Community Forestry Management:
Unveiling the success story of Nepal

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Motivation

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  - Community forestry would generate income, create employment, give loans or scholarships,...
- Forests in the Himalayas have a determinant impact on livelihoods
  - People living nearby forests derive a significant share of their income from forests
  - Forest provide ecosystem services in their vicinity and downstream: watershed services, filtration of water, reduction of nutrient run-off, reduction of air pollution...
  - Forest degradation is one of the causes of climate change.

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2. **Which mechanisms are at play?**
   - Institutional change is related to
     1. new management practices
     2. lower fuelwood collection and a diffusion of alternative energy sources such as biogas

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Contributions

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- Our outcome variable is one of the main stated goal of the decentralization program, namely the change in tree cover
- We are able to dig into the mechanisms behind our results using a combination of household level data, administrative data and remote sensing information.
- This project contributes to the analysis of the pros and cons of decentralization.
  - It is one of the few example of a success (Mookherjee, 2015 and 2022).
  - Community management seems to improve tree biomass.
  - Limited elite capture and local development remain open research questions before concluding to a success of the program.

Related literature in economics: institutional change and forest conservation

Effect of community management regime on forest cover:

- Somanathan et al. (PNAS, 2009): In Indian Central Himalaya, community forestry is shown to conserve forests at least as well as government management but at a lower cost.
- Baland et al. (World Dev., 2010): In Uttarakhand, community forest appear to reduce forest degradation. This is especially true for older groups
- Bluffstone et al. (World Dev., 2018): In Nepal, community forestry would sequester carbon, in community forest plot and provided social capital is high enough
- Oldekop et al. (Nature Sustain., 2019): Using matching, they show that CFUG reduce forest loss
- Desbureaux (FAERE WP, 2017): In Madagascar, the transfer of rights to community has failed to decrease deforestation, maybe even increasing it
- Yang et al. (China ER, 2017) suggests that collective forest tenure has increased fuelwood consumption in Yunnan
- Bowler et al. (FEE, 2011) provide a broader review

Related literature in economics: institutional change and forest conservation

- Privatization of the commons:
  - Relatively dense theoretical literature, with contributions by Weitzman (JET, 1974) ; Brito D. et al. (JPubE, 1997) ; Baland and Bjorvatn (EDE, 2013)
  - Less empirical work, especially on forests
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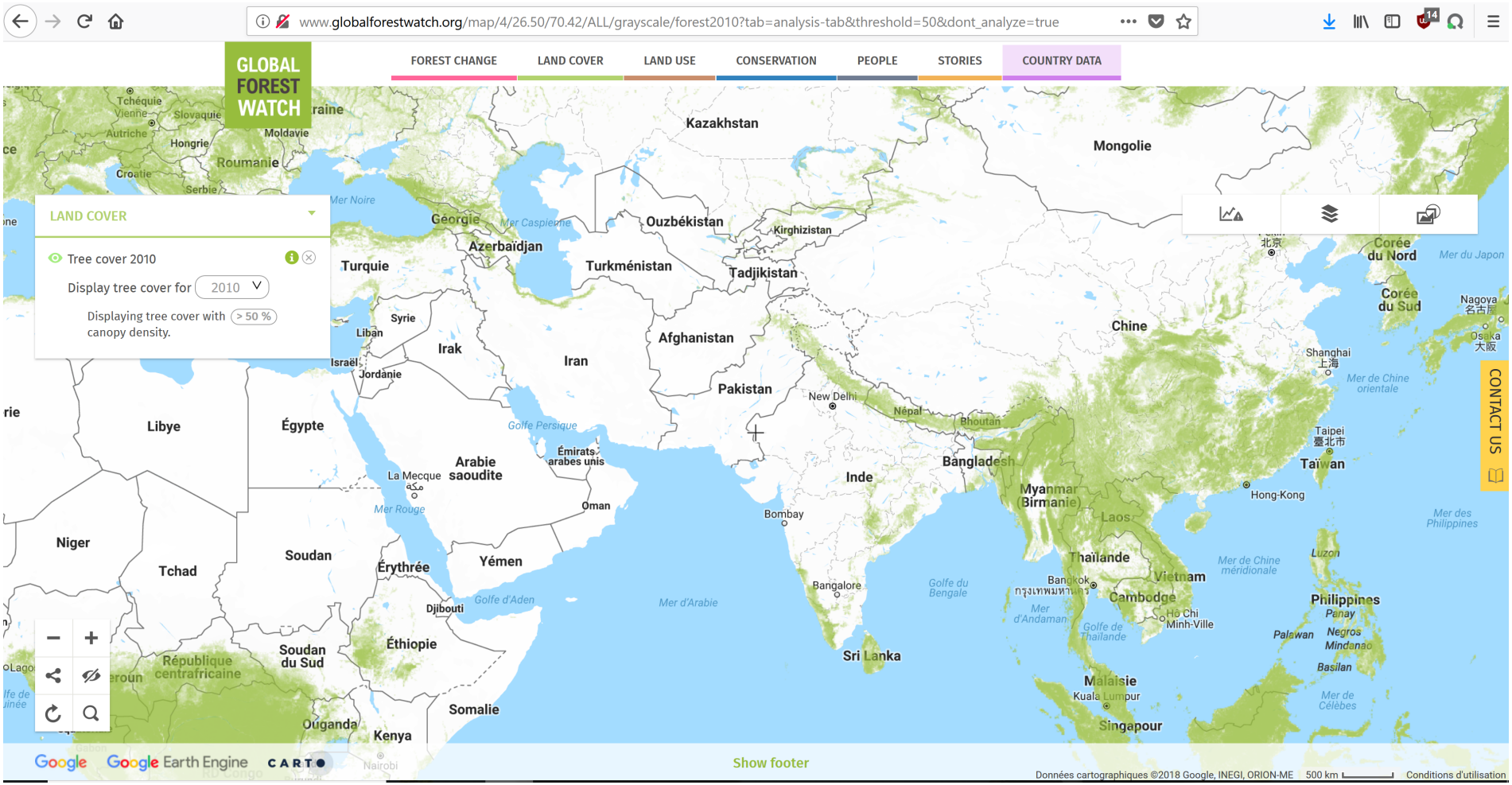
- Many papers discuss the effectiveness of protection status
- See Somanathan (2017) for a review of institutional change and forest management

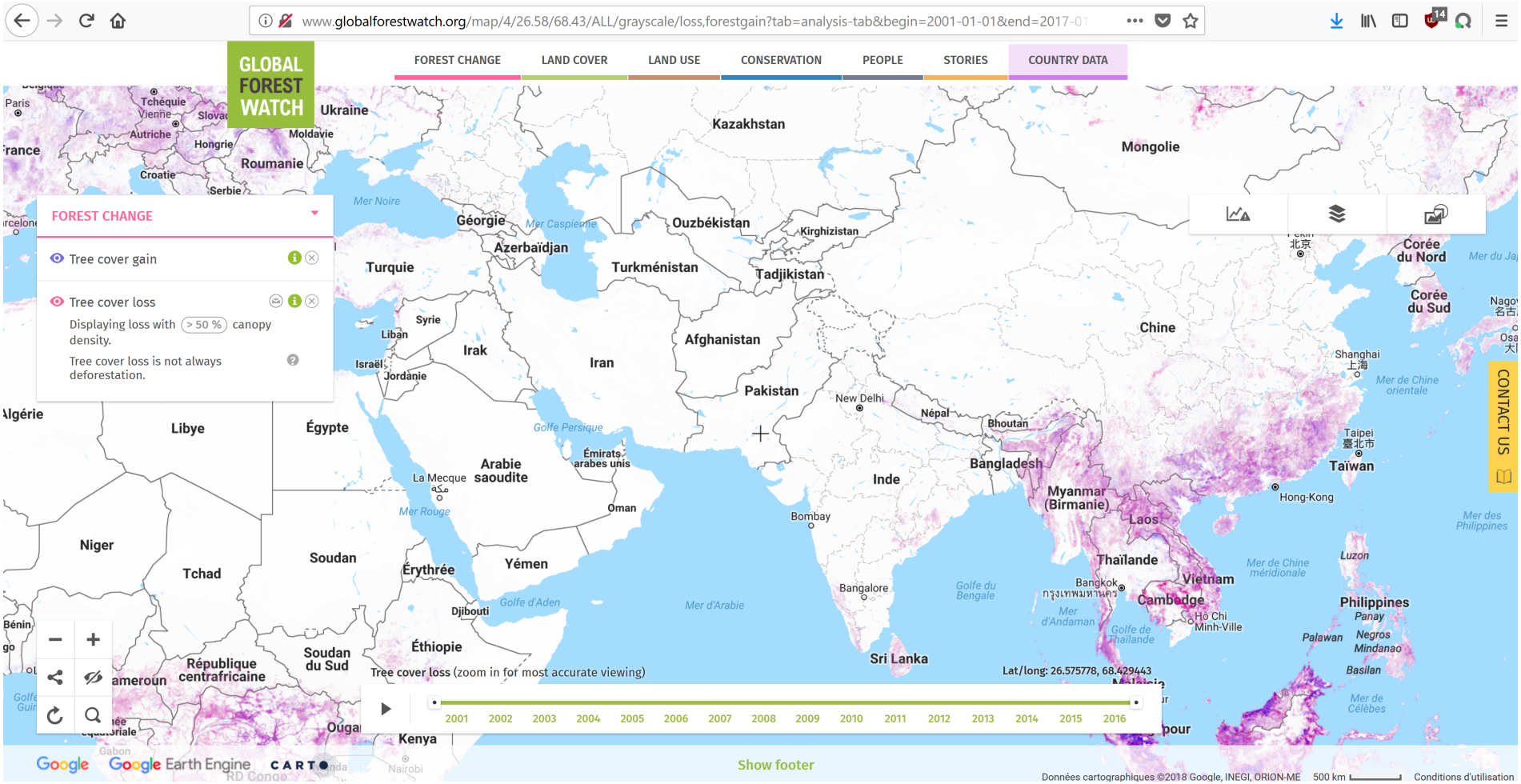
Roadmap

- Motivation
- Context
- Data
- Forest conditions
- Community forestry
- Exploration of mechanisms

Context: forest cover in South Asia



Context: forest cover change in South Asia



Context: why community forestry in Nepal?

- Prior to the 1950s, under the Rana regime, Nepal was feudal-like regime.
  - Local bureaucrats controlled (local) land and forest use.
  - Access by peasants was subject to payments and/or contribution in labour.
- Between the 1950s and Mid-1970s, forest were nationalized.
  - A forest department was created
  - The forest department was responsible of forest management and timber supply to a nascent forest industry.

