

# *LTC Paper*

**GENDER, CASH CROPPING, AND  
LAND PURCHASE PROGRAMS IN GUATEMALA**

by

**Carol V. Irvin**



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**LAND  
TENURE  
CENTER**

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An Institute for Research and Education  
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Resource Use and Development

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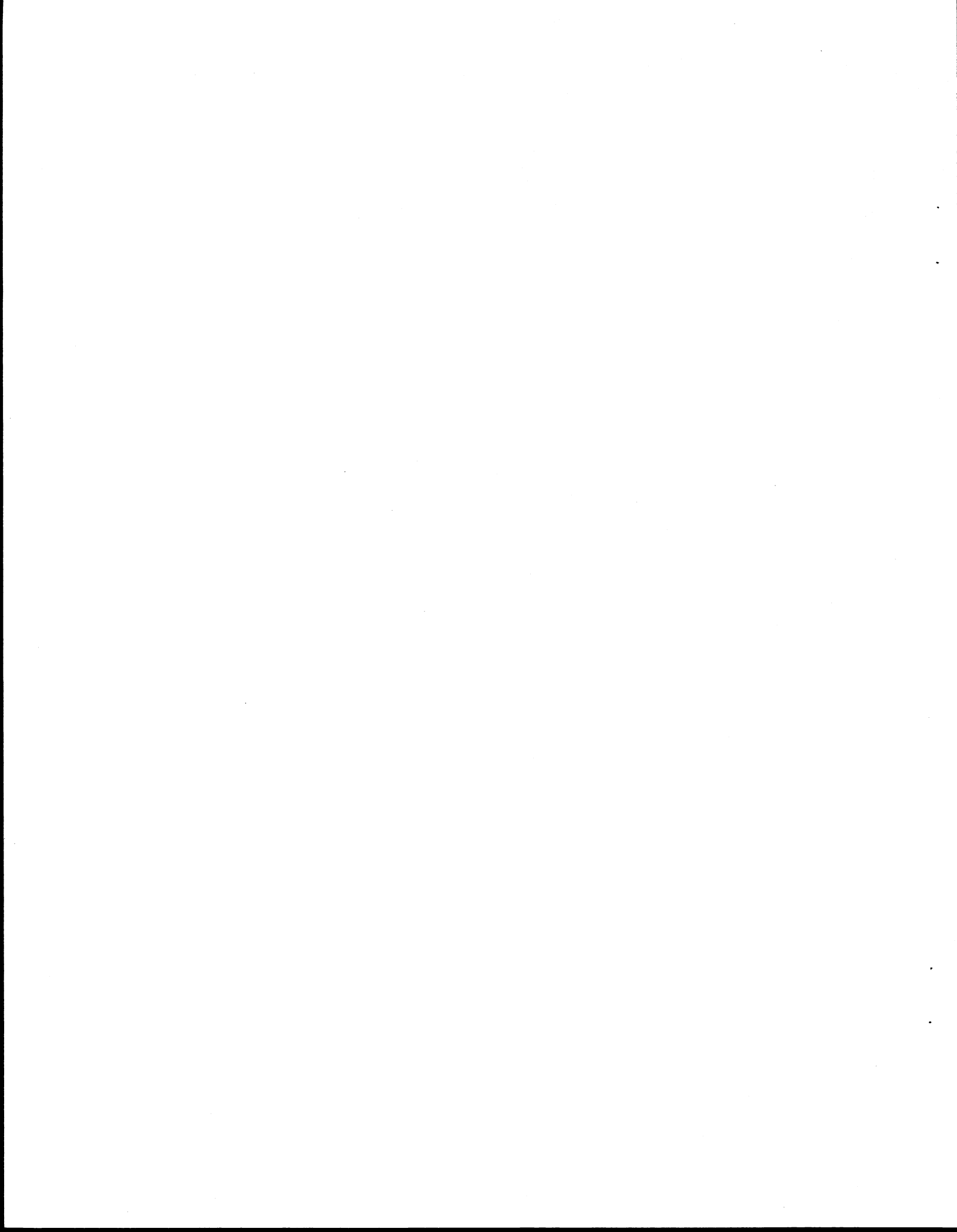
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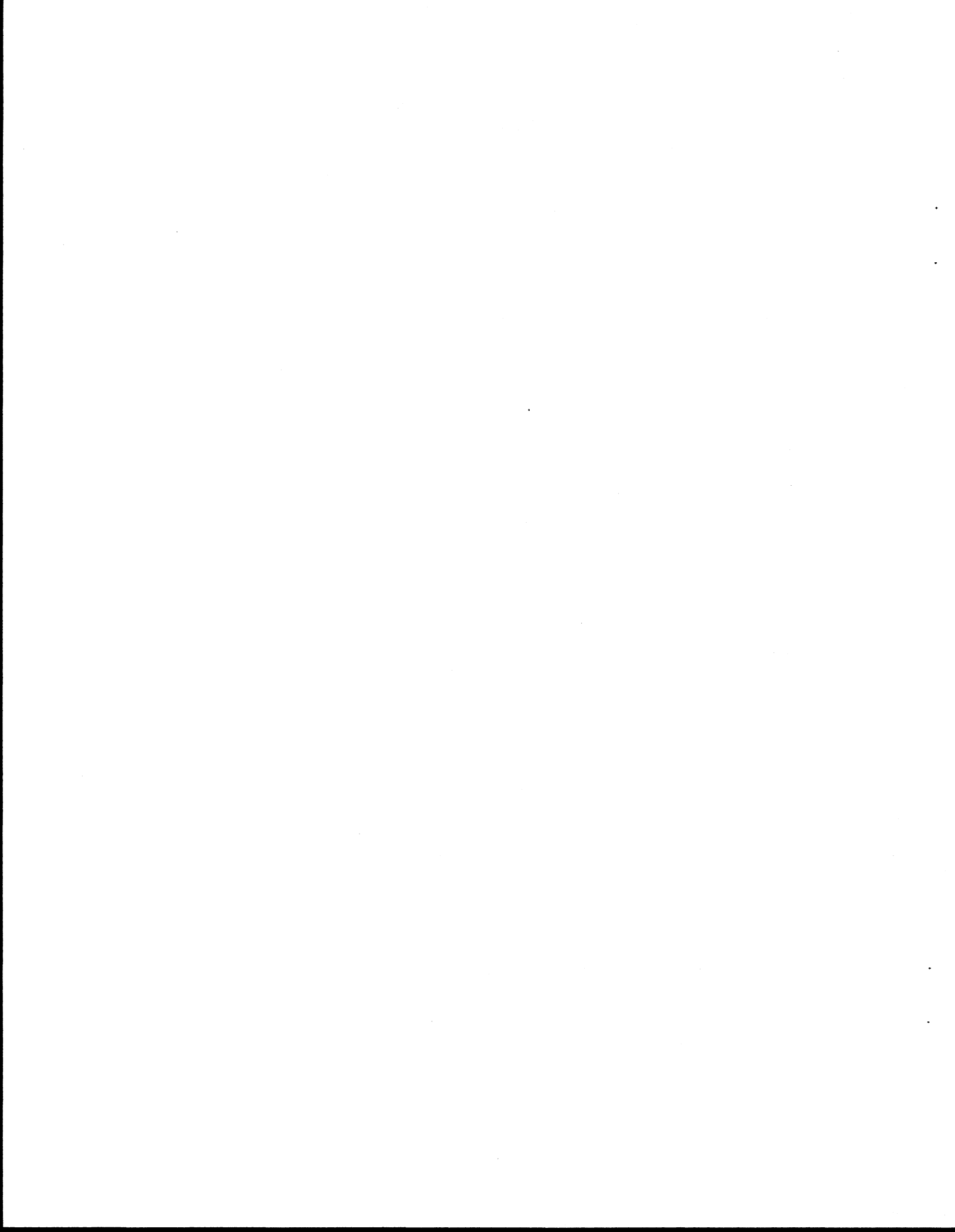
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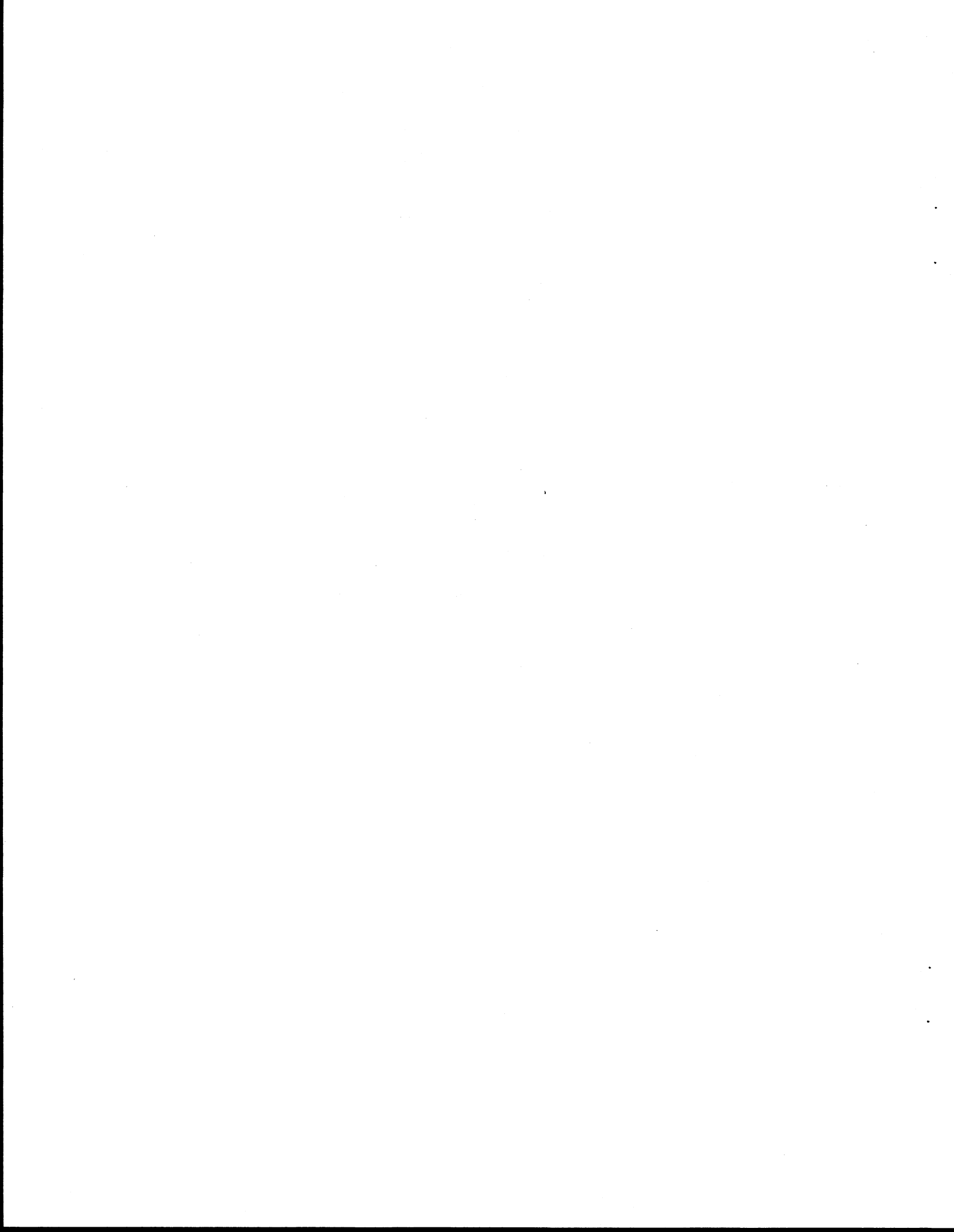
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## 1. INTRODUCTION

