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Review

Drivers of Households' Land-Use Decisions: A Critical Review of Micro-Level Studies in Tropical Regions

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Table S1. Main characteristics of micro-level land-use change studies.

NUMBER	AUTHOR	AUTHORS' DICIPLINE	JOURNAL	YEAR OF PUBLICATIO	REGION	COUNTRY	CATEGORY	METHODOLOGY	SPAITAL CONSIDERATION	DATA	YEAR OF HOUSEHOLD DATA COLLECTION	LAND USE CHANGE VARIABLE	NOTES ON THE MAIN EXPLANATORY VARIABLES IDENTIFIED
1.	Adams et al.	Eco, Anthro, Geo	*Human Ecology*	2013	South America	Brazil	Descriptive Analysis	Descriptive statistics	Spatial explicit	479 households (2003) 33 households (2010) aerial photos	2003 2010	Area under shifting cultivation (subsistence agriculture); Total forested area	*Decline in shifting cultivation:* + conservation policies, + market development, + Land rights *Total forested area:* - Land grabber (cattle)
2.	Ali et al.	Econ	*Journal of Development Economics*	2014	Africa	Rwanda	Regression Analysis	Spatial fixed-effects Model Boundary fixed-effect Model	Modelling special dependency	3554 households 6330 parcels	2010	Parcel of households (Parcel size in hectares)	*Investments on land: Use of improved seeds* + treatment group if households whose land rights where regularized *Change in soil conservation measures* + large effect for female headed households
3.	Alix-Garcia et al.	Econ	*World Development*	2005	Central America	Mexico	Regression Analysis	Probit model; OLS; OLS with instrumental	-	450 ejidos; (with 50 households	2002	Use of communal land for agriculture or pasture by households;	*Use of the commons (probit):* - parcel size, + parcel size ^{2},

								variable		in each ejido)		Average deforestation per member during 1993-2000	+ household member held leadership position, + total ejido area, - number of ejido members in 1990, - proportion of leaders with primary education in 1990 *Regime choice (forestry licence yes or no):* - total ejido area, + area at high altitude, + forest area in 1993, - tropical zone, - ejido < 25 years, - average age of leaders in 1990 *Deforestation in nonforestry ejidos:* + good agricultural land, + community not indigenous, - co-operators per member, + municipal population growth, (- proportion of parcels < 1 ha/adult) *Deforestation in forestry ejidos:* + share of dividends in profits per member,
4.	Barsimantov and Antezana	Econ, Eco	*Applied Geography*	2012	Central America	Mexico	Multivariate Analysis	Linear discriminate function analysis	Spatially explicit model	122 households (in 4 case study communities; two with and two without	2006	Forest cover change (purely descriptive); active forest management in community (yes or no) for the	+ education, + use of firewood, + time spent collecting firewood, - land sold, + strengthening of community governance,

										forest management); expert interviews; satellite images		discriminative analysis	
5.	Broadbent et al.	Anthro, Eco	*Landscape Ecology*	2012	Central America	Costa Rica	Descriptive Analysis	Descriptive statistics	Spatial explicit (model)	121 households	2009	Forest cover, ecological connectivity	*Forest regrowth:* + nature based ecotourism with private areas *Ecological connectivity:* - Hunting - Oil palm expansion
6.	Busch and Geoghegan	Econ	*Regional Environmental Change*	2010	Central America	Mexico	Regression Analysis	Probit-model; OLS		174 households in 13 ejidos	2004	Fraction of a household's land going to a particular land-use: (a) Pasture (cattle), (b) Chilli (cash crop), (c) Maize (subsistence)	*Pasture:* + cattle credit, + PROCAMPO subsidies, + rainfall, + distance to plot, + household head under 31 (Prob), - grain depot (Prob), + household amenities (Prob), - distance to markets (OLS) *Chilli:* + family labor supply (OLS), - full-time-job (Prob), + non-farm income (OLS), +subsidies (Prob), - land holding (OLS), + distance to market center (OLS), + own pick up (OLS), - household head under 31 (Prob), - household amenities (Prob) *Maize:* - full-time job (Prob), + subsidies (OLS),

													- land holding (OLS), + soil quality (Prob), + household head education, - household head under 31 (Prob),
7.	Busch and Vance	Econ	*Land Economics*	2011	Central America	Mexico	Regression Analysis	Cox proportional hazard model		173 households in 13 ejidos	2004	Adoption of cattle ranching	+ village network, - village network ^{2}, + government inducement, + prior years of chili cultivation, + rainfall, + landholding, - landholding ^{2}, + age of head, - age of head ^{2}, + education of head, + state of origin (Tabasco),
8.	Caldas et al.	Geo, Socio	*Annals of the Association of American Geographers*	2007	South America	Brazil	Regression Analysis	OLS with instrumental variable	modelling spatial dependence	132 households, satellite images	1996	Deforestation magnitude	*Results reported for OLS:* + men in households, - distance to highway, + household capital endowment (proxied by wealth), - access to credit (proxied by title), + soil type,
9.	Carrero and Fearnside	Eco,	*Ecology and Society*	2011	South America	Brazil	Regression Analysis	Regression-tree analysis		83 households	2008	Total area deforested by household	+ cattle size, + total area owned by the household,
10.	Castella et al.	Eco, Geo	*Human Ecology*	2013	Asia	Laos	Descriptive Analysis	Descriptive Statistics	Spatial explicit	504 households in 7 villages	2008	Area of main land cover classes (forest, shrub, recent fallow upland crops)	Forest cover: + intensification + conservation of areas Fallow areas: - permanent cultivation
11.	Cattaneo	Econ	*Land Economics*	2001	South America	Brazil	Theoretical Model	CGE-model		Social Accounting Matrix (SAM): Input/Outpu	1995-1996	Deforestation (measured by the transition of land types)	- currency devaluation, + reduction in transport cost, - regulating tenure