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- From Mid-1970s to 1980s, the government concern for environmental conservation increased.
  - It created the department of Wildlife and Natural Parks as well as a Department of Soil and Water conservation.
  - Tree felling of valuable species was banned.
  - Despite that, the environmental crisis became more and more visible.
- 1993: Forest Act establishing a legal status of **"Community Forest User Groups (CFUG)**

Context: community forestry in Nepal

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- Community forestry
  - is the local management of forest resources
  - aims at restoring degraded forest land
  - aims at improving livelihoods
  - generates income by selling timber and non-timber forest products
  - has to invest 25% of its budget in forest management
  - has to invest 75% in local development, public good provision and improved livelihoods
  - would have an aggregate budget 4 times larger than village development committee in the early 2010's,

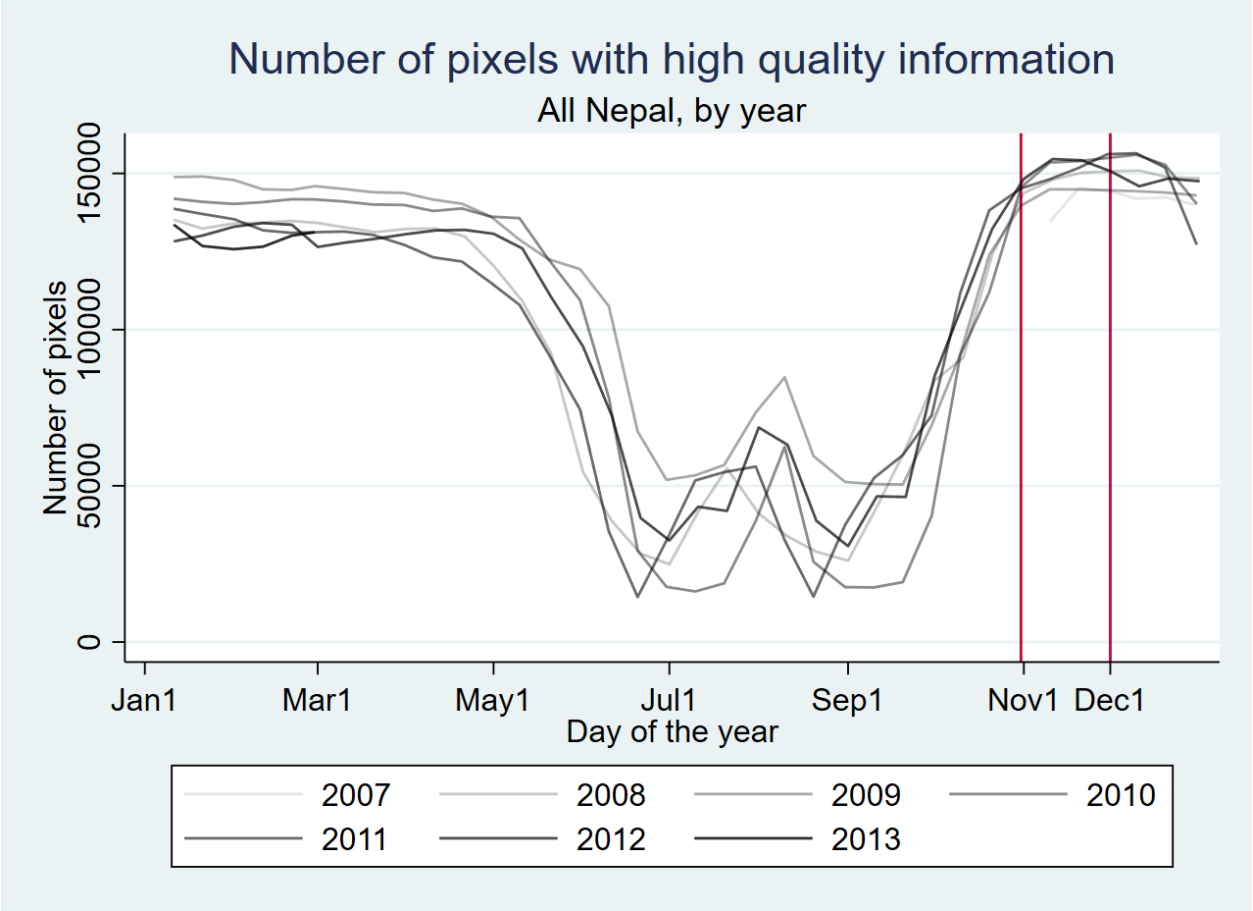
Data: village level information

- **Leaf Area Index (LAI), BioPar algorithm based on SPOT images**. Variable of interest: spatial average of LAI for each Village Development Committee in November or December
- **Land cover, based on MODIS images**. Variable of interest: share of a given land cover type for each Village Development Committee by year
- Land cover map by ICIMOD (30m resolution) in 2010, with a land cover classification in 8 classes.

Why the Leaf Area Index ?

- The leaf area index is half the surface of leaves above each m^2 of soil
- We use BIOPAR Geo-V2. (Baret et al. 2013 ; Camacho et al. 2013)
- Neural networks trained with other datasets (MODIS and CYCLOPES) $\rightarrow$ smooth and unsaturated LAI

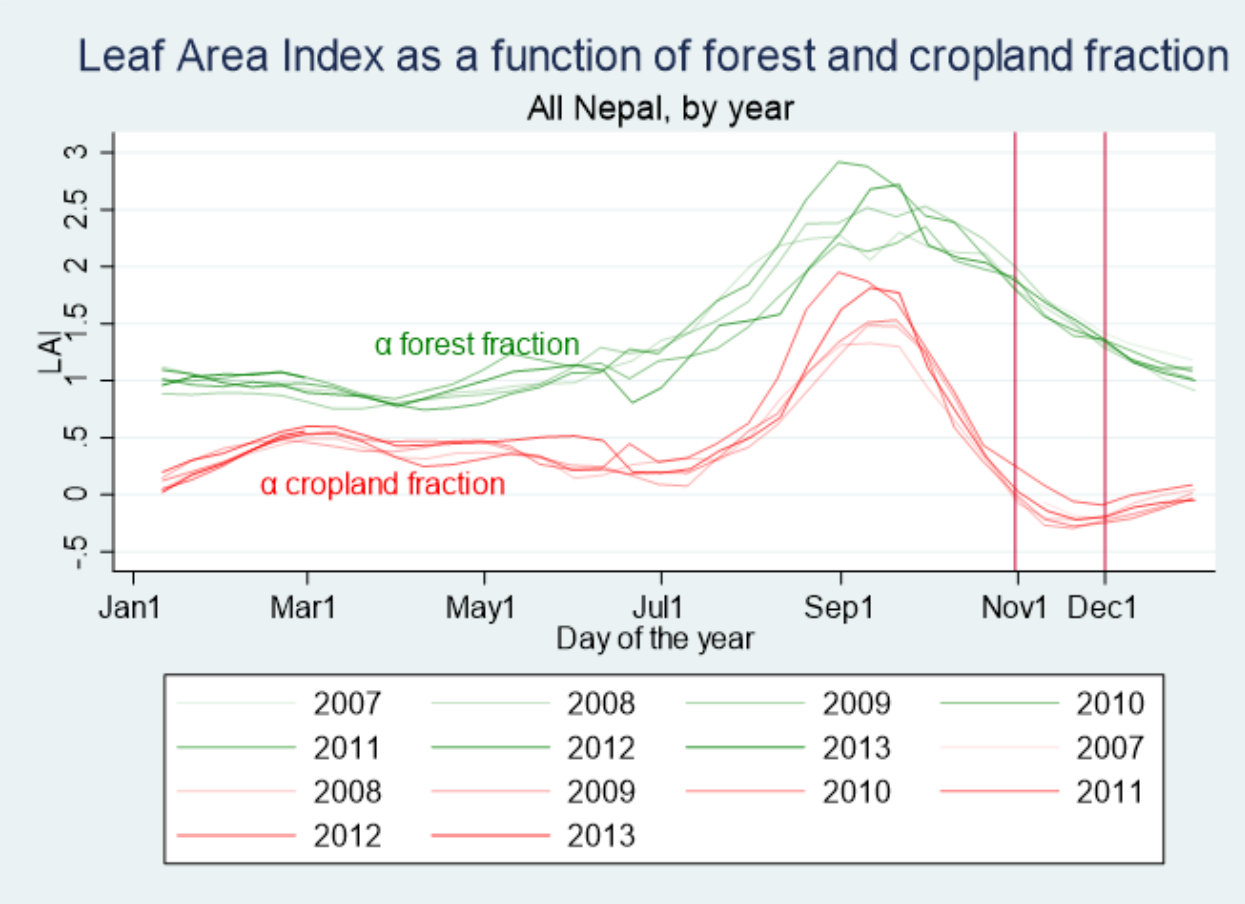
Why the Leaf Area Index in November ?



- Between May and November, less than half of the pixels contain high quality information
- Good data coverage from November to April

Why the Leaf Area Index in November ?

$$LAI_p^t = \alpha_0^t + \alpha_1^t ForestFraction_p^t + \alpha_2^t CroplandFraction_p^t + X_p^t \mathbf{B}^t + \varepsilon_p^t \quad \forall t \quad (1)$$



- Forest land (46%) and cropland (35%) do constitute the main land cover classes in 2010
- Reference category: snow (1.3%), **barren land** (6%), water (.5%) buildup area (.5%), **grassland** (8%) and bushes (2%)

Why the Leaf Area Index in November ?

- November because
  1. It's a month where we have a high quality of information
  2. It's the month that maximizes the difference between cropland and forest land in the leaf area index.

Data: village level information

- **Community Forest User Group census data 1988 - 2016 (DoF)** : creation date, municipality and area of all CFUG of Nepal. Source: Department of Forest, Nepal. Variable of interest: share of village area managed by CFUG in year t
- **Alternative Energy diffusion: census of biogas installations 1992 - 2011 (AEPC)**: Number of biogas installations constructed by year and Village Development Committee

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- **Alternative Energy diffusion: census of biogas installations 1992 - 2011 (AEPC)**: Number of biogas installations constructed by year and Village Development Committee
- **Digital Elevation Model from ASTER (NASA)**: allows to compute walking distance from district headquarters

