## Asset Inequality without Markets: Evolution of Household Land Holding in a Peasant Community, Peruvian Amazon

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## Abstract

Observers often point to markets as a major cause of asset inequality; markets, however, need not be the only cause of the gap between richer and poorer households. In this paper, we report on the determinants of land inequality in a peasant community from the Peruvian Amazon where land and labour markets are all but absent. The data gathered in 1994/5 through in-depth interviews with agroforestry-reliant households (n=36) -- on farming practices, land holding, demographic characteristics, incomeexpenditures and household non-land wealth -- allow us to create a panel data set to study land accumulation and inequality since 1960. During this period, new forest land became increasingly scarce around the community as the frontier closed. Land holdings in 1994 were highly unequally distributed with 20% of households holding 58% of the land. Results of regression analyses indicate that households with larger land holdings tend to be older (to a point), richer in in-house labour, access to more fertile land (yarinal) and who began with a larger initial endowment of land. Analysis of Gini coefficients over time indicate that land inequality fell sharply between the late 1960s and the Agrarian Reform of the early 1970s but then rose thereafter, reaching pre-Reform levels by the early 1990s. Decomposition of overall land inequality through time points to the importance of household acquisition of more fertile land, of holding land in forest fallow and of means other than claiming (e.g., gifts, state-transfers, bribes) in contributing to land inequality, especially since the early 1980s. Our findings suggest the importance of competition for scarce land through traditional allocative institutions and means rather than markets in understanding land inequality in traditional agrarian societies.

## **I. Introduction**

Inequality in the holding of land by peasant farmers is a theme of long standing interest in Latin America and elsewhere. Research to date has focussed primarily upon the role of markets and market imperfections in social differentiation in rural areas, typically where capitalist farmers (latifundistas) and peasant farmers (minifundistas) meet. As yet, few studies examine the role of 'traditional' (i.e., non-market mediated) allocative institutions in the evolution of asset inequality among the rural poor. Indeed, wealth in traditional societies – where markets are absent or thin – is often purported to be more equally distributed as individuals who seek first to meet subsistence needs are linked through moral/redistributive networks (Scott, 1976). As households in traditional communities become increasingly dependent on markets for livelihood, observers note a rise in inequality, attributing growing disparities in wealth specifically to the action of markets. Clearly rising asset inequality has both social and environmental costs, and a variety of public policy instruments are deployed to mitigate its nefarious effects through, for example, land reform, market intervention, and targeted subsidies.

In this paper we examine the evolution of land inequality in a traditional peasant community in the Peruvian Amazon where land and labour markets are all but absent. Our view is that differentiation and inequality arises not because of the specific nature of the allocative institutions in place -- indeed markets are but the forum in which competitive struggles are played out -- but rather because of differences in households' endowments, abilities, and opportunities. In previous work, we have demonstrated that land inequality in this community is quite pronounced and such inequality lies at the root of differences among local households in agricultural and fallowing practices (see Coomes and Burt, 1997; Coomes et al., 2000), the use of natural resources – specifically charcoal (Coomes and Burt, 2001) and palm fibre (Coomes, 2002), and in fertility rates among households (Coomes et al., 2002). Here we seek to better understand how inequality in land holding has arisen in the absence of land and labour markets. Specifically, we examine how has inequality changed through time, why have certain households succeeded in accumulating more land than others, and how differences in land type, land use and land acquisition means have contributed to overall land inequality through time.

### **II. Study Area**

The community of San José is situated along the Amazon river upstream of Iquitos, the largest urban commercial centre in the Peruvian Amazon. Founded in the mid-19th century as an agricultural estate serving the wild rubber trade, San José was the home for decades to the estate's peones and their families. With the demise of wild rubber in the 1910s, regional demand for agricultural produce fell sharply. Over the following decades through the 1960s, the estate became an increasingly marginal enterprise governed by an absentee owner. Residents came to live increasingly as peasants, relying on swidden-fallow agriculture, fishing and forest extraction for their livelihood. In 1971/72 with the Agrarian Reform (Ley No. 17716), the estate was dissolved and land ownership was transferred to the community of San José. Each household received a home site plot (4.5 ha) and a nearby parcel (6.0 ha). The community recognised usfructory rights on other lands worked by households within community boundaries. Over time, as available land near the village centre became increasingly scarce (and degraded), households sought new land from the surrounding primary forest. Until the early 1980s, community lands were bounded on three sides – downstream by a neighbour community (San Francisco), the Amazon river and, inland, by a tributary of the Amazon. In 1981, the formation of a new community upstream (San Juan) and creation of a boundary between the two communities effectively closed off the 'fourth side', enclosing the community of San José and making residents aware of the finite supply of available forest land. A second round of 'parcelisation' occurred in 1984 (9 ha lots), formalising extant claims among households on land near the community; primary forest remained to be claimed but at considerable distance from the village.