										t table for Brazil in (1995); National Accounts (1997); Agricultural Census data (1995-1996)			regimes, *Technological progress* + annuals (both short and long run, more severe for large farms), - perennials (short and long run, small and large), *livestock:* - large farms in short run, + smallholders and large farms in long run
12.	Caviglia-Harris	Econ	*Environment and Development Economics*	2004	South America	Brazil	Regression Analysis	OLS; Two-stage least squares regression		152 households	1996 2000 (panel data)	Total forest area cleared and percentage of the lot cleared	*Estimation of stock of cleared land using panel data:* -distance from city, -use of agroforestry, +income from milk, +cattle owned, +lot size in hectares, +number of hectares. deforested in previous year, *Estimation of stock of cleared land using 2000 data:* -distance from city, +household migrated from south, -use of agroforestry, +lot size, +number of bank accounts, -lagged income from perennials, -lagged number of vehicles owned
13.	Caviglia-Harris and Harris	Econ, Geo	*International Regional Science Review*	2008	South America	Brazil	Regression Analysis	OLS	modelling spatial dependence	171 households	1996 2000 (panel data)	Pasture area; crop area	*Pasture: Results reported for model with distance variables* - herbicides usage, + cattle ownership, + soil quality, - distance to town,

													+ income *Crop area: Results reported for models without spatial distance variables* - hired labour, + fertilizer, + herbicides, + lot size, + distance to town
14.	Caviglia-Harris and Harris	Econ, Geo	*Agricultural and Resource Economics Review*	2011	South America	Brazil	Regression Analysis	Fixed effects model; Random effects model; Mixed effects model		138 households (1996) 139 households (2000) 286 households (2005) 446 households (2009)	1996 2000 2005 2009 (panel data)	Rate of deforestation, percentage of lot deforested	*Rate of deforestation: Results reported for Random Effects* +lot size, +year settlement established, +number of family members, -price of milk, -radial settlement, *% of lot deforested :Results reported for Random Effects* -distance to city centre, -slope, +turnover to new households, -number of family members, +number of calves owned, +price of milk, +radial settlement, +watershed settlement,
15.	Caviglia-Harris and Sills	Econ	*Agricultural Economics*	2005	South America	Brazil	Regression Analysis	OLS; Tobit model		487 households	1996	Rate of deforestation and percentage of lot deforested	*Reduced Tobit Model;* +age of household head, -herbicide use, +fertiliser use, +number of cattle owned, -cash income,

16.	Chavez and Perz	Geo, Socio	*Human Ecology*	2012	South America	Peru	Regression Analysis	OLS		125 households	2003-2005	Land-use change indicators: Area of mature forest, crops, pasture, regrowth.	*OLS Model of policy adopters and non-adopters* *Forest cover:* - policies for intensified agriculture *Crop area:* + policies for credit, + taking part in reforestation program, + policies for intensified agriculture *Pasture and Regrowth:* Limited effect of policies
17.	Chibwana, Fisher and Shively	Econ	*World Development*	2012	Africa	Malawi	Regression Analysis	Two-step regression model with instrumental variable (Multinomial logistic MNL-Model, Probit model, Tobit model)		380 households	2009	Crop allocation (share of different crops: Maize, Tobacco, other crops)	*Step 1 Program participation:* Multinomial logistic - Model predicts the probability of participation in Maize programs (mutually exclusive). Probit Model to predict probability to participate in the Tobacco program. *Step 2 Individual land share (Tobit model)* *Maize and Tobacco:* - farm size, + tobacco prices, - off-farm (tobacco) + off-farm (all maize) + fertilizer price
18.	Chowdhury	Geo	*Applied Geography*	2006	Middle America	Mexico	Regression Analysis	Logit model	spatial explicit	29 households; satellite images	2002	Probability of deforestation at pixel level of households' parcels	*Landscape context & accessibility:* -distance to roads, -distance to markets,

													-distance to nearest agriculture in 1987, *Internal Household characteristics & strategies:* -Spanish speaker, -tenancy ^{2}, -family size, +number of active students, +quality of life index, -neither send nor receive funds, -sell labour, +livestock holdings, -income from chili, -off-farm income sources, -forest use index
19.	Chowdhury	Geo	*Ecology and Society*	2007	Central America	Mexico	Regression Analysis; Multivariate Analysis	Seemingly unrelated Regression; ANOVA		29 households	2002	Area under traditional and enriched fallows	*Traditional fallow:* +tenancy, +labour-consumer ratio, +livestock holdings, +PROCAMPO subsidy, -NGO subsidised Milpa, *Enriched fallows:* +labour-consumer ratio, +intensity of household forest use, +fallow enrichment and agroforestry,
20.	Codjoe	Geo	*International Journal of Environmental Studies*	2006	Africa	Ghana	Regression Analysis	OLS		240 households	2002 (retrospective for 1984)	Total cropped area by household	*Migrants 1984:* +affluence, (livestock) +affluence (consumer goods) + household size, *Migrants 2000:* + household size, + land ownership, + distance to farthest

													farm, +household educational level *Locals 1984:* + affluence (livestock) - fallow years allowed *Locals 2000:* + affluence (livestock), + on-farm income, + household size, +tractor use ,
21.	Codjoe and Bilsborrow	Geo, Econ	*GeoJournal*	2011	Africa	Ghana	Multivariate Analysis; Regression Analysis	ANOVA; OLS		252 households (110 migrant and 142 host population)	2002	Land degradation through: a) Extensification proxied by new land cultivation in past 5 years and mean hours of tractor use/hectare b) Intensification proxied by fallow length and fertilizer	*Migrants:* *New land :* - labor input(ha), *Tractor:* - fallow length, + fertilizer, +household size, +number of adult males, -livestock, - land tenure, *Fallow:* -tractor, +number of males, -livestock, *Fertilizer:* + tractor, +number of adult females, +livestock, *Host:* *New Land:* +education, *Tractor:* + fertilizer, *Fallow:* - tractor, -number of adult males, +age of farmer, - soil, - migration status

