

Does tenure reform influence household food security?

Nining Liswanti, Esther Mwangi, Michael Ndwiga, Tuti Herawati, Anne Larson, Iliana Monterosso
*Centre for International Forestry Research, Jalan CIFOR Situ Gede, Bogor Barat 16115,
Indonesia phone +62518622622, fax +6251 8622100*

Key words: Forest tenure reforms, food security, reforms types, global comparative study, Indonesia, Peru, Uganda

Abstract

This article analyzes the outcome of forest reform on household food security of forest dependent communities. Study involved 2733 respondents, 55 communities and five reforms types, and analysis done using descriptive and inferential analysis. Finding from descriptive analysis suggest the respondents in Peru indicated they were food secure and perceived tenure security had improved. In Indonesia and Uganda, both members and nonmembers were food secure. Finding from the ESR probit model suggest that perceived tenure security, land owned by communities, years of education, ownership of dwelling, age in years, forest products, ancestry and external contact, had influenced membership. Results suggest that tenure security outcomes are sensitive to the range of rights held by communities; food security outcomes are better under situations of full ownership rights regardless of whether de jure or de facto. Food security of forest adjacent communities are placed at risk where rules for harvesting forest products are strict.

Introduction

Land and forest tenure reform has become a global phenomenon in developing countries since the last two decades with aim to devolve ownership rights and authority from centralized forestry agencies to subnational governments or even to local communities. So far, early one third of forestlands in developing countries have been allocated to local and indigenous communities and/or smallholders, along with significant management rights and responsibilities. Devolution of rights over forest resources to forest dependent communities is broadly defined here as forest tenure reform. The “bundle of rights” associated with devolved forestland holdings varies by country and jurisdiction, and may include rights to sell or lease, or to engage in various degrees of resource extraction and production requiring changes in forest management or land use. In other cases, rights are more restricted, in which case compensation for forest management may be provided by the state. Such reforms are generally aimed at forest conservation as well as poverty alleviation and economic development.

Evolution of forest tenure reform and its success on the ground in the conservation of natural resources, community empowerment and meeting subsistence resource needs are well documented. Ravindranath et al. (2006), for example, show that community based forest management in South and South-East Asia could result into significant biodiversity and biomass production. There are, however, some reservations and critiques that actual contribution to the livelihoods of the forest dependent communities particularly the poor is still lower than expectations (Murali et al., 2003, Malla, 2000, Kanel and Niraula, 2004). Nonetheless,

all have shown some promise to contribute in livelihoods improvement and poverty reduction if appropriate policy and innovative practices are promoted. For example, Murali et al. (2003) claim that Joint Forest Management of India has shown the 'huge potential' of generating employment. Similarly, Kanel and Kandel (2004) and Chapagain and Banjade (2009) have shown the high potentials of Nepal's community forestry in generating income and employment, and thereby contributing to livelihoods and poverty reduction. The community institutions could be the entry point for rural development. In the countries where the net direct benefits are rather low such as in Bolivia, Brazil, Ecuador and Peru, communities put high value on the indirect benefits such as regularization of land tenure, improvements of road infrastructure because of forest development, increased access to market for agricultural products, improved opportunities of receiving information and credit facilities, and improved external linkages and policy influence (Pokorny and Johnson, 2008). However, the tendency of the states that show reluctance in handing over high value forests to local communities and small holders skews the potentials of forest tenure reforms in promoting local economic opportunities (Ribot et al., 2006, Charnley and Poe, 2007, Paudel et al., 2009). In the face of increasing mechanization of forestry practices, there are less optimistic scenarios that overall forestry sector could increase local employment opportunities (Charnley and Poe, 2007: p322).

