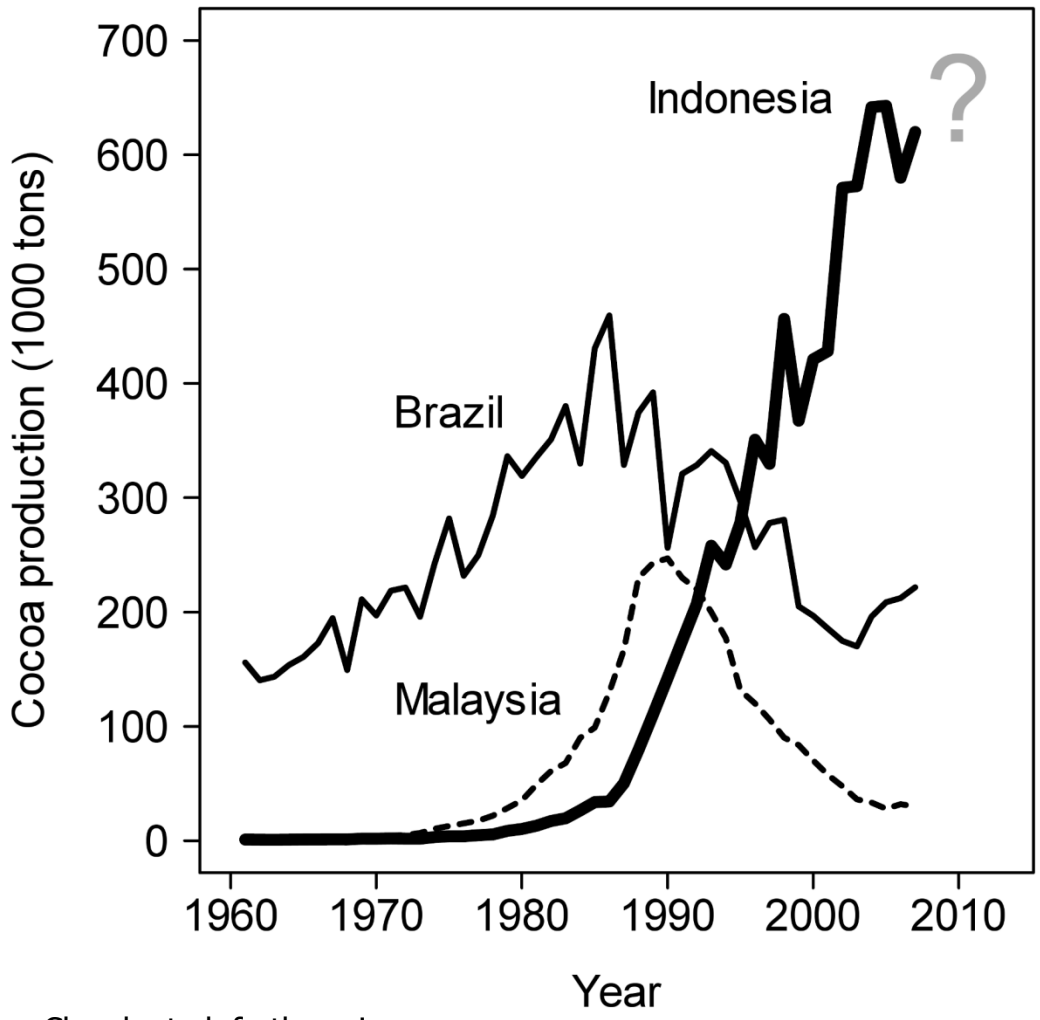
- The cacao world market and land use changes in the Lore Lindu region
- Underlying causes of deforestation
  - poverty
  - population growth
  - land titling
  - economic development
  - LLNP politics
- Conclusions

The cacao world market and land use changes in the Lore Lindu region

- High prices and global demand for cash crop cacao
  => cacao agroforestry provides two times higher mean net revenues compared to rice