In 1994 -- when field work for this study began -- 60 peasant households (365 individuals) resided in San José, whose boundaries encompass a land area of about 2300 hectares. Whereas 30 years ago primary forest was abundant within San José's boundaries, virtually no unclaimed land remains within community boundaries and less than a few percent of the land area is under primary forest. As such, peasant households in San José have experienced a growing shortage of land, especially since the early 1980s, as primary forest has progressively been replaced by crop fields and secondary forest fallows.

Local residents typically rely economically on swidden-fallow agriculture, complemented by fishing, small livestock, non-timber forest product extraction, handicraft production and annual floodplain cultivation (see Coomes and Burt, 1997, 2001; Coomes et al., 2000). Farmers work three distinct land forms – the upland, upon which the community is sited; the fertile 'yarinal', a relic terrace distantly inland; and, the floodplain along the Amazon river. On the upland and varinal -- where most farming activity is concentrated - residents practice swidden-fallow agriculture in small 'patches' within the forest. A farmer begins the swidden-fallow cycle by slashing and burning a patch of rain forest. Using machetes and axes, and working with kinfolk through reciprocal labor arrangements, farmers open the forest and plant crops in the field, thereby claiming the land. The plot is cultivated through a series of crop phases and then left typically for 10-15 years in fallow (see Coomes and Burt, 1997). The farmer retains rights to the land throughout the fallow, and such land can be transferred to others by gift (or inheritance). Typically, households at inception (defined as when the first child is born) begin farming an initial plot that is acquired by gift, inheritance or by claiming through forest clearing and cultivation. Overtime, the household accumulates land as the household size expands (see Coomes et al., 2002). Land is acquired by traditional means (e.g., forest clearing) as well as 'modern' means (e.g., state granted parcels). A complete land portfolio contains spatially dispersed fields in subsistence crops, cash crops and forest fallow. As the household matures and young adults begin to leave the household, land is typically de-accumulated through gifting to newly formed households.

Households are poor but well integrated into product markets. The median market income is approximately \$2000/household/year and remittance flows are minimal. Land is the primary asset with household holdings ranging from less than one hectare to over 45 hectares. Non-land assets are valued typically at less than \$500/household, comprising mostly farming and fishing implements as well as poultry and pigs. As such, land is the primary physical asset held by households and the key determinant of economic welfare in the village. All produce that is not consumed by the household (or shared with kin) is conveyed to the markets of Iquitos by river boat, one day's journey downstream. Local wage opportunities are few – limited to periodic day work in charcoal production (see Coomes and Burt, 2001) – and virtually all agricultural work is undertaken with 'in-house' labor or communal (reciprocal) labor. No credit or state-sponsored technical assistance is available to local farmers.

#### **III. Methods**

Data were gathered during formal interviews in San José, during June-August of 1994 and 1995, among peasant households who's primary vocation was swidden-fallow agroforestry (n=36) (see Coomes and Burt, 1997). Structured questionnaires were administered to heads of households and their spouses, seeking information on household demographic composition, kinship relations and family history, land holding, labour use, household income, expenditures, and non-land asset holdings. Households' perceptions and practices regarding settlement history, land use and land accumulation were discussed informally in small groups and with individual households.

