A META-ANALYSIS OF HAITIAN RURAL HOUSEHOLD SURVEYS

by

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A Dissertation Submitted to the Faculty of the

School of Anthropology

In Partial Fulfillment of the Requirements
For the Degree of

DOCTOR OF PHILOSOPHY

In the Graduate College

THE UNIVERSITY OF ARIZONA

2011

THE UNIVERSITY OF ARIZONA
GRADUATE COLLEGE

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ACKNOWLEDGEMENTS

I would like to thank the members of my Dissertation Committee for their interest and support. In particular, I am grateful to my Dissertation Director, Tad Park for his advice and direction over the long haul.

Readers of this dissertation will recognize the intellectual influences of Alice Schlegel, Tad Park, Jim Greenberg and the late Bob Netting.

Mamadou Baro and the Bureau for Applied Research in Anthropology at the University of Arizona generously granted me access to the survey data on which this work is based.

My wife, Carolyn Breed, has provided support and encouragement throughout this project and I am very grateful for that.

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ABSTRACT

This dissertation makes use of data from three large and detailed rural household surveys conducted in Haiti to examine elements of economic behavior in poor rural households. We use the earliest survey to formulate a set of hypotheses and use statistical meta-analysis to test them against all three surveys. Results in the areas of household vulnerability, form, migration, and education contribute to theory-refinement in Economic Anthropology

INTRODUCTION

The purpose of this dissertation is to add to our understanding of the economic behavior of poor rural households in periods of economic and ecological stress. It combines elements of economic anthropology and modern development microeconomics to try to expand our understanding of the economic behavior of Haitian farm households via a meta-analysis of household surveys that incorporate social, cultural and economic factors.

The analysis is based on data collected in three extensive household surveys in different parts of Haiti during 1994-1996[1]. The surveys, commissioned by aid agencies, were conducted by The Bureau for Research in Anthropology (BARA) at the University of Arizona. The research employed two survey instruments – a locality questionnaire and a household questionnaire. The locality questionnaire identified local infrastructure, information about market prices, aspects of the physical environment, and historical context on problems facing the local community. The household questionnaire covered demography, education, agricultural activities by type and season, market and other income sources, labor and other inputs.

As well as providing local insight and context for the sponsoring agencies the data-set offers a wealth of data on households in comparative context, enabling us to develop and test hypotheses about household behavior. The household questionnaires are almost identical in terms of their content and differ only in terms of the location and date.

[1] The studies were conducted for CARE International in the areas of Gonaives and the Northwest (August to November1994), Catholic Relief Services (CRS) in the areas of the South and the Grand Anse (March to June 1995), and Adventist Development and Relief Agency (ADRA) in the areas of the West and the Central Plateau (February to April 1996).

The surveys were specifically designed to capture both trends and variability in particular parts of the country by household types, agricultural conditions, climatic factors and socio-economic conditions and were stratified accordingly. Hence, we cannot draw population inferences directly from the results. In order to make general propositions about Haitian rural households, we employ a meta-analytical approach (made easier by the homogeneity of the survey instruments). The research approach is to treat the earliest survey as the base and subject it to a rigorous set of statistical tests designed to answer two questions:

- What are the drivers of economic activity of subsistence farming households?
- How do these households differ from each other?

The next stage is to conduct a meta-analysis of all three surveys to test out the robustness of the most compelling of the preliminary findings across region and time.

Household behavior does not happen in a sociocultural vacuum. Rather, it is shaped and conditioned by the environment within which it is situated. By "environment", we mean the social, political, economic and ecological circumstances of those times and places and the constraints they placed on the households. To account for this, we include comparative and national-level statistics in our analysis as well as making use of the first national surveys of urban and rural labor markets from this period.

Over and above the immediate purpose of empirical examination of Haitian rural households, the study has two more general applications - one theoretical and the other applied. The first is to integrate elements of economic and development anthropology with development microeconomics to create a more nuanced understanding of household

behavior. By integration we mean an attempt to fuse some elements of these disciplines, rather than merely supplementing one with the other.

The second application is to examine some significant propositions in current development thinking. This involves constructing acceptable empirical proxies for theoretical propositions and subjecting these to empirical testing via meta-analysis. These propositions include:

- Is there any evidence of the phenomenon of 'The Feminization of Poverty"?
- How do households differ by form, size, and dependency rates?
- Is there any evidence that tenure type has any effect on agricultural production?
- What households are vulnerable and why?

Finally, we suggest some future research directions to help address extra-household processes and the Macro-Meso-Micro linkages between households, the environment within which they operate, and the national and international economic and political forces that influence and constrain their actions. These directions include:

- What is the significance of Social Capital and how is it measured?
- How do we account for power and its consequences?
- How do we understand the relationship between the natural and human environments?
- Can we create a general dynamic model of the interactions between the polity, economy, environment, community, and household?

Chapter One describes the political, social, and economic environment in which the household economic and demographic activity is located. It also describes the basic

economic characteristics of the three locations. Chapter Two reviews the significant scholarship in the areas of subsistence agriculture, household form and function and the determinants of agricultural production and includes a discussion of their applicability to Haiti. Chapter Three uses the data from the earliest survey to explore the demographic characteristics of the Haitian rural household. It looks at household size, composition and form and at possible explanations for differences in each of these variables, including age, gender, education, and dependency rates. Chapter Four discusses household economics, examining agricultural production, consumption, and sales. It also covers other forms of non-agricultural economic activity including wage labor, commerce and migration. Chapter Five is a meta-analysis of the three surveys in which the most promising results from Chapters Three and Four are tested for robustness across all three settings and time-periods. This approach of creating and testing hypotheses using multi-site and multi-year data offers what we believe to be a significant methodological improvement in the quantitative analysis of ethnographic data and the refinement of theory on economic anthropology. Chapter Six lays the framework for future research into locating household demographic and economic behavior within a broader sociopolitical context, introducing both the theoretical considerations and some potential empirical approaches. Chapter Seven identifies avenues for future research.

1. CONTEXT

1.1 Political Background

The precariousness state of Haitian rural society is ultimately an effect of rapid population growth (see Table 1.2) and limited arable land. The associated rate of hill-side deforestation (see Table 1.6) brings more marginal land into play but it also opens all land up to weather-related degradation. The data used in this analysis was collected in 1994-1996 and reflects not only these long-standing demographic and environmental challenges but also a profound political crisis. The immediate cause of the crisis was a set of embargoes on Haiti imposed by the Organization of American States, the United States, and the United Nations. The embargoes were imposed in response to the overthrow of President Jean-Bertrand Aristide by Raul Cedras, the head of the Armed Forces, just seven months after he had been elected. The election in December 1990 had been observed by the United Nations Observer Group for the Verification of the Elections in Haiti (ONUVEH) and was widely regarded as democratic (Girard 2010). The embargoes gradually increased in severity in late 1991, eventually covering all trade except for some humanitarian assistance (Bush 1991; United Nations 2003).

		1988	1989	1990	1991	1992	1993	1994	1995
Official Aid	1991 dollars ($1,000)	141,730	195,970	167,390	177,290	100,980	120,650	599,840	722,220
Exports	1991 dollars ($1,000)	180,056	152,115	171,109	187,637	41,328	45,756	14,297	35,027
Official Aid	Index	79.94	110.54	94.42	100	56.96	68.05	338.34	407.37
Exports	Index	95.96	81.07	91.19	100	22.03	24.39	7.62	18.67

(Source: World Development Indicators, World Bank)

Table1.1: Official Aid and Exports 1988-1995

The immediate effects of the embargoes were the collapse of Haitian export sector and a huge reduction in Official Development Aid as illustrated in Table 1.1. Official Aid essentially halved between 1991 and 1992, rebounding in 1994 as foreign countries and international organizations began to reward political development in Haiti. Haitian exports fell further and took longer to begin to recover, falling by almost 92% between 1991 and 1994. The resulting fall in economic growth and rise in inflation are shown in Tables 1.5 and 1.6, respectively.

Whether or not the embargoes had any effect on Cedras and his government is open to debate (Buss 2008; Dupuy 2007). They clearly had profound effects on the Haitian poor, the most dramatic demonstration being the increase in the number of those trying to flee by sea. Total attempts are, obviously, unknown. We know, however, that in the twenty years between 1985 and 2004, the US Coast Guard interdicted an average of 9,954 people per year, 5,222 of whom were Haitians. In 1992 the Haiti total was 37,618. In 1994 it was 25,302 (USCG 2011).

Cedras resigned and left Haiti shortly after the UN Security Council authorized the formation and deployment of a 20,000 member military force drawn from 28 countries to facilitate the return to civilian rule. The embargoes ended in October 1994 with Aristide's return (Clinton, 1994; United Nations 2003).

The collapse of export markets, the limitations on aid, the population displacement, and the general political disequilibrium all contributed to an unfavorable environment for the lives of the Haitian people in general and for those of the survey respondents in particular.

1.2 Haiti in Comparative Context

Viewing Haitian statistics in an international comparative context should give us a more complete appreciation of the significance of their magnitude. It is difficult to draw inferences about variables such as the dependency rate or the GDP per capita without some benchmark to measure against. On the other hand, comparative analysis of any sort also indicates, at least implicitly, that there is some underlying relationship between the entities compared. When we compare Haiti with other Caribbean countries, for example, we are implying that this group has characteristics in common other than mere propinquity. An alternative approach is to create a benchmark group based on the characteristics of interest. We could compare Haiti with, for example, other former French colonies or with other countries with similar resources or populations, among others. Taken to the limit of its logic, this approach would require us to create a different benchmark group for each variable analyzed. While this approach would be accurate in some statistical sense, it would tell us little of contextual value about Haiti.

The results presented here constitute a kind of "bricolage" of geography and economics intended to tell us something meaningful about Haiti but with rather less precision than their quantitative representations imply. For environmental consideration – forestry, in particular – we compare Haiti to its neighbors. For demographic and economic comparisons we make use of a United Nations' classification which goes some way to addressing the concerns discussed above by creating a peer group. Haiti is one of

48 countries classified by the UN as a "Least Developed Country" (LDC).[2] An LDC is a low-income country facing specific structural handicaps against development. Membership is determined by three criteria: Gross National Income per capita, a Human Assets Index (HAI), and an Economic Vulnerability Index (EVI) (United Nations 2008).

The HAI is essentially a measurement of Human Capital, the qualitative component in labor force analysis. It measures health and education indicators including: the proportion of the population that is undernourished, the childhood (under five) mortality rate, the secondary school enrolment rate, and the adult literacy rate. The undernourishment element, linking food intake, health, and educational and labor force potential is a significant addition to the usual measures of human capital, education and training, likely more significant in LDC's than elsewhere.

The EVI is intended to measure a country's economic vulnerability to exogenous shocks, those beyond the influence of domestic policy-makers. It is the weighted average of two indices – Exposure and Shock. Exposure has three elements, Smallness, Location, and Structure. The thinking behind this is that smaller countries (by population) tend to have less diversified economies and to be more dependent on external markets than larger countries are. Likewise, countries that are distant from world markets face issues related to transportation and isolation. Finally export concentration in a few industries and the share of agriculture in GDP increase exposure to external shocks. The Shock Index

[2] The LDC's are: Afghanistan, Angola, Bangladesh, Benin, Bhutan, Burkina Faso, Burundi, Cambodia, Central African Republic, Chad, Comoros, Democratic Republic of the Congo, Djibouti, East Timor, Equatorial Guinea, Eritrea, Ethiopia, Gambia, Guinea, Guinea-Bissau, Haiti, Kiribati, Laos, Lesotho, Liberia, Madagascar, Malawi, Mali, Mauritania, Mozambique, Myanmar, Nepal, Niger, Rwanda, Samoa, Sao Tome and Principe, Senegal, Sierra Leone, Solomon Islands, Somalia, Sudan, Tanzania, Togo, Tuvalu.

includes the effects of natural shocks on population displacement, agricultural production and tourism. It also includes trade shocks related to fluctuations in world demand.

Constructions like these invite analysis of the choice of variables, their weighting, and their capacity for measurement. Nevertheless, by incorporating different dimensions of vulnerability, they demonstrate considerable improvement on simpler measures of poverty derived from National Income measures.

Annual Population Change (%)	1970-1975	1975-1980	1980-1985	1985-1990	1990-1995	1995-2000	
Least Developed Countries	2.18	2.48	2.54	2.63	2.75	2.46	
Haiti	1.75	2.02	2.34	2.16	2.01	1.86	
Annual Population Change (index)	1970	1975	1980	1985	1990	1995	2000
Least Developed Countries	100	111.39	125.90	142.72	162.50	186.11	210.16
Haiti	100	109.06	120.53	135.31	150.57	166.32	182.37

(Source: United Nations, Department of Economic and Social Affairs, Population Division, *World Population Prospects: The 2010 Revision*, New York, 2011)

Table 1.2: Relative Population Changes

Table 1.2 shows the average annual population growth in five-year intervals for Haiti and LDC's and an index illustrating the cumulative effects of population growth. The most striking result is the rate at which seemingly modest population growth rates can have substantial effects over time. In thirty years the population of the LDC's more than doubled while that of Haiti grew by just over eighty percent. There are two reasons for the disparity. The most obvious one is that Haitian growth rates were lower in each five-year period. The more intriguing reason is twofold - both Haiti and the LDC's experienced a turning point in their population growth rates but Haiti's happened in 1985-1990, a decade earlier than the group average. Why these countries experienced turning points merits further analysis but we will not pursue the issue in this paper.

Median Age (years)	1970-1975	1975-1980	1980-1985	1985-1990	1990-1995	1995-2000
Least developed countries	17.90	17.60	17.50	17.50	17.60	17.90
Haiti	19.00	19.10	19.10	18.80	18.60	18.60

(Source: United Nations, Department of Economic and Social Affairs, Population Division, *World Population Prospects: The 2010 Revision*, New York, 2011)

Table 1.3: Median Age of Population

The second important fact about LDC populations is their youth. Table 1.3 shows the median ages for LDC's and for Haiti. Having half of the population aged nineteen years or younger places great pressure on the capacity of a country to support its young in the short term. The problem is exacerbated in the longer term as these young cohorts move into adulthood, seek economic opportunities, and produce children of their own.

Child dependency ratio (ratio of population aged 0-14 per 100 population aged 15-64)	1970	1975	1980	1985	1990	1995	2000
Least developed countries	83.6	85.6	85.8	85.5	84.8	82.8	79.4
Haiti	76.7	75.2	74.9	78.4	81.0	79.3	72.2

(Source: United Nations, Department of Economic and Social Affairs, Population Division, *World Population Prospects: The 2010 Revision*, New York, 2011)

Table 1.4: Child Dependency Rates

This pressure is more clearly illustrated in Table 1.4, showing child dependency ratios. The higher the ratio is, the greater is the demand placed on the "productive" part of the population, e.g. a child dependency ratio of 75 means that for every four people aged 15-64 in the population there are three people under the age of 15 to support.. Haiti's dependency ratio, while not as challenging as that of the overall LDC ratio, hovers around this mark, falling below it twice but neither by much nor – seemingly - predictably.