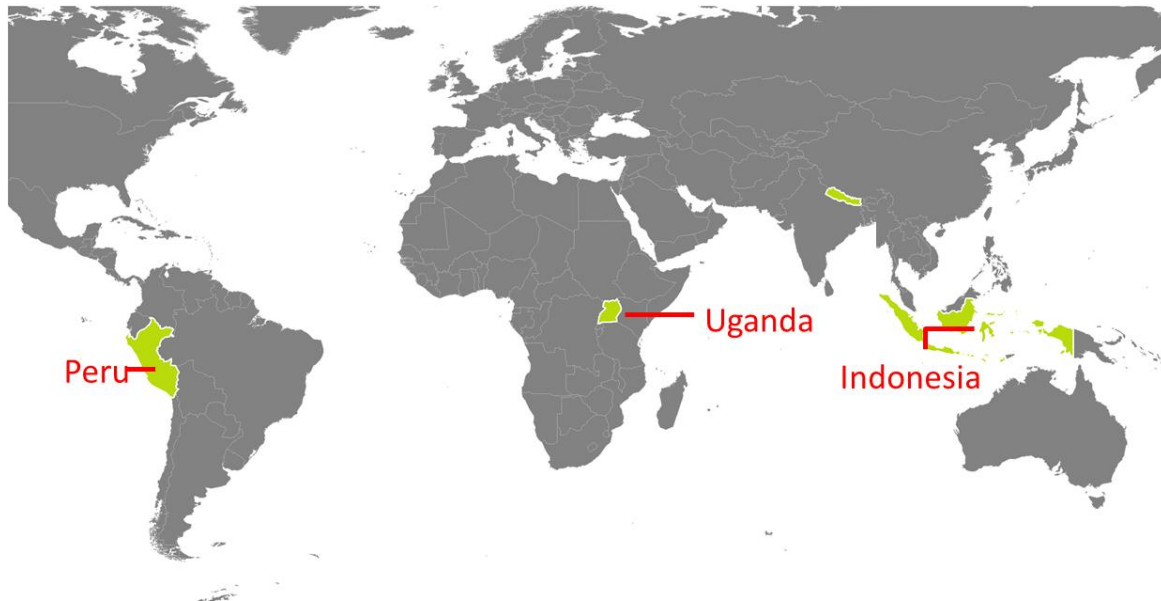
Securing access to and control over forests and tree resources is broadly recognized as a necessary condition for reducing poverty, increasing food security and ensuring sustainable forest management. Many of these reforms have provided greater legal recognition of customary and local authorities, indigenous territorial rights, and women's rights. In some countries, institutional arrangements for tenure reform implementation confer gender inclusion and inclusion of ethnic minorities in decision-making forums and have also contributed in sensitizing local communities including elites and marginalised members (Pokharel, 2007). However, there are mixed results in promoting inclusion and equity through community-based forestry in many countries. The implementation of these reforms has resulted slow progress, in some cases even increasing the tenure insecurity of local communities and discouraging investment and improved management of trees and forests by communities and limiting opportunities to improve incomes or enhanced livelihoods. In Indonesia for example, the reform implementation has an important objective to improve tenure security that affected to increase the food security, but the outcome was unclear after certain number of years. Hence, the actual contribution on household food security is still needed to explore more on the ground.

This article analyzes the outcome of forest reform on household food security of forest dependent communities, including women and other marginalized groups based on the research study of 55 forest communities from three countries (Indonesia, Peru, Uganda). The comparison across different sites with and without reform merits adequate analytical attention because different sites with different history of reform have been operating under different socio-economic, bio-physical and political contexts. Each site has applied diverse reform types, which differ in terms of extent of rights and tenure security presumably having implications on the outcomes.

Research Sites

The research sites were included 3 countries (Peru, Indonesia, Uganda) (see Figure 1). A comparative case study is used to inquire the attribution and contribution of an intervention when control sites and experimental designs are practically not possible (Goodrick, 2014) in order to obtain the outcomes of forest tenure reforms.

Figure 1. Research sites of Global Comparative Study on forest tenure reform implementation



Methodology

The research was part of the Global Comparative Study (GCS) on forest tenure reform implementation that has been implemented in three countries (Indonesia, Peru, Uganda) and initiated by the Center for International Forestry Research. Intra-household data was collected in 2015-2016 involving 2733 respondents from 55 communities (Table 1). Each country has applied diverse reform types, which differ in terms of extent of rights and tenure security presumably having implications on the outcomes. Data information was collected using a mixed method approach by combining both qualitative and quantitative research methods including household surveys (HS), key informant interviews (KII) and focus group discussion (FGD), observation and document analysis for empirical data collection. The respondents consist of members and non-members from the reform types and respondents from non-reform types. The comparison across different country contexts and reform types merits adequate analytical attention because different countries with different histories of reform have been operating under different socio-economic, bio-physical and political contexts.