													Fertilizer: + tractor, - labor input (ha)
22.	Coomes et al.	Econ, Geo	*Ecological Economics*	2000	South America	Peru	Regression Analysis	Tobit model		36 households (1995)	1950-1994 (reconstructed panel)	Forest fallow holding on the household level (percent of land holdings in forest fallow; average length of fallow among fallowed fields in the portfolio)	+ male worker, -/+ female worker, + kin group size, + age of household head, - number of generation, + total land holdings, + % of initial holding in fallow, - % primary forest remaining, - prior crop,
23.	Coomes et al.	Econ, Geo	*Ecological Economics*	2004	South America	Peru	Regression Analysis	OLS; Tobit model		263 households	1996	Volume of extraction and the share of income contributed by fishing, hunting and other forest extraction	*Income by sector and income reliance:* - age of household head, + village dummies, + Local endowments, + extractive experience
24.	Damnyag et al.	Eco	*Forest Policy and Economics*	2012	Africa	Ghana	Regression Analysis; Descriptive Analysis	Multinomial logit model		756 households	2005	Perceived deforestation: households were asked about main environmental problem of small-scale farming related to deforestation: a) intensive cultivation/reduction in fallow period; b) the non-availability of fertile land/farming close to riverbanks; c) the vegetation cover reduction/exposure of top soil/felling of trees;	Reference category -> c) *Vegetation cover reduction* *a) Intensive cultivation:* + leasehold, + sharecropping, + farms closer to village, + indigene, *b)Non-availability of fertile land:* + leasehold, + closer to village, + indigene, +male, +sharecropping,
25.	D'Antona et al.	Anthro,	*Population and Environment*	2006	South America	Brazil	Descriptive Analysis	Correlation analysis		126 familial properties;	2003	Transition schemes between forest,	Farm size is identified as the main driver as

		Socio								satellite images		secondary succession, crops and pasture	deforestation intensity is higher on smaller properties
26.	Deadman et al.	Anthro, Geo	*Environment and Planning B: Planning and Design*	2004	South America	Brazil	Simulation	Agent-based model (LUCITA)		-	-	Crop and pasture land-cover trends; mature forest and secondary succession and fallow land-cover trends	+ household size, + household labor, + off-farm income, + crop prices,
27.	Dolisca et al.	Anthro, Eco, Econ	*Journal of Forest Economics*	2007	Central America	Haiti	Regression Analysis	Tobit model		243 households	2003	Average annual area of forest cleared during 1998 to 2003 (average difference in plot size between 1998 to 2003)	+ household size, - Education of the household head, - residence duration, + annual income per capita , + Number of off-farm labour, + illegal tenant
28.	Ellis et al.	Eco, Econ	*Agroforest Systems*	2010	Central America	Mexico	Regression Analysis; Simulation			38 households ; census data (2005); satellite images	2007	b) Land use choice between agroforestry, pasture, agriculture	*Multinomial Logit:* Agroforestry: + profit from agroforestry (coffee), + elevation, + distance to market, Pasture: - distance to road, Agriculture: - distance to road, -distance to market, -elevation, *Simulation*: High increases in coffee prices or price floor have little effect on number of parcels with agroforestry
29.	Etongo et al.	Eco	*Forest Policy and Economics*	2015	Africa	Burkina Faso	Regression Analysis	Tobit regression		200 households	2013-2014	Area forested cleared annually	*Tobit regression* + Land tenure insecurity (migrants) + Low agricultural production (extensive instead intensive land use) - Ages of farm
30.	Fisher et al.	Econ	*Land*	200	Africa	Malawi	Regression	Constrained		99	2000	a) Forest labour	*a)*

			Economics	5			Analysis	maximum likelihood estimation		households		share (forest use); b) Maize labour share; c) Non-forest labour share	+ predicted shadow wage for forest activities, - Household head age 35-44, - Household head secondary school level, - Farm size per household member b) - Household head age < 35 c) - predicted shadow wage for forest activities, + Household head age < 35
31.	Garedew et al.	Eco	*Environmental Management*	2012	Africa	Ethiopia	Simulation	System dynamic model		Census data (1973/1975 – 2006); focus group discussion (2009)	1975-2004; 2009	Land-use types: Woodland; wooded-grassland; grassland; shrubland; bareland; settlement; farmland	*(Endogenous) driver of forest degradation:* + Population growth, + household farm size, - household income, *(Exogenous) driver of population:* - family planning (reduced birth rate), - education (emigration), + health,
32.	Geoghegan et al.	Eco, Econ, Geo	*Agriculture, Ecosystems and Environment*	2001	Central America	Mexico	Regression Analysis	Logit model; OLS	spatially explicit	188 households; satellite images	1997	Probability of pixel deforestation measured as remained forest and deforested forest and amount of deforestation	*Logit model:* + population density, - distance to road, + distance to market or village, *OLS:* - elevation, - slope, + plot size, + total value of livestock,

													-off-farm income, -education of household head,
33.	Geoghegan et al.	Econ, Geo	*GeoJournal*	2004	Central America	Mexico	Multivariate Analysis	Logit model; Hazard model		188 households (1997); census data (1990); GPS geo referenced maps; satellite images	1997	Probability that deforestation occurs	*Household hazard model:* +females>11years, +children<12years, -primary forest, +upland soil, -elevation & slope, +precipitation, -plot size, + %owning a saw, +% owning a vehicle, +education of household head, +number of household members >8 years education, -native Spanish speaker, -credit, -distance to plot, -distance to market, -occupancy, -occupancy^2,.
34.	Godoy et al.	Anthro, Eco	*Ecological Economics*	2009	South America	Bolivia	Regression Analysis	Fixed-effects model; Two-stage least squares instrumental variable panel regression		324 households	2002 – 2006 (panel data)	Natural logarithm of total forest area cleared by households (total forest = old-growth and fallow forest)	+ log household real income, - log household real income^2, +log household real monetary wealth/person, +number of plots cleared,
35.	Heubes et al.	Eco	*Economic Botanic*	2012	Africa	Benin	Theoretical Model, (Simulation)	Niche-based model	Spatial explicit model	230 households	2009-2011	Occurrence/Loss of species of non-timber forest products; Monetary loss/gain caused by climate and land-use change	Income driven collection of non-timber forest products