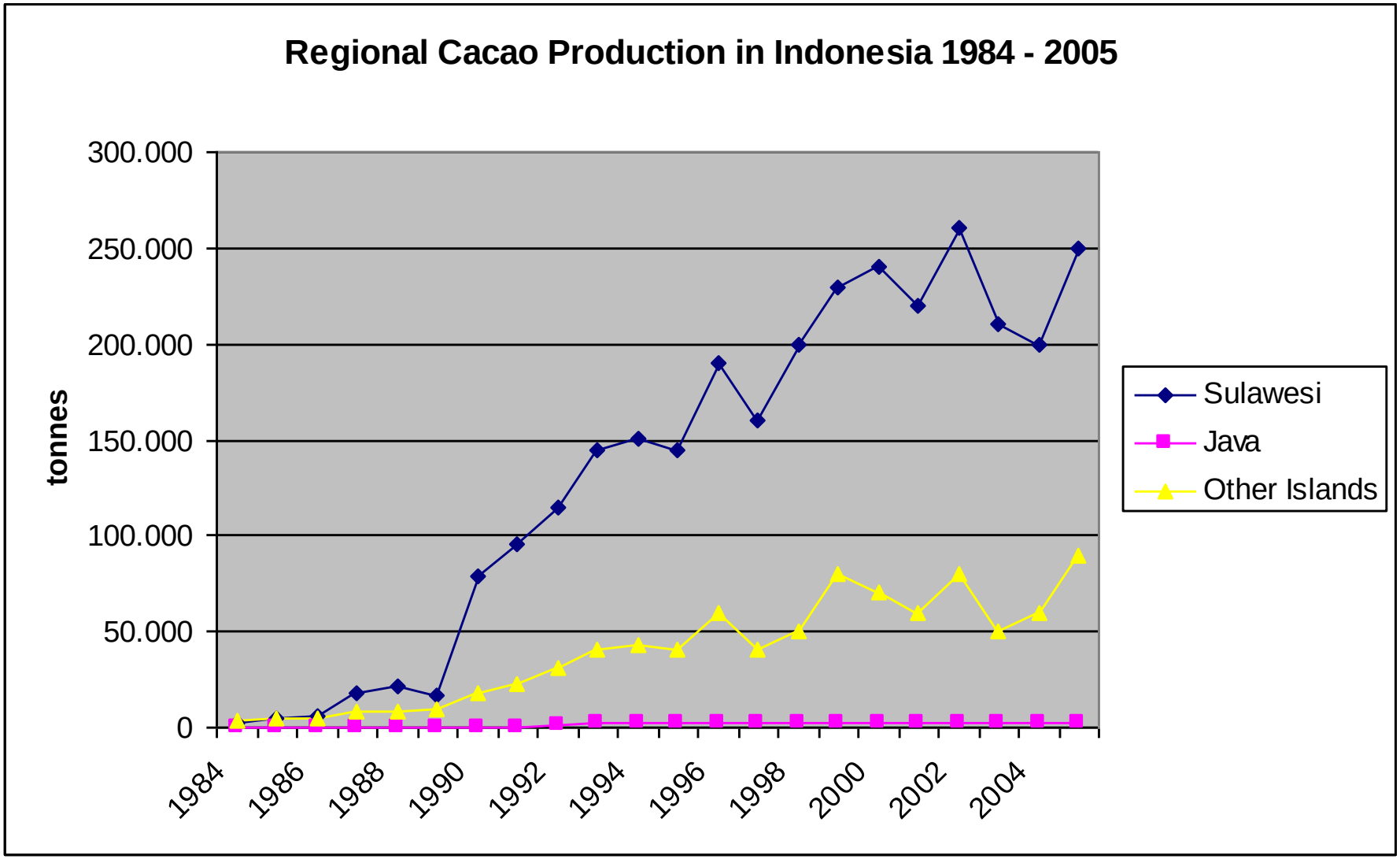


(Clough et al. forthcoming)