Data: village level information

- Population census data 1991 - 2001 - 2011 (CBS)
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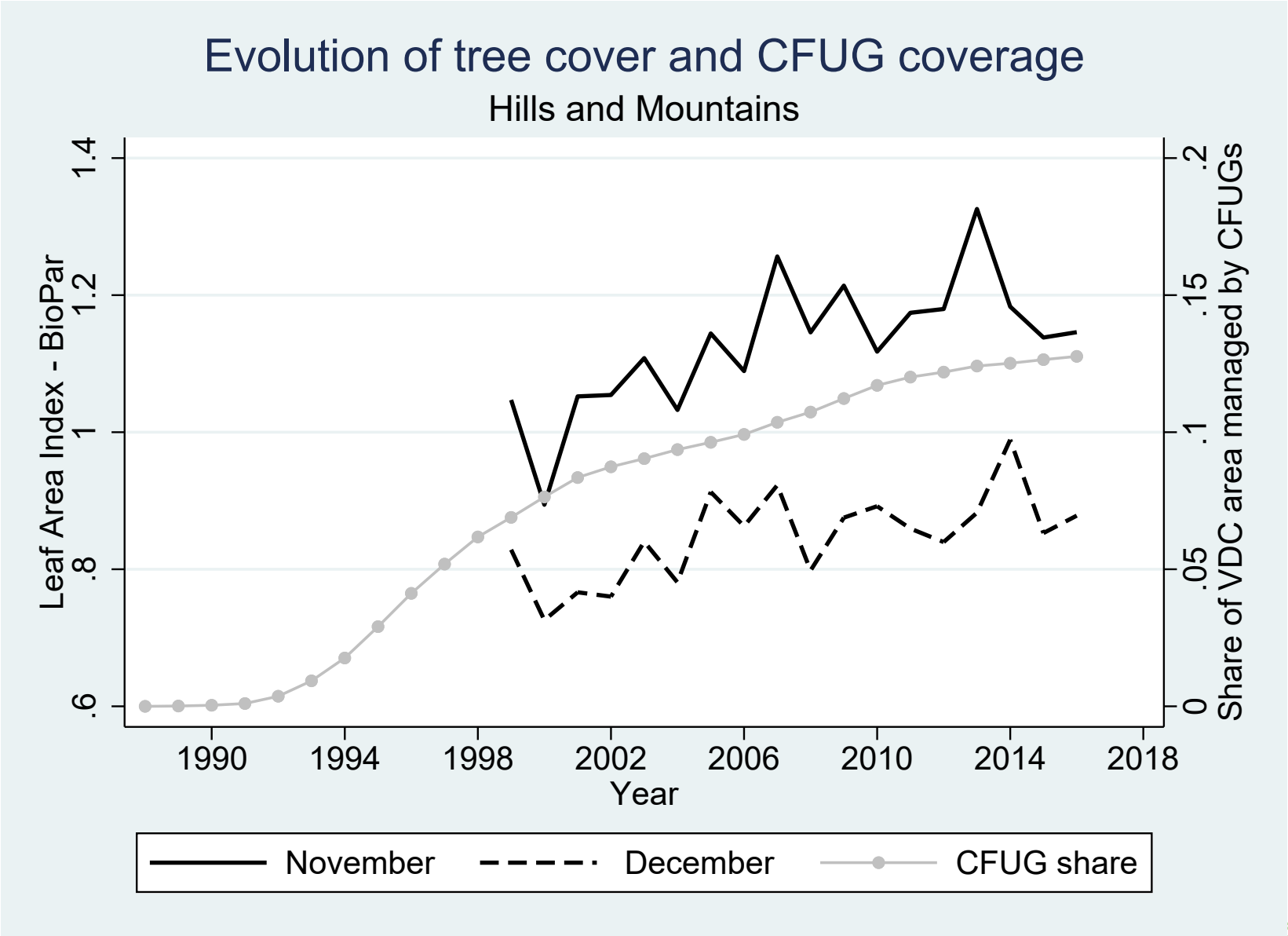
- Rainfall data from TRMM from NASA and JAXA
- Land Surface Temperature (LST) from MODIS (NASA)
- Snow cover data from MODIS (NASA)
- Nighttime light data (DMLP)
- Conflict data by village and by month 1996-2006 (INSEC)

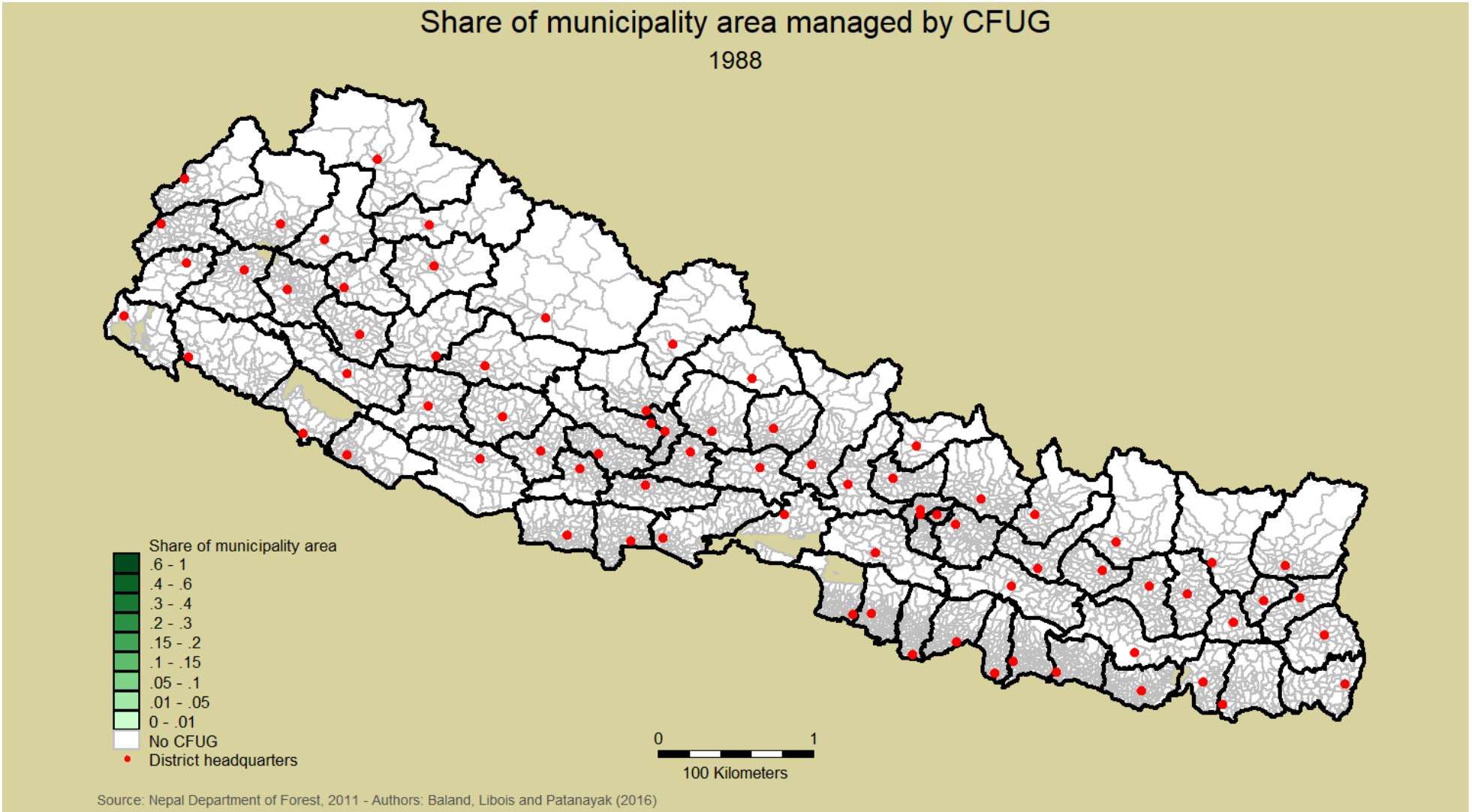
Data: household level information

- Nepal Living Standard Survey 1995/6 - 2003/4 - 2010/1
  - "LSMS-type" survey
  - Repeated cross-sections

Forest conditions and creation of Community Forest User Groups



Diffusion of Community Forest User Groups



By the end of 2016, 19824 CFUGs managed 1.9 million hectares of forest in Nepal, one eighth of the country, around half of countries' forest.

Leaf Area index & CFUG

$$LAI_{vt} = \alpha CFUGshare_{vt-1} + \beta_k X_{kvt} + \eta_v + \delta_t + \varepsilon_{vt}. \quad (2)$$

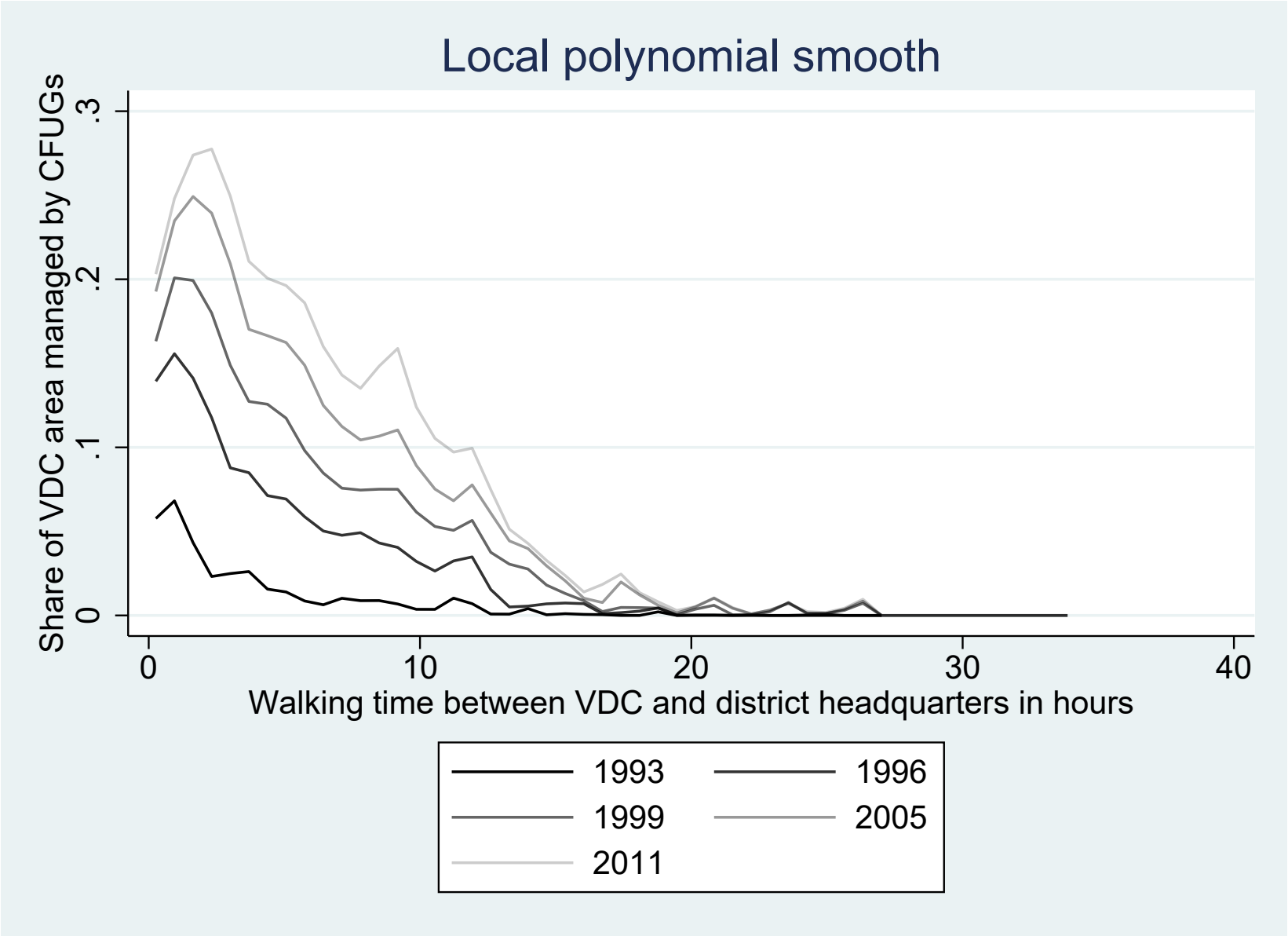
with

- LAI, the Leaf area index of village v in year t
- $CFUGshare$, the share of village area managed by CFUGs
- X_k, a vector of k village level controls
- η, village fixed effects
- δ, year fixed effects
- ε, the error term