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
LDC Growth (%)	1.4	1.49	0.3	0.75	1.67	5.19	5.59	5.42	4.33	4.47	4.52
Haiti Growth (%)	-0.1	4.24	-13.19	-2.44	-8.29	-3.95	4.12	2.7	2.2	2.7	0.39
LDC Growth (Index)	100	101.49	101.79	102.56	104.27	109.68	115.81	122.09	127.38	133.07	139.09
Haiti Growth (Index)	100	104.24	90.49	88.28	80.96	77.77	80.97	83.16	84.99	87.28	87.62

(Source: World Development Indicators, World Bank)

Table 1.5: GDP Growth

Table 1.5 shows GDP growth rates for 1990-2000 in percentage and index forms for the LDC average and Haiti. The LDC average rose modestly in the early years of the decade and grew more strongly later with average GDP almost 40% higher than it started with. The Haitian experience was quite different, with declines through 1995 and positive change thereafter. By the decade's end, however, the GDP was over 12% less than it had been at the beginning.

Over the same period, average prices in LDC's more than doubled. . This growth was dwarfed by Haiti's cumulative increase of almost 550% which included a rate of 83% in 1994. Such a collapse in purchasing power, in conjunction with the decline in GDP indicates that Haiti experienced a substantial reduction in economic welfare.

Country	Total Area (1,000 ha):	Forest area (1,000 ha):		Forest as % of total area		Annual Change (%)	Population (1,000):		Annual Change (%)
		1990	2000	1990	2000	1990-2000	1990	1999	1990-1999
Cuba	11,086	2,058	2,435	0.19	0.22	1.70	10,234	11,160	1.01
Dominican Republic	4,874	1,972	1,972	0.40	0.40	0.00	7,170	8,364	1.85
Haiti	2,775	116	109	0.04	0.04	-0.62	6,504	8,087	2.70
Bahamas	1,388	515	515	0.37	0.37	0.00	260	301	1.75
Jamaica	1,099	345	341	0.31	0.31	-0.11	2,521	2,560	0.17
Trinidad and Tobago	513	241	234	0.47	0.46	-0.30	1,283	1,289	0.05
Guadeloupe	163	67	65	0.41	0.40	-0.30	340	450	3.59
Martinique	110	49	49	0.45	0.45	0.00	341	392	1.66

(Source: Millennium Goals Database, United Nations)

Table 1.6: Forest and Population Changes 1990-2000

The most significant environmental challenge facing Haiti is rapid deforestation. This section discusses this in a regional context. The eight largest Caribbean countries in terms of size are also the largest wood producers. Table 1.6 ranks the countries in terms of forest size. It shows the changes in forest area in thousands of hectares and in terms of the proportion of total land under forest for 1990-2000. Haiti, at an average of -.62% per annum, has a rate of forest area decline at least twice as large as that of any other country. The significance of this decline is magnified by the observation that, at .04% total area coverage, Haiti is also the least forested, in relative terms. The other three countries with a decline in forest area had coverage of between 31% and 46%.

Over the same decade the Haitian population grew at an average rate of 2.70% per annum. Only one country – Guadeloupe- grew more rapidly and it started from a base population of less than 6% of Haiti's. None of the other countries with annual population

growth rates greater than 1% experienced any significant decline in forest coverage. In fact, Cuba's forest area grew over the period.

This seeming correlation between population growth and deforestation is examined further in Table 1.7. The table ranks the countries in terms of harvest size. Although it ranks sixth out of the eight countries in terms of forest size, Haiti's harvest far exceeds that of any other country. It is almost three times the size of Cuba's and at least ten times that of any other country.

	Woodfuel[1]		Industrial Roundwood[1]	Sawnwood[1]	Wood-Based Panels[1]	Pulp[2]	Paper[2]
	Production	Consumption	Production	Production	Production	Production	Production
Haiti	6,158	6,158	239	14	n/a	n/a	n/a
Cuba	2,145	2,145	611	130	149	52	57
Dominican Republic	556	556	6	0	n/a	n/a	130
Jamaica	300	300	43	12	0	n/a	0
Guadeloupe	15	15	0	1	n/a	n/a	n/a
Martinique	10	10	2	1	n/a	n/a	n/a
Trinidad and Tobago	10	10	50	27	n/a	0	n/a
Bahamas	n/a	0	117	1	n/a	n/a	n/a

1: Thousand of meters cubed. 2: Thousands of tonnes (Source: FAOSTAT, United Nations Food and Agriculture Organization)

Table 1.7: Uses of Wood, 2000

In summary, the data points to a rapid rate of depreciation of a resource which is already in very short supply and to its use for simple consumption rather than as part of a value-added process. This production process is unsustainable, a situation further exacerbated by a rapid rate of population growth. Even without considering the indirect effects of deforestation on land irrigation and productivity, it is evident that Haiti faces a severe and imminent environmental crisis.

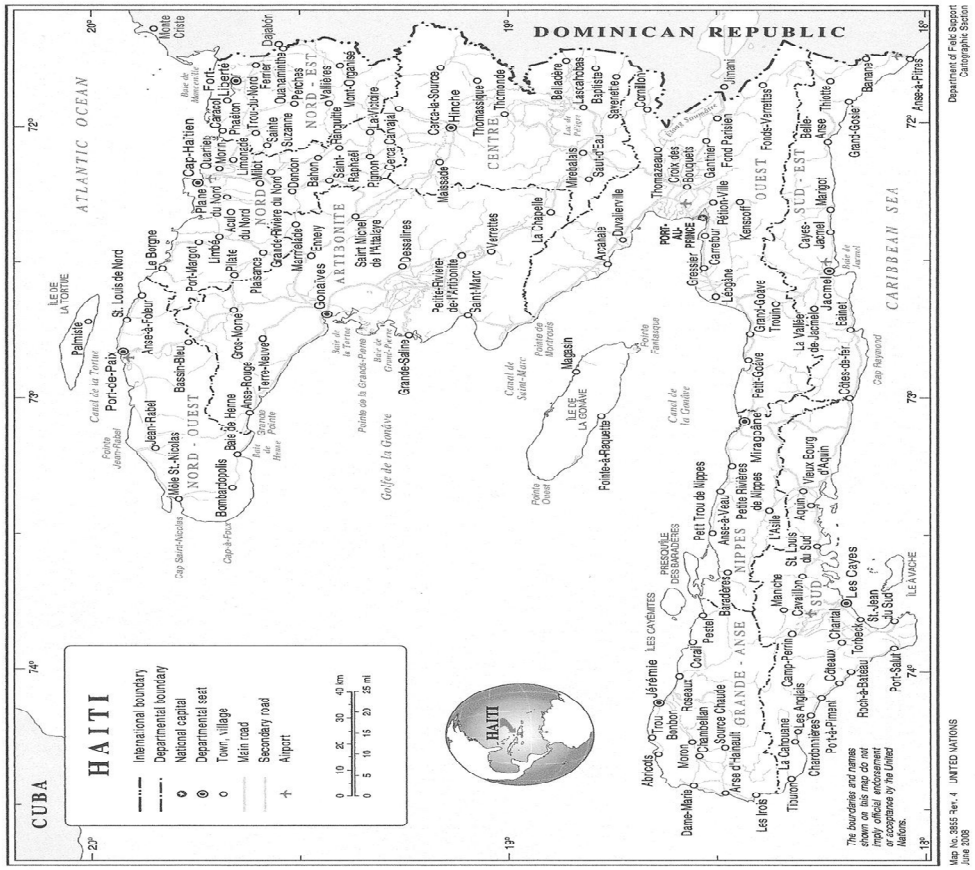


Figure 1.1: Map of Haiti showing Administrative Divisions

1.3 Economic Characteristics of the Regions Surveyed

The map on page 30 shows the country's Departments and principal towns. The Department is the primary administrative division of the country and there are ten of these. The Departments are further divided into 41 Arrondissements, and these, in turn, are divided into 133 Communes.

The three studies which provide the data for this dissertation were carried out in different parts of the country. The 1994 study, on behalf of Concerned Americans for Relief Everywhere (CARE) International in Northwest Haiti, was conducted entirely within the Nord-Ouest Department. 1,402 households across seven communes were surveyed. The 1995 study was focused on the southern part of the country with 1,457 households surveyed in four Departments, Grand-Anse, Sud, Sud-Est, and Ouest. This survey was conducted for Catholic Relief Services (CRS). The 1996 study was conducted on behalf of the Adventist Development and Relief Agency (ADRA). In this study, 1,166 households drawn from five Departments (Artibonite, Nord, Nord-Est, Centre, and Ouest) were surveyed. Overall the surveys covered all of the Departments and provide an extraordinary amount of detail about rural society and economy.[3]

Table 1.8 shows the average plot sizes in hectares held and used by region. The term "held" refers to all manners of possession including ownership, rental, sharecropping etc. These statistics are heavily skewed by the maxima reported in the North/Central and South, resulting in ranges far greater than that of the Northwest. In a

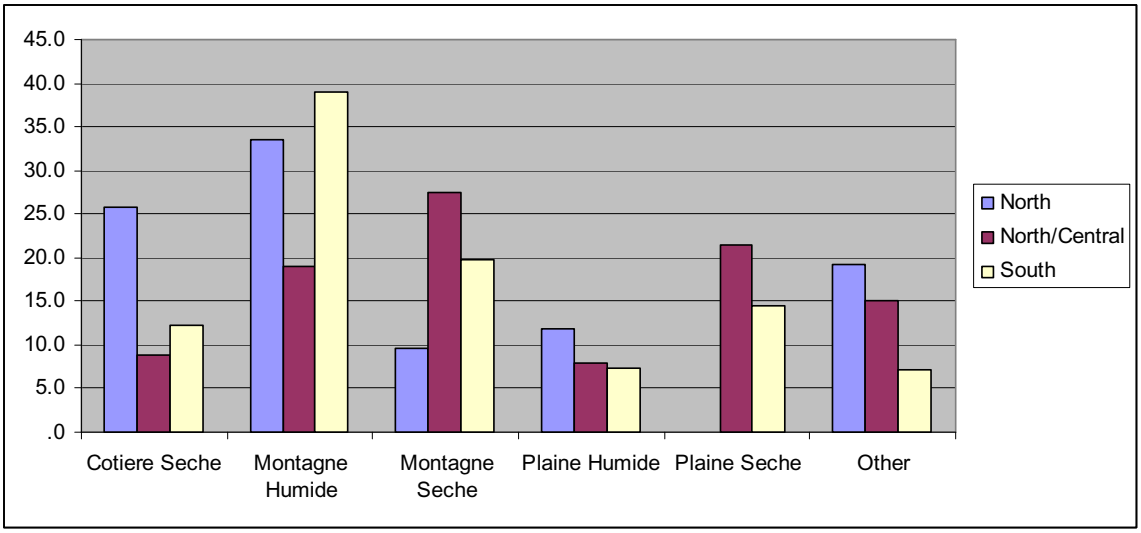
[3] In 2003, a new Department, Nippes, was created, splitting from Grand-Anse.

distribution which is skewed like this, the mean is not a very useful measure of the average value. A more illuminating way to compare regions is to look at the interquartile range of values, the middle 50% of the observations between the 25th and 75th quartiles as an indication of a typical value for each region. By this criterion, typical households in the Northwest hold and use more land than those elsewhere.

	Northwest		North/Central		South	
	held	used	held	used	held	worked
count	1192	1161	1023	890	1381	1381
mean	1.74	1.12	3.57	3.51	1.44	1.00
standard deviation	3.42	1.34	27.64	32.71	6.97	6.80
minimum	0.01	0.00	0.00	0.00	0.01	0.00
maximum	75.33	17.75	452.00	650.20	250.08	250.08
range	75.32	17.75	452.00	650.20	250.07	250.08
1st quartile	0.50	0.37	0.30	0.20	0.35	0.25
median	1.00	0.75	0.70	0.51	0.75	0.56
3rd quartile	2.00	1.37	1.50	1.10	1.50	1.00

Table 1.8: Average Holdings by Region

These households rely primarily on agriculture which is heavily dependent on environmental factors. Hence, the surveyors took care to ensure that their sampling populations reflected the agro-ecological variety across the country, classifying zones by soil-type, altitude, and rainfall. We can infer from this that the proportions shown in Figure 1.2 reflect the distribution of agro-ecological zones across each study.



*Cotiere Humide in Northwest, Island of La Gonave in the North/Central, Plaine Irriguee in the South.

Figure 1.2: Distribution of Surveyed Households by Agro-Ecological Zone

Even when we disregard the "other" category which contains the unique feature in each region surveyed, the regions appear to have little in common with regard to their distributions of agro-ecological zones. The largest zone in each region is mountainous but dry in the North/Central and humid elsewhere. Dry plains are more common than humid in two cases but absent in the third.

The difference in holding size and, in particular, the distribution of agro-ecological zone across regions must be a consideration when making comparisons based on agricultural output and the value of agricultural income. To begin to address this, Table 1.9 examines the planting frequencies for the most commonly grown crops and Table 1.10 does the same for crops concentrated in specific zones.

	Zone	mais	mil	pois	vivres
Northwest	Cotiere Seche	71	21	73	73
	Cotiere Humide	67	51	56	47
	Montagne Humide	66	25	81	79
	Montagne Seche	15	3	21	23
	Plaine Humide	71	28	73	73
North/central	Cotiere Seche	23	15	32	23
	Montagne Humide	41	13	48	80
	Montagne Seche	50	48	40	42
	Plaine Humide	35	0	37	90
	Plaine Seche	39	51	17	25
	La Gonave	8	12	7	8
Southern Peninsula	Cotiere Seche	51	31	37	59
	Montagne Humide	65	22	60	70
	Montagne Seche	57	31	52	48
	Plaine Humide	64	15	61	61
	Plaine Seche	64	40	59	43
	Plaine Irriguee	67	9	43	51

Table 1.9: Frequently Grown Crops by Region and Agro-Ecological Zone

Table 1.9 shows the frequency distribution of the most commonly grown crops in each region and agro-ecological zone. These are maize, sorghum, peanuts, and vivres, a collective term for starchy staples such as sweet potato, yam, plantain and breadfruit. The number in each cell refers to the percentage of plots growing a particular crop. Thus, 71% of plots on the dry coast of the northwest grow maize. There are some significant differences both within and between regions. The very limited potential of the dry mountainous region of the northwest is illustrated by planting rates far lower than the rest of the region and of similar zones elsewhere. In all regions, staples are planted much more frequently in humid mountainous regions than in dry. Sorghum demonstrates the most variability across zones within each region. Maize demonstrates the least.

The island of La Gonave has a planting profile different from all others as shown in Table 1.10. Rice, infrequently grown elsewhere, is its most common crop, appearing in

46.8% of its plots. Bananas appear frequently in the north/central but are essentially absent on the southern peninsula. Sugarcane grows on the plains in both regions. Pistachios are heavily concentrated on the dry coast of the North/central which is also one of only two areas with some significant tobacco planting.