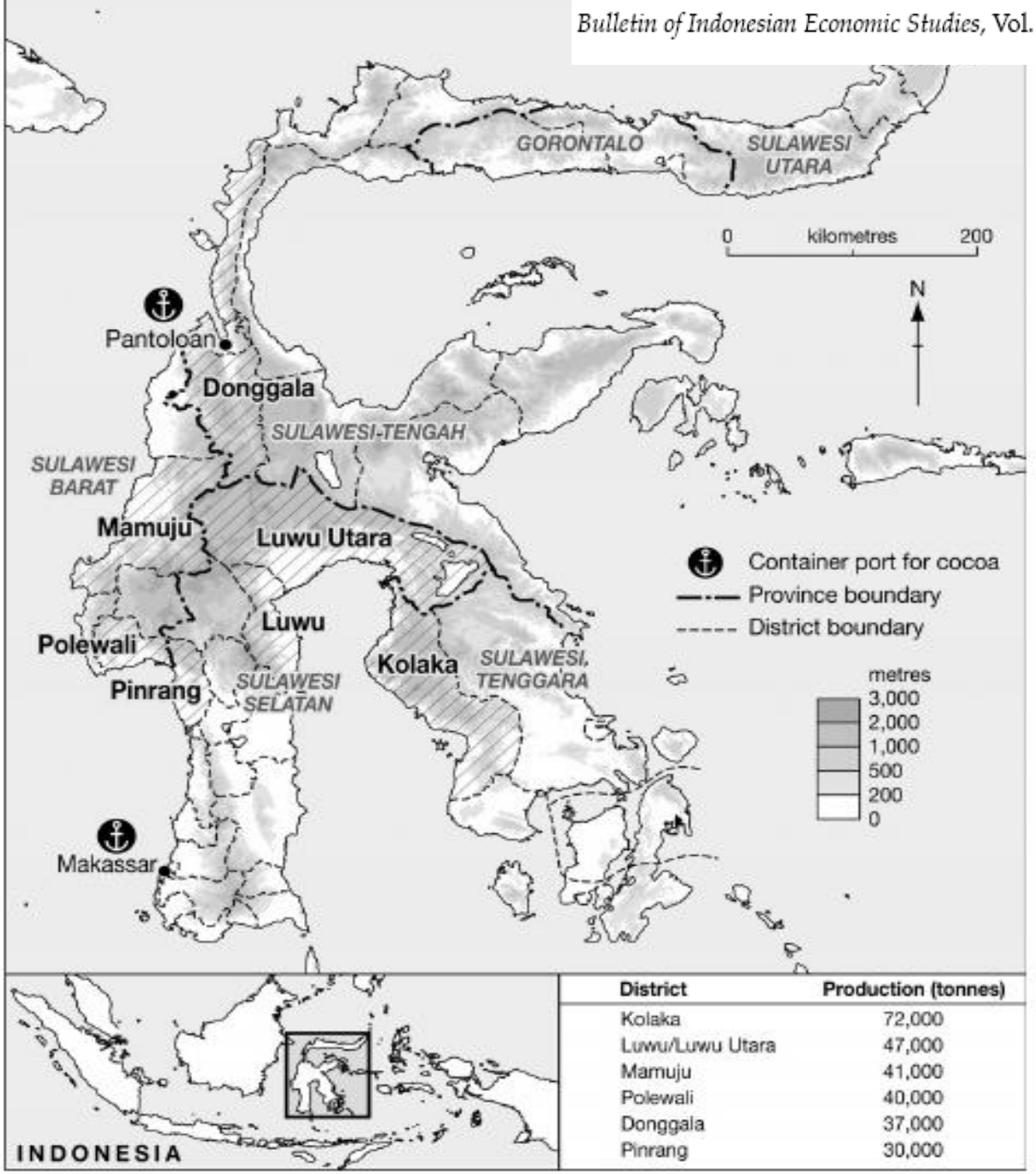


Clough et al. forthcoming

Sulawesi and the LLNP region is a “frontier” zone with favourable conditions



Source: Akiyama & Nishio (1996: 36) and Bulletin of Indonesian Economic Studies, Vol. 43, No. 2, 2007: 227-50



District	Production (tonnes)
Kolaka	72,000
Luwu/Luwu Utara	47,000
Mamuju	41,000
Polewali	40,000
Donggala	37,000
Pinrang	30,000