Potential endogeneity of CFUG creation

- Forest conditions may actually affect the creation of CFUGs
  - Villages with high social capital may already have started to manage their forest and get their CFUG before other villages
  - Villages with highly depleted forest may be handed over with less reluctance by the Department of Forests (DoF)
- Predicting CFUG creation based on an exogenous variable
  - The creation of a CFUG requires the intervention of civil servants based in district headquarters.
  - Given the low connectivity in Nepal and the size of the CFUG program, creations and registrations of groups first took place near DoF offices. (This is also the argument of Edmonds (2002) for the Arun Valley)
  - use the interaction between walking time to a given VDC and the number of years since the first creation of a CFUG in the district

Transfer of forest management to CFUGs



Transfer of forest management to CFUGs

$$CFUGshare_{vt} = \beta_1 \text{Proximity}_v \times \text{TO}_{dt} + \mathbf{Z_{vt}\Theta} + \gamma_v + \tau_t + \varepsilon_{vt} \quad (3)$$

with

- $CFUGshare$, the share of village area managed by CFUGs
- $Proximity$, the inverse of the walking time between a village and the district headquarters
- TO, the number of years since the program has started in a given district
- Village v and time t fixed effects, time and space varying controls Z and an error term ε

Leaf Area index as a function of CFUG expansion

Table: Change in Leaf Area Index as a function of CFUG expansion

	Panel F.E. (1)	First stage (2)	Panel F.E + IV (3)	Panel F.E. (4)	First stage (5)	Panel F.E + IV (6)	Panel F.E. (7)	First stage (8)	Panel F.E + IV (9)
FUG share in VDC	0.448***		4.594***	0.366***		5.281***	0.366***		5.620***
	(0.0608)		(0.925)	(0.0512)		(1.230)	(0.0502)		(1.336)
Proximity Hq		0.00546***			0.00449***			0.00423***	
× FUG years in district		(0.00119)			(0.00107)			(0.00104)	
Years since FUG in district	0.0221***	-0.00703***	0.169***	0.0206***	-0.00764***	0.178***	0.0207***	-0.00743***	0.179***
	(0.00340)	(0.00218)	(0.0223)	(0.00330)	(0.00216)	(0.0241)	(0.00349)	(0.00210)	(0.0247)
Forest in 1950 ×	-0.000184	0.00496***	-0.0197***	0.00129	0.00547***	-0.0248***	0.00131	0.00541***	-0.0263***
FUG years in district	(0.00356)	(0.00150)	(0.00582)	(0.00301)	(0.00138)	(0.00741)	(0.00302)	(0.00135)	(0.00814)
Population density				-0.00356**	-0.00115***	-0.00254*	-0.00387**	-0.00114***	-0.00230*
				(0.00152)	(0.000417)	(0.00134)	(0.00161)	(0.000409)	(0.00139)
Biogas per household				0.878***	0.253***	-0.507	0.877***	0.243***	-0.534
				(0.150)	(0.0695)	(0.431)	(0.147)	(0.0691)	(0.452)
Access to road							-0.00104	-0.00908*	0.0533*
							(0.0114)	(0.00478)	(0.0296)
Nighttime light							-0.00263**	0.000696*	-0.00524*
							(0.00127)	(0.000405)	(0.00272)
VDC fixed-effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed-effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Environmental controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations (in ha)	136252129	136252129	136252129	131392040	131392040	131392040	131372371	131372371	131372371
Observations (VDCxyear)	2252x13	2252x13	2252x13	2471x13	2471x13	2471x13	2470x13	2470x13	2470x13
Mean LAI in 2013	1.33								
Mean CFUG in 2013	0.12								

Regressions are weighted by VDC area. Environment controls include rainfall, snow cover, growing degree days and conflict-related casualties

We derive population data from the 2001 and 2011 population census and interpolate figures.

Standard errors in parentheses, clustered at the district level, $^{*}p < 0.1, ^{**}p < 0.05, ^{***}p < 0.01$

Change in Leaf Area Index as a function of CFUG creation

- Column (1) indicates that a 10% increase in the share of village area managed by a CFUG is followed by an increase in the LAI of 0.04.
- In terms of magnitude, with an average LAI of 1.3 and 12% of the village area managed by a CFUG in 2013, the contribution of the CFUG program to the increase in tree cover is estimated to be about 4%.

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- We expect selection bias when (and where) forest management gets transferred to communities
- After instrumenting, a 12% increase in CFUG coverage increases the LAI by 0.55, a 40% increase.
- After instrumenting, an hypothetical village that would go from no management by CFUG to full management (100% of its area) would have an increase of its LAI by 4.6, basically the difference between a densely forested pixel in Shivapuri national park and Kathmandu city.

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- Large change BUT the DoF tends to hand over
  - forests plots that are already degraded and under the threat of further degradation
  - forests plots that are close to settlements and closer to urban areas
  - "Community forestry is created to create a buffer protecting state forests"

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- robust if we control for night-time light and road network expansion (both are however bad controls)

Longer-term effects

- One may expect that forest regeneration takes time, we therefore estimate following descriptive relation:

$$LAI_{vt} = \sum_{z=0}^{20} \alpha_z \text{Proportion of VDC area managed by FUG}_{vt-z} + \mathbf{X_{vt}\Theta} + \gamma_v + \delta_{dt} + \varepsilon_{vt} \quad (4)$$

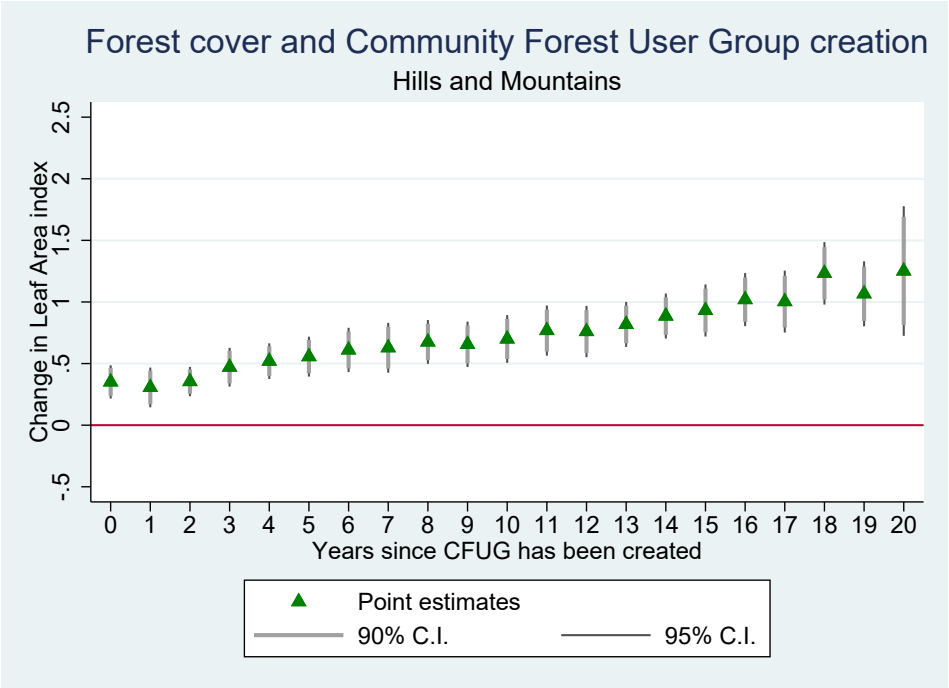


Figure: Forest cover and CFUG creation over time

Longer-term effects

- An alternative approach is to handle the staggered adoption of community forestry using recently developed estimation techniques (de Chaisemartin and D'Haultfoeuille [AER, 2020])

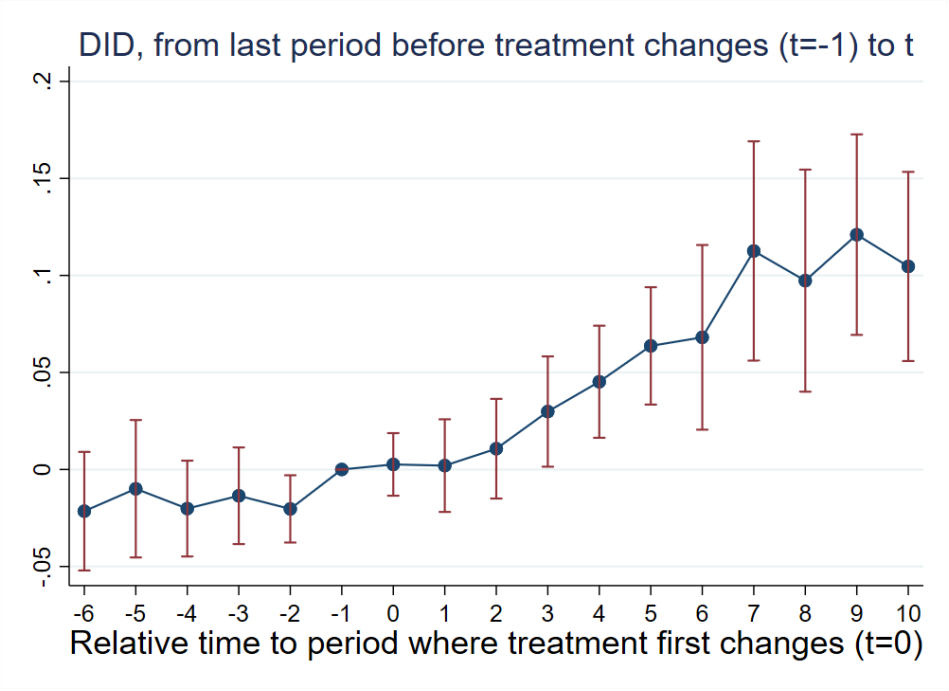


Figure: Short- and long- term effects of CFUG creation on Leaf Area Index

VDC share has been re-categorized in 6 categories, 0 for VDC without a CFUG, 1 for ¿0-20%, 2 for 20-40%, etc. The standard errors computed are based on 500 bootstrap replicates.

Longer-term effects

- No clear pre-treatment pattern
- consistent upward trend after the creation of a group, with a statistically significant improvement after 3 years of treatment
- Average effect size: 0.0338 (with a 95% Confidence interval given by: [.0140; .0535]).
- Average change in CFUG coverage at the time of the switch in the categorical variable: 1.50%.
- going from a share of village area managed by CFUG equal to 0 up to 1 would increase the LAI by 2.258

What do CFUGs do?