	Zone	riz	banane	canne_sucre	tabac	pistache	café
North/central	Cotiere Seche	1.41	1.41	4.23	15.49	29.58	1.41
	Montagne Humide	4.38	38.50	3.91	0.31	9.08	15.49
	Montagne Seche	10.59	21.96	3.38	2.14	7.88	1.80
	Plaine Humide	2.23	33.93	17.86	0.00	1.34	5.36
	Plaine Seche	7.54	11.23	11.23	0.18	5.44	0.88
	La Gonave	46.80	12.26	0.00	0.00	0.28	0.00
Southern Peninsula	Cotiere Seche	0.68	0.00	0.90	3.62	5.20	3.39
	Montagne Humide	0.16	0.11	1.21	0.26	1.21	7.30
	Montagne Seche	0.11	0.00	1.40	0.32	9.05	1.94
	Plaine Humide	0.67	0.00	4.70	0.34	4.03	2.68
	Plaine Irriguee	0.00	0.00	8.54	12.46	5.69	1.07
	Plaine Seche	1.20	0.00	2.56	0.17	7.35	1.20

Table 1.10: Crops Concentrated in Specific Agro-Ecological Zones

The obvious consequence of these variations in holding size, agro-ecological zone, and cropping decisions is that we can expect to see considerable variation in the distribution of the value of agricultural output across the regions. This is verified in Table 1.11. Using the interquartile range approach for non-normal distributions discussed above it is evident that the typical value of agricultural output in the North/Central region far exceeds that of the other two.

	Northwest	North/Central	South
count	1104	951	1325
mean	3989.30	8874.06	1606.79
standard deviation	10131.32	19416.64	4783.68
minimum	5.28	1.5	1.6
maximum	174219	322396.85	155459.04
range	174213.72	322395.35	155457.44
1st quartile	516.00	1157.54	286.86
median	1432.20	3236.88	811.21
3rd quartile	3330.01	8855.06	1777.14
interquartile range	2814.01	7697.52	1490.28

Table 1.11: Value of Agricultural Output across Regions

Table 1.12 provides summary statistics for non-agricultural income sources across regions. These serve to reinforce the agriculturally-based inequalities observed above. The North/Central Region demonstrates a significantly higher level of non-agricultural income than the other regions whose relative positions remain unchanged.

	Northwest	North/Central	South
count	1071	920	1181
mean	2,937.39	5,817.31	776.796
standard deviation	6,329.25	14,485.85	1,279.147
minimum	0	0	1.2
maximum	93600	208000	24210.4
range	93600	208000	24209.2
1st quartile	450.00	915.25	155.60
median	1,184.00	2,185.00	416.00
3rd quartile	3,000.00	5,000.00	884.00

Table 1.12: Non-Agricultural Income across Regions

Figure 1.3 shows the sources of non-agricultural income across regions. It offers little insight into the reasons for the income inequalities noted above. While it is not surprising that the poor Northwest relies heavily on agricultural labor and the sale of charcoal, the position of the South relative to the North/Central remains difficult to comprehend, its explanation subsumed, perhaps, in the “Autres” category.

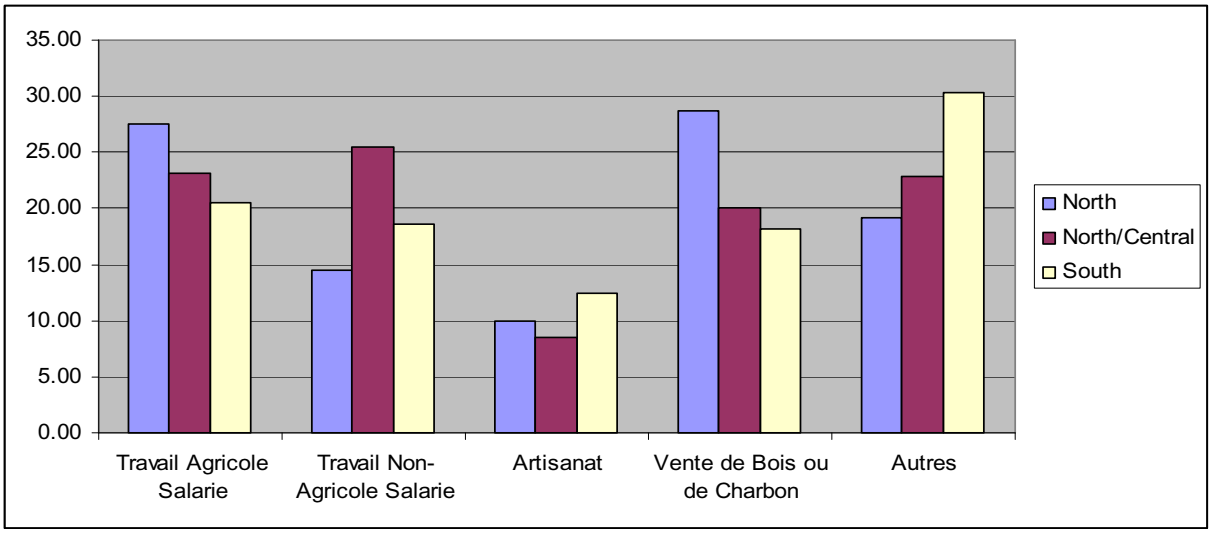


Figure 1.3: Non-Agricultural Income Sources

2. THEORY AND LITERATURE REVIEW

2.1 Anthropology, Economics, and Development

While the evolutionist thought of Morgan and Tylor essentially disappeared from anthropological theorizing in the early 20th century to be replaced by Boasian relativism, Ferguson argues that a particular form reappeared in Post WWII modernization theory with its emphasis on progress and social change in contrast with "folk societies", all of which dovetailed nicely with the aims of international development agencies (Ferguson 1997). Underdeveloped societies were seen as having dual structures, modern and traditional, each driven by its own dynamics (Peet 1999). The major intellectual challenges to this paradigm came from Dependency Theory and later, in a somewhat different form, from World Systems Theory. The benign and optimistic perspectives of modernization were challenged by approaches which emphasized differences in power and argued that, in essence, development and underdevelopment were part of the same capitalist historical process, world capitalism converting earlier social systems into sources of its own development. World Systems Theory divided the world into core and periphery. Core countries were powerful, industrially developed and capital rich with their need for surplus resources provided by the periphery. The periphery, on the other hand, lacking surplus, had no capital means for modernization (Leys 1996; Peet 1999).

Anthropology, then, has a mixed response to the development discourse. At different times and places, it has been a participant, albeit not always willingly, in the enterprise, seeking to add at least an element of cultural sensitivity to project and program development. At others, it has been deeply suspicious of the motives, methods,

and implicit politics of development. This uneasy relationship is best illustrated by contrasting the fields of Development Anthropology and the Anthropology of Development. The former can be understood as an applied field dedicated to ensuring that a modicum of cultural sensitivity and people-centeredness is incorporated into projects and programs. The latter treats the development enterprise as an object of study with, in many cases, less than enthusiastic findings. Scholars have questioned the motives, methods, and implicit politics of development (Crewe and Harrison 1998). They have challenged the political basis of development with its economistic and Eurocentric world-views. Indeed, the very discourse of development including the labeling of populations, the definition of problems and the mapping of progress has been drawn into question (Escobar 2005; Esteva 1999).

In many ways, this contrast has been overstated. Anthropologists, of whatever stripe, have never been proponents of the culture-as-obstacle thesis that pervades some elements of the development debate (Harrison and Huntington 2000). Nor are the most enthusiastic participants in the applied field unaware of the political components of the enterprise. Similarly, critics of development are not unconscious of or unsympathetic to the plights of the world's poor (Ferguson 1997, 2006). Nevertheless, Anthropology has lacked a global organizing principle around which to organize its efforts, having ceded much to Economics in the creation of development studies and the management of the development enterprise.

Anthropologists have been vocal in identifying the weaknesses of economics as applied to development (Gladwin 1989; Hill 1986). Their criticisms have been primarily

concerned with the tendency of economists to import an intellectual apparatus which was designed to understand highly monetized market economies with efficient capital, labor, and resource markets and try to apply it in settings where none of these conditions hold. The work also assumes (implicitly) that the government has both the legitimacy and the capacity to engage the standard tools of aggregate demand management.

Contemporary development economists are neither unaware of such criticism nor dismissive of their validity (Basu 1997; Fields 2001; Raj 1998). Indeed much work has gone into developing a more theoretically sound and empirically useful development microeconomics (Hoff and Stiglitz, 2001). Recent efforts to create more useful models of the development process have revived interest in the role of institutions. This new institutional economics is quite different in nature from the work of Commons, Veblen, and more recently, Galbraith. The earlier approach focused attention on power and the capacity of political and economic institutions and offered itself as a counterpoint to the neoclassical market model. New Institutional Economics (NIE), by contrast, uses the neoclassical model to understand how institutions develop and how they operate to solve the economic problems of cooperation and coordination. Institutions, in this sense, are the rules that govern economic behavior (North 1990).

Game Theory – the study of strategic interaction – is now widely used in NIE and has found its way into contemporary Development Economics where it is used to model relationships within households, between landlord and tenant, between industry and government, among others (Basu 1997; Raj 1998). The problem with conventional non-cooperative Game Theory, as Gintis points out, is that the rationality it assumes of its

actors assumes, in turn, that they share mental constructs – common beliefs and understandings - but offers no explanation of why this should be true. His solution, in part, relies on evolutionary game theory to help explain how social norms develop over time, successful strategies crowding out unsuccessful (Gintis 2009).

Contemporary Economic Anthropology has responded in a number of ways. One approach has been to embrace NIE as an analytical tool for understanding choice, property, incentives, and transactions costs, among others (Ensminger 2002). An alternative is to regard Game Theory – however formulated – as little more than a sterile re-working of the behavior of Economic Man, Anthropologists like Gudeman (2001) and Graeber (2001) describe relationships of reciprocity, community, power, and social reproduction that exhibit layers of complexity far beyond the capacity of models of dyadic exchange.

2.2 Households: Size, Form, Function

Pasternak, Ember and Ember (1977) suggest that the fundamental basis for household size is the presence of incompatible activity requirements. If people are obliged to do two different things simultaneously, households will have to be bigger. If women have to act as both child–rearers and agricultural workers and men are engaged in both war and long-distance trade, household size will have to expand to permit these mutually exclusive activities. They argue that this determinant of size works in both agricultural and in more complex societies.

Households can have many possible forms and memberships. De Vos and Palloni (1989) suggest that a general model will comprise the interaction between:

1. Rules for household formation – these are the culturally determined rules for entry, exit, fusion and fission.
2. Prevailing socio-economic conditions – these refer to the costs of formation and maintenance. If the household is also a producer, another component will be the availability and cost of labor, domestic and external.
3. The supply of kin for potential alliance and joint living arrangements. This, in turn is affected by the rules for kin formation.
4. Demographic factors – mortality, fertility, nuptiality, migration.

Keesing (1975) offers another formulation. In peasant communities, without economic differentiation, the nature and robustness of households will depend on

maintaining a set of balances of interest: between sexes, between young and old, between husband and wife and brother and sister, between non-kin age mates and kin-based corporations. While the determination of such balances can give rise to many household forms, we shall restrict our analysis to three types, all deriving from the compact nuclear form (Robertson 1991). A nuclear household will typically comprise a married couple and their unmarried children. A stem family household contains two generations of married couples and unmarried children. In the patrilocal case we would expect to see a married couple, their unmarried children, their married son, his wife and children. In a joint family patrilocal household we expect to see married couples of two generations, a couple, their married sons, wives and children.

In terms of its robustness or capacity to endure over time and in face of external shock, each form of household has its own advantages and disadvantages. A nuclear household has the advantage of mobility. Its small size allows it ease of movement in pursuit of economic opportunity. Its principal disadvantage is that it is most liable to produce a labor bottleneck at times where labor demands are beyond its capacity. It is also most vulnerable in the face of crisis – illness, death, desertion. Furthermore, by dint of demography, it is the shortest-lived of household types. Robertson argues that it goes through well-established phases of formation, expansion, fission, and decline. The former two correspond to the marriage and child-rearing; the latter occur as adult children move out to form their own households and, finally, when the last surviving parent dies or moves out to live elsewhere (Robertson 1991).

Stem family households avoid many of these problems. A stem family household has more built-in stability over time as one generation replaces the next. Berkner (1972) describes an Austrian example of farm ownership and management whereby a farmer retires and passes on his farm to a resident married son in exchange for separate living quarters, a financial settlement paid out over time and rights to certain goods and services. Thus the family life-cycle begins in nuclear form, transforms into stem, and returns to nuclear on the deaths of the retired parent.

Joint family households are most successful in cases where a relatively large labor force is needed. While flexible in their use of labor, because of their size they tend to be quite unwieldy in terms of mobility. This form may be the best solution to cases of incompatible activity requirements, where people have to perform different tasks simultaneously. This can be true for both agricultural and for more complex societies. The durability of the joint family among the wealthy in China is based on the provision of a minimal corporate unit needed for pooling capital and investment resources into a variety of family-controlled enterprises. At the other end of the economic scale, large joint households with cooperative pooling arrangements may act as the best hedges against insecurity and irregularity of earnings. They can survive as long as they avoid fission by incorporating their married children (Pasternak, Ember, and Ember, 1977).

Trying to define households by the functions they perform invites a circularity of reasoning long avoided by anthropologists. An alternative is to focus on what households do. Hammel and Laslett (1974) suggest that a household can be seen as a domestic group sharing a physical space for eating, sleeping, growing up, child rearing and procreation.

Wilk and Netting (1984) also seek to understand households' nature, composition and size by examining the regular activities performed within them. These activities are production, distribution, transmission, reproduction, and coresidence. All have economic significance. Production refers to procuring and processing resources, including agricultural and domestic labor. Distribution refers to the exchanges and transactions within households. The transmission activity refers to the passing of assets across generations. Reproduction encompasses both child-bearing and socialization. Coresidence implies the provision of a common dwelling for household members.

Each of these activities can be assessed in terms of their significance for household robustness. It should be noted, however, that an approach based on typical activities brings us no closer to defining a household. A narrow definition along these lines would require us to argue that a household must perform all five of these activities and that only a household can do so. Obviously, this would exclude many social groupings we might normally regard as comprising households, childless couples, for example. A looser definition might allow for fewer activities such as requiring a household to perform at least three or four. This still leaves us far short of definitional precision for two reasons. The first is that it opens up the possibility of the need to rank activities by their degree of centrality to the definition i.e. whether the exclusion of any one of these equal in significance to the exclusion of any other? The second problem is that such a definition would require that no other entity could display the capacity for some subset of these activities. This is patently false. Joint production and distribution activities take place in many settings far from what we might regard as households.

Nevertheless, the approach is of great practical value to empirical research, providing a guide to what to look for in data collection on household behavior.

The most obviously economic activities are production, distribution, and transmission. Production processes vary according to their timing and the diversity of their tasks. Greater complexity and simultaneity of productive activities will likely demand larger labor forces and may place the independent productive capacity of the household under stress. Households, faced with the trade-off between labor drudgery and satisfying needs may well experience bottlenecks at times of high labor needs and be forced to seek labor from outside the household.

Household distribution is often accomplished through pooling of resources and labor via an accepted generalized reciprocity. The long-term viability of the household will depend upon the willingness of members to subscribe to this. Pooling can be an effective security device in the face of uncertainty such as seasonality and income irregularity, particularly where incomes are relatively uniform across sources. On the other hand the presence of variation in income opportunities will reduce the willingness of likely winners to pool. Economic differentiation may lead to the diffusion of household members into smaller more mobile arrangements.