36.	Hought et al.	Eco, Geo	*Applied Geography*	2012	Asia	Cambodia	Descriptive Analysis	Descriptive statistics	Spatial explicit model	32 households	2009	Cleared forest area	1989-2002: + Non timber forest products + Settlement programs 2003-2005: + cash cropping 2006-2009: + Expanding cassava as biofuel feedstock
37.	Ickowitz	Econ	*Agricultural Economics*	2011	Africa	Cameroon	Regression Analysis	OLS; Tobit model; Instrumental variable Tobit regression; Instrumental variable regression; Stochastic frontier model	spatial dependence	365 household	1998 2001 (panel data)	Average fallow length for -fields cleared from forests and fallows > 20 years (fal1) -fields cleared for fallow >20 years (fal2)	*Cross Sectional model IV Tobit (fal1):* -population pressure, -market environment, +years of education of head, +age of female household head, *Panel data:* *Full sample t=1997:* -population pressure, -age of male head, +age of female, *Balanced sample. t=1997:* -population pressure
38.	Kaminski and Thomas	Econ, Econ	*Land Economics*	2011	Africa	Burkina Faso	Regression Analysis	Ordered probit model		300 households	2006	Change in cotton land share; change in total cultivated land	*Change in cotton land share:* - variability of relative cotton price with respect to cereals, - food needs, + guarantee of selling, + input access, + payment date, - number of visits of technical advisors, + past number of visits of technical advisors, + change in total cultivated land, + cotton experience < 5 years

													Change in total cultivated land: + relative price of cotton with respect to cereals, - access of inputs, + change in family labour force during the cotton reform, + change in village labour force during the cotton reform, + adopted animal traction >/< 10 years, - absolute input, + cotton experience < 10 years, - duration of residence, + resident ethnic group,
39.	Klemick	Econ	*Agricultural and Resource Economics Review*	2011	South America	Brazil	Regression Analysis	Two part hurdle model (Probit OLS); Fixed effects model	modelling special dependency	271 households; satellite images	2002	Percentage of the area allocated to fallow on farm (conditional on farms using shifting cultivation)	*Two part hurdle model:* + ownership of land, - community association meetings, - slope, + distance to market, - wage income, + fertilizer price, + crop price (only probit model) - transportation frequency (only OLS) *Fixed Effects model:* + farm size, - working age family members, - access to credit, - wage income
40.	Klepeis and Vance	Geo, Econ	*Economic Geography*	2003	Central America	Mexico	Regression Analysis	OLS; Tobit model		188 households from ejidos (communal land) (1997); satellite images	1986-1997 (reconstructed panel)	Area allocated to forest, staples, commercial, pasture	*Forest:* -PROCAMPO subsidy, +distance to plot, +horse transportation, -vehicle transportation,

													+elevation, +land endowment, *Staples:* +age of household head, +vehicle transportation, *Commercial:* +PROCAMPO subsidy, -distance to plot, -horse transportation, +vehicle transportation, -distance to market, -elevation, *Pasture:* +PROCAMPO subsidy, +household size, -education of head, -Spanish as first language, -vehicle transportation, -elevation, +land endowment,
41.	Lorena and Lambin	Geo	*Applied Geography*	2009	South America	Brazil	Multivariate Analysis	Cluster analysis; ANOVA		118 households, (24-39 per spatial pattern)	1990-2004	Four spatial patterns (a-d) as part of the same settlement program	Average area of subsistence crop and commercial crop; average production of both crop types; average number of animals; average area of pastures, average production of non-timber forest products
42.	Luisana et al.	Eco	*Agriculture, Ecosystems and Environment*	2012	Asia	Indonesia	Theoretical Model	FALLOW model	Spatially explicit model	120 households in 4 villages	2008	Carbon sequestration (in forests)	Farmers select plots following a function of soil fertility, market accessibility, land tenure and land zonation; the model includes profitability

													measures (return to land, return to labor).
43.	Maertens et al.	Econ	*Agricultural Economics*	2006	Asia	Indonesia	Regression Analysis	Three-stage least squares instrumental variable regression		77 villages; Census data (1981); satellite images	2001	Natural logarithm of cultivated area of lowland crops; natural logarithm of cultivated area of highland crops	*Lowland:* + ln pop lowlands (with exogenous instruments, lagged pop and lagged pop density), + hand tractors, + travelling time to markets, - travelling time to markets^2, *Upland:* - irrigation system (tech), - hand tractors (stronger), + travelling time to markets, - travelling time to markets ^{2},
44.	McLennan and Garvin	Geo, Econ	*Land Use Policy*	2012	Middle America	Costa Rica	Descriptive Analysis	Descriptive Statistics		Within 5 communities: 31 current or former landholders and community leaders	2007	Traditional land uses new land uses	New land uses: + Off-farm employment, + sold land to investors, + intensified/diversified production
45.	Mekasha et al.	Econ, Eco	*Agriculture, Ecosystems and Environment*	2014	Africa	Ethiopia	Descriptive Analysis	Descriptive Statistics	Spatial explicit	217 households	2007 (not clear)	Transition from: grassland/forest land to bush/shrub land / crop land; bush/shrub land and grass land to crop land; bush/shrub land, forest land, grass land to crop land	+ human pressure, (-> increases livestock systems and subsistence crop systems) + land tenure arrangements, + poverty, Natural condition (climate)
46.	Mello and Hildebrand	Econ, Eco	*Journal of Sustainable Forestry*	2012	South America	Brazil	Theoretical Model, Simulation	Ethnographic linear program	Special explicit	307 lots; satellite images	2004, 2007	Area of forest land (reduced deforestation due	- household with cattle-centered farms (type 1) have the