Land reform programs in Central America have had a long and troubled history (see Bulmer-Thomas 1987; Thiesenhusen 1989). One of the objectives of many reform programs is to improve the standard of living of poor rural peasants. By examining data generated from a 1991 survey administered by the Land Tenure Center and the *Facultad Latinoamericana de Ciencias Sociales*, this study looks at the impacts of recent Guatemalan land purchase programs on the lives of rural women. If these programs have adverse effects on the women's ability to maintain and reproduce their households, any improvements in their living standards, as measured by increasing incomes, are surely tenuous.

Guatemala's history of landownership is deeply rooted in the Latin American *latifundia-minifundia* model. Most of the arable land is held by a relatively small number of large landholders while most farms are small and often not able to meet subsistence requirements. Inequalities in land distribution, in terms of both amount and quality of land held, have been the leading contributor to the misery and poverty of rural Guatemalans. Poverty promises only to worsen as the Guatemalan population grows, causing increasing land fragmentation.

If rural poverty is to be alleviated, the inequities in land distribution must be addressed. In 1952, the Arbenz regime attempted to facilitate a more equitable distribution of land through a land reform based on expropriating large landholdings, but the program was effectively canceled when the Arbenz regime was overthrown in 1954. Since that time, the Guatemalan governments and military have had a distinct political dislike for expropriatory land reform programs (Schweigert and Strohlic 1992).

In the mid-1980s, the private, nongovernmental Penny Foundation (*Fundación del Centavo*, FUNDACEN), the governmental National Institute for Agrarian Transformation (*Instituto Nacional de Transformación Agraria*, INTA), and the National Association of Peasants for Land (*Asociación Nacional de Campesinos Pro-Tierra*, ANACAMPRO) began separate land purchase programs with the intention of addressing living standards and land distribution issues through land markets. They conceived of their purchase programs as facilitating the transfer of land from large holders who are interested in selling their property to landless and land-poor peasants through private-sector land redistribution.

The FUNDACEN program, with funding from the US Agency for International Development (USAID) since 1985, has been purchasing large farms on the open market, subdividing the land, and reselling the parcels to selected and carefully screened landless and land-poor peasants. FUNDACEN supplies the long-term credit that enables the peasants to purchase land as well as production credit, full-time technical assistance, and social services such as housing, running water, and education. These services are credited against the

peasant's future agricultural sales. By providing a full complement of services, FUNDACEN hopes to supply the ingredients necessary for success as commercial farmers, as measured by the repayment of loans by and the improved standards of living of participating peasants.

INTA began a similar land purchase program in 1986 after demand for land and associated political unrest became extremely vocal and unrelenting. The INTA program acts as intermediary for purchases of land by groups self-organized for the purpose of buying land. INTA does not supply the range of services available on FUNDACEN program farms, but INTA beneficiaries enjoy more autonomy.

INTA program farms are titled in the group's name but farmed as individual tracts. FUNDACEN parcels, on the other hand, are titled individually. Despite collective ownership of the land, INTA participants have a higher degree of tenure security than their counterparts in the FUNDACEN program. An INTA participant faces expulsion only after consensus is reached within the community that such action is necessary. Expulsions from the FUNDACEN program are decided by the institution and are often perceived by the beneficiaries as being arbitrary (Schweigert and Strohlic 1992).