Transmission refers to the transfer of resources among family members through inheritance or marriage practices. Whether or not intergenerational transfer is a household function will depend on the extent to which resources have been privatized which, in turn, may result from increased population pressure and agricultural intensification (Wilk and Netting, 1984). Transmission strategies may also depend on relative resource scarcity

and productivity. Goody (1976) suggests that African hoe agriculture and Eurasian plough agriculture differ in this regard. In the African case there was little need to provide for a direct heir to particular resources because there was no shortage of land and little economic differentiation. In the Eurasian case, because neither of these conditions held, families sought to provide for offspring more directly. Goody also makes the useful distinction between lateral and lineal inheritance. Lateral inheritance favors brothers over sons and is quite common in West African cultures where siblings engage jointly in extensive agriculture. Lineal or vertical inheritance transmits property to the next generation. Transmission also happens upon marriage in the forms of goods or services. Schlegel and Eloul (1988) identify a correlation between kinds of marriage transactions and differing levels of sociocultural complexity; dowry and gift exchange prevail at higher levels of complexity and bride service, woman service and bridewealth at lower levels where labor needs are paramount.

Reproduction encompasses procreation and child socialization. Its economic significance is that it becomes part of the household calculus. Balancing the ratio of hands to work and mouths to feed, households are faced with questions of birth rate and spacing. The economic significance of their children will depend on the extent to which they can provide useful labor in the short term and security for aged parents in the longer term. Child socialization is not without cost and the capacity of households to bear it varies with type, nuclear households having the challenging adult to child ratio.

Coresidence and household membership are not necessarily synonymous. Over the life-cycle of the household, it is not uncommon for household members, particularly

the young and unmarried, to leave in search of paid labor. The significance of this for household boundedness depends on whether or not there continues to be an ongoing economic arrangement between the household and the migrant. One possibility is that the migrant's departure is part of the shedding of members necessary to maintain household viability under a system of lineal transmission, in which case the migrant is no longer a household member. Alternatively, the migrant, whether temporary or permanent, may continue to help support the household, thereby maintaining membership entitlements.

2.3 Migration

In the face of economic change, one way for households to maintain economic viability and independence is to incorporate migration into their operations, relying on emigrants' remittances as income sources and offering their absent members access to some of the rewards of distribution and transmission. This may not be easy. Individual migration may well place strains upon traditional household structure. Individualization of legal contracts in a market economy and the increasing emphasis on romantic love as a basis for marriage may turn migrants towards the nuclear family and away from extended forms, an effect reinforced by the primacy of legal regulation over customary practice in cities (Gugler and Flanagan 1978). If a household is part of a kinship-based continuum, then factors other than wage rates come into play. It is possible that earning a cash wage in the city is an income diversifying strategy employed by an extended rural family as insurance against variable agricultural output. If so, then the mere existence of a cash-wage source may be sufficient to keep a family member in town. It is possible that urban wage earning is the only viable means of capital accumulation for a non-heir to acquire agricultural land. Working in the city may be a short term asset accumulation strategy employed by young women who may return to marry and raise children. Household forms and sizes may provide clues as to the nature of the underlying economic arrangement. If migration is typically done by unmarried family members for short periods, there may not even be urban households. If migration is a longer-term activity performed by nuclear families, the physical quality of the urban household may be an

indicator of the long-term intentions of its members. The form of the rural household may vary across the family life-cycle if families move through the continuum from nuclear to extended (Robertson 1991). The presence of rural homes built by urban dwellers will indicate the continuation of the rural link. It may also suggest that the traditional kinship-based resource allocation is changing inasmuch as it indicates individual asset allocation.

Whatever their kinship obligations, young migrants are unlikely to have the capacity to maintain contact or sufficient resources for remittance. Older migrants, whether driven by bonds of generalized reciprocity or self-interest in their long-term welfare are more likely to maintain economic contact. Hence, across the life-cycle, the presence or absence of contact cannot necessarily be ascribed to kin-based obligations.

Kinship-based networks can break down for many reasons. Legal change in the nature of land tenure arrangements may reduce access to rural land by urban migrants (Potts 1995). Migration to the cities by young people of both sexes will, in Haiti, almost certainly result in the formation of urban nuclear households and families. Unmarried, divorced, or widowed women may not acknowledge any lingering attachment to rural patrilineal kinship systems, even in the event of urban income decline.

It is also possible that having a relative in the city provides access to urban facilities such as jobs, education and healthcare. Here, wage earning capacity may not be the most important factor in migration. Urban presence alone could act as a conduit for rural relatives seeking services or for would-be migrants seeking jobs.

There is ample empirical evidence that migration continues unabated even while developing-country urban labor markets demonstrate very high unemployment and underemployment rates. Under these circumstances the possibility of facing periods of less than adequate employment will have to enter into the calculation of the rational migrating worker. Todaro (1970) suggests that the true driver of the migration decision is the net present value of the expected stream over the planning horizon of the migrating worker. The rational migrant factors the wage differential, the unemployment rate, and the likely waiting time before finding a job into his calculations.

If workers move from low wage to high wage labor markets, over time we would expect the wage differential to shrink. The increased supply of urban workers should force urban wages down and the corresponding reduction in rural labor supply should force up rural wages, reducing the incentive to migrate. Basu suggests that there is downward rigidity or forces preventing the reduction of urban wages. When firms cut their wage rates, they will cut their wage bill but they will also increase their likelihood of labor turnover as workers depart in pursuit of higher wages elsewhere. The increased turnover and the associated labor replacement costs may outweigh the savings in the wage bill, thereby reducing the incentive to cut wage rates (Basu 1997, 2006).

These models lead to some powerful and paradoxical policy conclusions. They imply that, rather than solving the problem of urban unemployment, standard labor policies may exacerbate it. A policy of creating more urban jobs may lead to even more urban unemployment if it causes increased immigration. Government subsidy of urban jobs, by raising real urban wages (and increasing the rural-urban wage differential) may

also stimulate migration with similar results for urban unemployment. Expansion of educational opportunities may also create urban unemployment if education is used as a rationing device by employers (Basu 1997; Raj 1998; Todaro 1997).

2.4 Households at Risk

Understanding poverty requires understanding the underlying vulnerability. While related, these are not identical concepts. Prowse reminds us that not all vulnerable are poor, nor are all poor equally vulnerable (Prowse 2003). One approach is to regard poverty as a condition and vulnerability as a process. This is not to suggest that poverty is static, people can move in and out of poverty. Rather, we could regard both as dynamic in nature but differentiate between probabilistic and determinative. We can understand vulnerability as the probability of an inability to cope with an external shock while poverty results from variation in vulnerability. The relationship is not, of course, unidirectional. Vulnerability to shocks is both a cause and effect of poverty

Approaches to vulnerability measurement will have to vary along a number of dimensions (Baro and Deubel, 2006). They may be based on money metrics or on a basic needs framework. They may emphasize duration or severity of poverty. Incorporation of Social Capital into the research paradigm has had consequences for both the dimensions of the issue to be addressed and the manner in which it is analyzed. Specifically, the role of institutions in maintaining sustainability and providing access to resources has played a much greater role in research. In the 1970s research on Food Security was mostly concerned with issues of national and global food supplies. Supply shortfalls were understood to be created by production failures due to drought or to desert encroachment. In the 1980s the emphasis shifted the Household Food Security. By the time of the African Food Crisis in the mid 1980s, it was clear that adequate food supplies did not translate into food security for individuals and households. Attention broadened to

incorporate understandings of food entitlement and stable and sustainable access. In the early 1990s the focus broadened further to incorporate nutritional security, including concerns with food, health, mother and childcare. Food, it was noted, was only one factor in malnutrition issues. The fundamental questions were about the path from production/income to food and the extent to which food obtained is subsequently translated into satisfactory nutritional levels. In the mid 1990s the focus was developed further to incorporate Household Livelihood Security. Food is only one factor in how the poor make decisions, spread risk, and balance competing interests (Frankenberger and McCaston, 1998). Throughout this development, we note the growing significance of social networks and an emphasis on decision analysis.

Recent developments in development theory introduce normative and ethical elements into what had hitherto been a technical and scientific field. Sen is concerned more with a capabilities approach rather than a needs-based approach to development (Crocker 2008). For Sen, the purpose of development is not economic growth. Rather, it is a means by which to attain what he calls "instrumental freedoms", political freedoms, economic facilities, social opportunities, transparency guarantees, and protective security (Sen 1981, 1999). In a similar vein, Nussbaum (2011) lists the ten central capabilities necessary for human dignity: capacity to live of normal length, ability to maintain good health, guarantee of bodily integrity, ability to use senses, imagination and thought, capacity for emotional attachment, ability to plan one's own life via practical reason, capacity for affiliation with other people, ability to live with concern for other species, capacity for recreation, and capacity for political involvement and material property

rights (Nussbaum 2011). In their effort to create a general theory of disadvantage and to address the theoretical and practical challenges of appropriate policy responses, Wolff and De-Shalit make use of these capability approaches to facilitate the creation of categories of advantage and disadvantage (Wolff and De-Shalit 2007).

Confined as we are to the data at our disposal, we must limit ourselves in this paper to a prosaic, simple, and rather crude measure of vulnerability as it relates to livelihood security. Nevertheless, the elaboration of the ethical dimensions in development opens up a whole new vista of the theoretical and empirical possibilities necessary for more sophisticated understanding of the means and ends of the development endeavor.

Where expenditure on market goods and services exceeds monetary income, we categorize the household as vulnerable. The over-arching reason for using this is that we have the data. While accepting that it does not capture the complexity of the measures outlined above, we can at least argue that it indicates a condition unsustainable over time.

2.5 Female-headed Households

Are Haitian women more likely to be poorer than Haitian men? The question presents significant measurement problems, particularly if, as in these surveys, economic data is collected at the household level. While the easiest solution is to measure the income difference between male-headed and female-headed households, this conflating has its own difficulties. It tells us nothing about intra-household gender differences. It also leaves unanswered the need for clarity about the meaning of the term. We know that there are male-headed and female-headed households in our data-sets. Indeed, the survey designers drew from a stratified sample to ensure inclusion of the latter. What we do not have is an elucidation of why and how they are different. Are they different because of circumstance? Did a male-headed household become female-headed (or vice versa) because of death or desertion? Does migration confer headship on the remaining spouse?

Section 5.5 addresses the observable differences between the characteristics of households of both types, leaving unanswered the more fundamental question.

Medeiros and Costa (2008), in their study of eight Latin American countries, use two definitions of the feminization of poverty – an increase in the difference in the levels of poverty between women and men, and an increase in this difference between female-headed and male-headed households. They find no explicit evidence of the feminization of poverty. The number of children in a household rather than the sex of the household head appear to be a more significant driver. It should be noted that this is a study of differential change in poverty, leaving questions of absolute differences unanswered.

Buvinic and Rao Gupta (1997) offer guarded support for targeting female-headed households in poverty-reduction programs. They offer three reasons why such households have a propensity towards poverty. These relate, in turn, to issues of household structure, issues of gender difference, and issues arising out of an agglomeration of both. The first reason is that female-headed households have higher dependency rates. Why this seems to be more prevalent in female-headed households may be explained by the absence of fathers, removing, simultaneously, a worker from the dependency ratio and a traditional source of income transfer from father to children. Female-headedness, in this case, is a result of an absent male adult. The second reason is that women have poorer access to the labor market and to capital resources where access is determined – to a great extent – by lower education levels. This, however, is likely true of all women rather than household heads in particular. Their third, and most compelling suggestion, is that the combination of gender and household arrangement spawns poverty. Women who are both mothers and wage-earners may have to sacrifice some wage-earning potential to fulfill unpaid domestic roles. Female household heads – as householders - may face discrimination beyond that of gender bias. Finally, female-headed households may be the result of early parenthood and family instability.

That female-headedness is an indicator of household poverty seems to be clear and will be demonstrated in the empirical sections of this dissertation. Whether it is a cause remains problematic.

2.6 Tenure and Property Rights

An asset may be held, used, and transferred in a variety of ways depending on the property rights attached to it. The distribution of these rights will have considerable significance for the economic motivations of those who use the asset. If a person has absolute property rights to an asset, he has the right to make physical use of it, the right to derive income from it, and dispose of it (Furubotn and Richter 1997). The economic value of an asset can also be partitioned. For example, one may enjoy usufruct rights only i.e. the right to the produce derived from the asset and not the right to the asset itself. Someone who holds usufruct rights for a finite time period will likely have different motivations from one who enjoys absolute property rights. Because he cannot realize capital gain, the usufruct right-holder may be motivated to exhaust the soil and other attributes of the asset prior to surrender.

De Soto (2000) argues that formalizing property rights offers six major benefits the poor:

1. It fixes the economic value of the asset facilitating its use for purposes such as collateral and equity.
2. It integrates dispersed information, creating a formal widespread property market.
3. It makes people responsible by ensuring that they are accountable for contracts
4. It makes assets fungible to be split and combined as needed.
5. It networks people. Linking people to property allows for the development of public utilities such as electricity and water.
6. It protects transactions.

The property rights approach in De Soto's work implies an ownership that contains the capacity to alienate i.e. to exclude others from use of the asset. Such an understanding of property rights fails to account fully for the possibility of overlapping interests. This "bundle of rights" approach recognizes that the same asset can offer different non-competing use rights to different groups Examples of use rights to a plot include cropping by farmers, grazing by pastoralists in the fallow season, access to water for all (Hann 2005). Formalization of property rights may well exclude marginal groups from ancillary usage rights, impacting the livelihood modes of the powerless (Meinzen-Dick, Mwangi, 2008). Grey and Kevane (1999) argue that, in many Sub-Saharan societies, women's access to land has eroded for just this reason.

2.7 Rural Society in Haiti

The fundamental definition problem facing the BARA researchers was to decide on a definition of household that would make sense in the Haitian case. They defined a household as a unit of production and consumption, whose head and members may reside together and regularly take meals together (BARA 1996:12.). The reason for the loosening of the residential requirement is that the entity most closely resembling the household is the *lakou* or compound comprising a primary unit and a number of subsidiary ones within some form of extended kin group resides. Bastien (1961) suggests that the origin of the *lakou* lies in the practice of dividing land among children upon reaching adulthood. A related explanation may be a form of domestic relationship known as placage, discussed below.

Two forms of conjugal unions are observable in Haiti, mariage and placage. (Allman 1985, Herskovits 1937 and 2007, Williams, Murthy Berggren 1975). Mariage is a legally recognized union, usually church sanctioned. Placage is a less formal but communally-recognized relationship. Herskovits suggests that both are equally formal, that the difference between the two is primarily economic, and that couples may spend many years in placage before being able to afford to enter into mariage. On the other hand, Allman and Williams et al. ascribe placage, in some cases, to polygyny, a male in relationship with more than one woman either in series or simultaneously and associated with more than one primary household. This, in turn, may also be a reason for the multi-housing *lakou* (BARA 1996).

The problem of identifying multiple simultaneous relationships is a thorny one for nuptiality research, and all the more so if questions focus on marriage when other relationships are possible or rely on marital registration if that is not commonplace, both of which apply in Haiti.