To reconstruct the history of land holding -- in the absence of formal records -- each head of household was accompanied to visit his/her current fields. For each field, a cropping-fallowing history was developed with the aide of the field owner, beginning with the current crop/fallow cover and working back through time to the year of acquisition. The natural 'programmatic' sequencing of crops in the

swidden-fallow agroforestry cycle enabled owners to readily recall field cover back as far as the 1950s (see Coomes and Burt, 1997). The owner was then asked about fields that were he/she once held, but since had been abandoned or transferred; the areas of such fields were recorded but not the crop/forest cover. Data are available on the area, location, crop/fallow cover and acquisition/transfer of 593 fields for the period, 1955-1994. By aggregating fields through time, the evolution of each household's land holdings could be tracked by year, from inception to the present. The resulting panel data set thus combines for each household and year, the area of total land holding and household characteristics such as age, size, and composition. Because new households were formed over time, the panel is unbalanced, with eight households in 1960 and 36 households in 1994. Descriptive statistics are presented for key variables in Table 1.

### **IV. Results**

#### A. Land Access and Holding in San José

The history of recent land cover change in San José is one of the progressive appropriation through the conversion of primary forest into crop land and secondary forest fallow (Figure 1). The rate of decline of primary forest accelerated in the 1960s, peaked in the late 1970s and began to slow after 1981 as land in primary forest became increasingly scarce. Over time, households accumulated land at roughly the same rate as population growth in the sample, until the late 1960s when land holdings began to expand faster than the population. Two 'bursts' of land accumulation occurred in San José – the first during the 1970s following the Agrarian Reform of 1971/72 and the second during the early-mid 1980s, after community enclosure in 1981. During the late 1980s and early 90s, some households continued to add land to their portfolios but at a decreasing rate and field sizes fell markedly; for new households, however, prospects for adding land to their portfolios were increasingly limited.

By 1994, sample households held a total of about 375 hectares of land with a mean holding of 10.4 hectares (Table 1). Holdings varied markedly however within the sample -- from 0.4 to 46.1 hectares -- with 20% of households possessing 58% of the land, suggesting significant inequality in land holding. The largest proportion of mean holdings is found on the upland (68% of holdings) followed by the varinal (16%) and floodplain (16%). Whereas all households possess land on the upland, fewer than one in two holds land in the varinal. Mean holdings are dominated by forest fallow (42% of area), followed by subsistence crops (28%) and cash crops (24%). Households vary substantially in the relative area devoted to crops and fallow as well as in the length of fallow periods with land poorer households holding proportionally more land in subsistence crops, less in forest fallow and practising shorter cropping and fallow periods (see Coomes and Burt, 1997). Mean holdings were acquired primarily by gifting (55% by area) followed by claiming (23%) and state-mediated transfers (14%). Some households however acquired all of their land through claiming whereas others relied almost entirely on gifts or state transfers. Households began with a mean initial endowment of 4.1 hectares of land (about 39% of current holdings) and accumulate land at a mean rate of 0.1 hectares per year. The range of initial land holding (0.2-11.8 hectares) is notably and inequality in the initial endowment is similar to inequality in current land holdings (Gini: 0.495 vs. 0.496). In general, households do not acquire land yearly, but rather acquisition occurs episodically, driven in part by the need to open a new or fallowed field for subsistence crops every 18-24 months, and the path of land accumulation follows that of demographic change in the household (Figure 2, see also Coomes et al., 2002).

#### **B.** Land Acquisition and Accumulation

The traditional means of acquiring land in San José – as in many forest peasant communities – is through use and gift/inheritance. To claim land through use, a household identifies a patch of primary forest within the community boundaries and verifies with village authorities (i.e., Tte Governor and

Municipal Agent) that such land has no claims upon it. A communal work party is assembled, comprising members of the extended family and kin folk, and the plot is cleared of forest. The property right is conferred only when the plot is planted in crop, after burning, both of which are conducted done by the household only. Usfructory rights are retained as long as household members or their progeny remain in the community. Such rights endure over long periods of secondary forest fallow (e.g., 10-30 years) and 2-3 generations, though in the early 1990s, a few land poor households had invaded fallows of richer households, claiming subsistence need in the face of scarcity of available land to work. Land acquired through claiming by use can be transferred by gift or by inheritance, most commonly from parents to their children but also between close relatives (e.g., uncles and aunts) and even among siblings. No strong trends toward matri-locality or patri-locality are evident in our data on land transfers.