ANACAMPRO, led by Catholic priest Andrés Girón, began a land purchase program similar to INTA's in 1986. Padre Girón publicized the issue of landlessness throughout Guatemala and drew beneficiaries, who were mainly migrant agricultural laborers, from all over the country. The ANACAMPRO program farms included in this survey are financially supported by the European Community's Bocacosta Project (Schweigert and Strohlic 1992).

In an effort to ensure the viability of program farms and increase the standard of living among participants, FUNDACEN has mandated that beneficiaries cultivate a cash crop, usually coffee. If a beneficiary does not comply and cultivates a nonmandated crop, s/he potentially faces expulsion from the program. INTA and ANACAMPRO beneficiaries face no institutional restrictions on the types of crops they are to plant. In general, these two institutions have a less paternalistic attitude and allow the participants more flexibility in managing their farms. However, in contrast to the FUNDACEN program, they supply fewer social services such as schools and housing materials.

There is an extensive literature analyzing the various impacts cash cropping has had on peasants. Much of this literature emphasizes the expropriatory nature of cash cropping and the neutral or negative impacts these crops have had on the living standards of particular family members (see, for example, Braun and Kennedy 1986). The following analysis adds to this literature by examining the impacts of coffee cultivation on the beneficiary households in the three land purchase programs in general and on female household heads<sup>1</sup> in particular. Initial results indicate that coffee production is inducing women to supply more labor both

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1. In the survey and in this paper, female household head denotes the female partner in a conjugal couple. As the data will show, the great majority of the households in the sample are nuclear families consisting of the conjugal pair and their children.

in absolute terms and relative to the total family labor supply. These results are potentially a cause for concern because if this shifting pattern in women's time allocation has adverse impacts on household maintenance and reproduction, then any improvements in living standards in terms of increased incomes are thrown into question.

After the survey instrument is described in section 2, various aspects of the beneficiary households are presented in section 3. Evidence in section 3 suggests a positive correlation between the relative importance of coffee production in the household's cropping regime and higher rates of agricultural participation by female household heads. Section 4 expands on this result by examining the correlation in a multivariate context. Section 5 summarizes the conclusions from the analysis.

## 2. LAND PURCHASE PROGRAM SURVEYS

The Land Tenure Center (LTC) of the University of Wisconsin-Madison is conducting a five-year research program to assess the socioeconomic impacts of the Penny Foundation land purchase program. INTA and ANACAMPRO program farms were included in the investigation for comparative purposes. The LTC study consists of a baseline survey conducted in 1988 covering a sample of the beneficiary population with two follow-up surveys in 1991 and 1993. Using information generated from the 1991 follow-up survey administered by LTC and FLACSO (*Facultad Latinoamericana de Ciencias Sociales*), this paper is a descriptive analysis of the female household heads involved in the three land purchase programs and the impact of the cropping regimes on their lives.

The 1988 baseline survey conducted by the Land Tenure Center indicates that the peasant participants in the land purchase programs bring with them high levels of agricultural labor experience. Only 6 percent of beneficiaries were engaged in nonagricultural activities prior to joining the programs, indicating that rural Guatemalans constitute a majority of the participants. In addition, a majority of beneficiaries are members of indigenous groups: 54 and 55 percent of FUNDACEN and INTA beneficiaries, respectively, are from indigenous ethnic groups, as are 68 percent of ANACAMPRO participant (Schweigert and Strohlic 1992). In a 1981 national census of the departments from which the FUNDACEN farms were drawn, 51.5 percent of the population were members of indigenous groups. Equivalent figures for the INTA and ANACAMPRO areas are 60.6 and 67.9 percent, respectively (*Ministerio de Economía* 1984). Thus, it appears that the three programs are doing a reasonable job of reaching indigenous rural peasants, who are typically the poorest Guatemalans and are frequently left behind in Latin American development efforts.

A majority of FUNDACEN beneficiaries were living within the area of the program farm prior to their participation; only 31 percent came from other departments in Guatemala. INTA program farms exhibit the highest degree of beneficiary recruitment from the area

around the farm. Thirty-four percent of INTA beneficiaries had previously lived on the farm while only 15 percent came from other departments in Guatemala. In contrast, ANACAMPRO program farms have recruited 60 percent of their beneficiaries from other departments (Schweigert and Strohlic 1992). Currently the programs are too young to clearly determine whether including beneficiaries from the area surrounding the farm improves the performance of the program.

The 1991 survey instrument, which is used in this study, consisted of three parts. The first part was directed toward the male head of household, and was designed to gather information on access to land, land use, agricultural production, male nonprogram income-generating activities, access to and awareness of household credit, and suggestions for program improvements.

The second part of the survey instrument consisted of detailed production information on yields, marketing strategies and sale prices, technologies used and costs, and labor allocation and costs. This questionnaire was also directed toward the male household head and was applied for each crop cultivated. The questionnaire collected agricultural labor input from the male household head at an unusual level of disaggregation. Data detail the household members involved and the intensity of their dedication to each particular task for each major crop grown. It is believed that collecting highly disaggregated agricultural labor information will more accurately capture the agricultural activities of household members and their economic roles within the household.

The third part of the questionnaire was administered to the female household head. Information gathered included demographic data for all members of the household, female income-generating activities, household consumption patterns, general attitudes toward the program, and suggestions for improvements.

To address the impacts of coffee production on women, this analysis initially profiles the women's basic characteristics and the various activities, nonagricultural as well as agricultural, in which they are engaged. Based on the patterns seen in the detailed evaluation, a descriptive multivariate analysis is performed. The results of this analysis suggest that even when controlling for other explanatory factors, the labor supplied by the female household head is significantly influenced by the household's cropping regime. Specifically, coffee production appears to be increasing the extent of the female head's agricultural labor in general and as a percentage of total family labor supply. These results suggest that total family labor becomes relatively feminized as the family concentrates production in coffee. The multivariate analysis seeks to draw out the main determinants of this feminization of agricultural family labor.

### 3. DESCRIPTIVE STATISTICS ON HOUSEHOLDS

The survey collected data from a sample of 146 households across 12 program<sup>2</sup> farms from the 3 land purchase programs. Within the 146 households, there are 137 female household heads with an approximate mean age of 35 years. By most standards the men and women are poorly educated. In the entire sample, 64 percent of the women have had no education and 63 percent do not know how to read. Women, as compared to men, are less likely to be able to read and have fewer years of schooling; the widest educational gender gap is found on FUNDACEN program farms.

When comparing across land purchase programs, the FUNDACEN program appears to be attracting beneficiary households which have relatively higher education levels (as measured by the percentage of respondents who can read). Differing education levels across programs may be a function of the selection process that the programs employ. Beneficiaries are determined or chosen by the FUNDACEN program whereas land recipients in the INTA and ANACAMPRO programs are self-determined. Persons interested in participating in the FUNDACEN program initially apply to the program, whereupon their application is reviewed and either accepted or rejected. In the INTA and ANACAMPRO programs, in contrast, several farmers organize themselves and then apply as a group to the governing bodies of the two programs for the necessary funding to purchase the land.