Table 1. Different reform type across the three countries

Reform Type	Peru	Uganda	Indonesia	Total
State Land/Forest designed to use by community	-	<i>Collaborative Forest Management</i>	<i>HKM, HTR, HD</i>	11
State Land/Forest used by company	-	-	<i>Kemitraan (Company/FMU and community)</i>	4
Land/Forest Owned by Communities	<i>Native commn.title Peasant commn.title</i>	<i>Community Forestry</i>	<i>Hutan Adat</i>	22
Forest Own by individual		<i>Private Forest Owner Association</i>	<i>Hutan Rakyat</i>	4
Unrecognized Community Land/Forest	<i>Native Comm. not titled Peasant Comm.not .titled</i>	<i>Customary system</i>	<i>Hutan Adat Not recognized yet</i>	13
	22	16	17	55

The respondents are consisting of the member and non-member from the reform types and respondents from non-reform types. The comparison across different country contexts and reform types merits adequate analytical attention because different countries with different history of reform have been operating under different socio-economic, bio-physical and political contexts.

Statistical analysis was done using descriptive and inferential analysis to establish the influence of tenure reform on household food security. Descriptive analysis comprised of frequencies, measure of central tendency, Chi square test and Kruskal-Wallis H Test (McDonald, 2009; Kruskal, W. H., & Wallis, 1952) while inferential analysis included Endogenous Switching Regression (ESR) probit model (Lokshin & Sajaia, 2011). Furthermore, the analysis uses the ESR probit model for selectivity bias and endogeneity that was estimated by full information maximum likelihood (Lokshin & Sajaia, 2011). ESR model is founded on the reality that it concurrently determines the selection and outcome (member and nonmember) equations (Besley & Case, 2000).

Findings

Finding from descriptive analysis suggest that majority of the respondents in Peru indicated that they were food secure (62%) and that their perceived tenure security had improved (53%). In Indonesia, majority of both members (50%) and nonmembers (55%) of tenure reform group were food secure. The mean value for perceived tenure security was better for members (32%) than non-members (23%) of tenure reform group. Further, there was a significant difference in mean state land designated to/use by communities between members (40%) and non-members (70%). Averagely, nonmembers of tenure reform group had more assets than the members. Similarly, for Uganda, the study established the mean value for food security and perceived tenure security were almost the equivalent for both members (48% and 23%) and non-members (46% and 24%) of tenure reform group respectively. Members of tenure reform group indicated that there was more land owned by communities (38%) than the nonmembers (18%), on average. Further,

members of tenure reform group had more assets (70%) than the nonmembers (25%).

Table 2. Descriptive analysis of the outcomes on forest tenure reform implementation