Modern means are also used to acquire land in San José. The Agrarian Reform of the early 1970s – aiming to give 'land to the tiller' -- allocated upland parcels on this former estate. In the early 1980s, the second upland 'parcelisation' occurred of land adjoining the parcels of 1971/72. Such lands had been used for decades -- first as estate lands, then in 'plots' by residents -- and were not considered to prime land. In some cases, households gave up plots to receive a more proximate, consolidated parcel. Although the boundaries of such parcels have remained clearly known over time, the land therein continues to be worked in 'patches' of small crop and fallow fields. In rare cases, a field may be 'sold', never for the value of the land <u>per se</u>, but rather for the value of the standing crop; such cases occur during a serious family emergency (life-threatening illness) or upon departure of the household from the community. As such, no land market exists in the community and parcels of land can not be sold.

To identify the household features that may explain total land holding and rates of land accumulation, regression analyses were undertaken using the panel data for 1960-1994. Robust estimations were made of models that include eight independent variables capturing household lifecycle effects, labour access, land quality, land use, and the household's initial asset position. Following Chayanov, household life cycle effects (i.e., consumption and production) are proxied by household age and age squared. Access to labour -- a key factor in an economy where land is claimed by forest clearing and crop planting -- is indicated by two variables: the number of household members that are economically active (i.e., 15-64 years of age), and the number of workers that assist the household through communal labor arrangements. Land quality effects are captured by the percentage of a household's holdings on the more fertile yarinal. Differences in how households use their extant holdings are represented in the percentage dedicated to subsistence crops and to cash crops. Finally, the models account for differences in the initial amount of land with which households begin, as a factor influencing their total land holding and the rate of land accumulation. The unit of analysis is 'household-year' and for this reason the number of observations far exceeds the number of households in the sample.

Results of regression modelling of total land holding indicate that a substantial and statistically significant portion of the variance is explained by our model (r2: 0.53) (Table 2). Seven of the eight independent variables contribute significantly in explaining land holding. Household age is quadratically related to land holding, as expected, increasing with age to a maximum at around 33 years and then declining gently off thereafter. Households with access to more in-house labour (p<0.01) hold more land. Access to land in the more fertile yarinal clearly has allowed certain households to accumulate larger holdings; those with a higher portion of their holdings here hold significantly more land. Households that begin with a larger initial endowment of land tend also to possess larger land holdings through time.

The regression model for the rate of land accumulation – using the same specification as for the total land holding – account for a small but statistically significant portion of the observed variance in accumulation rates (r2: 0.04)(Table 2). Household age strongly influences the rate of land accumulation, following a negative quadratic consistent with our findings for total land holding, i.e., accumulation rates tend to fall over time to a point when they move towards the apex of households total holdings. Those households beginning with a larger initial endowment of land tend to accumulate land more slowly

(p<0.05) than other households. Households with a larger proportion of their holdings in cash crops also tend to accumulate land more slowly. Labour access – in-house or communal – does not appear to be related to the rate of land accumulation.

## **C. Evolution of Land Inequality**

To portray the evolution of land inequality in San José, Gini coefficients on land holding were estimated which indicate a marked shift in inequality between 1960 and 1994 (Figure 3). Households land inequality fell sharply from about 0.5 to just over 0.2, reaching a minimum during the Agrarian Reform period of 1971/72 (Figure 3). Prior to the Reform, the estate was held by an absentee landlord, and with the military coup of 1968 which brought the promise of land reform, more households began to lay claim to land on the estate and to send produce directly via river boat to market. In 1971/72, the estate was formally dissolved and each household received a parcel of upland. Since the Reform, household land inequality has increased, returning to levels comparable to those in the early 1960s. Inequality among extended families followed that at the household level strongly until the early 1970s, then diverged; inequality at the household level has exceeded that at the family level since early 1980s as new forest land has becoming increasingly scarce.