In describing the labor burdens female household heads carry and the activities in which they engage, it seems appropriate to start with activities in the home and an examination of their position as primary caretakers of children. Households in the sample average six members and four resident children. When household size was distributed according to the age of the household head, it became evident that household size and the age composition of children follow a typical life-cycle pattern. Small households with young children are found among younger household heads since these households are in a period of expansion and growth. Older households with older children leaving and setting up independent households are in a period of dissolution and also tend to be small.

A decomposition of the children's age structure reveals that beneficiary women care for approximately one child under the age of six. Frequently mothers are able to rely on older children, particularly older female children, to help with the care of younger siblings and with household and farm chores. On average, they can rely on one child between the

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2. Each of the three land purchase programs covered by the survey initially obtain ownership rights to large farms or large tracts of land. The term "program farm" denotes the initial large farm. In practice, program farms have been subdivided and distributed to households and most land rights have been individualized. Every program farm has a central organizing unit, some having a more extensive mandate than others. The unit of analysis in the survey, and in this report, is the household that has been allotted a plot of land in the program farm.

**TABLE 1**  
**Household demographics by land purchase program**

	FUNDACEN	INTA	ANACAMPRO	ALL
# of households	98	24	24	146
Household size	5.52	6.75	5.25	5.68
<b>Female heads</b>				
Number	91	24	22	137
Age	34.90	36.09	32.14	34.65
% who can read	41	29	32	37.20
Years of schooling	.99	1.04	.91	.99
<b>Male heads</b>				
Number	94	24	22	140
Age	39.08	40.57	35.41	38.75
% who can read	69	54	55	64.30
Years of schooling	1.66	1.63	1.41	1.61
<b>Children</b>				
Total number	4.11	5.96	3.83	4.37
# resident <sup>a</sup>	3.61	4.76	3.42	3.78
Children < 6 years	1.14	1.40	1.38	1.23
(% female)	1.27	1.76	1.13	1.33
Children 12 to 17 years	(42)	(60)	(45)	(46)
(% female)	.75	1.12	.83	.83
	(50)	(40)	(31)	(45)

Source: LTC/FLACSO survey.

- a. These figures include children 18 years and older who are living with their parents.

ages of six and twelve (46% are female children) and one child between the ages of twelve and eighteen (45% are female children).<sup>3</sup> It appears that while mothers have considerable childcare responsibilities, they also have substantial intrahousehold resources in the form of older children to help alleviate the burden.

Besides their childcare responsibilities, women play a vital role in the daily maintenance of the household. Considerable amounts of time and energy are required in the daily upkeep of the home, meal preparation, and the gathering of wood and water. Nearly

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3. The mean number of children in each age bracket masks a great deal of variability, perhaps due to different stages of the life cycle. The standard deviations for the number of children under the age of six years, between six and twelve years, and between twelve and eighteen years are 1.13, 1.19, and .98, respectively.

84 percent of the women must work without electricity, and 89 percent prepare meals on unvented mud, wood-burning stoves located inside the home. In no case is there piped water within the home, so all water used in the household must be carried in.

The absence of electricity may actually alleviate women's work since the presence of electricity within the home can have the adverse effect of prolonging the working day. However, the nature of the stoves in beneficiary homes implies that women must spend time gathering wood and cooking in smoke-filled rooms, a situation detrimental to their health. While all water must be gathered and carried into the home, water is not potable and, as Dunn (1992) notes, its source is often next to latrines and sewage facilities.

**TABLE 2**  
**Dwelling characteristics by land purchase program**

	FUNDACEN	INTA	ANACAMPRO	ALL
# of households	97	24	24	145
<b>Basic amenities (%)</b>				
Electricity	7.4	45.8	22.7	16.3
Latrine	90.5	95.8	77.3	89.4
<b>Water source (%)</b>				
River	10.5	0.0	9.1	8.5
Communal well	20.0	0.0	13.6	15.6
Carried water	18.9	0.0	45.5	19.9
Backyard water tap	42.1	58.3	0.0	38.3
Other	8.5	41.7	31.8	17.7
<b>Cooking source (%)</b>				
Mud wood stove	98.9	100.0	100.0	99.3
Gas stove	1.1	0.0	0.0	.7

Source: LTC/FLACSO survey.

The strategies the women follow to meet daily household food requirements can take several forms. Some women grow vegetables for household consumption in small gardens adjacent to the family dwelling. Close to 47 percent of the households cultivate gardens as a part of their daily survival strategy. Of these, 82 percent cultivate strictly for home consumption while 18 percent sell part of their harvest.

Maintenance of small animals, particularly chickens, represents another food source which women generally control. Sixty-three percent of the households raise chickens while only 22 and 19 percent, respectively, raise pigs and other fowl (such as ducks). Of the

households raising small animals for home consumption, 77, 64, and 44 percent restrict their activities to either chickens, ducks, or pigs, respectively.

**TABLE 3**  
Incidence of garden plots and small animals by land purchase program

	FUNDACEN	INTA	ANACAMPRO	ALL
# of households	99	24	24	145
<b>Garden plots</b>				
# cultivating plots	51	11	6	68
% of all households	53	46	25	46.9
% of producers with marketable surplus	16	36	0	17.6
Value of marketable surplus <sup>a</sup>	137.00	122.75	0.00	132.25
<b>Small animals</b>				
<b>CHICKENS</b>				
# with chickens <sup>a</sup>	74	6	12	92
# of chickens/household	13.25	6.54	6.65	11.00
# of chickens/producer	20.64	37.50	7.00	20.60
% of producers with marketable surplus	14.86	66.67	50	23.1
Value of marketable surplus <sup>b</sup>	70.73	212.50	48.67	91.43
<b>PIGS</b>				
# with pigs <sup>a</sup>	23	7	2	32
# of pigs/household	13.25	6.54	6.65	11.00
# of pigs/producer	1.92	4.20	4.00	2.67
% of producers with marketable surplus	52.17	71.43	50	56.25
Value of marketable surplus <sup>b</sup>	333.75	416.00	460.00	363.61
<b>OTHER FOWL (DUCKS)</b>				
# with other birds <sup>a</sup>	23	2	3	28
# of ducks/household	1.09	1.00	.57	.99
# of ducks/producer	5.13	4.00	10.00	5.50
% of producers with marketable surplus	34.78	50	33	35.7
Value of marketable surplus <sup>b</sup>	133.63	160.00	75.00	130.40

Source: LTC/FLACSO survey.

- a. Based on the time of the survey.
- b. In 1990, the market rate of exchange was 5 quetzales = US\$1.00 (IMF 1991).

Garden produce and small animal production and how this production is allocated between the home and the market are emphasized because these activities present women with the **potential** of generating their own cash incomes, conceivably allowing some autonomy within the household. However, it appears that few women follow this strategy.

Women may also have other cash-income opportunities from off-farm labor income and home enterprises. Only five women claim to have earned off-farm labor income during the year prior to the survey. These women report average earnings of 269 quetzales<sup>4</sup> (standard deviation = 209.89). Approximately 43 percent of the earnings were contributed to household expenses, or *gasto*.<sup>5</sup> Only twenty-six of the women report the operation of a home enterprise, 50 percent of which are newly formed, having started since 1987, after the majority of households had joined the program. Their average earnings were approximately 419 quetzales (standard deviation = 435.23) in the year preceding the survey.