- Two primary reasons may explain why LAI rises with the expansion of community forestry:
  1. CFUGs can contribute to the expansion of forested areas
  2. CFUGs can prevent forest degradation and "densify" forests
- Changes in forest cover by CFUG presence in 2013

Share of village area managed by CFUG in 2013

	Below median	Above Median
Forest cover in 2001	15.9%	30.4%
Forest cover in 2013	15.3%	32.3%
Change in percentage	-3.8%	6.8%

What do CFUGs do: better management and plantations

	Panel F.E.			1st stage	Panel F.E + IV		
	(Forest)	(Needle)	(Mixed)	(FUG share)	(Forest)	(Needle)	(Mixed)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
FUG share in VDC	0.0764***	0.00821**	0.0661***		0.583***	0.0686*	0.405**
	(0.0163)	(0.00378)	(0.0147)		(0.185)	(0.0372)	(0.177)
Proximity Hq				0.00547***			
× FUG years in district				(0.00119)			
Years since FUG in district	0.00138***	-0.000121*	0.00174***	0.000249	0.000781*	-0.000193**	0.00133***
	(0.000444)	(0.0000680)	(0.000410)	(0.000469)	(0.000438)	(0.0000960)	(0.000420)
Forest in 1950 ×	-0.00258***	0.0000510	-0.00164**	0.00497***	-0.00497***	-0.000234	-0.00324***
FUG years in district	(0.000645)	(0.000185)	(0.000631)	(0.00150)	(0.00107)	(0.000301)	(0.000899)
VDC fixed-effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed-effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Environmental controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations (in ha)	139495824	139495824	139495824	139495824	139495824	139495824	139495824
Observations (VDCxyear)	2552x13	2552x13	2552x13	2552x13	2552x13	2552x13	2552x13

Regressions are weighted by VDC area. Environment controls include rainfall, snow cover, growing degree days and conflict-related casualties.
Standard errors in parentheses, clustered at the district level, $^{*}p < 0.1, ^{**}p < 0.05, ^{***}p < 0.01$

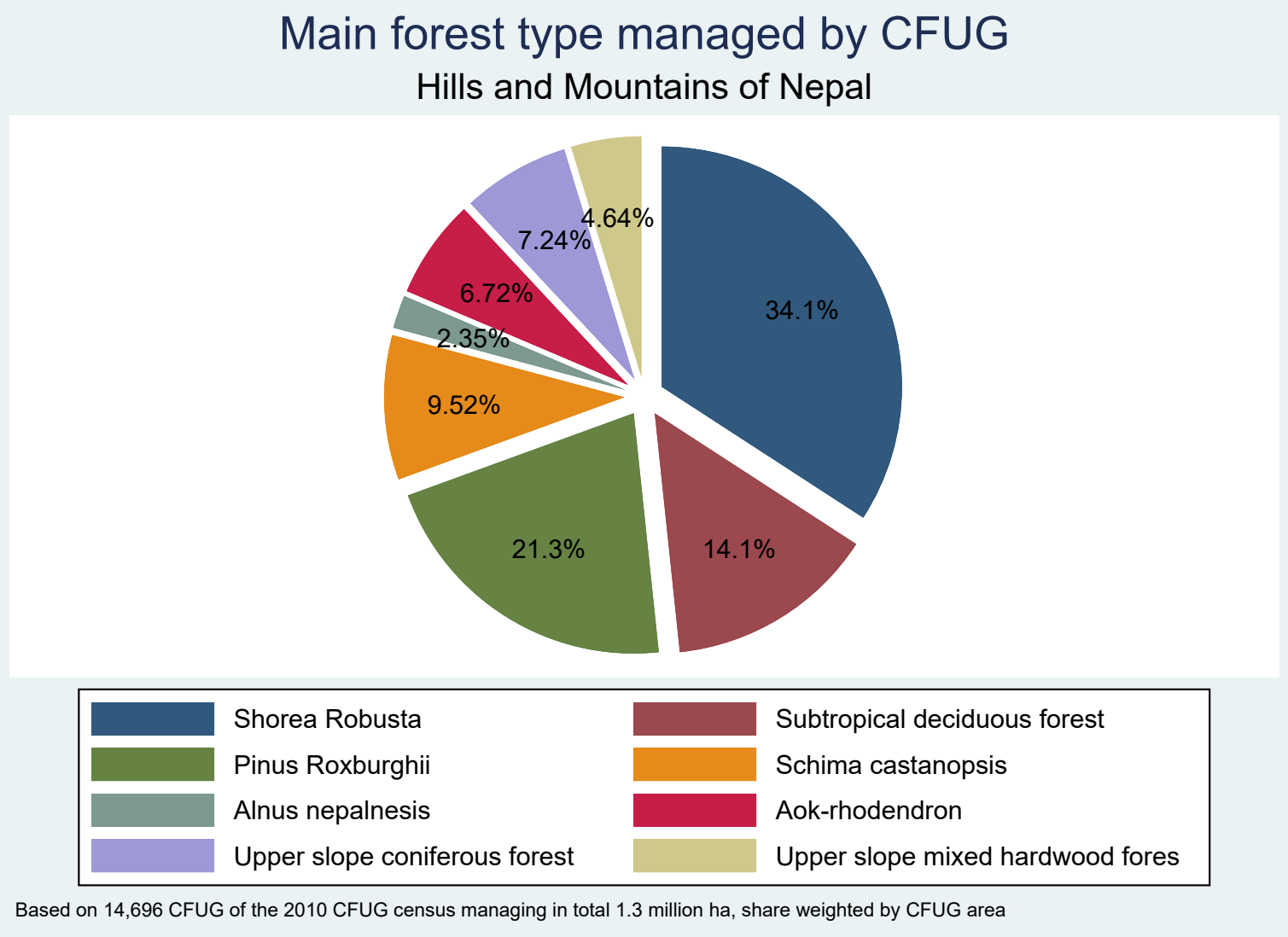
What do CFUGs do: better management and plantations

	Panel F.E.			1st stage	Panel F.E + IV		
	(Broadleaf)	(Crop)	(Shrub)	(FUG share)	(Broadleaf)	(Crop)	(Shrub)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
FUG share in VDC	0.00203	-0.0172***	-0.0735***		0.109	-0.390***	-0.494***
	(0.00770)	(0.00583)	(0.0170)		(0.0678)	(0.121)	(0.163)
Proximity Hq				0.00547***			
× FUG years in district				(0.00119)			
Years since FUG in district	-0.000230*	-0.00115***	0.0000642	0.000249	-0.000358***	-0.000702***	0.000565
	(0.000126)	(0.000271)	(0.000421)	(0.000469)	(0.000149)	(0.000252)	(0.000409)
Forest in 1950 ×	-0.000990***	0.00136***	0.00170**	0.00497***	-0.00149***	0.00312***	0.00368***
FUG years in district	(0.000275)	(0.000419)	(0.000777)	(0.00150)	(0.000433)	(0.000854)	(0.00115)
VDC fixed-effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed-effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Environmental controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations (in ha)	139495824	139495824	139495824	139495824	139495824	139495824	139495824
Observations (VDCxyear)	2552x13	2552x13	2552x13	2552x13	2552x13	2552x13	2552x13

Regressions are weighted by VDC area. Environment controls include rainfall, snow cover, growing degree days and conflict-related casualties.
Standard errors in parentheses, clustered at the district level, , $^{*}p < 0.1,^{**}p < 0.05,^{***}p < 0.01$.

What do CFUGs do: better management and plantations

Figure: CFUG main forest type



What do CFUGs do: forest extension or forest density ?

	Villages with stable forest cover			All villages		
	Panel F.E.	First stage	Panel F.E + IV	Panel F.E.	First stage	Panel F.E + IV
	(1)	(2)	(3)	(4)	(5)	(6)
FUG share in VDC	0.600***		4.359***	0.312***		4.043***
	(0.0816)		(0.861)	(0.0496)		(0.848)
Share of forest land cover in VDC				1.776***	0.207***	0.944***
				(0.133)	(0.0634)	(0.270)
Proximity Hq		0.00424***			0.00481***	
× FUG years in district		(0.00109)			(0.00116)	
Years since FUG in district	0.00494**	-0.000334	0.00396**	0.0111***	0.0000567	0.00791***
	(0.00192)	(0.000336)	(0.00171)	(0.00208)	(0.000454)	(0.00220)
Forest in 1950 ×	0.00997***	0.00564***	-0.0107	0.00440	0.00540***	-0.0151***
FUG years in district	(0.00302)	(0.00146)	(0.00715)	(0.00291)	(0.00151)	(0.00550)
VDC fixed-effects	YES	YES	YES	YES	YES	YES
Year fixed-effects	YES	YES	YES	YES	YES	YES
Environmental controls	YES	YES	YES	YES	YES	YES
Observations (in ha)	45139146	45139146	45139146	139495824	139495824	139495824
Observations (VDCxyear)	679X13	679X13	679X13	2564X13	2564X13	2564X13

Regressions are weighted by VDC area. Environment controls include rainfall, snow cover, growing degree days and conflict-related casualties.
Villages with stable cover corresponds to the subset of villages whose forest cover changed at most by one percentage point between 2001 and 2013.
Standard errors in parentheses, clustered at the district level, $^{*}p < 0.1,^{**}p < 0.05,^{***}p < 0.01$

Both happens, with a clear gain in forest density

Household response

- CFUGs restrict the access to forest for livestock related activities
  - prohibit grazing
  - reduce and regulate fodder extraction

Household response

- CFUGs restrict the access to forest for livestock related activities
  - prohibit grazing
  - reduce and regulate fodder extraction
- No quantitative evidence
- See Baland et al. (JAERE, 2018) for a discussion of the link between livestock rearing and firewood collection
- Large qualitative evidence from field visits of the research team in 10 districts

What do CFUGs do: reduced degradation

	Panel F.E.		1st stage	Panel F.E + IV	
	(Biogas units)	(Biogas units per hh.)	(FUG share)	(Biogas units)	(Biogas units per hh.)
	(1)	(2)	(3)	(4)	(5)
FUG share in VDC	180.9***	0.0743***		4074.0***	0.848***
	(42.46)	(0.0188)		(1391.7)	(0.243)
Proximity Hq			0.00547***		
× FUG years in district			(0.00119)		
Years since FUG in district	2.229*	0.00142***	0.000249	-2.413	0.000499
	(1.146)	(0.000502)	(0.000469)	(1.978)	(0.000431)
Forest in 1950 ×	0.627	-0.000796	0.00497***	-17.75**	-0.00445***
FUG years in district	(3.613)	(0.00112)	(0.00150)	(8.607)	(0.00137)
VDC fixed-effects	Yes	Yes	Yes	Yes	Yes
Year fixed-effects	Yes	Yes	Yes	Yes	Yes
Environmental controls	Yes	Yes	Yes	Yes	Yes
Observations (in ha)	139495824	139495824	139495824	139495824	139495824
Observations (VDCxyear)	2552x13	2552x13	2552x13	2552x13	2552x13