	Etat Civil							
	Placage	Mariage	Separe(e)	Veuf/Veuve	Celibataire	N/A	Missing	Total
Masculin	1704	1317	166	187	2716	10	63	6163
Feminin	1850	1321	382	650	2094	9	123	6429
Total	3554	2638	548	837	4810	19	186	12592

Table 2.1: Civil Status of Those Aged 15 and Older

Table 2.1 shows the civil status for all people aged 15 and older across the three surveys. Younger people were labeled "not applicable" for this variable. We assume that the 1,317 males and 1,321 females who are reported as married are, in fact, married to each other. We cannot make the same assumption about those in placage. The placage relationships may not necessarily be with members of the same household or, indeed, with any household in the samples surveyed. Hence, we cannot infer that the 146 person excess of females over males in placage implies that these women and some number of men are in polygynous relationships. This problem will also be a complicating factor in our analysis of female-headed households in Chapters Three and Five.

Resources and obligations do not end with the household. Collective labor is a significant element in Haitian rural life. Their types, organization, activities and socioeconomic significance and political potential have been detailed in a recent ethnography (Smith 2001). Unfortunately, she offers less emphasis and no quantitative

detail on their economic significance. Essentially, they fall into two broad categories – those where work crews are compensated directly with cash and those which, directly or otherwise, generate mutual expectations. In a rural economy, this kind of mutual activity offers obvious benefits. It helps reduce seasonal labor bottlenecks and provides a larger workforce when needed for episodic labor-intensive activities such as ground-clearing. Simultaneously, it imposes obligations on the receiving household in terms of cash or reciprocity. Associated mutual-aid groups offer other kinds of hedges against vulnerability (Edmond, Randolph, Richard 2007). Two of the three surveys from which the data for this dissertation were gleaned sought some information on non-household labor but had difficulty integrating the information into their analysis, reverting – for the most part – to commentary. This is not surprising. Household surveys provide two important facilities to researchers. The household becomes the organizing dimension for both data-collection and analysis. At supra-household levels, these facilities are somewhat diminished. The crude solution is to monetize the relationships beyond the household as labor market transactions. Smith (2001) describes a more complicated reality. The work done and the food and drink supplied are not transactions but gifts; the expectations they generate depend on mutual circumstance. A host of some standing may be expected to make loans or rent land at favorable rates. The "price" varies with the transactors and not with market forces. Chapter Six explores some theoretical approaches to understanding transactions beyond the household and Chapter Seven suggests some future research possibilities for data-gathering and empirical evaluation.

Smucker, White and Bannister (2002), in their review of Haitian land tenure literature, estimate that 75% of all agricultural plots are owned – 37% via purchase and 38% via inheritance but that, for the most part, such ownership is customary rather than legal in nature. They suggest that high cost and lack of trust in the state are the reasons why people do not favor legal registration and documentation. They cite an FAO estimate that 95% of land sales in rural Haiti are not legally documented. From a property rights perspective, we would expect that this lack of legal ownership should discourage adoption of agricultural technology – crop bands, gully-plugging, hedging, tree-planting. However, by the authors' estimates, there were no significant differences between rates of adoption and mode of tenure.

3. HOUSEHOLD DEMOGRAPHY

3.1 Introduction

In this chapter we examine the basic characteristics of Haitian peasant households. We are interested in their size, composition and form. We also conduct exploratory analysis of how these measures differ by variables like age and sex of the household head and by the nature of the marital arrangement between principals – mariage and the less-formal placage being the alternatives. We are also interested in education attainment and in whether participation has any demographic consequences.

These households are both producers and consumers and household size has considerable significance for both of these activities. Age distribution and the combinations of workers and non-workers are also important dimensions in household size and composition. The dependency rate, the ratio of non-workers to overall household size, is of particular interest in understanding household composition because it may reflect a need to balance the overall size of the household with the capacity to support it. This is the so-called "hands to work versus mouths to feed" calculation.

Form refers to the kinship structure within the household. There is no reason why households must contain only kin-related members. In this dataset, however, all but 36 of the 1,402 households do so. Within them we identify three general kinship patterns – nuclear, stem and extended. These, too, may vary by size and composition. For example, nuclear and stem households, by definition, both limit the number of affinal relationships and thereby, their reproductive capacity. This suggests that they should

both be smaller than extended households. They may also have higher dependency rates because they limit adult membership categories.

Given the ongoing focus on female poverty in current development thinking, a potential driver of particular interest is the sex of the respondent. It should be noted, however, that these are household-level surveys, restricting us to differentiating between households, thereby conflating the difference between males and females with the difference between male-headed and female-headed households.

One possible explanation for differences in household form and size is that they vary with the age of the household. It can be argued that a household follows a life-cycle. Small and nuclear when newly-formed, it may grow in size and complexity over time, perhaps returning to a nuclear form as it sheds members. We do not have direct data on household age. Indeed, it would be difficult to create an empirical measure for it without knowing either when the household was formed or when the membership has been completely replaced. Instead, we will use the age of the household head as a proxy measure for household age.

3.2 National Context

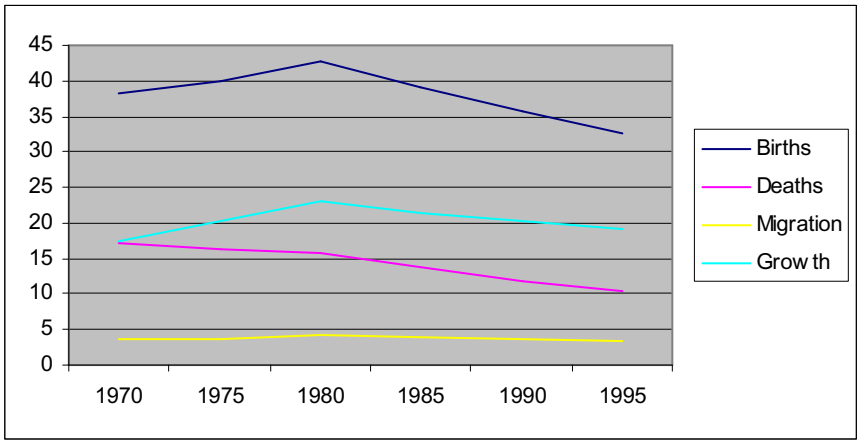
This section discusses national-level demographic statistics to allow us to contextualize the analysis of our survey data. The time period (1970-2000) covers the range within which the surveys were collected (1994-1996).

Per Thousand	1970-1975	1975-1980	1980-1985	1985-1990	1990-1995	1995-2000
Births	38.218	40.031	42.822	39.172	35.592	32.693
Deaths	17.147	16.178	15.74	13.839	11.913	10.331
Migration	3.571	3.633	4.082	3.873	3.549	3.272
Growth	17.5	20.22	23	21.46	20.13	19.09

(Source: World Population Prospects: The 2010 Revision, United Nations Population Division)

Table 3.1: Components of Population Growth (per thousand)

Table 3.1 and the associated Figure 3.1 show the components of population growth for 1970-2000. Rates are expressed in terms of events per thousand. The simple formula is: Population Growth Rate = Birth Rate – Death Rate – Net Migration Rate



(Source: Derived from Table 3.1)

Figure 3.1: Components of Population Growth 1970-2000

The most striking result is the turning point in the population growth rate in 1980-1985, the principal driver of which is the concurrent change in the birth rate trend. The death

rate falls over the entire time period, and the migration rate remains broadly constant. The change in the birth rate is reflected in the statistics in births per woman which fell from 6.2 in 1980-1985 to 4.6 in 1995-2000, a fall of 25%.

Year	Population	Median Age	Percentage aged 14 and younger	Dependency Rat10	Life Expectancy	Male	Female	Births per woman
2000	8,647,874	19.13	40.29	79.44	1995-2000	55	58	4.6
1995	7,860,725	18.55	42.56	86.55	1990-1995	54	57	5.2
1990	7,107,901	18.52	43.12	87.82	1985-1990	52	55	5.7
1985	6,384,846	18.76	42.26	85.17	1980-1985	50	53	6.2
1980	5,691,260	19.13	41.09	81.55	1975-1980	49	42	5.8
1975	5,143,887	19.13	41.27	81.74	1970-1975	47	49	5.6
1970	4,712,998	19	41.82	82.84				

(Source: World Population Prospects: The 2010 Revision, United Nations Population Division)

Table 3.2: National Demographic Measures

Despite the falling growth rate, Haitian population grew rapidly, rising by 83% between 1970 and 2000 (Table 3.2). Over the same period the median age ranged between 18.52 and 19.13 years. It comes as no surprise, therefore, that the dependency ratio hovers around 80%. The dependency ratio is the ratio between the size of the dependent population (those aged 14 and younger plus those aged 64 and older) to the non-dependent population (those aged between 15 and 64) i.e. the presumed supporters of the dependents. In Table 3.2 the ratio as expressed as the number of dependents per 100 people of working age, hence a dependency ratio of 80% implies that there are four dependents for every five non-dependents. Although life expectancy for males and females rose significantly over this period, most of these dependents fall into the younger category. The percentage aged 14 and younger never falls below 40%, a distribution driven by the high birth rate.

3.3 Basic Household Data

The 1,402 households in the survey house 8,798 people, of whom 4,233 are male and 4,565 are female[4]. The average ages are very young - 21.31 for males (standard deviation = 18.43) and 21.23 for women (s.d. = 18.29). 50% of people are 16 or younger. These young average ages are associated with age distributions that are heavily skewed towards youth. The most dramatic illustration of this is the generational population pyramid in Figure 3.2 which divides the population into 20-year groupings. It shows a pronounced bulge for people 20 and younger. This kind of distribution will very likely result in high dependency rates, imposing considerable strain on the capacity of households to support themselves.

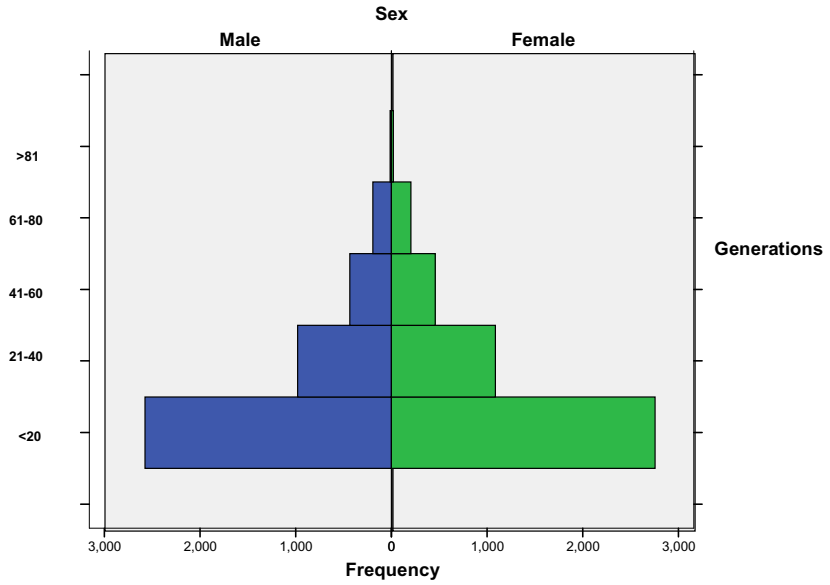


Figure 3.2: Population Pyramid Arranged by Generation and Sex

[4] Households and individuals do not all have complete sets of responses. Missing data is handled via pair-wise exclusion. Cases are included for analyses for which they have data and excluded where they have not. Hence, the number of cases will vary by analysis.

Men head 1,006 households and women head 396. The mean size of a male-headed household is 6.59 (s.d. = 2.98) compared to 5.5 (s.d. = 2.79) for female-headed. Table 3.3 illustrates one of the most significant differences between households. Almost 90% of the male heads have a resident female partner who is related either by marriage or placage, an informal but widely present arrangement. In contrast, 56% of the female household heads are single, widowed or separated. The consequences of this disparity for wealth, income-generation, land ownership and vulnerability will be addressed in the economics chapter as will the relationship between the skewed population distribution and economic activity.

			Civil status					Total
			Placage	Mariage	Separe(e)	Veuf/Veuve	Celibataire	
Sex	Male	Count	481	432	29	40	21	1003
		% within Sex	48.0%	43.1%	2.9%	4.0%	2.1%	100.0%
	Female	Count	107	67	57	130	31	392
		% within Sex	27.3%	17.1%	14.5%	33.2%	7.9%	100.0%
Total		Count	588	499	86	170	52	1395*
		% within Sex	42.2%	35.8%	6.2%	12.2%	3.7%	100.0%

* missing cases = 7

Table 3.3: Civil Status of Household Head

3.4 Household Form

People of any kinship relationship or none may occupy a household. Households can be categorized into a number of typical forms to take account of the nature of any kinship relationship between its members. The simplest and typical form is a conjugal family in a nuclear household. There are just two generations - parents and unmarried children or some subset of this such as a single parent and unmarried children. A stem household comprises three generations. The household stem links the household head's parents, spouse and unmarried children. While there may also be unmarried siblings of the middle generation present, there is no incorporation of other affinal relationships. The extended form of the household incorporates a wide variety of possible memberships including joint family membership, siblings and their conjugal families. We will use the term as a catch-all category for all remaining households in the dataset.

An important caveat is that these forms may not necessarily be the result of deliberate decisions by households. We cannot infer that the households deliberately chose these forms and acted accordingly. This is cross-sectional data showing household membership across many households at a single point in time, rather than through their life-cycle. We have no way of determining whether or how particular households change membership over time. Clearly, nuclear and stem households will each have to shed members over time to maintain their forms. Otherwise as members reach adulthood without leaving, the households will likely transform into extended form. Similarly, extended forms may change over time also, returning to simpler structures as generations

replace each other. Our data precludes us from testing for any of these possibilities. Hence, implicit in the analysis of form is an assumption that it is deliberately chosen.

Form	N	Mean	Std. Deviation	Range
nuclear	830	5.83	2.66	14
stem	102	6.81	3.18	20
extended	470	6.95	3.27	22
Total	1402	6.28	2.96	22

Table 3.4: Household Forms

Table 3.4 divides the households into three identifiable forms. The nuclear household accounts for almost 60% of all households. Just over 7% of households are in stem form and together these account for 2/3 of the households. We categorize the final 1/3 of the households as extended. Of the 470 in this category, just 35 have members without kinship ties with their fellows.

Table 3.5 shows how the forms differ from each other in terms of membership. It shows the proportion of households in each form reporting whether or not a particular relation is present e.g. 73% of nuclear households have spouses present compared with 65% of stem households and 64% of extended households. For differentiating between household forms, the categories of particular interest are those where forms have relationships in common. Both stem and extended forms may have siblings, parents, grandchildren and grandparents present. In this dataset, for the most part, they do not. It is clear that stem and extended differ significantly in membership categories. Grandparents and grandchildren are absent from extended households. Parents of the

Form by Relation	Head	Spouse	Son Daughter	Brother Sister	Father Mother	Grand-Child	Grand-Parent	Cousin	Nephew Niece	Uncle Aunt	In-Law	Other Relative	Other
Nuclear	1	0.73	0.92	0	0	0	0	0	0	0	0	0	0
Stem	1	0.65	0.87	0.57	0.47	0.03	0.02	0	0	0	0	0	0
Extended	1	0.64	0.8	0.11	0.06	0	0	0.11	0.33	0.02	0.33	0.39	0.07

Table 3.5: Composition of Household Forms

household head appear in approximately half of the stem households but are present infrequently in the extended form. Siblings in stem households must be unmarried, a stricture that does not apply in extended households. Nevertheless, the proportion of stem households containing siblings vastly exceeds that of extended households.