The reasons why few women appear to be generating personal cash income may be numerous. Time and cost constraints may make the returns to these activities unattractive. The markets for products capable of producing cash income may be too thin or nonexistent. It is notable that most program farms are in remote areas of the country, implying that viable markets for various products are lacking outside the immediate program farm. It is also likely that the reporting of cash-generating activities is measured with error. Many women may not have reported outside income out of fear of losing autonomous control over that income.<sup>6</sup>

Dunn (1992) cites the isolation of many FUNDACEN program farms, and research by de la Cadena and Strohlic (1991, p. 18) indicates that female beneficiaries have few opportunities to generate income because "their geographic sphere of activity is very limited, since it is difficult for them to leave the farm." Before entering the land purchase programs, some of the women earned cash income by selling goods from their homes, but they no longer engage in this activity because the community of the program farm is too small to support this type of venture (de la Cadena and Strohlic 1991).

Female household heads also contribute to the household's maintenance and reproduction by supplying their labor to the household's agricultural activities. Households in this sample have roughly 2 to 4 manzanas of program land (see table 4), which is generally not fully cropped.<sup>7</sup> As will be noted later in this study, the area of cultivation is an imperfect indicator of a household's agricultural labor needs, particularly since the sample contains households with different cropping regimes.

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4. In 1990, the market rate of exchange was 5 quetzales = US\$1.00 (IMF 1991).

5. Nearly 60% of the *gasto* is spent on food purchases.

6. It may also be hypothesized that women do not need this supplemental income. Given the perceived incidence of poverty on these program farms, this appears to be an unlikely reason. However, the data do not allow the testing of this hypothesis.

7. Only the Sam Greene farm in the FUNDACEN program indicates that its parcels are fully planted.

**TABLE 4**  
**Land and labor in maize and coffee production by land purchase program**  
**(1990 agricultural cycle)**

	FUNDACEN	INTA	ANACAMPRO	ALL
<b>Maize only<sup>a</sup></b>				
# of households	23	10	11	44
Total parcel area	3.51	3.95	2.57	3.36
# of manzanas <sup>b</sup> planted	1.66	2.64	2.23	2.03
LABOR DAYS				
Female heads	.48	1.22	0.00	.56
Per manzana	.48	- <sup>c</sup>	0.00	.29
% reporting 0 days	91.3	88.9	100.0	92.3
Total family	76.74	55.67	59.36	68.76
Per manzana	77.41	16.00	33.40	56.37
<b>Maize and coffee</b>				
# of households	54	2	4	60
Total parcel area	4.07	1.92	1.68	3.84
# of manzanas in maize	.89	.72	.50	.88
# of manzanas in coffee	2.88	0.00 <sup>d</sup>	1.48	2.67
LABOR DAYS—MAIZE				
Female heads	.74	.00	30.33	2.20
Per manzana	1.17	.00	47.40	3.46
% reporting 0 days	92.5	100.0	66.7	91.5
Total family	63.47	115.50	107.00	70.91
Per manzana	66.38	191.67	159.72	76.84
LABOR DAYS—COFFEE				
Female heads	10.23	.00	149.50	19.32
Per manzana	3.50	-	92.60	9.69
% reporting 0 days	75.5	100.0	50.0	74.6
Total family	352.45	315.00	598.00	366.98
Per manzana	157.84	-	383.84	174.09
<b>Coffee only</b>				
# of households	20	12	9	41
Total parcel area	3.75	2.09	1.67	2.82
# of manzanas <sup>e</sup> planted	2.91	.71	.73	1.79
LABOR DAYS				
Female heads	28.95	.58	43.44	23.70
Per manzana	10.70	- <sup>c</sup>	55.92	15.58
% reporting 0 days	57.9	91.7	55.6	67.5
Total family	318.39	186.80	187.56	251.00
Per manzana	106.92	188.40	178.61	136.14

Source: LTC/FLACSO survey.

- a. Among these households there are 20 households (10 in the ANACAMPRO program) that actually grow maize and sesame.
- b. Among the INTA households, one respondent reported 0 manzanas planted in maize.
- c. These values could not be calculated due to households' reporting the input of labor, yet 0 manzanas planted in the crop.
- d. It is possible that a household will not have any planted coffee on its land if its coffee seedlings are still in the nursery.
- e. In the INTA and ANACAMPRO programs, 5 and 4 households, respectively, recorded 0 manzanas planted in coffee. See note d above.

The two prominent crops grown on program farms are maize and coffee. Table 4 shows that households can be perfectly arrayed among three cropping regimes: maize households located in agroclimatic zones favoring commercial levels of production, maize and coffee households raising maize for subsistence and coffee for cash, and coffee households raising only commercial coffee.

Table 4 clearly indicates that, in general, female household heads did not supply large amounts of agricultural labor during the 1990 agricultural cycle. Among those households growing only maize, female household heads, on average, contribute approximately  $\frac{1}{2}$  day of labor in total (representing 0.8% of total family labor) and  $\frac{1}{3}$  day of labor per manzana. The data, however, show a significant amount of variation and most women are not involved.<sup>8</sup>

As compared to maize-only households, female heads in households growing both maize and coffee supply more labor input. These women on average contribute 21 days of labor in total (13 days per manzana); 90 percent of their labor is devoted to coffee production. Female heads in households growing only coffee devote approximately 24 days of labor (16 days per manzana) to coffee production.

These results are not surprising given the labor-intensive nature of coffee production. It is apparent that both total family labor and labor supplied by female heads increase when a farm is growing both crops; however, labor supplied by female heads increases at a faster rate and consequently constitutes an increasing proportion of total family labor. (Their labor represents 4.9% of that total.) The proportion again increases (to 9.4% of total family labor) when households are only growing coffee; interestingly, these households cultivate fewer manzanas and use less total family labor than the mixed-crop households.

This descriptive analysis suggests that women supply more labor to agricultural activities when the household moves into and intensifies agricultural production in coffee, and that most of their agricultural labor is applied to coffee production. The proportion of total family labor that is supplied by the female head also increases when the cropping scheme shifts from maize only to maize and coffee, and from maize and coffee to coffee only, suggesting that coffee production feminizes total family agricultural labor. This pattern of feminization remains and becomes stronger when analysis is limited to only those households where the female household head participates in agricultural production (see appendix). However, a closer and more sophisticated analysis is warranted to control for other mitigating factors such as household size and composition, farm size, and other responsibilities which compete for a woman's time.

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8. The standard deviations for total labor days of female heads and days per manzana are 2.11 and 1.36, respectively. When only three women in the forty-four maize households participate in maize production activities, relatively large variances can be expected. The appendix offers a descriptive analysis of that group of households ( $n = 34$ ; 23% of all households) in which the female reported working on the farm.

#### 4. Multivariate analysis of cash-crop production and female labor

The univariate analysis of the preceding section suggests a positive relationship between the relative intensity of coffee production in the household's cropping regime and the absolute and relative amount of agricultural labor supplied by female household heads. That is, the cropping scheme is a determining factor in the woman's supply of labor to agricultural activities. How and why women increase their participation in agricultural production warrants study for several reasons. On the one hand, a mother's increased labor in the fields may impact negatively on childcare, education, and household maintenance. On the other hand, a woman's contribution to cash-crop production may raise her status within the household and her control over household income.

There are other factors, however, that mediate a woman's choice to work in agriculture. Household responsibilities and characteristics of the particular program may influence whether or not a woman actually involves herself in agricultural activities. It may be the case that those women working in coffee production do so because they have few child- and animal-care responsibilities. When examining the feminization of family agricultural labor, we also need to consider basic family characteristics such as educational levels and life-cycle factors which may be overriding influences in the determination of who does or does not participate in agricultural activities. Thus, by examining the proportion of total family labor provided by the female household head under a multivariate framework, we are able to control for not only the influence of cropping regimes but also other explanatory factors.