## **D. Land Inequality Decomposed**

Given fluctuations in land inequality and that certain household features strongly influence total land holding, we sought to assess whether such features also affect inequality through time. To do so, we use a Gini decomposition that explores the relative contribution to inequality made by three key factors found by regression analysis to influence land holding – *land types*, by *land uses* and by *means of land acquisition*. Generally, our approach to decomposition by component (k) follows that of Lerman and Yitzhaki (1985) as,

Overall Gini (G) =  $\Sigma (\mathbf{R}_{k}^{*}\mathbf{G}_{k}^{*}\mathbf{S}_{k})$ 

where, R : correlation between component k and total land holding G : relative Gini of component k S : share component k's share of total total land holding

Decomposition of Gini coefficients by *land type* reveals notable shifts in the relative contribution to inequality through time (Figure 4). Prior to the coup of 1968, land inequality was composed almost entirely of differences in upland holdings; subsequently, as more households claimed upland of their own and then formally received parcels in 1971/72, inequality in upland land holdings feel precipitously, bringing overall land inequality down to its minima. Over the next decade, inequality in upland holdings rose as households claimed more land beyond their respective parcels. In 1981, when the community was enclosed, land inequality began to rise sharply. Unlike in previous periods, land inequality was driven in the early 1980s by prescient households in one extended family who first appropriated the fertile though distant yarinal, rather than upland. Households holding more land in the yarinal are those belonging to this extended family and those richer in in-house labour. Once claimed, the contribution of yarinal holdings to overall land inequality remained constant while once more, in the late 1980s through to 1994, inequality in upland holdings, then yarinal holdings drove much of household land inequality over time.

Land inequality when decomposed by *land use* indicates the growing contribution since 1981 of differences in households' holding of forest fallow, rather than of subsistence or cash crops (Figure 5). Prior to 1981, the dominate contributor to land inequality was fields of 'unknown' cover, i.e., fields that had been de-accumulated or abandoned and for which no crop/forest cover data are available.

Throughout the period of 1960-1994, the contribution of 'unknown' cover fields falls while the contribution of differences in household holdings of subsistence and cash crop lands remains low. The early 1980s witness however the rise in importance of forest fallow land – increasingly, land inequality is comprised by differences among households in the holding of fallows. Clearly, with community enclosure and falling crop yields on some plots, households recognised the need to build up their stock of secondary forest fallows as primary forest disappeared around the community; some households though were more able to act on their concern than others. Specifically, households with larger land holdings were able to raise their holdings of fallows relative to crop fields. Interestingly, despite the increase in fallow holdings, the fallow periods have fallen steadily since the early 1980s, especially among land poor households (see Coomes et al., 2000).

Decomposing land inequality by the *means of land acquisition* is also revealing (Figure 6). Prior to the early 1970s, differences in the holding of land acquired by claiming (i.e., by clearing of primary forest and crop planting) accounted for most land inequality. In 1971/72, households received parcels of upland through the Agrarian Reform and immediately thereafter the contribution of claimed land to inequality fell sharply; in contrast, the contribution of gifted land rose. During the decade between stateled land redistribution and community enclosure, land acquired by claiming and via the state contributed most to overall land inequality. After 1981, however, the composition of land inequality by the means of land acquisition shifts quite abruptly, in three equally important ways that reflect awareness of the growing scarcity of primary forest. First, a second round of 'parcelisation' of the upland occurs, sanctioned by the state; not all households, however, are present on the day the parcels are surveyed -some receive none, others take advantage of absences to make false claims and thereby acquire more than one parcel. The allocation of parcels dampens differential claiming of land, and the contribution of claimed land holdings to land inequality is at an historic low in 1984/85. Second, at least one enterprising household manages to bribe the surveyor to allow him to acquire a substantial holding in the varinal. Overtime, several fields in this holding are transferred to the next generation. And third, land acquired through gifting becomes increasingly evident in households' land portfolios, contributing increasingly through the 1980s and early 1990s to overall land inequality. Households receiving more gifted land since 1981 tend to be those that are younger (second generation, with more dependents) and, importantly, those belonging to specific extended families (and not others). Although the availability of new land for claiming decreases significantly during this later period, the contribution to inequality by claimed land actually rises and in 1994 is on par with that of gifted land, state-transfer land and land received through bribing.