								(ELP)		(used as model input)		to PES)	highest deforestation rate + Type 1 household receiving PES
47.	Mena et al.	Eco, Econ, Geo	*Environnemental Management*	2006	South America	Ecuador	Regression Analysis	OLS	spatially explicit, modelling spatial dependence	144 household (1990, 1999); Census data (1990, 2001); satellite images	1990 1999 (panel data)	Annual deforestation rates at the farm level for two time periods (1986-1996 and 1996-2002)	*1986-1996:* - area of the farm, -hired labour, -education of household head, +household size +electricity in the farm *1996-2002:* -distance by primary road to main town, -legal farm title, + hired labour, + education of household head, + household size, + gentle topography
48.	Mena et al.	Anthro, Demo, Econ, Geo	*World Development*	2006	South America	Ecuador	Descriptive Analysis; Regression Analysis	Cross-tabulations; Poisson regression		415 farms; satellite images	1999	Deforested area in 1997-98 (count variable, grouped in different hectare sizes)	*Results reported for Poisson regression:* + car access, + number children, + farm area (hectare), + labour days hired
49.	Mena et al.	Geo, Econ	*Applied Geography*	2011	South America	Ecuador	Simulation	Agent based model	spatially explicit	100 household; satellite images	1990 – 1999 (panel data)	Six LULC types: Primary forest, successional vegetation, pasture, subsistence agriculture, commercial agriculture, barren/urban	LULC mainly driven by profit maximization of household; household demographic structure and migration are explicitly modelled; model allows for copying of neighbour's strategy; modelling transition between subsistence and commercial farming; assets are the key driver
50.	Mertens et	Geo,	*World*	200	Africa	Cameroo	Regression	Bivariate	spatial	552	1998 (retro	Deforestation in	*Linear multiple*

	al.	Econ, Socio	*Development*	0		n	Analysis	regression; OLS	explicit	household; satellite images	perspective to the 1970s)	three periods of observation i. 1986-1996 ii. 1986-1991 iii. 1991-1996	*regression:* *1986-1996;* +population growth, +distance to market, -household average size, +marketing of plantain and non-plantain food crops, +proportion of migrants, -use of insecticides, *1986-1991;* +population, +population growth, +proportion of migrants, *1991-1996;* +population growth, +distance to market, -household average size, +marketing of plantain and non-plantain food crops, +forest cover, -well-being, -use of insecticides,
51.	Müller and Zeller	Econ	*Agricultural Economics*	2002	Asia	Vietnam	Regression Analysis	Multinomial logit model	spatially explicit	101 villages; satellite images	(No information of the year of data collection, but retro perspective to 1975)	Five land cover classes: - Mixed agricultural land - Paddy fields - Closed canopy (base category) - Open canopy - Mixed grasslands MNL was performed for two time periods: a) 1975-1992 *1990 model*; b) 1992-2000 *2000 model*	*Odd ratios results:* *'1990 model'* - older villages ("age of village"): increase likelihood of closed forest, - ethnic minority villages (Dummy): decrease likelihood of closed forest -availability of primary schools increases land use *'2000 model'* - lagged population decreases likelihood of closed forest -higher distant to

													market and all year roads increase odds for closed canopy forest. - availability of schools decreases of likelihood of agriculture and paddy - irrigation: increase of likelihood of forest protection via intensification
52.	Munroe et al.	Geog, Anthro	*The Professional Geographer*	2004	Central America	Honduras	Regression Analysis	Multinomial logit model; Logit model	modelling spatial dependence	110 households (1994); 42 households (1997); satellite images	1997	Stable forest and forest cover in 1996	*Results reported for Binary logit model:* +elevation, -slope, +distance to the nearest village, -patch size in 1987, -patch size in 1991, +forested in 1987, +forested in 1987,
53.	Muriuki et al.	Eco	*Landscape and Urban Planning*	2011	Africa	Kenya	Descriptive Analysis	Descriptive statistics		188 households; focus group discussion in 15 villages; satellite images	2009	Land cover classes (dense forest, open forest, shrublands, cultivation, grasslands, lava and rocks, marsh/wetland)	*Patterns of landscape change:* + population growth rates, + migration, + conflicts over access, + lack of tenure security,
54.	Murphy	Socio	*Human Organization*	2001	South America	Ecuador	Regression Analysis	OLS; Logit model; Tobit model		380 household (OLS + Logit model); 408 household (Tobit model)	1990	a) Natural logarithm of household farm income from cash crop/cattle sold/small livestock/food crops b) Off-farm work c) Percentage of total income derived from selling cattle;	*OLS regression* +start-up capital, +more land, +good soil, +pasture, +technical assistance, -recent settlers, *Logit model;* +education, -low farm income, -recent settlers, -lack of start-up

													capital, +household assets, *Tobit model:* +rich before(start-up capital), + more land cleared, +legal title, + Sierra origins,
55.	Neupane et al.	Eco	*Agricultural Systems*	2002	Asia	Nepal	Regression Analysis	Logit model		223 household	1998	Probability of agroforestry adoption for project and non-project households	*Agroforestry project household:* -number of children<5, -number of children 5-10, -number of males 10-59, -number of old people >59, -male education, +female education, +male NGO member, -female NGO member, -age, +number of livestock units, +perception towards agroforestry, *Non-agroforestry-project household:* +female NGO member, -sex, +number of livestock units owned.
56.	Newby et al.	Econ, Eco	*Small-scale Forestry*	2012	Asia	Laos	Descriptive Analysis	Descriptive statistics		127 households in 5 villages	2009	Change in teak plantation, Household parcels	+ duration of settlement + age of household-head + education of household-head + off-farm + access to paddy (self-sufficient) - household doing

													shifting cultivation
57.	Newton et al.	Eco	*Global Environmental Change*	2012	South America	Brazil	Descriptive Analysis	Correlation Analysis	spatially explicit	181 households in 27 communities, satellite images	2008-2010	Forest area, cropped area	Correlation in: - household size and manioc cultivation, - total household land and manioc crop size - terra firm forest and manioc cultivation
58.	Otsuka et al.	Eco, Econ	*Agricultural Economics*	2001	Asia	Indonesia	Regression Analysis	Logit model; Tobit model		60 villages	1995	Proportion of area under different land tenures by land-use type; Tree planting of formerly forest and bush-fallow plots	*Land tenures/ Agroforesty plots:* *a) Joint family:* - low region *b) Single family:* - population density, - population growth, + paddy area (%), + middle region *c) Purchased:* + Time to forest d) *Cleared:* + population growth, - middle Region *Tree planting on forest/bush-fallow plots:* - walking time to plot, + age of head, + year of acquisition, - private ownership (purchase)
59.	Overmars and Verburg	Eco, Geo	*International Journal of Geographical Information Science*	2005	Asia	Philippine	Regression Analysis	Logit model	spatially explicit	187 fields	2002	Crop choice: probability of yellow corn, wet rice, banana	*Household model:* +/- ethnic groups, +/- place of birth, -/+ slope, +/- creek *Spatial model:*