The first set of factors examined that may influence agricultural work decisions is the woman's basic characteristics and nonagricultural household responsibilities. The role played by her specific attributes (literacy and age) are difficult to analyze given their ubiquitous role in determining behavior. The woman's ability to read, or her literacy, may be a proxy for her efficiency within the household.<sup>9</sup> Literacy among women may also proxy for household attitudes that promote women's working in agriculture. Conversely, the woman's level of literacy may be an indication of her bargaining power and position within the household, which influence the amount of labor she supplies to agricultural activities. In addition, literacy may mean that those women have other income-earning opportunities.

Assigning a role to age is as difficult as the part played by education. While it is reasonable to assume that older women are less active, thereby decreasing the likelihood that they would take part in agricultural production, younger women tend to have younger children and less household help, a constraining situation given the nuclear nature of most

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9. The literature examining mother's education and nutritional outcomes of children uses this line of reasoning; see Behrman and Deolalikar (1988) for a review.

households in the sample.<sup>10</sup> However, due to the lack of older children in younger households, the demand for her agricultural labor may be higher.

Given the potential significance of childcare activities on women's time, a separate child burden variable is included in the model. By including a child burden variable the woman's age variable is able more accurately to represent her physical abilities, and we would expect her age to be negatively related to her contribution to total family agricultural labor.

The child burden indicator is the ratio of the number of resident children under the age of six to the number of potential childcare givers living in the household. Childcare givers are defined as female children between the ages of six and eighteen plus the female head. It is assumed that the larger the child burden, the less time the female head devotes to agricultural activities.

The other variable describing the woman's nonagricultural household responsibilities is the number of small animals the household had at the time of the survey. The animals considered are chickens, other fowl (e.g., ducks), and pigs. Women in Guatemala take the main responsibility for animal care and maintenance. They also generally control the sale of animals. Again, causality between the number of animals a household has and the labor supply of the female head is not particularly clear. Do women who maintain more animals consequently supply less time to agricultural activities, or do the agricultural labor demands of the household dictate the woman's ability to maintain animals?<sup>11</sup> Most likely causality runs both ways.

The estimated model of the female head's contribution to total family agricultural labor also includes the total number of manzanas that a household has in crops. It is reasonable to expect that as the household's area of cultivation increases and available family labor per manzana decreases, there will be a greater need for women to work. However, given the small parcels of land that these households crop and the competing responsibilities that women have within the household, one would expect to find female labor supplied to agricultural production increasing at a decreasing rate as cultivated area increases.<sup>12</sup>

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10. The correlation coefficient between the female household head's age and the household's childcare burden is  $-.5539$  with a one-tailed significance level of  $.001$ .

11. This notion is supported by bivariate correlations of  $-.2217$  between the number of animals owned and the coffee-only production regime and  $.2493$  between animal ownership and the maize production regime. These correlations have a one-tailed significance level of  $.01$ .

12. A quadratic term in number of manzanas cultivated in the multivariate analysis will capture this idea in a straightforward manner.

Cropping patterns enter the model as dummy variables. Dummy variables also represent the land purchase programs. Taken together, the intercept term captures maize households and/or INTA program farms.

#### ESTIMATION PROCEDURES

The previous section distinguished the variable of interest as the proportion of total family labor that is supplied by the female head. The stochastic model that is represented by the Tobit model<sup>13</sup> is:

$$y_i^* = X_i\beta + u_i$$

$$y_i = y^* \text{ if } y_i^* > 0$$

$$y_i = 0 \text{ otherwise}$$

where  $y_i$  is the  $i^{\text{th}}$  observation of the dependent variable and  $u_i$  is an independently distributed error term assumed to be normal with zero mean and constant variance,  $\sigma^2$ . The model assumes that there is an underlying, stochastic index  $y^*$  equal to  $X_i\beta + u_i$  which is observed only when  $y^*$  is positive, and hence qualifies as an unobserved, latent variable (McDonald and Moffitt 1980). Thus  $y^*$  can be thought of as the family's propensity to employ the female household head in agricultural activities. We only observe this propensity when the woman actually participates.

The interpretation of the model is then:

$$E(y_i^*) = X_i b$$

and

$$\frac{\partial E(y^*)}{\partial x_j} = b_j$$

that is, the vector of estimated coefficients,  $b$ , contains the predictions of the latent variable.<sup>14</sup>

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13. Because the dependent variable has numerous values clustering at a limiting value, zero, the estimated model uses a Tobit analysis. The Tobit technique uses all observations, both those at the limit, zero, and those above it, to estimate a regression line.

14. These coefficients are obtained from the maximization of the Tobit likelihood function. The maximization and estimation of the model was done using version 6.0 of LIMDEP.

## DISCUSSION OF RESULTS

Results of the Tobit analysis (presented in table 5) suggest that when controlling for child- and animal-care responsibilities as well as for parcel size, cropping pattern, and land purchase program, literate women contribute a larger proportion of total family labor. The woman's age also plays a significant role in determining her relative contribution to the family agricultural labor supply. As the female household head ages, she contributes relatively fewer days. Results indicating that both younger and better educated women contribute more to the family agricultural labor supply were foreshadowed in table A1 of the appendix.

The estimated coefficient signs for other household characteristics support our expectations. Increasing child- and animal-care burdens reduces the woman's relative contribution to total family labor. The child- and animal-care burden coefficients, however, are not significantly different from zero at the 10 percent significance level. While this result may be due to definitional considerations, tables 1 and A1 and an overall sample mean for child burden of .785 indicate that on average this burden is not particularly large due to the availability of other household members.<sup>15</sup> An overall average of thirteen animals per household suggests considerable animal-care responsibilities, but table A2 indicates that those women who are contributing agricultural labor continue to maintain relatively large numbers of animals. This pattern suggests that animals do not require much care, that children assist in this activity, or both.

The cultivated area coefficients suggest that female household heads contribute a larger proportion of total family labor as cultivated area increases, but this increase occurs at a decreasing rate.<sup>16</sup> Interestingly, these two coefficients are not significantly different from zero at the 10 percent significance level. The relationship between cultivated area and labor requirements is weak for two reasons. First, the number of manzanas cultivated may be crop-determined.<sup>17</sup> A given amount of labor can work a larger area of maize than coffee due to coffee's greater labor needs. Second, several of the program farms engaging in coffee

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15. Katz (1992, p. 103), who conducted research on nontraditional agricultural export production in Guatemala, also found that the presence of older daughters had a strong positive influence on women's labor time devoted to nontraditional export crops.

16. Katz (1992, pp. 102-3) found that the amount of land in nontraditional agricultural export production had a positive but weak relation to the amount of female labor. In other words, the relation between the amount of land in nontraditional agricultural production and the amount of female labor is inelastic.

17. Correlation coefficients between number of manzanas and the mixed cropping regime dummy variable and number of manzanas and the coffee cropping regime dummy variable are .3319 and -.4216, respectively. Both have one-tailed significance levels of .001.