Variable	Peru			Indonesia						Uganda					
	Member of tenure reform group			Nonmember of tenure reform group			Member of tenure reform group			Nonmember of tenure reform group			Member of tenure reform group		
	N	Mean	Std. Dev.	N	Mean	Std. Dev.	N	Mean	Std. Dev.	N	Mean	Std. Dev.	N	Mean	Std. Dev.
Food security	835	0.622755	0.484988	132	0.507576	0.501847	879	0.557452	0.496971	439	0.460137	0.498977	249	0.485944	0.500809
Perceived Tenure Security	752	0.530585	0.499396	95	0.231579	0.424079	845	0.32426	0.468375	396	0.247475	0.432091	226	0.234513	0.424635
State land designated for use by communities	842	0	0	132	0.704546	0.457985	880	0.406818	0.49152	442	0.359729	0.480465	254	0.173228	0.379192
State land used by companies	842	0	0	132	0.295455	0.457985	880	0.253409	0.435211	442	0	0	254	0	0
Land owned by communities	842	0.997625	0.048708	132	0	0	880	0	0	442	0.153846	0.36121	254	0.38189	0.486809
Owned by individuals/firms	842	0.002375	0.048708	132	0	0	880	0	0	442	0.223982	0.417383	254	0.236221	0.425598
Unrecognized customary lands	842	0	0	132	0	0	880	0.339773	0.473901	442	0.262443	0.440461	254	0.208661	0.407154
Married	841	0.94887	0.220393	132	0.954546	0.209092	880	0.928409	0.257956	442	0.819005	0.385451	253	0.826087	0.379786
Widow/widower	841	0.014269	0.118667	132	0.037879	0.19163	880	0.068182	0.252201	442	0.097285	0.296681	253	0.098814	0.299004
Divorced/separated	841	0.019025	0.136694	132	0	0	880	0	0	442	0.061086	0.239759	253	0.059289	0.236632
Never married	841	0.017836	0.132434	132	0.007576	0.087039	880	0.003409	0.058321	442	0.022624	0.148872	253	0.01581	0.124988
Gender (1=male)	842	0.509501	0.500207	132	0.507576	0.501847	880	0.495455	0.500264	442	0.382353	0.486513	254	0.480315	0.500599
Age in years	842	41.41568	13.92875	132	42.93182	12.78668	880	42.84545	10.99865	442	40.49774	15.19044	254	40.54331	12.91551
Years of education	842	6.623515	3.820847	132	7.840909	3.529223	880	8.276136	3.556772	442	6.113122	3.698484	254	6.401575	4.188748
Household size	477	4.800839	1.966142	70	3.9	1.678077	464	4.528017	2.134584	233	5.519313	3.092094	163	6.361963	3.492182
Ancestry	841	0.526754	0.499581	132	0.356061	0.480658	880	0.539773	0.498699	442	0.371041	0.483631	254	0.425197	0.495349
Owns dwelling	477	0.985325	0.120375	70	0.857143	0.352454	463	0.883369	0.321327	233	0.875537	0.33082	163	0.865031	0.342744
Own land	477	0.995807	0.233676	69	0.855073	0.354607	462	1.030303	0.803431	230	0.826087	0.379861	162	0.790124	0.408483
Total Assets	842	2895.572	20860.27	132	186.5645	1882.79	880	34.95312	74.07804	442	25.32534	109.1453	254	70.70607	297.3391
Off-farm income	842	0.663896	0.472656	132	0.515152	0.501674	879	0.494881	0.500258	442	0.260181	0.43923	254	0.314961	0.465417
Distance to nearest all season road	570	15.47895	48.08005	132	2.378788	2.808195	880	4.314773	11.44517	442	21.19457	36.83977	254	23.0748	33.32565
Forest product extraction rules (1= more restrictive now, 0 otherwise)	639	0.86385	0.343217	85	0.682353	0.468324	788	0.446701	0.497467	391	0.682865	0.465957	233	0.811159	0.392225
Forest product extraction rules (1= same as before, 0 otherwise)	639	0.128326	0.334714	85	0.305882	0.463515	788	0.453046	0.498107	391	0.217391	0.413	233	0.120172	0.325862
Forest product extraction rules (1= less restrictive now, 0 otherwise)	639	0.007825	0.08818	85	0.011765	0.108465	788	0.100254	0.300529	391	0.099744	0.300043	233	0.06867	0.253436
Forest products	842	0.623515	0.484792	99	0.282828	0.452666	848	0.466981	0.499203	400	0.1575	0.364728	230	0.13913	0.346837
External contact	840	0.7	0.458531	131	0.19084	0.394472	874	0.427918	0.49506	424	0.209906	0.407722	238	0.344538	0.476219

Finding from the ESR probit model (Table 3), which examined whether being a member of a tenure reform group had any influence on household food security in Indonesia, Peru and Uganda, suggest that perceived tenure security, land owned by communities, years of education, ownership of dwelling, age in years, forest products, ancestry and external contact, all had influenced membership as all have positive and significant effect on decision to join tenure reform groups. Individuals living adjacent to state land designated for use by communities and state land used by companies are more likely to have negative and significant effect on household food security than those living adjacent to unrecognized customary lands. Whereas marital status (widow/widower), years of education, off-farm income and country dummies (Peru and Indonesia) is tends to have a higher and significant effect on household food security. Food security of non-members of tenure reform groups living adjacent to state land designated for use by communities and land owned by communities tend to be positive and significant as compared to unrecognized customary land. In addition, years of education, owned land and total assets had positive and significant effect on food security whereas marital status (divorced/separated) and more restrictive forest product extraction rules had negative and significant effect on household food security.