													+/- Improved distance to village (wet rice and banana) +slope(banana) -slope (corn and maize) +place of birth(rice) +policy(rice and banana)
60.	Pan et al.	Eco, Econ, Geo	*Agriculture, Ecosystems and Environment*	2004	South America	Ecuador	Regression Analysis	Generalized linear mixed model		155 household (1990), 157 households (1999); satellite images	1990 1999 (panel data)	Three pattern metrics at the farm level: a) *Patch density*: fragmentation of land uses b) *landscape shape index*: connectivity, insularity and spatial heterogeneity c) *contagion*: probability, that two adjacent cells belong to different patch types	a) *Patch density:* - area of plot, + age of household head, + age of plot, + number of subdivisions, - off-farm employment, - road access to Finca, - distance to reference/ community, + number of children, - population density, b) *Landscape shape index*: + Land area, -median slope - hired labour, - age of household head, - adults females, +number of subdivisions + title of Finca, - distance to reference community/water, c) *Contagion*: +median slope - age of household head, +adult females - age of plot, + number of subdivisions, + off-farm

													employment, - population density, - title of Finca, - distance to reference community, + distance to water, - access to electricity,
61.	Pan et al.	Eco, Geo, Demo, Econ	*Population Research and Policy Review*	2007	South America	Ecuador	Regression Analysis	OLS; Random effects model	modelling spatial dependence	361 farms; satellite images; GPS	1990 1999 (panel data)	Forest cover loss on Finca level (total hectares of primary forest plus secondary forest at least 7 years old)	*OLS;* +road access in 1999 -Finca cohort settlement -males 12-49(pop) +all < 50 years(pop) -males 12-49 (change in pop) *Spatial error;* +road access in 1999 -final settlement cohort -males 12-49(pop) -males 12-49 (change in pop) *Random Effects;* +final settlement cohort(80-84& 85-90), -males 12-49(pop), -males 12-49 (change in pop)
62.	Pender et al.	Econ, Socio	*World Development*	2004	Africa	Uganda	Multivariate Analysis; Regression Analysis	Principal component analysis; OLS; Ordered probit model		107 villages	2000	*Ordered probit model:* Ordinal scaled area changes for cultivated area, forest/woodland, woodlots, wetlands, settlements	*Cultivated area expansion:* - irrigation in village, + cash crop expansion (banana and coffee), - distance to tarmac road (miles), - number of NGO programs *Settlements expansion:* + population density, + number of households, + cereals production, - cotton production, + number of government

													programs, - coffee production *Forest/woodland expansion:* + number of households, + distance to tarmac roads, + irrigation in village *Woodlots expansion:* - market access, + cereals production, + nonfarm activity, - horticulture, + coffee production, - distance to tarmac roads, + number of NGO programs *Wetlands expansion:* - market access, - cotton production, - coffee production, + distance to tarmac roads, + irrigation in village, - number of community-based organizations
63.	Perz et al.	Geo, Socio	*Human Ecology*	2006	South America	Brazil	Descriptive Analysis; Regression Analysis	Correlation Analysis; Three-stage least square regression		261 households; 347 lots	1996	Primary forest; Annual crops; Perennials; Pasture; Secondary vegetation	*Primary forest:* +distance to town, -number of children under 15 *Annual crops* +number of adults, -number of adults^2, +number of children under 15, +number of elderly over 66, *Perennials:* +previous job,

													-wealth, +remittances, +agricultural Inputs, +number of adults, -number of adults^2, -number of children<15, *Pasture:* -agriculture capital, +credit, +pasture rotation, -number of children under 15, -number of elderly over 66 *Secondary growth:* -wealth factor, +log area cleared, +fire damage, -commercial business, +years on lot
64.	Pinyopusarerk et al.	Eco	*Land Use Policy*	2014	Asia	Vietnam	Descriptive Analysis	Descriptive statistics		155 households in 4 villages, 438 ha unallocated forest land	2007 2010 2012 (panel data)	Forest area (sustainable managed by communities)	After commencement of the project illegal logging activities decrease substantially (36-37 cases in all villages); community development funds provide loans; establishing of new forest plantations on areas which have been degraded
65.	Ribeiro Palacios et al.	Anthro, Geo, Eco	*Land Use Policy*	2012	South America	Mexico	Multivariate Analysis	Hierarchical cluster analysis	Spatial explicit	90 households in 3 communities, 190 plots, remote sensing data	2009 recall information for plots from 1970-2009	Agricultural land use (cash crops) of households' plots	+ market liberalization policies (low market prices without subsidies), + freezing event, + emerging off-farm possibilities (by policies)
66.	Rodríguez-Meza et al.	Econ	*Environment and Development Economics*	2004	South America	El Salvador	Regression Analysis	Fixed effects model; Random effects Tobit model		427 household	1996 1998 2000 2002 (panel data)	Area of land cultivated	+permanent income, -permanent income^2, +number of household members in own agriculture,

													-number of household members in off farm employment, +livestock value, +household experience in farming, +technology employed,
67.	Rudel et al.	Socio	*Annals of the Association of American Geographers*	2002	South America	Ecuador	Regression Analysis	Logit model; OLS		72 household (ethnicity Shuar); 202 household (ethnicity Mestizo); satellite images	1986 1997	a) Probability of reforestation b) Extent of forest regrowth	*Logistic Regression;* +naranjilla, +cacao, -cattle income, -ethnicity *distance from road, *Regression;* +farm size, +household size, +abandoned crops, -cattle income, -ethnicity, +distance,
68.	Sakane et al.	Eco	*Agriculture, Ecosystems and Environment*	2014	Africa	Tanzania	Theoretical model, Simulation	Empirical decision-making model		13 focus farmer groups, 275 households	2009	Wetland agriculture	*Farm decision-making process described by farm types with information on:* - land, capital, cultivated area in the wetland, age of the household head, household labour, off-farm, livestock
69.	Sankhayan and Hofstad	Eco, Econ	*Ecological Economics*	2001	Africa	Senegal	Simulation	Dynamic stochastic non-linear programming model		Village as unit of observation	-	Woodland degradation (reduction of vegetative biomass density)	*6 scenarios compared to baseline were analyzed:* - technological progress through introduction of fertilizer use; + population growth; - cotton price; + charcoal prices; - rural wages (in this model only through reduction in charcoal production),