TABLE 5

## Relationship between female labor and household characteristics: Tobit analysis

[dependent variable = total female head labor ÷ total family labor (N = 134)]

	COEFFICIENT	STANDARD ERROR	MEAN	STANDARD DEVIATION
<b>Female head's characteristics</b>				
Literacy <sup>a</sup>	0.1576**	0.0786	0.3657	0.4834
Age	-0.0159**	0.0055	34.5710	9.5424
Child burden <sup>b</sup>	-0.0816*	0.0610	0.7850	0.8308
# of animals <sup>c</sup>	-0.0038*	0.0024	12.9320	18.5570
<b>Cultivated area</b>				
# of manzanas	0.0760	0.0951	2.8697	1.6576
# of manzanas squared <sup>d</sup>	-0.0193	0.0174	10.9620	10.3050
<b>Cropping regime<sup>e</sup></b>				
Maize and coffee	0.2723**	0.1191	0.4328	0.4973
Coffee only	0.2953**	0.1251	0.2761	0.4488
<b>Land purchase program<sup>e</sup></b>				
FUNDACEN	0.2228*	0.1419	0.6642	0.4741
ANACAMPRO	0.2483**	0.1498	0.1642	0.3718
Intercept	-0.2071	0.2730		
Log-likelihood	-41.8345			
$\sigma$	0.3031			

\* Coefficient is significantly different from zero at the 5 percent level.

\*\* Coefficient is significantly different from zero at the 10 percent level.

a. This is a dichotomous variable; 1 indicates that the woman knows how to read.

b. The child burden variable is defined by the number of children under the age of 6 divided by the sum of female children older than 6 and less than 18 plus the female head.

c. The number of animals is the sum of chickens, other fowl, and pigs the household owned at the time of the survey.

d. The squared term picks up the nonlinear relationship between fixed and variable factors of production. See discussion on p. 13 and footnote 12.

e. The cropping patterns and land purchase programs are represented by dummy variables, i.e., 1 if the characteristic holds, and 0 otherwise. The intercept term is therefore capturing INTA farms and/or noncoffee-producing farms.

production are at an early stage of development and very few trees are actually permanently planted, implying that labor activity is concentrated in nursery and preparation tasks. This second factor is a function of the timing of the survey, the relatively young age of the land purchase programs and coffee farms, and the biology of coffee trees. Together, the inclusion of different cropping regimes with the stage of coffee cultivation on many of the farms may weaken the relationship between farm size and labor input.

Both types of cropping regime are positive and significant at the 5 percent significance level. The cropping regime coefficients suggest that female household heads in maize and coffee-growing households contribute a notably larger proportion of total family agricultural labor than do women in maize-only households, even after controlling for child- and animal-care responsibilities. The same is true of female household heads in coffee-only as compared to maize-only households. Thus, the descriptive results discussed in section 3 are maintained. Despite controls for other explanatory and mediating factors in the sample, the cropping regime that the farm follows is an important determining factor in the feminization of the total family labor.

## 5. SUMMARY AND CONCLUSIONS

The initial descriptive analysis suggested that female household heads are concentrating their activities within the home, maintaining the home and the welfare of other household members. This first level of analysis draws a picture of a division of labor intimating that women remain in the domestic sphere and men in the agricultural sphere. However, as a household increases its involvement in growing coffee, the roles and activities of the female heads appear to be changing, placing greater demands on the women's time and labor. Separate research done in Guatemala by Elizabeth Katz (1992), who studied the impact of nontraditional agricultural export production on intrahousehold allocation of resources, supports in general the findings from this analysis of women's participation as agricultural labor. There are some differences between the contexts of the two analyses, including distinct agronomic practices and marketing arrangements between traditional (e.g., coffee) and nontraditional (e.g., "winter" vegetables) export crops, which complicate a comparison of the two studies. However, some of the results relating to women's labor time are comparable. Katz also found that the incidence of women's doing agricultural work is much higher among households that grow nontraditional export crops, such as broccoli or snow peas, as compared to those that grow subsistence or locally marketed crops (Katz 1992, pp. 96-100).

Coffee production, by adding one more responsibility for the female head, may cause severe time constraints for many of the beneficiary women. This change and the nature of its impact need to be closely analyzed. The FUNDACEN land purchase program mandates cash cropping, mainly coffee, as a means to ensure viability of the program, and eventually most

FUNDACEN program farms will be concentrating on production of coffee. With this concern in mind, a multivariate analysis was performed which sought to highlight the roles played by the cropping regime and other mediating factors in determining the level of feminization in total family agricultural labor.

The multivariate analysis indicates that when controlling for responsibilities within the home and various aspects of the household's agricultural activities, younger women and women who can read will supply a larger proportion of total family agricultural labor, as will those women whose households follow a mixed cropping regime of maize and coffee or grow coffee exclusively. The multivariate analysis confirms the univariate analysis, suggesting that coffee production increases the woman's participation in agricultural activities.

Katz (1992) found a different pattern among women engaged in independent commercial agricultural production: they are on average significantly older than any other group of income-earning women. In addition, they are more likely to be single heads of household and have relatively fewer small children. On the other hand, they have a much higher than average number of older sons living at home (Katz 1992, p. 119). This set of circumstances releases the time and labor necessary for these women to engage in nontraditional agricultural export production. The land purchase sample survey included a minimal number of single female-headed households ( $n = 4\%$ ), making a comparable analysis infeasible.

Whether or not family labor becomes more feminized as a household becomes more involved in coffee production requires further analysis. Preliminary analysis of labor supply by task suggests that female heads are more involved in agricultural activities when the coffee trees are producing than when the trees are in preproduction stages. This preliminary result suggests that as these program farms stabilize, mature, and become well-established, female household heads will be supplying more labor to their agricultural activities than they are currently. More thorough analysis of this subject will be facilitated by subsequent survey rounds when households are running mature coffee production operations.

This analysis has offered a better understanding of the impact on families of their moving into cash-crop production and the consequent shift in factors competing for women's time in labor allocation. Land purchase programs must recognize that the introduction of cash cropping, and the subsequent shifting in labor supply patterns among particular family members, may be adding labor burdens on women. This may result in less time for childcare and household maintenance and reduced improvement in the quality of life for beneficiary families.

## APPENDIX

This appendix is a restricted analysis of the subsample of 34 households (23% of the entire sample) whose female household heads contribute labor to agricultural activities. The tables presented here are analyzed in comparison to the descriptive information found in section 3 of the main body of the paper.

The women contributing their labor to agricultural activities are on average 3 years younger but better educated than the overall sample of women. The men in this subsample are also younger and better educated. Interestingly, the literacy rates between the genders are more homogeneous in this restricted group.

**TABLE A1**  
Household demographics of subsample by land purchase program

	FUNDACEN	INTA	ANACAMPRO	ALL
# of households	26	2	6	34
% of households	26.5	8.3	25.0	23.2
Household size	5.62	5.00	5.50	5.56
<b>Female heads</b>				
Number	26	2	6	34
Age	32.81	32.50	30.00	32.29
% who can read	57.7	50	30.30	52.90
Years of schooling	1.04	2.50	1.33	1.18
<b>Male heads</b>				
Number	26	2	6	34
Age	37.00	31.50	33.50	36.06
% who can read	73.10	50.00	66.70	70.60
Years of schooling	1.50	1.00	1.33	1.44
<b>Children</b>				
Total number	4.08	5.00	3.50	4.03
# resident <sup>a</sup>	3.62	3.00	3.50	3.56
Children < 6 years	1.42	1.50	1.50	1.44
Children 6 to 12 years	1.62	1.50	1.17	1.53
(% female)	(47)	(33)	(67)	(48)
Children 12 to 17 years	.46	0.00	.83	.50
(% female)	(58)	(0)	(50)	(59)

Source: LTC/FLACSO survey.