Stem and nuclear must shed members over time to maintain form. Extended form households have fewer restrictions on membership and, hence, have the potential to be larger. There is, however, no reason why a given household size must be related to a particular form. The minimum size of a stem household must be three members, while both nuclear and extended households can have as few as two. The constraint on the size of the nuclear form is the mother's fertility. In the case of stem households, size is limited by mothers' fertility across two generations. Nevertheless, in this sample there is a modest relationship between form and size. The mean size of the extended household (6.95) exceeds the mean of the stem households (6.81) and both are bigger than the average nuclear household (5.83).

Form by Size	<= 4	5 to 7	8 to 9	9+	Total
Nuclear	266	256	172	136	830
%	65.36	63.68	57.53	46.26	59.2
Stem	24	28	25	25	102
%	5.9	6.97	8.36	8.5	7.28
Extended	117	118	102	133	470
%	28.75	29.35	34.11	45.24	33.52
Totals	407	402	299	294	1402
%	100	100	100	100	100

Table 3.6: Cross-Tabulation of Size and Form.

We are less interested in knowing how form relates to discrete family sizes than we are in its relationship to broader size categories. Table 3.6 shows such a relationship. The most interesting result is the growing convergence between nuclear and extended forms as household size grows. Nuclear households comprise 65% of the smallest quartile and 46% of the largest. Extended households rise from 29% to 45%. Stem families show a slight upward trend as household size grows.

Another possible explanation for the form of the household is that it reflects different phases in the life-cycle of the household. A newly formed household may begin in nuclear form and – if it does not shed members - grow in complexity as it ages. Lacking time-series data, we use the age of the household head, as a proxy for the age of the household in trying to determine whether there are observable differences over the life-cycle. The result is a rather modest correlation coefficient of .18, significant at the .01 level. However, rather than examine the relationship between form and individual ages of household heads, it is more meaningful to examine how form varies across different generations. The cross-tabulation in Table 3.7 shows a convergence between nuclear and extended forms as they age. Both comprise essentially the same proportion of households in the oldest generation. The stem form decreases rapidly with age.

Form by Age	<=33	34-43	44-57	=>58	Total
Nuclear	220	218	220	163	821
%	61.97	63.74	63.4	47.25	59.2
Stem	41	35	13	13	102
%	11.55	10.23	3.75	3.77	7.28
Extended	94	89	114	169	466
%	26.48	26.02	32.85	48.99	33.53
Total	355	342	347	345	1389*
%	100	100	100	100	100

*missing cases = 13

Table 3.7: Cross-Tabulation of Household Forms and Age Cohorts

Table 3.8 is a cross-tabulation of the relationship between household form and the sex of the household head. Over 12% more males than females head nuclear households and 50% of female-headed households are in non-nuclear form.

Form by Sex	nuclear	stem	extended	Total
Male	630	61	315	1006
%	62.62	6.06	31.31	100
Female	200	41	155	396
%	50.51	10.35	39.14	100
Total	830	102	470	1402
%	59.2	7.28	33.52	100

Table 3.8: Cross-Tabulation of Household Forms and Sex of Head

Tests 3.1, 3.2, 3.3, are the Chi-Square tests for the cross-tabulations above. They examine whether household form is independent of household head age-cohort, sex of the household head, and size, respectively. The null hypothesis in each case is that form is independent. In all three cases we reject that null hypothesis of independence in favor of the alternate that there is a relationship between form and the three variables, as we claimed above. The effect sizes in all cases are small (Cramer's V = .160, 118 and .106 respectively) implying that the strengths of association are all modest.

	Chi-Square	df.	N	Significance	Cramer's V	Result
Test 3.1	71.206	6	1389*	0	0.16	**Reject**
Test 3.2	19.433	2	1402	0	0.118	**Reject**
Test 3.3	31..56	6	1402	0	0.106	**Reject**

* missing cases = 13

Test 3.1: Chi-Square test for independence of form and age cohort
Test 3.2: Chi-square test for independence of form and sex
Test 3.3: Chi-square test for independence of form and size

3.5 Household Size

The size distribution of households is illustrated in Figure 3.3. Although somewhat "peaked" (Kurtosis = 1.78) and positively skewed (Skewness = .83), its distribution is sufficiently close to normal to enable us to employ standard parametric statistical tests. The households range in size from one to 23 members with a mean of 6.28 and a standard deviation of 2.96. Separating by sex of household head, we note that the 396 female-headed households are smaller than the male-headed ones, with narrower ranges and smaller deviations (Table 3.9).

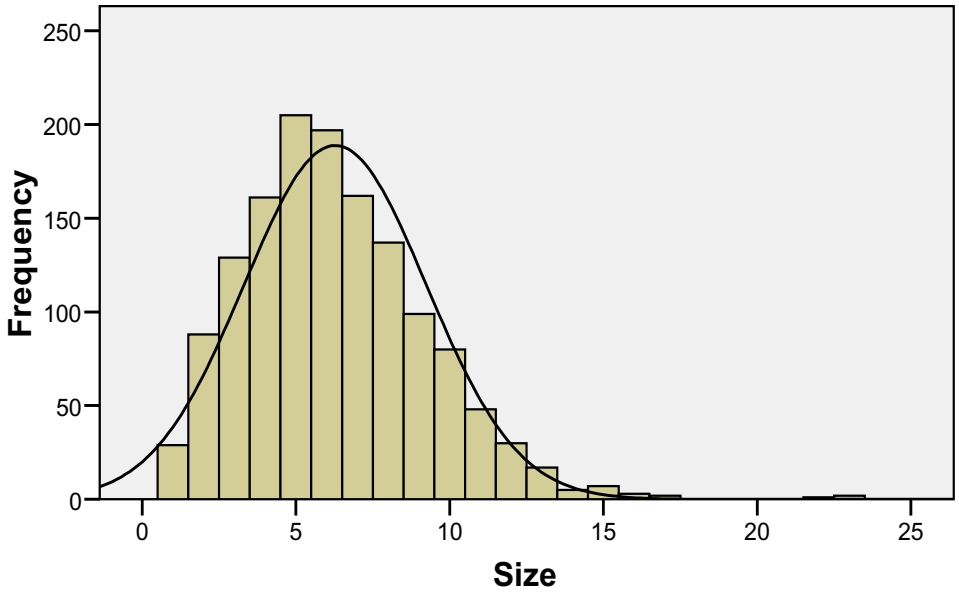


Figure 3.3: Size Distribution of Households

	Overall	Male	Female
Households	1402	1006	396
Mean	6.28	6.58	5.5
Standard Deviation	2.96	2.974	2.788
Range	22	22	16

Table 3.9: Household Size Statistics by Sex of Head

Test 3.4 is an independent-samples t-test, testing whether or not the mean difference between the sizes of male- and female-headed is significant. We reject the null hypothesis that the households have the same average size in favor of the alternative hypothesis that female-headed households are, on average, smaller. Similarly, an independent-samples t-test leads us to reject the null hypothesis that nuclear and non-nuclear (combining stem and extended forms) extended households are the same size in favor of the alternative hypothesis that nuclear households are smaller (Test 3.5). In each of these cases the effect sizes are moderate.

	Groups	Mean	Standard Deviation	N	Test Statistic	Significance	Effect size	Result
Test 3.4	M	6.58	2.97	1006				
	F	5.5	2.79	396	t = 6.41	0.00E+00*	0.374	**Reject**
Test 3.5	Nuclear	5.83	2.66	830				
	Non-Nuclear	6.93	3.25	572	t = -6.95	0.00E+00*	0.37	**Reject**

*Significant at the .05 level

Test 3.4 T-test of household size by sex of head
Test 3.5: T-test of household size by form

If we take the age of the household head as a proxy for the age of the household, we can test whether longer-established households are larger. A correlation coefficient of .045 indicates that there is little evidence of this. However, as used here, this test has two potential flaws. A non-significant result indicates the absence of a simple linear relationship, not the absence of any relationship. Furthermore, the test may also be too precise in that it tests for the consequences of discrete differences in age. It would be

more significant to know whether different generations of household heads have households of different sizes.

	Statistic	Significance	Effect size	Result
Test 3.6	F = 55.19 (3, 1385)	1.06E-33*	0.1203	**Reject**
Test 3.7	F = 44.31 (3,993)	7.12E-22*	0.118	**Reject**
Test 3.8	F = 12.00 (3,388)	1.58E-07*	0.0926	**Reject**

*Significant at the .05 level

Test 3.6: ANOVA of household size by age quartiles of heads
Test 3.7: ANOVA of household size by age quartiles of male heads
Test 3.8: ANOVA of household size by age quartiles of female heads

Dividing the household heads equally into four age groups allows us to use an Analysis of Variance test (ANOVA) to test whether the differences in means of the household sizes for each generation are significant. The test results – 3.6, 3.7, and 3.8 - lead us to reject the hypothesis that the mean household size is equal across generations. This holds true both for all households and for male- and female-headed households, considered separately. We can push this analysis a little further by conducting post-hoc t-tests on all pairs of age quartiles as shown in Tests 3.9, 3.10 and 3.11.

Test 3.9	means	<=33	=>58	34 - 43	44 - 57
<=33	5.1				
=>58	5.6	0.017357*			
34 - 43	6.9	2.92E-16*	5.78E-09*		
44 - 57	7.5	4.7E-29*	7.42E-19*	0.001912*	
Test 3.10					
<=33	5.3				
=>58	6.0	0.006437*			
34 - 43	7.1	1.91E-12*	3.79E-05*		
44 - 57	8.0	1.32E-25*	5.4E-14*	0.000306*	
Test 3.11					
<=33	5.1				
=>58	5.6	0.361142			
34 - 43	6.9	1.61E-05*	0.000212*		
44 - 57	7.5	3.77E-06*	5.58E-05*	0.825843	

*Significant at the .05 level

Test 3.9: Post-hoc analysis of differences in all means
Test 3.10: Post-hoc analysis of differences in male means
Test 3.11: Post-hoc analysis of differences in female means

Whether considered as a whole or divided by sex of the household head, the underlying pattern is that the household sizes are smallest for the youngest quartile, rise through the second quartile, peak in the third, and fall again in the oldest quartile. The test for each group resulted in 18 tests of significance and 16 demonstrated significant statistical difference from their neighbors. We are unable to reject the hypothesis that the mean size for female-headed households differs for the 33 and younger and 58 and older quartiles nor are we able to reject the hypothesis that the means for the middle pair are different. Nevertheless, these tests take nothing away from the general conclusion that average household size rises from a minimum in the youngest quartile, peaks in the middle and falls again in the oldest and that this is true for all households and for male- and female-headed households considered separately.

3.6 Household Composition

An agricultural household, reliant, for the most part, on its own labor resources, will need a domestic labor force sufficient for its productive needs. On the other hand, larger household sizes will also require greater output and income levels to sustain them. One possible consequence of this problem is that household composition may be the result of balancing the ratio of dependent and economically productive members. We define the dependency rate is the ratio of the number of dependents to the total members of the household. Thus, a rate of .5 would mean that a household has equal numbers of economically inactive and active members. This measure differs from the more conventional dependency ratio which is the ratio of people aged under 15 and over 64 to those aged between 15 and 64. We choose this alternative measurement for two reasons. The first is that it is independent of adult age. The cut-off of 65 years for economic activity is more suited to an industrial economy than an agricultural one. The second reason is that all of the adult respondents indicate whether they are available for work. It should be noted, however, that the survey assumed that people under the age of 13 were not available for work, eliminating the possibility of reporting childhood labor, and classifying all under this age as dependents.

	Groups	Mean	Standard Deviation	N	Test Statistic	Significance	Effect size	Result
Test 3.12	M	0.5796	0.2296	1006		.0343 one-tailed		
	F	0.6058	0.2469	396	t = -1.82		0.109	**Reject**
Test 3.13	Nuclear	0.5785	0.2453	830				
	Non-nuclear	0.5993	0.2184	572	t = -1.67	.0480 one-tailed	0.089	**Reject**

Test 3.12: T-test of dependency rate by sex
Test 3.13: T-test of dependency rate by form

Tests 3.12 and 3.13 are t-tests intended to compare dependency rates. We use Test 3.12 to reject the hypothesis that the dependency rates are equal in both male-headed and female-headed households in favor of the alternative that male-headed households have lower dependency rates. We also reject the hypothesis that dependency is equal across household forms in favor of the alternative that nuclear households have lower dependency rates than non-nuclear ones (Test 3.13). In each case the effect size is small.

We are also interested in whether dependency varies with the age cohort of the household head. ANOVA Tests 3.14, 3.15, 3.16 lead us to reject the hypotheses that dependency rates are equal across cohorts and this is also true for male-headed and female-headed households, considered separately.

	Statistic	Significance	Result
Test 3.14	F = 37.29 (3, 1385)	3.58E-23*	**Reject**
Test 3.15	F = 33.28 (3, 993)	1.68E-20*	**Reject**
Test 3.16	F = 10.49 (3, 388)	1.19E-06*	**Reject**

* Significant at the .05 level

Test 3.14: ANOVA of dependency by age quartile of all heads
Test 3.15: ANOVA of dependency by age quartile of male heads
Test 3.16: ANOVA of dependency by age quartile of female heads

An examination of these results more closely via the post hoc t-tests, 3.17 and 3.18, shows that, for men, dependency in the youngest cohort and oldest cohorts are significantly smaller than the middle two. For women, dependency in the oldest cohort is significantly smaller than the other three.

	Test 3.17: Men	58=>	<=33	44 to 57	34 to 43	**Test 3.18: Women**	58=>	<=33	34 to 43	44 to 57
Age Cohorts	Means	0.481	0.587	0.590	0.676	Means	0.496	0.613	0.633	0.661
58=>	0.481					0.496				
<=33	0.587	3.241E-07*				0.613	0.0001057*			
44 to 57	0.589	1.84358E-07*	0.9119622			0.633	4.603E-06*	0.5143724		
34 to 43	0.676	1.06691E-19*	1.66E-05*	2.678E-05*		0.661	1.286E-07*	0.1331911	0.3765299	

* Significant at the .05 level

Test 3.17: Post-hoc test of differences by male heads

Test 3.18: Post-hoc test of differences by female heads

3.7 Education

Do women with more education have fewer children? Economists offer two general reasons why to expect this. If education leads to increased earning potential, it also raises the opportunity cost of not being in the labor force. Prolonging education in teenage years also cuts into the years of prospective child-bearing. The validity of these assertions depends on the underlying assumptions. The opportunity cost argument obviously assumes that there are economic alternatives available to women. But it also assumes that education is perceived in a society as conveying market skills. The 'education as birth control" argument assumes both a capacity for voluntary postponement and that pursuit of education and child-rearing are incompatible. These assumptions are all testable for a given community, as are the resulting hypotheses.