													+poverty (proxied by higher discount rates) increases deforestation but not grazing pressure
70.	Schmook and Radel	Geo	*Human Ecology*	2008	Central America	Mexico	Multivariate Analysis	ANOVA		203 household (2003); 143 household (panel data); satellite images	1997 2003 (panel data)	Comparison of *migrant household groups* (migrant household head to US/migrant offspring only) vs. *non-migrant household groups* (no migrant in household / household head is non-migrant)*	*Migrant household groups*: -less likely to cultivate summer maize and chili Less likely to have higher hectare for chili and maize. -less likely to practise traditional milpa. +more likely to have higher hectares for pasture. +more likely to own cattle. +more likely to have higher hectares for reforestation. *Non-migrant household groups* +more likely to practise agroforestry +more likely to have % of young secondary land +more likely to have higher % of older growth forest +more likely to practise beekeeping
71.	Schmook and Vance	Geo, Econ	*World Development*	2008	Central America	Mexico	Regression Analysis	Seemingly unrelated regression		164 household (1997); 47 household (2003)	1997 2003	(a) Milpa (b) Jalapeno (c) Pasture d) Forest	*Milpa:* +PROCAMPO subsidy, -PROCAMPO*highway, +Alianza subsidy, +price ratio, +age of household head, +off-farm income,

													Jalapeno: +PROCAMPO subsidy, +children 12-17, +age of household head, +farm income, *Pasture:* +PROCAMPO subsidy, +PROCAMPO*highway, +Alianza subsidy, +price ratio, -males 18-64, +education of household head, +off-farm income, +remittances, +farm income, +area of parcel, *Forest:* -PROCAMPO subsidy, +education of household head, -farm income, +area of parcel, +minutes to parcel,
72.	Shively	Econ	*Land Economics*	2001	Asia	Philippines	Regression Analysis; Simulation	OLS; Stochastic frontier model; Regression-based simulation		108 lowland farms; 104 upland farms	1997 (retro perspective to 1995)	Output per hectare	*Stochastic frontier:* +labour, +fertiliser, +pesticide, -farm size, +tenure,
73.	Soler and Verburg	Geo	*Regional Environmental Change*	2010	South America	Brazil	Multivariate Analysis; Regression Analysis	ANOVA; OLS		86 households; satellite images	2000, 2008 (reconstructed panel)	Percentage deforested per property	*ANOVA:* + high fertile soils, *OLS:* + high fertile soils, - low fertile soils, - property size, - year of establishment, - estimated travel

													speed of the nearest road, - distance to highway,
74.	Shively and Pagiola	Econ	*Environment and Development Economics*	2004	Asia	Philippines	Regression Analysis	Heckman two-step model; Instrumental variable Probit model with random effects; Instrumental variable Tobit model; Seemingly unrelated regression with instrumental variable		251 farms (Model L1); 88 farms (Model L2); 324 farms (Model U1); 45 farms (Model U2)	1994 – 2000 (panel data)	*Probit model:* Upland labour hired *Tobit model:* Total upland labour hired *SUR Regression:* (a) Off-farm labour supply (b) Land clearing (c) Purchase of Fertiliser*	*Lowland Farms:* -probability of upland hired labour with time (L1) +farm size (L1) +cultivated area (L1) -household size (L1) +total hired labour in 1997 (L2) +shadow value of labour in 1997 (L2) *Upland Farms:* +number of workers (U1& U2-b) +farm size (U1-a& U2-c) +prior investments in agriculture (U1-c)
75.	Sunderlin and Pokam	Socio	*Economic Development and Cultural Change*	2002	Africa	Cameroon	Descriptive Analysis; Regression Analysis	OLS		38 villages	1997	a) Percentage of village households clearing land in 1996 b) Area of forest cleared per village c)Forest clearance index	*a) Percentage of village household clearing land:* +distance of village to city, +% non-plantain growers expanding non plantain crop land, *b) Area cleared per household in the village:* -household size, +%plantain growers expanding plantain crop land, -distance of village to city *c)Forest clearance index* -% non-plantain growers expanding

													non plantain crop land, -% of households using fertiliser
76.	Takasaki	Econ	*Environment and Development Economics*	2007	Latin America/Sub Sahara Africa	-	Theoretical Model	Agricultural household models under distinct land and labour regimes		-	-	Cleared forest area	+ output prices, + higher technology, - higher off-farm wages (when an imperfect land market exists) -/+ higher off-farm wages (when a land market exists) + land prices (when a land market exist) - ag. subsidies (when a imperfect labour market exists) + ag. subsidies (when a labour market exists),
77.	Vadez et al.	Anthro, Eco	*Human Organization*	2008	South America	Bolivia	Regression Analysis; Simulation	OLS; Tobit model		493 households	2000 – 2002 (panel data)	Amount of total deforestation and old-growth forest deforestation	+ cash crop area, + cash income, + market dependence,
78.	Vance and Iovanna	Econ	*Land Use Policy*	2006	Central America	Mexico	Regression Analysis	Multilevel complementary log-log model		135 households; satellite images	1997	Deforestation (binary variable: transformation from mature upland/lowland forest to agriculture)	Results reported for Model IV *(random effects at parcel level for vehicle and chain saw possession):* + upland soil, - slope, - elevation, - plot size, + household members>11, + household members<12, + duration of occupation squared, - possession of vehicle, - PROCAMPO farm support, + ejido population,
79.	Vance and Geoghegan	Econ	*Agricultural Economics*	2002	Central America	Mexico	Regression Analysis	Survival analysis;	spatial explicit	188 household;	1998	Length of time before forest	Results for Model I(*entire sample of*