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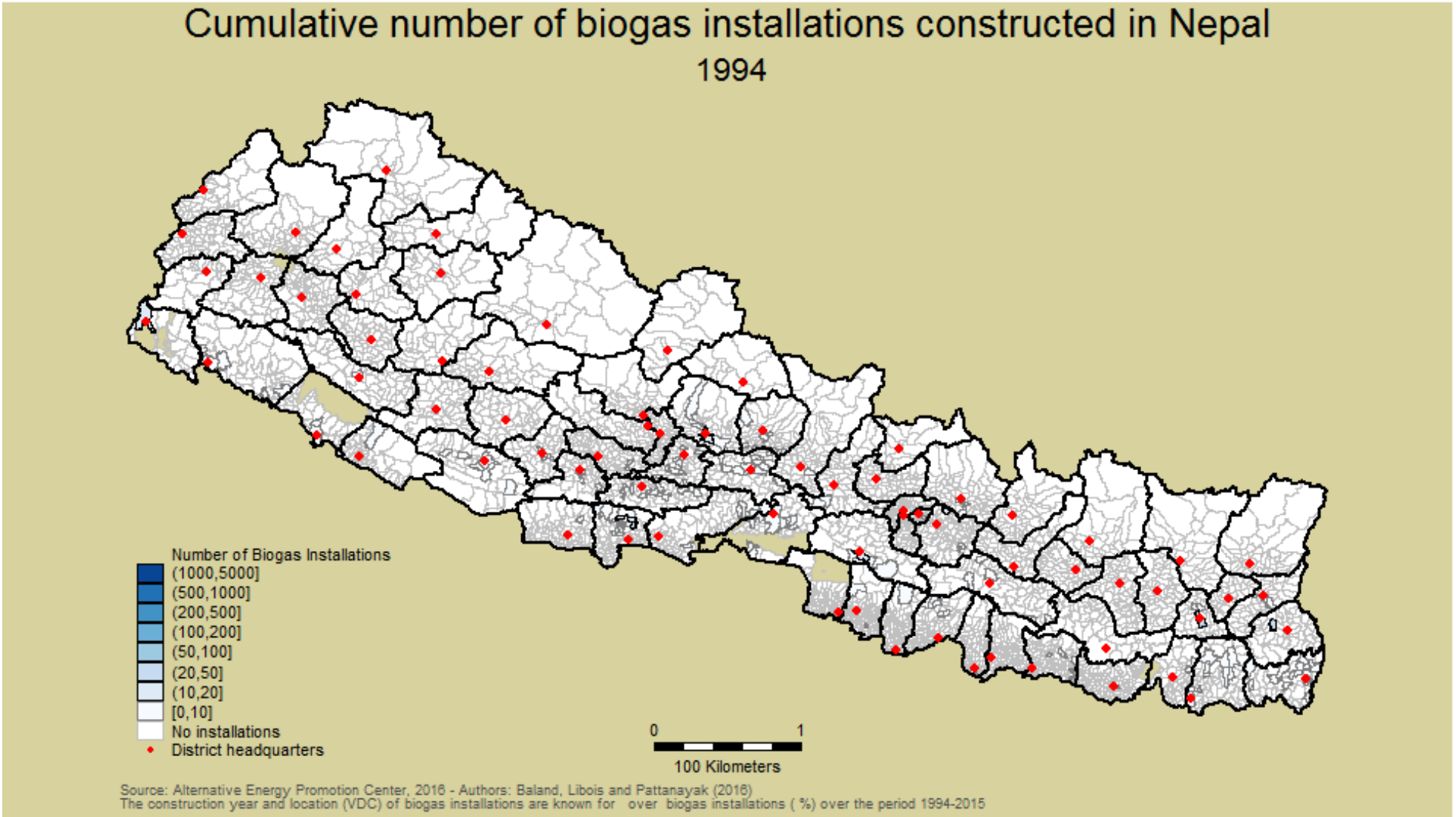
Construction of biogas installations



What do CFUGs do: reduced degradation

Using the large cross-sectional Nepal Living Standard Survey (2003-4 and 2010-1), let's see how community forestry relates to household energy choices

$$Y_{hvt} = \alpha CFUG_{vt} + \mathbf{X}_{vt}\mathbf{fi} + \mathbf{W}_{ht}\mathbf{fl} + \delta_d + \tau_t + \varepsilon_{hvt} \tag{5}$$

where

- Y stands for energy consumption of household h in village v at time t
- $CFUG$ stands for the share of village area managed by community forest
- $\mathbf{X}$ is a vector of village level controls
- $\mathbf{W}$ is a vector of household level controls
- δ and τ respectively are district and time fixed-effects

What do CFUGs do: reduced degradation

	collection time (hrs)		Firewood collection (bhari)			
	(1)	(2)	(3)	(4)	(5)	(6)
% of Vil. area in FUG	1.218***	1.471***	-15.29	-27.94**	-9.193	-20.94*
	(0.432)	(0.463)	(11.32)	(11.48)	(11.11)	(11.44)
% of Vil. area in FUG		-1.160		65.47**		58.05**
15 years ago		(1.064)		(26.11)		(23.75)
Med. collection time					-4.244***	-3.876***
					(1.417)	(1.372)
Years since	-0.0159	-0.0113	1.988	1.736	1.837	1.627
1st CFUG in district	(0.0428)	(0.0426)	(1.418)	(1.397)	(1.379)	(1.364)
[1em] Proximity	0.0334	0.0331	1.225**	1.245**	1.311**	1.322**
to district HQ	(0.0231)	(0.0230)	(0.528)	(0.524)	(0.515)	(0.512)
Forest cover in 1950	-0.00520	-0.0247	3.988	4.834	4.987	5.651
	(0.259)	(0.260)	(7.020)	(7.200)	(6.832)	(6.973)
Household assets	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed-effect	Yes	Yes	Yes	Yes	Yes	Yes
Belt-Zone fixed-effects	Yes	Yes	Yes	Yes	Yes	Yes
Village controls	Yes	Yes	Yes	Yes	Yes	Yes
Observations	3332	3332	3578	3578	3578	3578

Village controls include distance to paved road, war casualties, median elevation and standard deviation, snow cover, rainfall, growing degree days and cooling degree days

Standard errors in parentheses, clustered at the village level, $^{*}p < 0.1, ^{**}p < 0.05, ^{***}p < 0.01$

What do CFUGs do: substitution for alternative fuel

	Fuel expenditures (NPR)			
	(1)	(2)	(3)	(4)
% of Vil. area in FUG	1581.6*	1756.1*	1044.8	1083.3
	(826.8)	(953.3)	(721.7)	(826.6)
% of Vil. area in FUG, 15 years ago		-902.7		-190.2
		(2043.3)		(1711.8)
Med. collection time			373.6***	372.4***
			(135.2)	(134.7)
Years since 1st CFUG in district	-277.8**	-274.3**	-264.6**	-263.9**
	(109.5)	(109.4)	(110.5)	(110.5)
Proximity to district HQ	-86.70*	-86.98*	-94.32**	-94.36**
	(47.30)	(47.37)	(46.52)	(46.55)
Forest cover in 1950	-795.1*	-806.8*	-883.1**	-885.3**
	(436.8)	(440.8)	(443.7)	(445.7)
Household assets	Yes	Yes	Yes	Yes
Year fixed-effect	Yes	Yes	Yes	Yes
Belt-Zone fixed-effects	Yes	Yes	Yes	Yes
Village controls	Yes	Yes	Yes	Yes
Observations	3578	3578	3578	3578

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  - CFUG may be very well managed and have negative spillovers at the local level
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- Community forestry have **distributional consequences** at the local level, between the elite and others, between men and women...
- **Climate change mitigation ?**

Discussion: beyond Nepal

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- Community forestry works in Nepal but it is compared to the pre-existing situation: forest managed by the Department of Forest, notably understaffed
- When energy is at stake, the classic measures of deforestation may miss most of the story, whether positive or negative
- Developing (remote sensing) measures of forest quality is important

Discussion: beyond Nepal

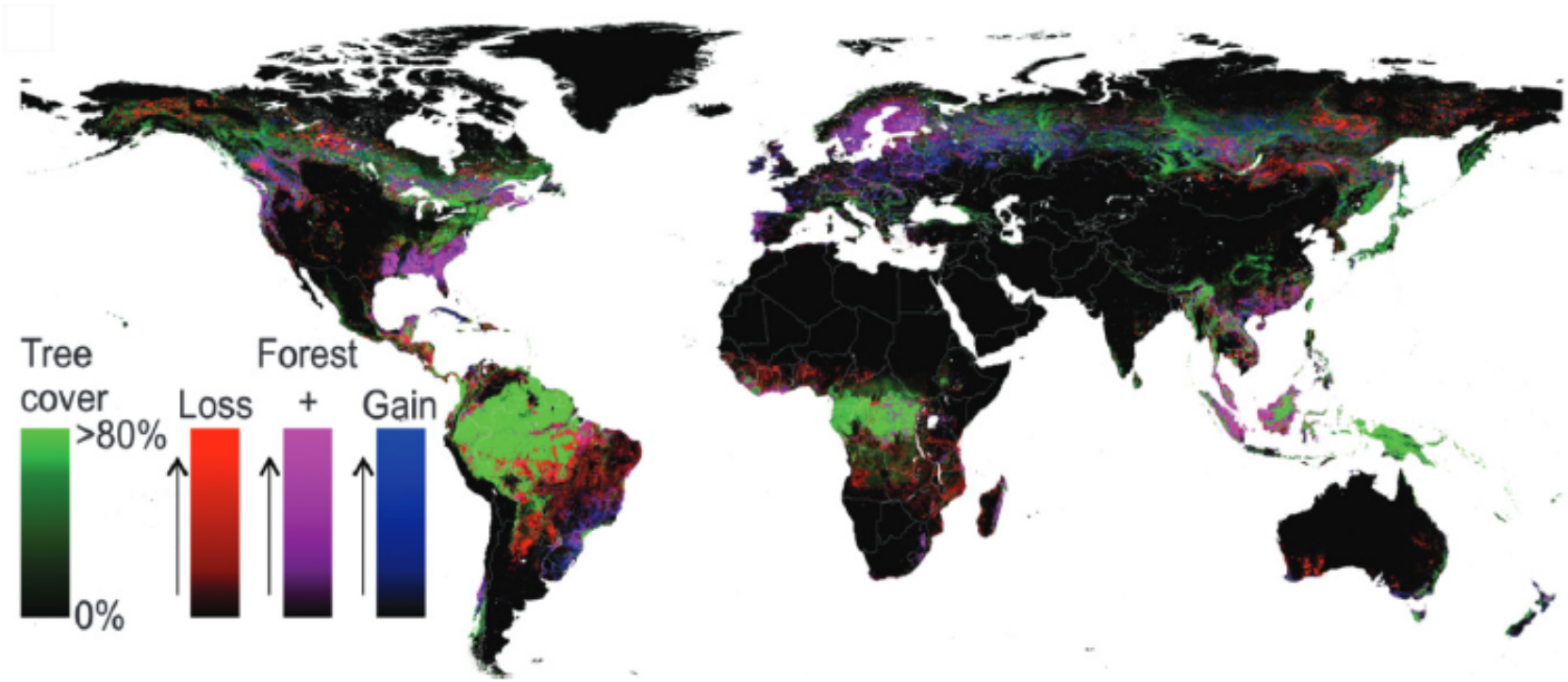
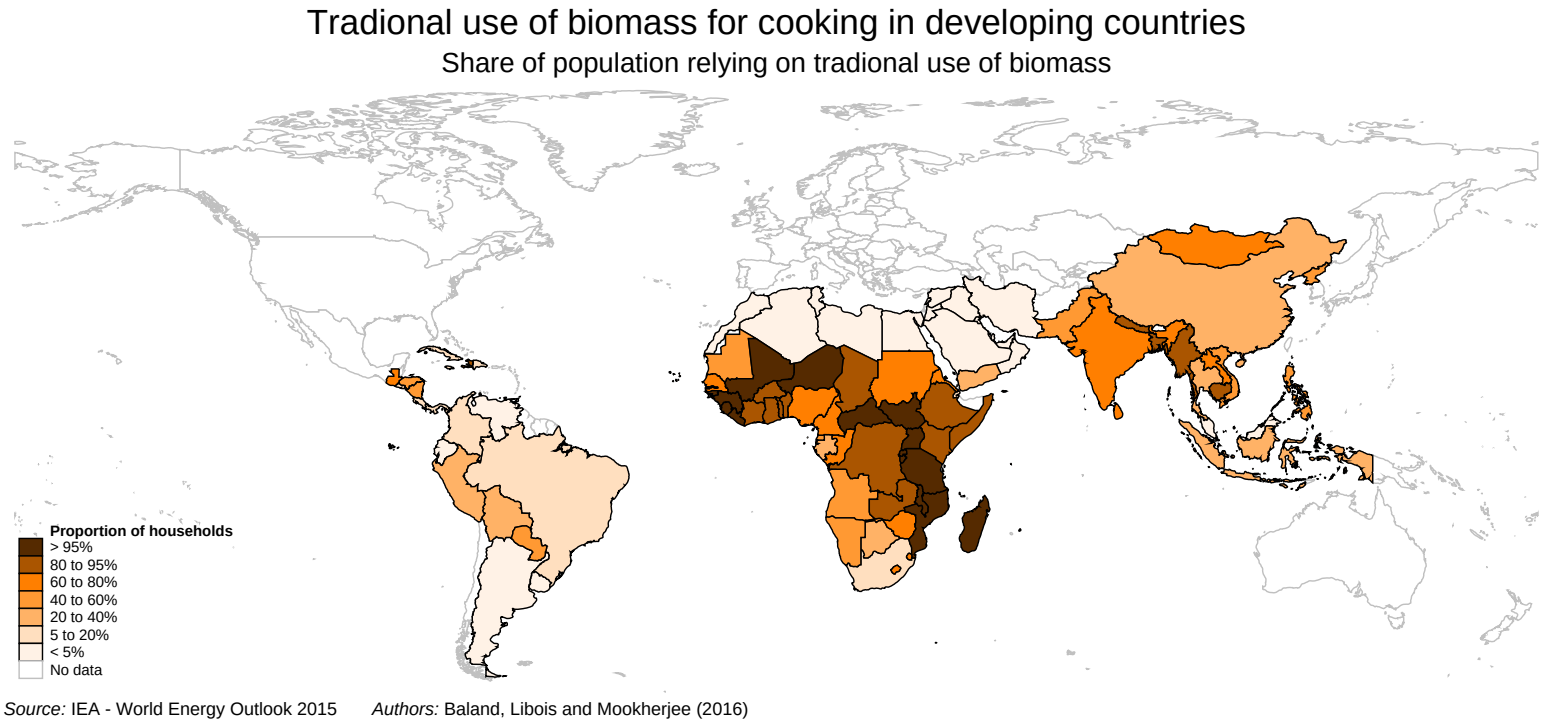