Nothing in the dataset allows us to link children directly to their mothers. In order to create a subset from the data that will create this link we first identified households with children under 14 years and those with women between 15 and 54 years old, thereby assuming that the oldest age at which a woman could give birth is 40. From these women we chose only those who reported their civil status as mariage, placage, separee, or veufe, and excluded the celebitaire. We then matched the two groups of household lists. Finally, we excluded any household where there was more than one potential mother. In those households where there was just one adult woman, we assumed that she was mother to the minor children present. All of these decisions are debatable. The most problematic is that excluding households where there was more than one potential mother

present effectively excluded the extended form household from the analysis. On the other hand, the value of the approach is that we can say, with some certainty, that the households remaining in our subset contain only mothers and their children. Hence, we can argue that, at least for nuclear and stem forms, the analysis and conclusions are valid.

The four education possibilities for women were: analphabete, primary incomplete, primary complete, and secondary. The difference between the education levels of all adult women and those eventually identified as mothers of known children is shown in Table 3.10. The education levels for the subset selected are lower than the overall group and the analphabete category is over-represented - suggesting another reason for circumspection in the interpretation of results.

Adult Women	Analphabete	Primary Incomplete	Primary complete	Secondary	University	Total
All	1302	768	125	207	3	2405
%	54.07	31.89	5.19	8.6	0.12	100
Selection	566	236	25	33	0	860
%	65.81	27.44	2.91	3.84	0	100

Table 3.10: Education of Women in Mother Sample versus All Women

Test 3.19 and 3.20 show that there is no significant relationship between a mother's education and the number of children she bears, even when we simply separate mothers into two categories - some education and none.

	Statistic	Significance	Effect size	Result
Test 3.19	F = 1.53 (2,732)	0.2047	0.005	**Fail to Reject**
Test 3.20	t = .1.89	0.592	0.004	**Fail to Reject**

Test 3.19: ANOVA of number of children by mother's education
Test 3.20: T-test of number of children by whether mother had any education

Test 3.21 shows the post hoc t-tests for the differences between means. The mean number of children for the analphabete group is 3.6 versus 3.2 for both primary-complete and secondary. Nevertheless, in the seven cases where we compare each mean to all of the others, we fail to reject the hypothesis that the means for each education level are equal. When interpreting this striking result we must remain cognizant of the limitations imposed on the analysis by the absence of data linking mothers to children directly. Nevertheless, at a minimum, we must conclude that a relationship between a woman's education and the number of children that she bears cannot always be assumed. This issue and potential future research directions are discussed in the final chapter.

Test 3.21	Primary Complete	Secondary	Primary Incomplete	Analphabete
Means	3.2	3.2	3.4	3.6
Primary Complete				
Secondary	0.9635			
Primary Incomplete	0.5432	0.5328		
Analphabete	0.1987	0.1619	0.0586	

Test 3.21: Post-hoc tests of differences by mother's education

Table 3.11 shows the education attainments by adults of different generations sorted by sex. In every age cohort, the level of education of men exceeds that of women.

Sex	Cohort	Primary Complete	Secondary	Primary Incomplete	Analphabete	Total
Male	15-30	0.2	0.47	0.11	0.21	1257
Female		0.32	0.46	0.08	0.14	1334
Male	31-45	0.48	0.36	0.05	0.11	456
Female		0.74	0.21	0.02	0.03	534
Male	46-60	0.67	0.29	0.02	0.02	317
Female		0.88	0.11	0.01	0	314
Male	61+	0.7	0.27	0.01	0.02	210
Female		0.94	0.05	0	0.01	223

Table 3.11: Education Levels of Adults by Sex

	Cohort	Analphabete	Primary Incomplete	Primary Complete	Secondary
Test 3.22:	15-30	3.8027E-12*	0.6100125	0.0090987*	2.631E-06*
	31-45	0.00E+00*	1.566E-07*	0.0092448*	5.075E-07*
	46-60	2.7678E-10*	1.629E-08*	0.301852	n/a
	61+	4.6415E-11*	2.551E-10*	n/a	0.3864598

* Significant at the .05 level

Test 3.22: T-tests of gender differences in education by age cohort

Whether or not the differences are significant is evaluated in Test 3.22. For the 15-30 and 31-45 age groups, male education levels are significantly higher than female in seven of the eight categories. Male attainment is also significantly higher in the 46-60 and 61+ age groups for the two categories – analphabete and primary incomplete – where there are sufficient numbers to make the contrast meaningful.

It is more difficult to perform a similar test on the 5-15 age group because members of this cohort may be in school and may continue their education after survey. A partial solution to this is offered in Test 3.23 which evaluates the gender differences in the proportions of children classified as analphabete for each year.

Age	5	6	7	8	9	10	11	12	13	14
Male	0.76	0.58	0.43	0.45	0.3	0.27	0.26	0.21	0.22	0.17
Female	0.7	0.54	0.43	0.36	0.28	0.32	0.15	0.18	0.27	0.16
p value	0.2175	0.468	1	0.1109	0.744	0.3604	0.0433*	0.5094	0.3731	0.829

*Significant at the .05 level

Test 3.23: Testing gender differences in the analphabete category across years

The results here are quite different from those for the adults. There is no significant difference between male and female scores in nine of the ten categories. The only significant result is for 11 year olds where the female proportion is significantly lower than the male.

3.8 Marital Arrangements

There is no evidence for plural marriage in this dataset nor are there cases where a person heads more than one household. Two kinds of marital arrangement are discernable. *Mariage* is a legally-sanctioned union while *Placage* is a common informal relationship. Test 3.24 demonstrates that there is no significant difference in form between men and women. Women are more likely than men to be separated or widowed.

Test 3.24	Placage	Mariage	Separe(e)	Veuf/Veuve	Celibataire	Total
Male	554	516	45	54	1050	2219
Percentage	24.97	23.25	2.03	2.43	47.32	100
Female	647	512	97	207	900	2363
Percentage	27.38	21.67	4.10	8.76	38.09	100
Total	1201	1028	142	261	1950	4582
p value	.0638	.2001	0.0001*	0.0001*	2.70E-10*	

*Significant at the .05 level

Test 3.24: T-tests of differences in civil status by gender of household head

There are areas where the form of union appears to be significant. Table 3.12 shows that for those in a relationship, the prevalence of placage is greatest among those without formal education and is gradually replaced, for both men and women, by mariage as education levels rise.

	%	Analphabete	Primary Incomplete	Primary Complete	Secondary
Male	Placage	61.48	46.41	42.37	20.62
	Mariage	38.52	53.59	57.63	79.38
	Total	100	100	100	100
Female	Placage	62.22	46.79	20.59	17.50
	Mariage	37.78	53.21	79.41	82.50
	Total	100	100	100	100

Table 3.12: Form of Union by Education by Sex

Chi-square tests 3.25 and 3.26 confirm this relationship for both men and women. In both cases, the association – as measured by Cramer's V – is small.

	Chi-Square	df.	N	Significance	Cramer's V	Result
Test 3.25	65.114	3	1059	0.047	0.303	**Reject**
Test 3.26	10.63	3	1149	0.014	0.011	**Reject**

Test 3.25: Chi-square test of Independence of union form and education – male
Test 3.26: Chi-square test of Independence of union form and education - female

Table 3.13 examines whether there is a relationship between the form of the union and age cohorts. The associated tests – 3.27 and 3.28 – reject the null hypothesis that the variables are independent. It appears, however, that, although the proportions change between cohorts, there is little evidence of a simple linear relationship between the two.

	Male (n = 1059)					Female (n = 1149)				
%	29 and younger	30 to 39	40 to 50	51 and older	Total	29 and younger	30 to 39	40 to 50	51 and older	Total
Placage	55.38	44.86	55.30	52.27	51.56	57.82	54.93	60.49	46.27	55.70
Mariage	44.62	55.14	44.70	47.73	48.44	42.18	45.07	39.51	53.73	44.30
Total	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00

Table 3.13: Form of Union by Age Cohort

	Chi-Square	df.	N	Significance	Cramer's V	Result
Test 3.27	7.29	3	1059	0.047	0.247	**Reject**
Test 3.28	10.63	3	1149	0.014	0.234	**Reject**

Test 3.27: Chi-square test of Independence of union form and age cohort – male
Test 3.28: Chi-square test of Independence of union form and age cohort - female

3.9 Conclusion

The results of the 28 tests conducted on household demography in this chapter provide us with a wide range of preliminary conclusions about Haitian rural households and, in turn, a set of testable hypotheses for subjection to meta-analysis in Chapter Five.

We observed three distinct household forms in our sample – nuclear, stem, and extended, and we can make probabilistic statements about two of them. When contrasting nuclear and extended households, the nuclear form is more likely to have a younger household head, more likely to have a female head and more likely to be smaller in size than the extended form. Female-headed households, regardless of form, tend to be smaller than male-headed households.

When we test for generational differences in household size, we find a consistent pattern for all households and for male-headed and female-headed, considered separately. Average household size is smallest in the youngest age quartile, rises in size in the middle quartiles, and falls again in the oldest quartile. This is the first empirical verification of our general hypothesis about the existence of a household life-cycle.

Household dependency rates will have considerable significance for income and vulnerability. Our tests show that male-headed households have lower dependency rates than female-headed households. Nuclear households have lower dependency rates than non-nuclear households. Inasmuch as the nuclear form is self-limiting in adult membership, this is a surprising result. Another result of interest is that for both male-headed and female-headed households, the dependency rate is lowest in the oldest age quartile and highest in the middle quartiles. When we combine this with the results of the

size tests, we must conclude that older households have shed both members and dependents. Whether this has any economic significance as a mechanism to guard against vulnerability, for example, is tested in Chapter Four

Males have higher education levels than females but this difference diminishes in the younger age groups, and all but disappears among teenagers and younger. Finally, and surprisingly, education of females does not appear to have any effect on their fertility rate. This result flies in the face of the conventional understanding of the significance of female education and is further discussed in the last chapter where we also identify some potential future research in this area.

4. HOUSEHOLD ECONOMICS

4.1 Introduction

In this chapter we explore the economic characteristics of households and the interaction between household demography and economic behavior. We are interested in the sources of income – agricultural and non-agricultural – and in the relationship between income and spending. We also pay particular attention to three dimensions of household economic behavior – vulnerability, migration, and gender differences.

4.2 National Economic Performance

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Real Gross Domestic Product per capita (gourdes)	2030.4	2031.0	1886.2	1747.7	1506.4	1618.7	1647.1	1656.5	1658.3	1669.2
Real Gross Domestic Product (billions of gourdes)	13.1	13.4	12.7	12.0	10.6	11.6	12.1	12.4	12.7	13.0
RGDP Growth (%)	1	1.9	-5.3	-5.4	-11.9	9.9	4.1	2.7	2.2	2.7
Inflation (%)	20.4	19	21.3	18.8	37.4	30.2	21.9	16.2	12.7	8.1

* 2000 estimate

Table 4.1: Macroeconomic Conditions 1990-1999

The household surveys were conducted during a period of great economic stress for Haiti following the 1991 embargo. Table 4.1 shows some key macroeconomic statistics for the period. Real Gross Domestic Product (RGDP) per capita was 13.1 billion gourdes in 1990. Ten years later, in 1999, it had barely returned to that level. In the interim it had fallen to as low as 10.6 billion gourdes in 1994, which was also the year of the largest annual percentage decline in RGDP, 11.9%. The population grew by 21.7% over that decade. The joint effect of this is that RGDP per capita fell by almost 26 % between 1990

and 1995 and, while increasing since then, had reached only 82 % of the 1190 figure by the end of the decade. Inflation rates rose to 37% in 1994, falling annually thereafter.

These unfavorable economic circumstances must have had a significant effect on the households surveyed. Their economic behavior and decision-making must have been conditioned by the effects of macroeconomic conditions on market prices for products and purchases, opportunities for non-agricultural earning, and migration decisions.

4.3 Migration

In this section we explore the demographic characteristics of migrants and their households. We also test for significant differences between migrant and non-migrants and between migrant and non-migrant households.

Of the 496 people were migrants at the time of the survey, 346 male and 150 female. The mean age of male migrants was 34.3 years with a standard deviation of 14.59. For female migrants the mean age was 26.33 years and the standard deviation was 13.6. All were over age 15.

		Analphabete	Primary Incomplete	Primary Complete	Secondary	University	Total
Migrants	Male (n = 343)	41.11	37.03	9.04	12.83	0	100
	Female (n= 149)	50.34	38.26	4.7	6.71	0	100
All Adults	Male (n = 2240)	37.32	40.27	7.37	14.73	0.31	100
	Female(n= 2405)	54.14	31.93	5.2	8.61	0.12	100
Test 4.1:	Migrants	0.00E+00*	0.00E+00*	5.53E-07*	2.28E-07*	n/a	
p values	All adults	0.00E+00*	0.00E+00*	2.13E-08*	2.03E-10*	n/a	

* Significant at .05 level

Table 4.2: Education Levels of all Adults and Migrant Adults
Test 4.1: T-tests of differences in education between migrant adults and all adults

Table 4.2 shows the relationship between the education levels of migrants and those of the general adult population. For both populations and sexes, the vast majority of adults had not completed primary education. The accompanying test (4.1) demonstrates that the differences in all categories are statistically significant. The most telling result for males is that migrants are more likely to lack any formal education than the adult male population. Female migrants lag behind their male counterparts but the difference

between migrants and the general female population, while significant, is less pronounced than it is for males.

The primary reason for exploring the relationship between education and migration is to examine the popular microeconomic hypothesis that education raises human capital and increases perceived earning potential. This raises the reserve wage – the opportunity cost of not migrating. As a corollary to this we could argue that a similar logic would explain why people with more education are more likely to migrate further and incur higher migration costs than those without. Table 4.3 presents the relevant cross-tabulations. It shows the proportion of migrants to regional and external locations, divided by education and general occupation type.

	Migrant Destination (%)	N	Autres Zones Agricoles	Ville (PauP Exclu)	Within Region	Port au Prince	USA	Autres Pays Exterieurs	Outside Region
no education	Travail Agricole Salarie 65%	86	73.26	16.28	80%	4.65	2.33	3.49	20%
	Travail Non-Agricole 35%	47	19.15	44.68		27.66	4.26	4.26	
some education	Travail Agricole Salarie 51%	71	54.93	19.72	61%	7.04	2.82	15.49	39%
	Travail Non-Agricole 49%	68	13.24	33.82		42.65	7.35	2.94	

Table 4.3: Cross-Tabulation of Migrant Occupation and Destination Controlling for Education

While agricultural labor remains the most prevalent job for all migrants, the proportion doing non-agricultural work is considerably higher for those with some education (49%) than for those without (35%). This result is consistent with the economic theory of migration if, in the absence of wage data, we make the assumption that

agricultural work is less well-paid than non-agricultural work. Similarly, as the economic hypothesis predicts, people with some education (39%) are more likely to incur the increased cost of travel outside the region than those without (20%). It should be noted, however, that this analysis does not account for the continued presence of agricultural labor among those with some education. Table 4.4 provides a partial answer. Agricultural labor all but disappears among migrants who have completed primary education, regardless of distance travelled.