The cacao world market and land use changes in the LLNP region

⇒ Cacao cash cropping is the main driver of land use change inside and outside the park

Conversion in ha

	Perrenial crops **(mainly cacao),** 2002	Paddy, 2002	Fallow land, Mixed, 2002
From Forest, 1983	**19.400**	7.600	26.625
From Perrenial crops, 1983	X	1.500	900
From Paddy, 1983	2.750	X	5.700
From Fallow land, mixed, 1983	4.750	8.350	X

(Erasmi and Priess 2007)

Poverty and deforestation trade offs

⇒ **The cultivation of cacao had a significant positive impact on incomes in our study area**

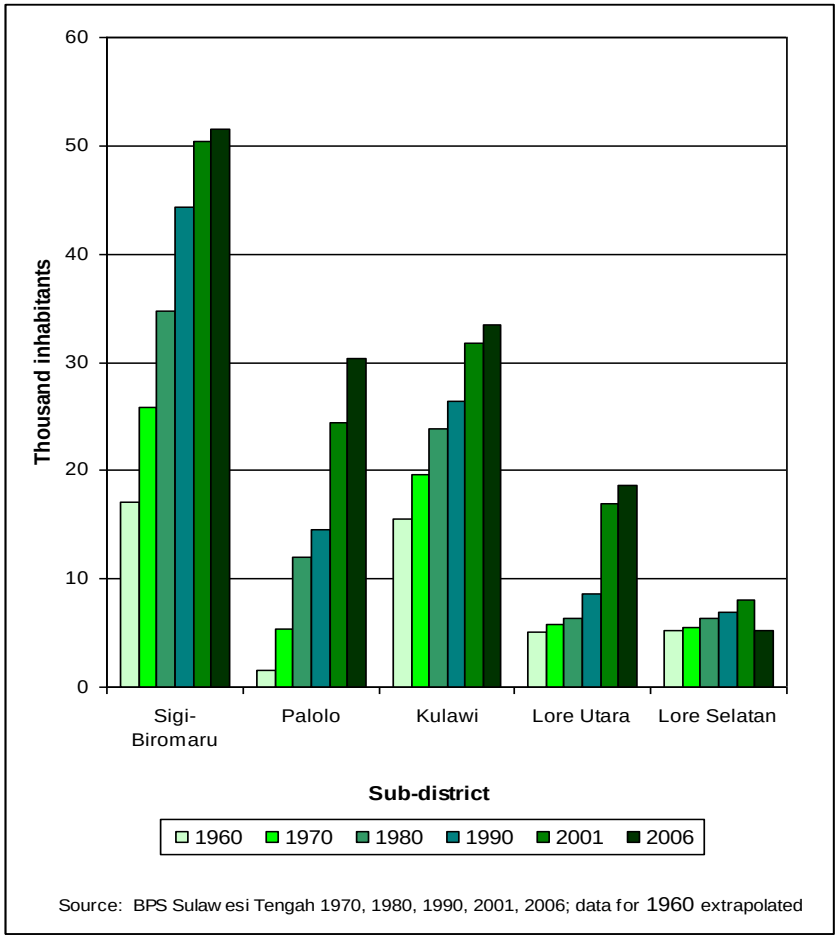
- In 2005 and 2007, almost 20% of the rural population of Central Sulawesi was identified as being very poor with individuals living on less than $1 US per capita and day in purchasing power parities
- 90 % of the cacao cultivators are smallholders (as well as in Sulawesi)