Table 3. Results of Endogenous Switching Probit Model

Variables	(1)	(2)	(3)
	Membership	Food Security for members	Food Security for nonmembers
Perceived Tenure Security	0.3779*** (0.1284)	0.1409 (0.0871)	0.0107 (0.2190)
State land designated for use by communities	-0.9850*** (0.1667)	-0.4789*** (0.1274)	0.6968** (0.2821)
State land used by companies	-0.5090* (0.2811)	-0.4221** (0.1669)	0.5528 (0.4798)
Land owned by communities	0.8000*** (0.3054)	0.0579 (0.2849)	0.7358* (0.3889)
Owned by individuals/firms	-0.4020* (0.2207)	-0.2204 (0.2222)	0.6012* (0.3164)
Widow/widower	-0.2281 (0.2657)	0.3015* (0.1696)	0.0921 (0.3354)
Divorced/separated	-0.7011** (0.3146)	-0.0485 (0.2624)	-0.6703** (0.3249)
Never married	0.1092 (0.6580)	0.3080 (0.3898)	8.3082 (3.7117e+08)
Gender (1=male)	-0.2624 (0.2399)	-0.1052 (0.1432)	-0.4827 (0.2964)
Years of education	0.0266* (0.0149)	0.0323*** (0.0116)	0.0977*** (0.0279)
Household size	0.0002 (0.0218)	0.0049 (0.0178)	0.0022 (0.0339)
Owns dwelling	0.3395* (0.2007)	0.0291 (0.1667)	0.1783 (0.3988)
Own land	0.0212 (0.1068)	0.0154 (0.0733)	0.8282*** (0.2653)
Total Assets	0.0009 (0.0012)	0.0000 (0.0001)	0.0085** (0.0040)
Off-farm income	-0.0363 (0.1179)	0.1795** (0.0855)	-0.0274 (0.1762)
Distance to nearest all season road	0.0020 (0.0025)	-0.0018 (0.0014)	-0.0035 (0.0032)
Forest product extraction rules (1= more restrictive now, 0 otherwise)	-0.3141** (0.1390)	-0.0871 (0.1017)	-0.5167** (0.2372)
Forest product extraction rules (1= less restrictive now, 0 otherwise)	-0.2456 (0.2196)	-0.0484 (0.1712)	-0.2820 (0.3557)
Peru	7.8148 (2251747)	0.6994*** (0.2694)	
Indonesia	1.7616*** (0.1784)	0.6312*** (0.1460)	0.1298 (0.3092)
Age in years	0.0137***		

LR test of independent equations. ($\rho_1 = \rho_0 = 0$): $\chi^2(2) = 35.71$ Prob > $\chi^2 = 0.000$

Standard errors in parentheses, *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

The study estimated the ATT, ATU, ATE and MTE after establishing covariates that influence membership of tenure reform group and household food security for members and nonmembers. Bootstrapping method was utilized to estimate the standard errors of each treatment effect. The treatment effects shown in Table 4 indicate that members of tenure reform group would have significantly reduced the probability of been food secure by about 40% points had they been nonmembers of tenure reform group (counterfactual scenario). Nonmembers of tenure reform group would have significantly reduced the probability of been food secure by about 54 percentage points had they become members of tenure reform group (counterfactual scenario).

Table 4. Treatment Effects from ESR Probit estimates

Outcome	Treatment Effects			
	ATT	ATU	ATE	MTE
Household food Security	-0.3989*** (0.005)	-0.5386*** (0.0226)	-0.4313*** (0.0049)	-0.97 *** (0.0160)

Conclusion

These results suggest that tenure security outcomes are sensitive to the range of rights held by communities; food security outcomes are better under situations of full ownership rights regardless of whether de jure or de facto. In addition, where rules for harvesting forest products are strict, food security of forest adjacent communities are placed at risk.

References

- CHAPAGAIN, N. & BANJADE, M. R. 2009. Community forestry and local development: Experiences from the Koshi hills of Nepal *Journal of Forest and Livelihood*, 8, 78-92.
- CHARNLEY, S. & POE, M. R. 2007. Community forestry in theory and practice: Where are we now? *The Annual Review of Anthropology*, 36, 301-336.
- KANEL, K. & NIRLAULA, D. R. 2004. Can rural livelihood be improved in Nepal through community forestry? . *Banko Jankari*, 14, 19-24.
- KANEL, K. R. & KANDEL, B. R. 2004. Community forestry in Nepal: Achievement and challenges. *Journal of Forest and Livelihood*, 4, 55-63.
- MALLA, Y. B. 2000. Impact of community forestry policy on rural livelihoods and food security in Nepal. *Unasylva*, 51, 37-45.
- MURALI, K. S., RAO, R. J., SUDHA, P., SANGEETHA, G., MURTHY, I. K. & RAVINDRANATH, N. H. 2003. Evaluation studies of Joint Forest Management in India: social and institutional implications. *Environment and Sustainable Development*, 2, 19-35.
- PAUDEL, N. S., BANJADE, M. R. & DAHAL, G. R. 2009. *Community forestry in changing context: Emerging market opportunities and tenure rights*, Kathmandu and Bogor, ForestAction and CIFOR.
- RIBOT, J. C., AGRAWAL, A. & LARSON, A. M. 2006. Recentralizing While Decentralizing: How National Governments Reappropriate Forest Resources. *World Development*, 34, 1864-1886.