Figure 1: Deforestation (losses), afforestation (gains) and net afforestation between 2000 and 2012, source: Hansen et al. (2013).

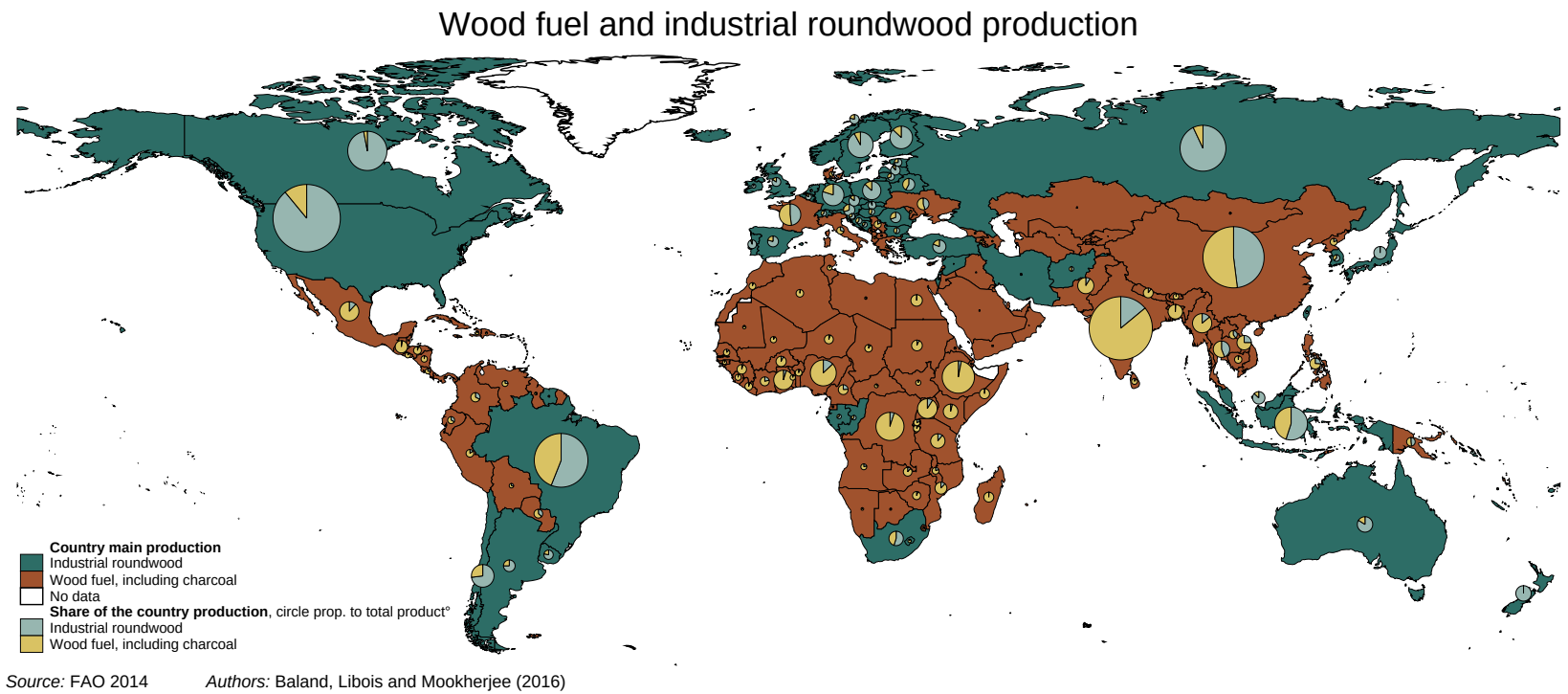
Discussion: beyond Nepal

- Traditional use of biomass is a very important source of energy in many developing countries, especially in rural areas (but not only)



Discussion: beyond Nepal

- Biomass extraction for fuel is an important issue for many forested areas in the world, especially in South Asia and Sub-Saharan Africa



The end: questions, suggestions and discussion...

Local spill-overs with (at least) Jean-Marie Baland and Nicolas Delbart

- Suppose now that one group works
- What happens for its neighbours ?

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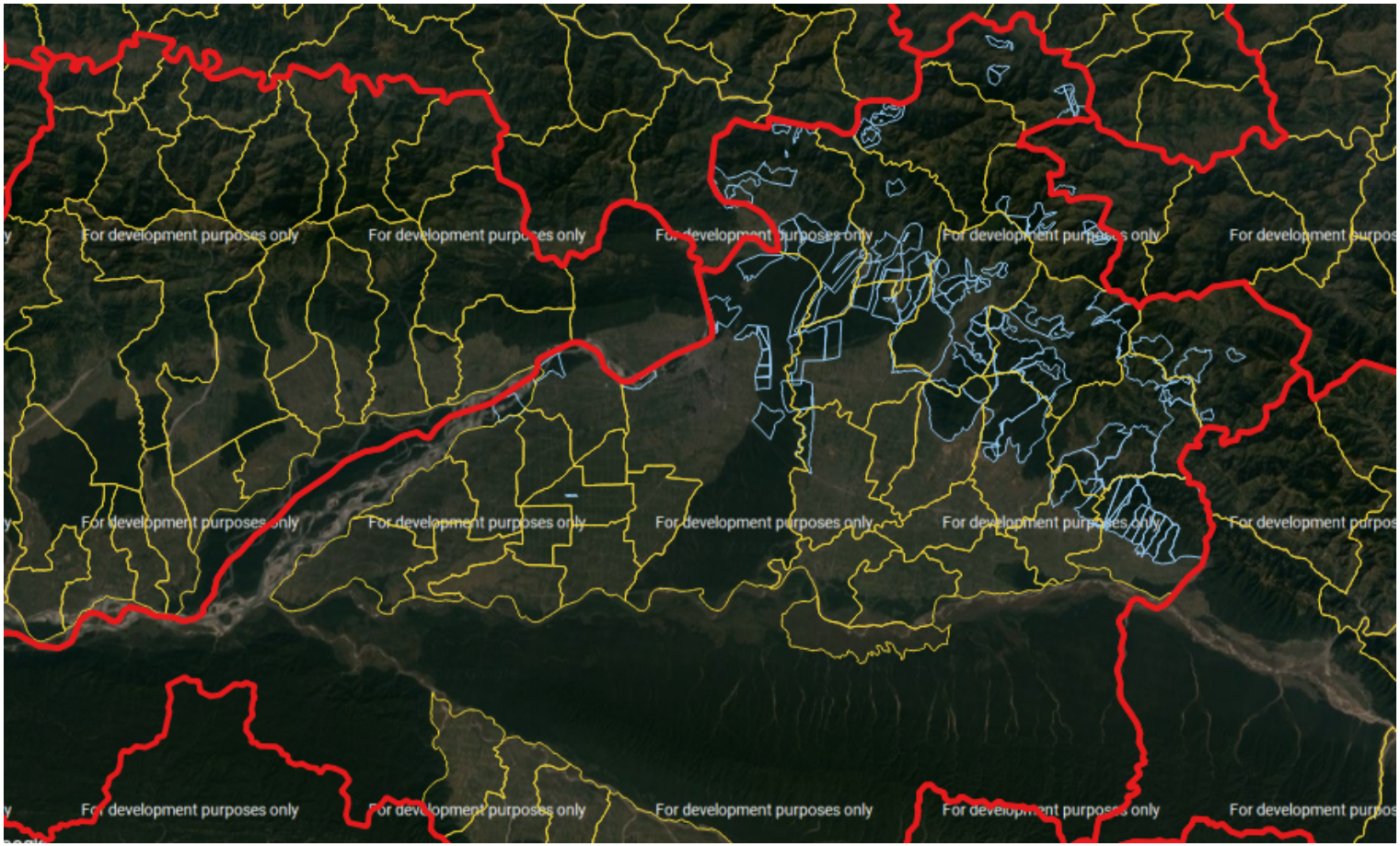
Local spill-overs

Figure: CFUG in Chitwan districts



Local spill-overs

- Our ongoing work with the boundaries of more than 1500 CFUG in 14 districts of Nepal aims at
  - separating the effect of community forestry on managed areas from the net effect at the landscape level
  - delving into the short-term versus long-term effects
  - understanding how environmental (negative) spill-overs may induce (positive) institutional spill-overs

Towards the political economy of resource management

- Well-managed forests create value
- Benefits are distributed in various ways and group leaders play a large role in these allocation decisions
  - sell timber at subsidized prices
  - build school, roads, temples
  - subsidize solar panels, biogas installations...
  - fight against poverty - including by buying a 4-wheeler for the chief of the group

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- **How far can the local management of natural resources help to select leaders who will be in charge of much broader public good provision ?** (with - at least - Jean-Marie Baland, Marine Gueben and Mani Nepal)
- After 20 years without local elections, the 2017 elections set a milestone for Nepal
  - More responsibilities (and more budget) at the local level
  - New boundaries of local constituencies
  - New positions for local leaders

Towards the political economy of resource management

- Do CFUGs play a role in selecting "good" leaders in a nascent local democracy ?
- Given that political parties did select a lot of CFUG executive committee members, which characteristics of these groups do influence the odds of being elected?