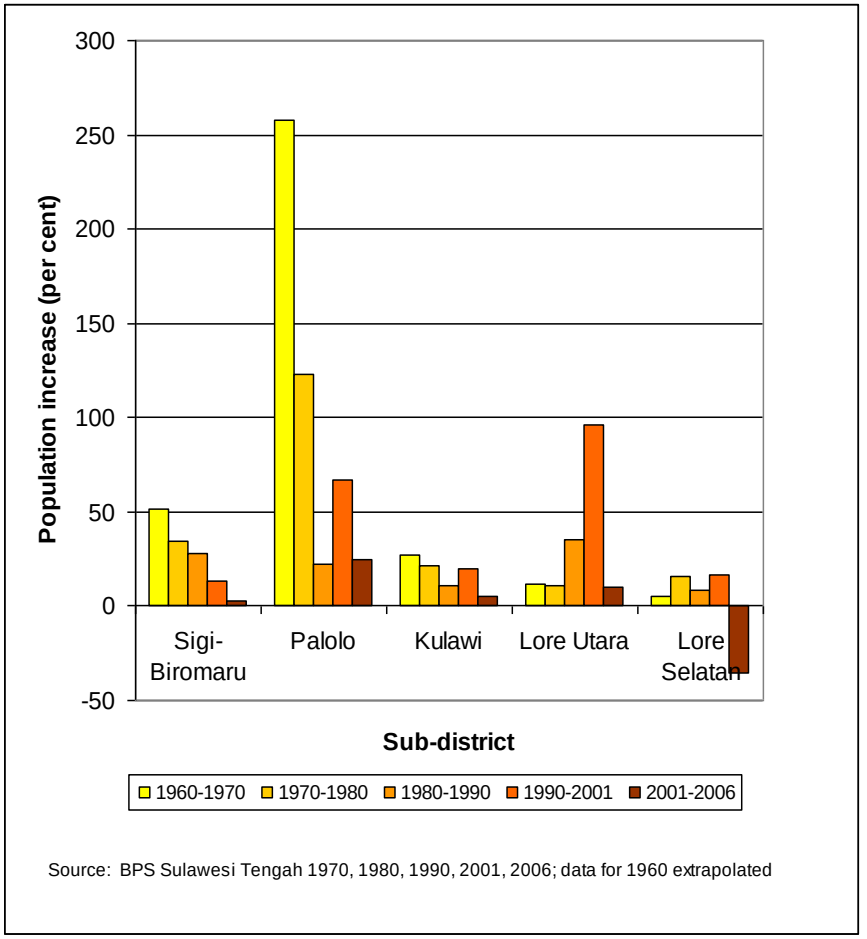
⇒ **But poorer autochthonous households are the direct agents of forest conversion, whereas timing and extent of forest conversion depends highly on consumptive demands (family size)**

(Clough et al. fothcoming, Van Edig et al. forthcoming, Priebe et al. forthcoming)

Population growth and deforestation trade offs

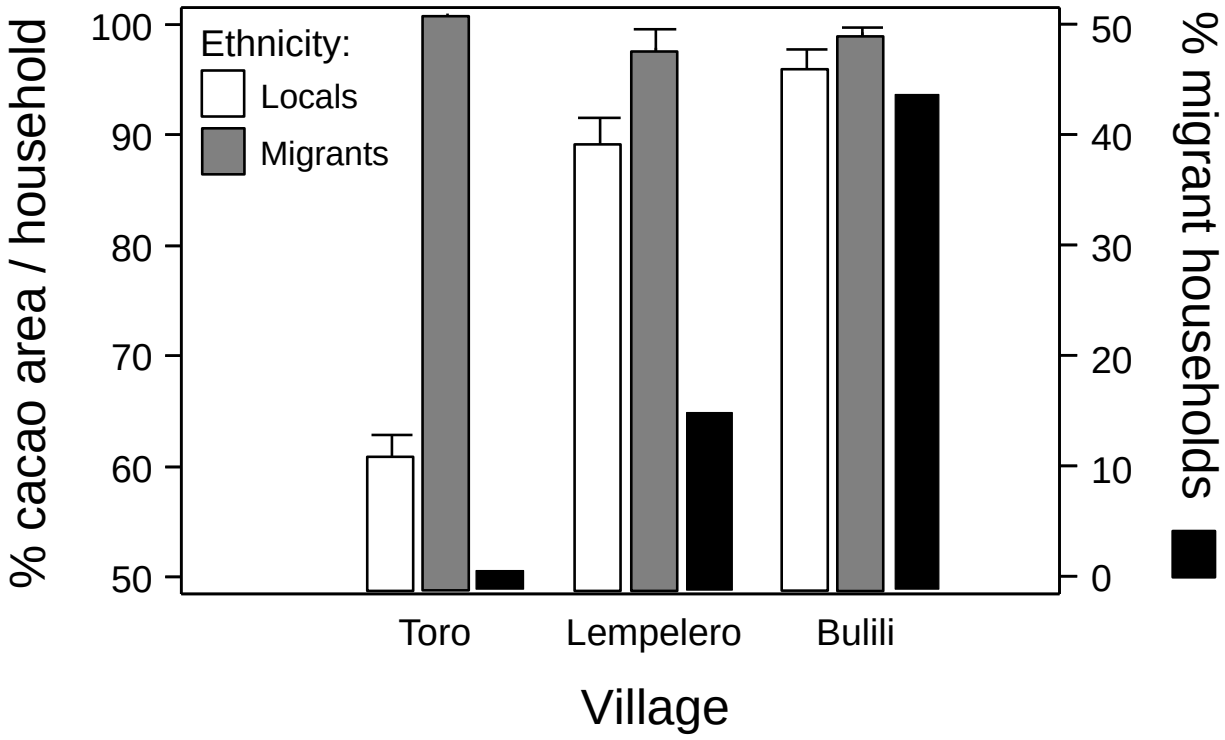
- Key driver of land use change is population pressure, particularly immigration into the Lore Lindu area