								Complementary log-log model		GPS plot data; 32satellite images		clearance to cropland or pasture	*observations>6years):* + household members >11, + household members <12, -elevation, -slope, +precipitation, +plot size, +% of owning a vehicle, +education of household head, +members with >8 years education, -distance to plot, -distance to nearest market, -duration of occupancy, +duration of occupancy ^{2}, -mature forest, +PROCAMPO subsidy
80.	Vance and Geoghegan	Econ	*International Regional Science Review*	2004	Central America	Mexico	Regression Analysis	Switching regression model		187 household; GPS plot data; satellite images	No information of the year of data collection	a) Area planted in maize (ha) b) Area planted in chili (ha)	*Weighted least squares;* *Sellers of maize:* +age of head, +labor Index, +good soil, +off farm labor, +government credit, *Nonsellers:* +consumption index, +labor index, +age of head, -distance to plot, +good soil, +government credit, *Heckman Model :* +consumption index, -age of head, -consumption of head, -elevation, -number of cattle,

													-off farm labor, +government credit,
81.	Vang Rasmussen and Reenberg	Geo	*Applied Geography*	2012	Africa	Burkina Faso	Descriptive Analysis	Descriptive statistics	Spatial explicit	45 households (1995), 75 households (2010), Focus group interviews, satellite images	1995, 2010, (semi-structured interviews were retro perspective for the last 50 years)	Field expansion/contraction	+ population pressure (household size and migration), + globalization, + climate variability
82.	Vanwambeke et al.	Eco, Geo	*Journal of Land Use Science*	2007	Asia	Thailand	Regression Analysis	Multilevel logit model		223 household; satellite images	2002 (retro perspective to 1989)	Adoption of following land use strategies: intensification of irrigated areas, expansion of orchards, conversion of agricultural plots into orchards	*Intensification of irrigated areas* - upland field area, - farm partly market oriented, + social network *Potential adopters of intensification of irrigated areas:* - upland field area, + use of herbicides (requires capital), - possession of pump
83.	VanWey et al.	Socio, Anthro	*Population and Environment*	2007	South America	Brazil	Regression Analysis	Fixed effects model		540 household (Altamira); 148 household (Santarém); satellite images; GPS plot data	1998, 2003 (panel data)	a) Annuals b) Pasture c) Perennials d) Forest Area(Survey) e) Forest Area (Satellite)	*Altamira:* +kids(0-11), +females(12-18), +females (50+), *Santarém:* +/- kids(0-11), +females(12-18), -females(19-49), +females(50+),
84.	VanWey et al.	Socio, Demo, Econ	*Population and Environment*	2012	South America	Brazil	Regression Analysis	Poisson regression; Logit model; Seemingly unrelated regression model; Tobit model		267 household	1998 2005	a) % Forest b) % Pasture c) % Perennials	*Results reported for Tobit model; % Area in forest;* + out-migrant children sending money, *% Area in perennials;* + out-migrant

													children sending money, +number of out-migrant children sent money, +number of children, -household income, +soil quality, *% Area in pasture;* -out-migrant children sending money, -number of children, +household income,
85.	Vihervaara et al.	Eco, Geo, Socio	*Forest Policy and Economics*	2012	South America	Uruguay	Descpritive Analysis	Descriptive statistics	spatial explicit	74 households, satellite images	2008	Change from grassland to plantations	Grassland is converted for tree plantations for eucalyptus and pine, partly driven by subsidies.
86.	Villamor et al.	Eco, Geo, Socio	*Mitigation and Adaptation Strategies for Global Change*	2014	Asia	Indonesia	Multivariate Analysis, Regression Analysis	Role-Playing Games (RPG), Principal Component Analysis (PCA), Logit model		389 households	2010-2012	Probability of changing land use (conservation or conversion)	Women react more positively to external investors proposing logging (uplands) or conversion (for monoculture)
87.	Walker et al.	Anthro, Econ, Geo	*World Development*	2000	South America	Brazil	Regression Analysis	Two-stage least squares model	modelling spatial dependence	132 households; satellite images	1993	Amount of deforested area	Land as a factor "produced" by small producers for ranching investment: + hired hands + household workers Endogenous: (delta) wealth
88.	Walker et al.	Geo, Socio	*International Regional Science Review*	2002	South America	Brazil	Regression Analysis	Multinomial logit model		261 households	1996	Farm system selection: (a) *high-value farms* (cattle, perennials, perennials with cattle) (b) *mid-value farms* (annuals with perennials, annuals with cattle, perennials with annuals) *	*High-value-farms:* - distance to highway, + day labour, + years since acquisition, + years of school, +title, *Mid-value farms:* - distance to highway, + day labour hired, +male family workers,

													+ years since acquisition, - Dependency, +title
89. .	Walsh et al.	Geo	*Geoforum*	2008	South America	Ecuador	Simulation	Cellular Automata model		Census data (2001); households survey (1990/1999); satellite images	2001, 1990/ 1999	*Two scenarios:* a)*Existing Forest* transitions to non-forest vegetation and urban/barren b) *Non Forest Vegetation* transitions to secondary forest and urban/barren Transitions define changes between flux classes (succession, agriculture & pasture)	a) *(Endogenous) driver :* + income *(exogenous) driver:* + access to infrastructure and communities (markets), b) *(Endogenous) driver :* + income, *(exogenous) driver:* + off farm employment (parcel abandonment of farms),
90.	Wyman and Stein	Eco	*Applied Geography*	2010	Central America	Belize	Regression Analysis	Logit model	spatially explicit	33 households; satellite images	2005	Deforestation (vs. stable forest)	+ cattle, - cattle income, + agriculture, - education of household head, - tenure security, - distance to road, - family size, - agriculture. Income, + remittances, - distance to river, + tourism, + outside work, - pasture, + pledge, - pledge & tourism,
91.	Zwane	Econ	*Development Economics*	2007	South America	Peru	Regression Analysis	Fixed effects model; OLS; Instrumental variable regression		45 households	1994, 1996, 1997 (panel data)	Land cleared (fallow, cultivation, animal pasture)	*Fixed Effects Model;* +lag total annual household income, -lag total household income^2, +lag labour supply constraint, -lag households asset,

													-lag forested land claim,