Towards the political economy of resource management

- Do CFUGs play a role in selecting "good" leaders in a nascent local democracy ?
- Given that political parties did select a lot of CFUG executive committee members, which characteristics of these groups do influence the odds of being elected?
- is a matter of
  - group size ?
  - good management of the resource ?
  - value of the resource that is managed ?
  - felling the trees before the elections to buy votes ?
  - the composition of the group being a "fair" representation of the new constituency ?
  - ...

Back to Chitwan

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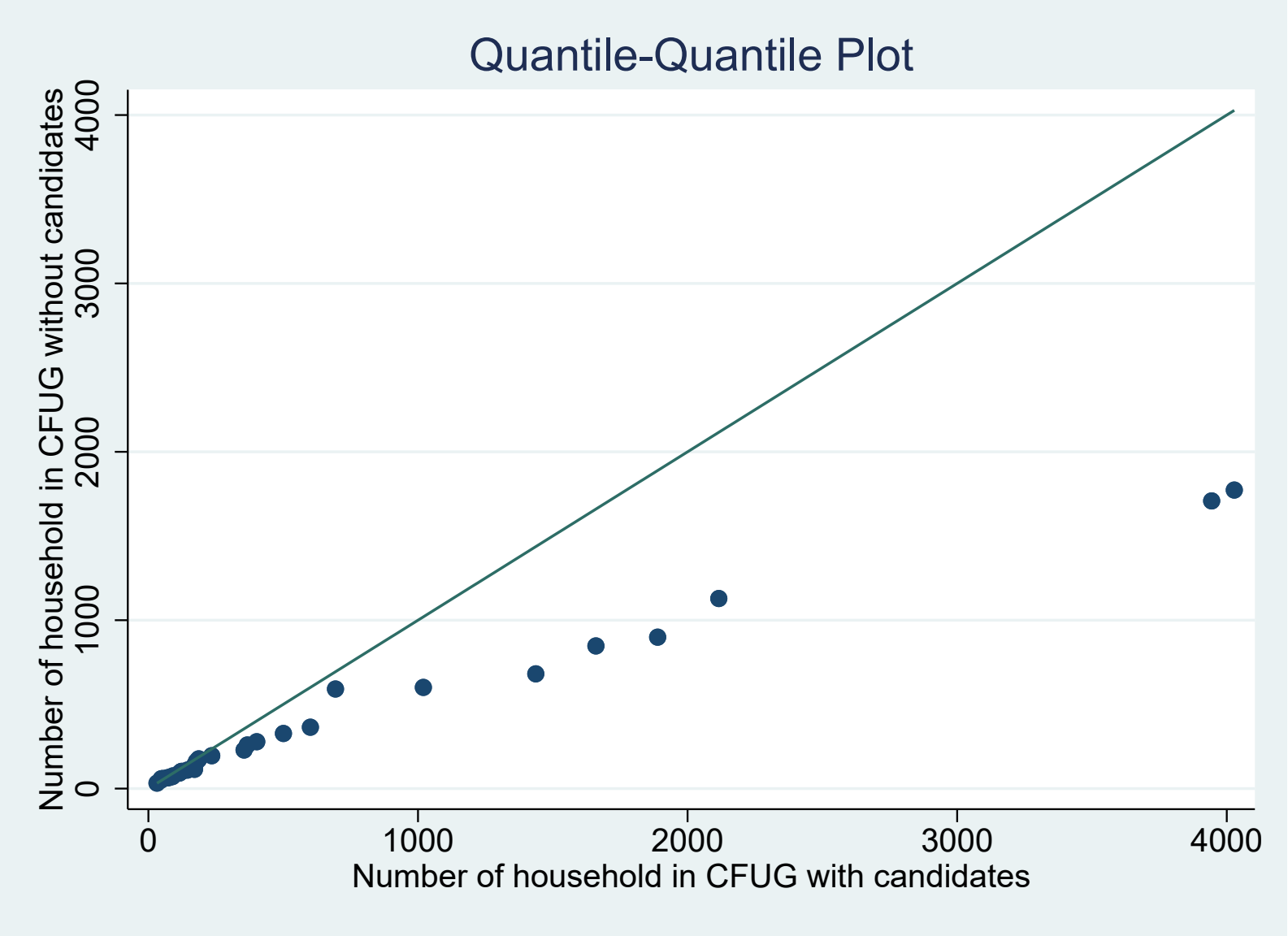
- 80 CFUGs in the census and 75 operational plans
- 2203 candidates in 105 constituencies
- 82 executive committee members coming from not less than 40 CFUGs were running for the local elections in 44 constituencies
- 3.7% of candidates
- 24 executive committee members got elected (30%), among which 9 out 24 female
- it represents 5% of elected officials

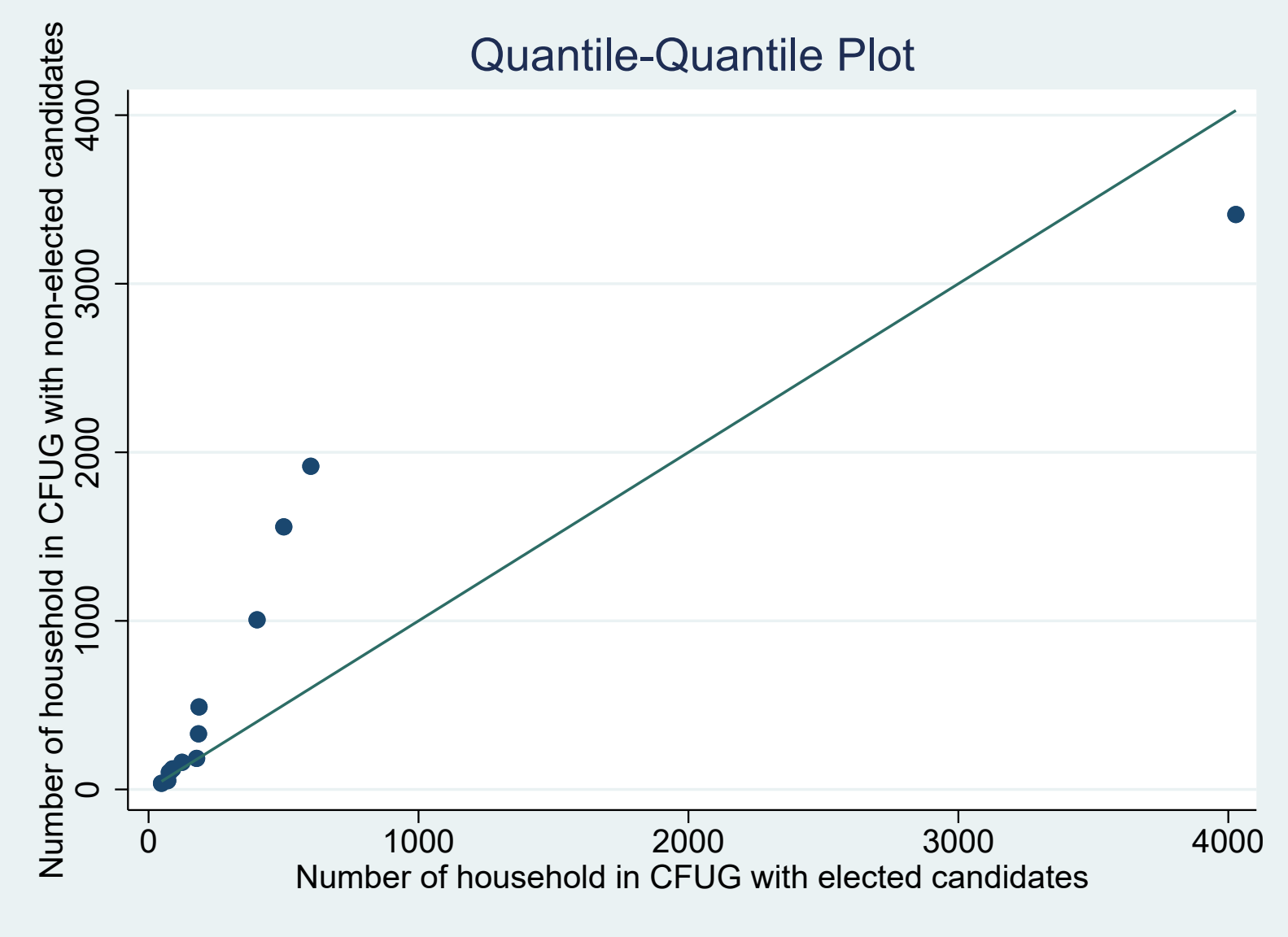
Back to Chitwan

First insights on the number of CFUG members: more candidates from large CFUG



Back to Chitwan

First insights on the number of CFUG members: but more elected candidates in smaller CFUG



Towards the political economy of resource management

- As forest conditions improve, the value of standing trees increases
- As monetary stakes become more important "new" stakeholders get interested by forests

Towards the political economy of resource management

- As forest conditions improve, the value of standing trees increases
- As monetary stakes become more important "new" stakeholders get interested by forests
  - Political parties play an increasingly larger role in the selection of executive committee members
  - Different levels of government (wards, palikas, provinces, central...) are willing to tax CFUGs and partially take over some of their tasks

Conclusion

- This project contributes to the analysis of the pros and cons of decentralization.

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- This project contributes to the analysis of the pros and cons of decentralization.
- It is one of the few example of a success (Mookherjee, 2015 and 2022).
- Community management seems to improve tree biomass.
- Limited elite capture and local development remain open research questions before concluding to a long term success of community forestry in Nepal.

The end (the other one)