- a. These figures include children 18 years of age and older who are living with their parents.

Households in this group are also slightly smaller. Women in these households both care for children who are slightly younger and have fewer children aged 12 to 17 years to assist with homemaker responsibilities. The younger age distribution of children is another indicator of the youthfulness of this subsample of households. A slightly smaller proportion of these women cultivate garden plots and they appear to raise slightly fewer animals.

**TABLE A2**  
**Incidence of garden plots and small animals for subsample households**  
**by land purchase program**

	FUNDACEN	INTA	ANACAMPRO	ALL
% of households	26	2	6	34
<b>Garden plots</b>				
# cultivating plots	12	2	0	14
% cultivating plots	46.2	100.0	0.0	41.2
<b>Small animals<sup>a</sup></b>				
Total # of animals	11.50	11.0	.83	9.59

Source: LTC/FLACSO survey.

- a. Sum of chickens, pigs, and other fowl the household owned at the time of the survey.

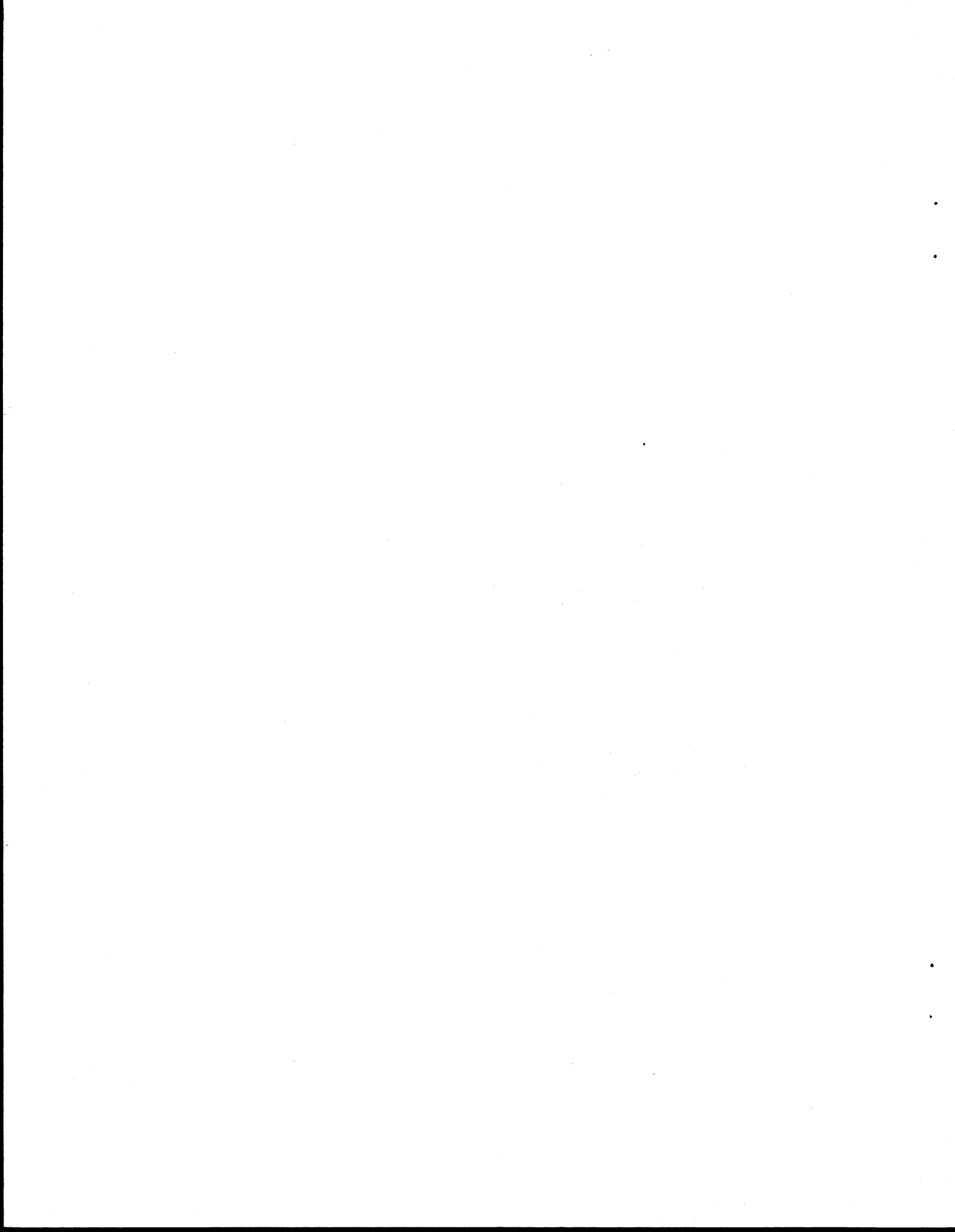
The women in this subsample contribute a nontrivial amount of labor to agricultural activities. In maize-only households, female household heads work slightly more than 9 days, representing approximately 7 percent of total family labor. The women in households planting both maize and coffee contribute more labor to agriculture and most of their time is spent in coffee production. Women in these mixed-crop households put in about 71 days of labor—and 90 percent of that labor is in coffee—making up 17 percent of total family labor. Female household heads in coffee-only households contribute the largest amount of labor, 73 days, which is approximately 24 percent of total family labor. So the shifting of female household heads into agricultural production as the household intensifies cultivation of coffee remains and is stronger in this subsample as compared to the overall sample.

**TABLE A3**  
**Land and labor in maize and coffee production for subsample households**  
**by land purchase program (1990 agricultural cycle)**

	FUNDACEN	INTA	ANACAMPRO	ALL
<b>Maize only<sup>a</sup></b>				
# of households	2	1	0	3
Total parcel area	2.86	3.75	0	3.16
# of manzanas	1.23	3.75	0	2.07
LABOR DAYS				
Female heads	5.50	17.00	0	9.33
Per manzana	5.56	4.53	0	5.22
Total family	70.50	275.00	0	138.67
Per manzana	61.11	73.33	0	65.18
<b>Maize and coffee</b>				
# of households	16	0	2	18
Total parcel area	4.10	0	1.64	3.83
# of manzanas in maize	.69	0	.44	.66
# of manzanas in coffee	2.77	0	1.64	2.64
LABOR DAYS—MAIZE				
Female heads	2.44	0	45.50	7.22
Per manzana	3.87	0	71.09	11.34
% reporting 0 days	75	0	50	72.2
Total family	32.69	0	149.50	45.67
Per manzana	61.42	0	260.94	83.59
LABOR DAYS—COFFEE				
Female heads	33.88	0	299.00	63.33
Per manzana	12.13	0	185.19	32.49
% reporting 0 days	18.8	0	0	16.7
Total family	327.50	0	1004.00	402.67
Per manzana	148.08	0	624.12	204.08
<b>Coffee only</b>				
# of households	8	1	4	13
Total parcel area	3.65	2.00	1.66	2.91
# of manzanas	2.55	0 <sup>b</sup>	.62	1.76
LABOR DAYS				
Female heads	68.75	7.00	97.75	72.92
Per manzana	25.41	0	139.79	48.29
Total family	361.00	7.00	277.50	307.54
Per manzana	139.37	-	281.07	167.71

Source: LTC/FLACSO survey.

- a. Some of these households are actually growing maize and sesame; one women in the INTA program supplies labor to sesame production.
- b. It is possible that the households will not have any planted coffee on its land if its coffee seedlings are still in the nursery.



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