## E. Land Inequality Revisited: The Extended Family

Our foregoing analyses focussed on land inequality at the level of the household, but what about inequality at higher levels of social organisation, i.e., the extended family? In San José, as in many peasant communities, most key economic decisions regarding investment, production and consumption are taken at the household level. The household – which typically comprises a nuclear family – makes agricultural decisions over land allocation, crop choice and management practices. Land inequality is most salient at the household level, given that land is the primary productive asset and land holding and income are highly correlated (r=0.43,  $p \le 0.01$ ), without significant opportunities for consumption smoothing across families beyond periodic food sharing. Nonetheless, inequality among extended families (i.e., siblings and parents of heads of households) is also relevant. Labour is shared reciprocally beyond the household, among members of the extended family and kin group. Although household decisions when to clear forest are not contingent upon approval from other households, each household is aware of the planned activities of others, enabling them to gauge future access to extra-household labour. Also, land transfers occur predominately parent-to-child, within extended families, rather than among

siblings or via uncles/aunts or cousins. For these reasons, we explore the evolution of land inequality among extended families.

Land inequality among extended families is persistently higher than among households (Figure 7). Whereas the Gini coefficients at the household level range between 0.52 and 0.25, the Ginis for extended families vary between 0.67 and 0.46. Indeed, rather than declining and then rising since the early 1970s, land inequality among extended families has generally risen somewhat between 1960 and 1994. Interestingly, inequality does dip in the late 1960s/early 1970s (with the Reform) and peaks just after village partitioning in 1981, reflecting the differential effects of the second parcelisation and strategic claiming of the yarinal by households belonging to certain extended families. Throughout the 1980s and early 1990s, land inequality among extend families declined somewhat as inequality among households rose.

### V. Discussion and Conclusions [to come]

## **VI. References**

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		Mean	Sd	Range
Demographics	Household Age	19.2	14	2-56
Domographico	Household Size	6	3	1-14
	No. Econ Active	3	1.9	0-8
	No. Communal Workers	6.1	2	0-10
Land Holdings	Land Holding (ha)	10.4	10.1	0.4-46.1
	% Holdings by Land Type		/	
	Upland	68%	24%	14%-100%
	Yarınal	16%	23%	0%-73%
	Floodplain	16%	16%	0%-60%
	% Holdings by Land Use	000/	000/	00/ 4000/
	Subsistence Crops	28%	28%	0%-100%
	Cash Crops	Z4%	ZZ70 210/	0%-74%
	Other	42%	31% 13%	0%-100%
	% Holdings by Acquisition Method	0,0	1070	0,001,0
	Claiming	23%	30%	0%-96%
	Gift	55%	37%	0%-100%
	State/Parcel	14%	24%	0%-87%
	Other	8%	17%	0%-77%
	Initial Land Holdings	4.1	3.6	0.2-11.8
	Land Accumulation Rate (ha/yr)	7%	23%	-0.13%-100%

 Table 1. Characteristics of Sample Households (n=36), San José, Peru, 1994.

# Table 2. Determinants of Household Land Holding Area and Rate of Land Accumulation, San José, Peru, 1960-1994.

	Land Holding Area			Rate of Land Accumulation				
	В	S.E.	z	В	S.E.	z		
Constant	-5.934	2.26	-2.63***	0.323	0.15	2.20**		
Age of household	0.681	0.06	10.50***	-0.021	0.01	-2.79***		
Age of household squared	-0.009	0.001	-6.34***	0.0003	0.0002	1.93*		
No. economically active	0.735	0.19	3.94***	0.014	0.02	0.68		
No. communal workers	0.503	0.33	1.53	0.013	0.02	0.68		
% holdings in yarinal	11.91	1.1	10.79***	0.171	0.12	1.43		
% holdings in subsistence crops	-1.589	1.23	-1.29	0.115	0.14	0.84		
% holdings in cash crops	-3.836	1.4	-2.65***	-0.29	0.14	-2.03**		
Initial land endowment (ha)	0.75	0.18	4.12***	-0.025	0.01	-2.29**		
No. obs	632			608				
$R^2$	0.53			0.04				
Wald chi <sup>2</sup>	683.59***			25.75***				

\*\*\* p<=0.01 \*\* p<=0.05 \* p<=0.1