Migration and land use

- Migrants, especially from South Sulawesi, have an enormous effect on the land use decisions of local ethnic groups in their respective villages



=> The portion of migrants modifies traditional and economic power structures in local communities, varying from village to village

(Weber et al. 2007, Steffan-Dewenter et al. 2007)

Population growth, land titling and deforestation

- Migrants accelerate the issuing of land titles by acquiring land through purchases from villagers
- A substantial share of the autochthonous population finds itself either landless or is forced to cut marginal forest land

=> Restricting land ownership to traditional forms of community land rights could avoid newly landless locals, but it comes at costs in terms of social discrimination and lost agricultural income

(Klasen et al. forthcoming; Barkmann et al. forthcoming)

Land titling and economic development

=> But, demography-induced and capital-driven technological and institutional change - formal and semi-formal titles over agricultural land - are the key drivers of **agricultural productivity improvements and economic development**

=> With land titles, the propensity to invest in perennial crops and modern technologies rises considerably in the villages

(Burkard and Fremerey 2008; Koch et al. 2008)

General economic development and deforestation trade-offs

- Alleviation of poverty and income growth has been strongly associated with diversification into the **non-agricultural sector** of the economy, higher value-added agricultural activities and investments into new production techniques
- This economic development, brought about by intensification, helps to reduce deforestation

⇒ **Unfortunately, immigration as well as some aspects of technological change are also major direct drivers of deforestation**

⇒ **It turns out that the forest-clearing direct effect of demographic pressure and technological change is always larger than the forest-conserving indirect effect of promoting economic development**

(Schippers and Faust 2009, Maertens et al. 2006, Grimm and Klasen, 2009; Klasen et al. forthcoming)

LLNP Politics and deforestation

- Clearly formulated rules and laws, boundary demarcation and abidance by enforcement of the law seem to play a major role in buffer-zone management
- Further barriers are insufficient awareness of forest conservation needs among groups of villagers and the ever-increasing number of immigrants
- A mediator in the communication process between the management body and local people is missing

=> Local people should be considered as partners (in buffer-zone management) rather than as passive objects in this process

(Mehring and Stoll-Kleemann forthcoming)

Conclusions

- The ability to alleviate poverty, to enjoy income growth and to reduce deforestation has been strongly associated with a household's ability:
    - to diversify into the non-agricultural sector of the economy
    - to focus on higher value-added agricultural activities and
    - to its capability to invest into new production techniques
    - Investment in terraces and other intensification measures in lowland agriculture might provide such an income alternative
- Measures could be taken to support a faster transition of the rural economy towards more agricultural downstream industries
- Therefore, access to capital for rural households and investment into human capital (quality of education) are core elements for agricultural intensification and generation of non-farm incomes

(Priebe et al. forthcoming)

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