		Primary Incomplete	Primary Complete	Secondary
In Region	Travail Agricole Salarie	44%	6%	3%
	Travail Non-Agricole	18%	6%	8%
Out of Region	Travail Agricole Salarie	15%	2%	1%
	Travail Non-Agricole	19%	7%	10%

Table 4.4: Migrant Labor among the Educated

The survey data distinguishes between long-term migrants (one year or more) and those whose migration is measured in months and motivated by household needs "au temps du crise". The very fact that long term migrants retain membership of the household is significant in itself. It implies that physical presence – at least in some cases – is not a requirement for household membership. This is not surprising in the case of short-term seasonal migration with its implied expectation of the migrant's return to the household. For longer absences there is no such implication. We have no record of whether there are other long-term migrants who are not regarded as household members, despite having similar kinship relationships. Therefore, we are limited in our capacity to delimit the relationship between long-term migration and household membership. We

can, however, examine whether the distinction between short- and long-term migrants is more than merely temporal i.e. if it has any demographic or economic significance. Table 4.5 and the associated tests demonstrate that there are significant differences between long term and short term migrants.

	Sex		Relation		Destination	
	Male	Female	Head	Other	In Region	Out of Region
Short Term	241	87	158	170	252	76
Long Term	83	58	18	123	58	73

Table 4.5: Relationship between Migration Duration and Sex, Household Relationship and Destination

The table shows that migration within the region is more likely than migration outside in the short term. It also shows that males are more likely than females to be short-term rather than long-term migrants. Household heads are more likely than other household members to be short-term migrants. Tests 4.2 - 4.4 support these findings by rejecting the null hypothesis that there is no relation between duration and sex, household status, and destination.

	Chi-Square	df.	Significance	N	Cramer's V	Result
Test 4.2	10.703	2	.005*	469	0.146	**Reject**
Test 4.3	52.762	2	.000*	469	0.305	**Reject**
Test 4.4	41.119	2	.000*	459	0.308	**Reject**

* Significant at .05 level

Test 4.2: Chi-square test of independence of sex and migration duration
Test 4.3: Chi-square test of independence of relationship and migration duration
Test 4.4: Chi-square test of Independence of destination and migration duration

The 496 migrants were drawn from 365 of the 1,402 households surveyed. Of the 1,402 households surveyed, 365 have migrant members. Possible reasons for migration may be found in the demographic makeup of households. Tests 4.5 through 4.7 examine how the

dependency rates of migrant and non-migrant households differ. They indicate that the dependency rate is not a driver of emigration. Regardless of whether we examine male-headed, female-headed, or all households, we fail to reject the null hypothesis that there is no difference between the dependency rates of the migrating and non-migrating.

	Groups	Mean	Standard Deviation	Number	Test Statistic	Significance	Result
Test 4.5	Non-Migrant	0.58	0.24	1037	t = -0.698	0.485	**Fail to Reject**
	Migrant	0.59	0.21	365			
Test 4.6	Non-Migrant	0.579	0.24	760	t = .385	0.7	**Fail to Reject**
	Migrant	0.209	0.21	233			
Test 4.7	Non-Migrant	0.596	0.26	279	t = -1.294	0.196	**Fail to Reject**
	Migrant	0.632	0.21	110			

* Significant at .05 level

Test 4.5: T-test of dependency rates –all
Test 4.6: T-test of dependency rates –Male
Test 4.7: T-test of dependency rates –Female

Another possible explanation for migration is that it may depend on whether households have spare labor capacity, more labor than is necessary for its domestic functions. We have no direct way to calculate this. One possibility is to calculate a household support ratio equal to one minus the dependency ratio and to assume that the higher this ratio, the greater the capacity of a household to support itself and, perhaps, the more likely that a household has some potential for migration. We examine this in Tests 4.8, 4.9, and 4.10. In all three cases we fail to reject the null hypothesis that there is no difference in the support ratios of migrant and non-migrant households.

	Groups	Mean	Standard Deviation	Number	Test Statistic	Significance	Result
Test 4.8	Non-Migrant	0.416	0.2414	1039			
	Migrant	0.4081	0.2125	343	t = .537	0.591	**Fail to Reject**
Test 4.9	Non-Migrant	0.4205	0.2356	760			
	Migrant	0.4271	0.2094	233	t = -.385	0.7	**Fail to Reject**
Test 4.10	Non-Migrant	0.4037	0.2566	279			
	Migrant	0.3679	0.2144	110	t = 1.294	0.196	**Fail to Reject**

Test 4.8: T-test of spare capacity –all households
Test 4.9: T-test of spare capacity –male headed households
Test 4.10: T-test of spare capacity –female-headed households

Having failed to find demographic explanations for migration, we turn to income differences. An examination of income differences between migrating and non-migrating households presents some challenges. On all income measures, the data is heavily right-skewed. Rather than standard t-tests of means which are designed only for use on normal distributions, we will use Mann-Whitney U Tests to compare medians. We are interested in whether monetary income differentials are significantly different between migrating and non-migrating households. To control for household size, we test on a per-capita basis. The three variables are Total Income per person (TotalPP) which captures both monetary and subsistence income, Monetary Income per person before remittances (MonPreRemPP) and after (MonPostRemPP). Inasmuch as we expect that remittances are primarily monetary we should expect to see a significant difference in the latter two. Test 4.11 confirms this. There is no statistical difference between migrant and non-migrant households in Total Income per person or in Post-Remittance Monetary Income per person. There is, however, a significant difference between them in Pre-Remittance Monetary Income per person. Taken together, we can infer that remittances helped cut the per-person income gap between migrant and non-migrant households. The median

pre-remittance per person monetary income for non-migrating households is 431. For migrating households, it rises from 343.75 before remittances to 371 after.

Test 4.11:	TotalPP	MonPreRemPP	MonPostRemPP
Mann-Whitney U	169351	161091.5	169857
Z	-1.3790	-2.6679	-1.3001
Sig	0.1679	0.0076*	0.1936

* Significant at .05 level

Test 4.11: Mann-Whitney U test of Income differences between migrant and non-migrant households

4.4 Income

The most significant feature of household income is the extent of its inequality. Figure 1 shows a Lorenz curve of income distribution across households, the deviation from the diagonal showing the extent of the inequality. The accompanying table (4.6) identifies some of the more significant points on the graph. Over 48% of households share just 10% of the income while 50% of the income is shared among almost 90% of the households.

Households (%)	0	48.04	65.33	76.06	83.75	89.19	93.19	96.16	98.08	99.36	100
Income (%)	0	10	20	30	40	50	60	70	80	90	100

Table 4.6 Income Distribution

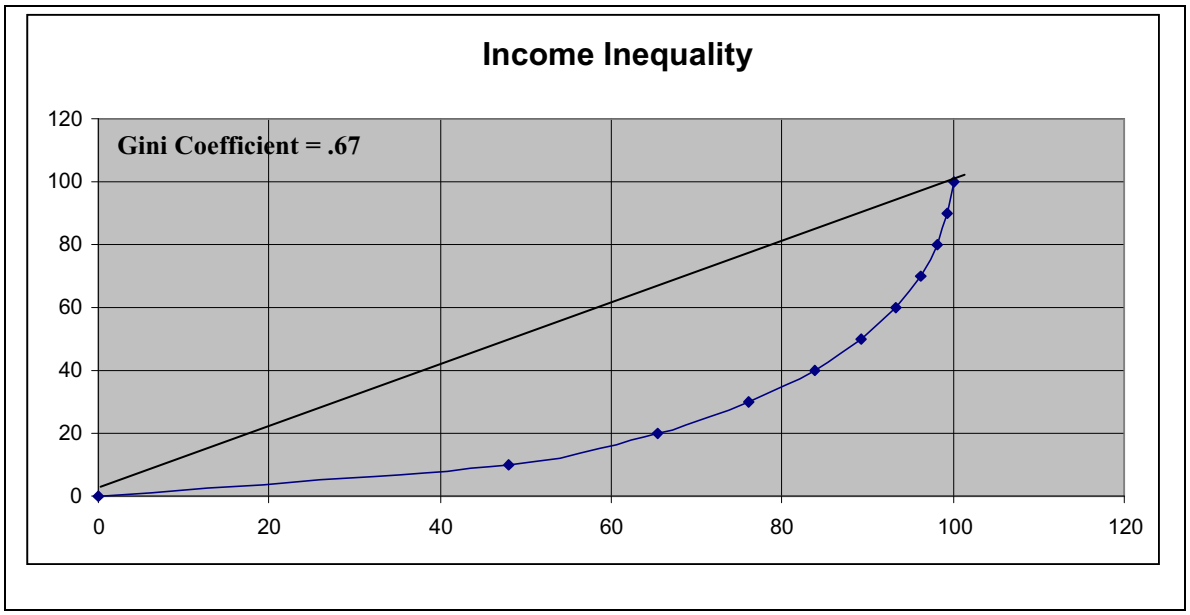


Figure 4.1: Lorenz curve of income distribution

We are interested in analyzing two different measures of income – monetary and total, where we define total income as the sum of monetary income and the market value of household subsistence. We can regard subsistence as income in the sense that it substitutes for the purchase of staples. On the other hand, it does not have all the characteristics of its monetary equivalent in exchange use.

As the Lorenz curve indicates, income is heavily skewed in this data-set. In order to make use of conventional parametric statistical tests, we must transform the monetary variables into forms that are approximately normal. First calculating per-person measures to account for different household sizes, we transform the measures by calculating their natural logarithms. The resulting distributions are approximately normal. This transformation will not affect the relative differences between households; it will simply facilitate testing for them.

In Tests 4.12 and 4.13 we continue our examination of the differences between male-headed and female-headed households and conclude that average income per capita of male-headed households – whether measured in total or monetary terms – is significantly larger than that of female-headed households.

	Groups	Mean	St. Dev.	N	Statistic	Significance	Result
Test 4.12	M	6.1475	1.4019	972			
	F	5.8416	1.3516	370	t = 3.666	.0000*	**Reject**
Test 4.13	M	6.4558	1.3305	991			
	F	6.1321	1.3176	381	t = 4.064	.0000*	**Reject**

Test 4.12: T-test of differences between male-headed and female-headed households in monetary income per capita (log)
Test 4.13: T-test of differences between male-headed and female-headed households in total income per capita (log)

In Tests 4.14 and 4.15 we look at the income differences between households with different kinship forms by testing for differences between the average per-capita incomes of nuclear and non-nuclear households, encompassing both stem and extended households. We are interested in these tests as part of our examination of the relationship between kinship form, income and household vulnerability. There is considerable overlap in the household sizes of both forms so we control for size to focus attention on the nature and consequences of the form itself. The tests demonstrate that there is a significant statistical difference between the two forms, the nuclear form having lower average incomes on both measures.

	Groups	Mean	St. Dev.	N	Statistic	Significance	Result
Test 4.14	nuclear	5.94038	1.413525	797			
	non-nuclear	6.24264	1.347244	545	t =-3.956	000*	**Reject**
Test 4.15	nuclear	6.25784	1.349179	812			
	non-nuclear	6.52256	1.297804	560	t= -3.654	000*	**Reject**

Test 4.14: T-test of differences between household forms in monetary income per capita (log)
Test 4.15: T-test of differences between household forms in total income per capita (log)

We are also interested in the association between the education levels of household heads and household average income as part of our pursuit of the manifestations of theories of human capital. Test 4.16 and 4.17 are ANOVA tests for three education levels – Analphabete, Primary Incomplete and Primary Complete. A small number of household heads with some secondary education are subsumed into the latter. The tests show that – in both cases – we reject the null hypothesis that there is no relationship between education and household income.

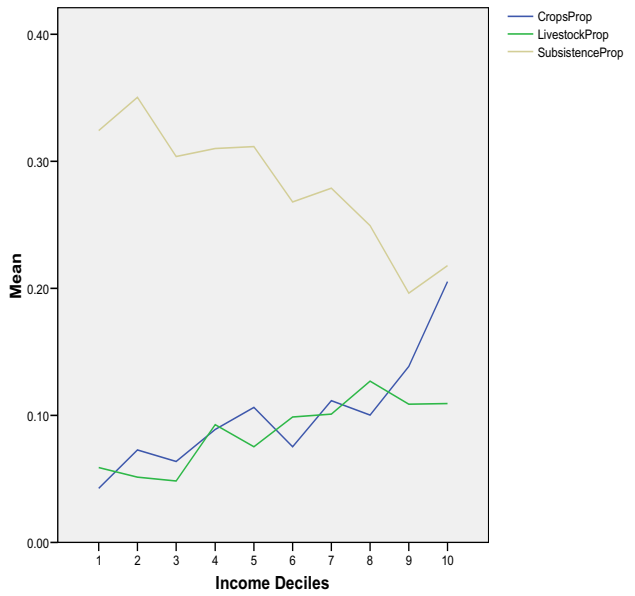
	Statistic	Significance	Result
Test 4.16	F = 19.65 (3, 1385)	3.89E-09*	**Reject**
Test 4.17	F = 2.73 (2, 1368)	9.13E-07*	**Reject**

Test 4.16: ANOVA of monetary income (log) by education of household heads
Test 4.17: ANOVA of total income (log) by education of household heads

The post-hoc t-tests between the three education levels make clear that the real difference in income is between household heads with some education and those with none. There is no significant difference between incomes of those with differing levels of education.

Test 4.18	means	Analphabete	Some Primary	Primary Complete
Analphabete	7.593			
Some Primary	8.009	1.39E-06*		
Primary Complete	8.213	7.04E-07*	0.128	
Test 4.19				
Analphabete	5.3			
Some Primary	6	1.92E-06*		
Primary Complete	7.1	1.33E-06*	0.1426	

Test 4.18: Post-hoc t-tests of monetary income by education
Test 4.19: Post-hoc t-tests of total income by education



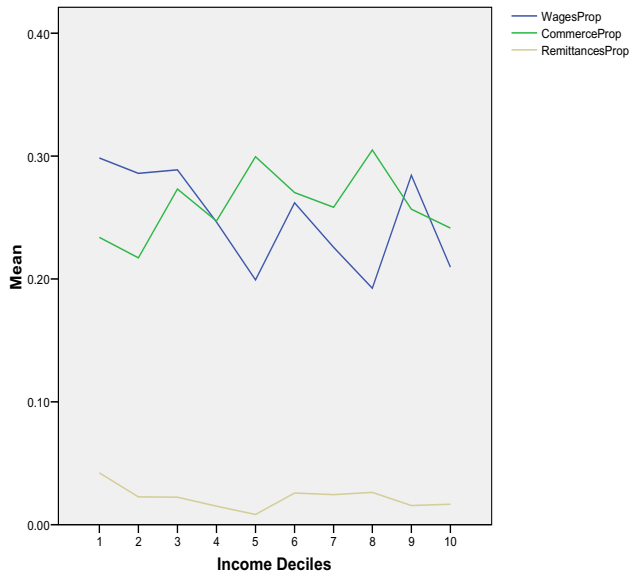


Figure 4.2: Income Sources (a) Agricultural (b) Non-Agricultural

4.5 Income Sources

The monetary income sources for the households are: crop and livestock sales, commerce, wages, and remittances. We calculate total income by adding the market value of subsistence. To investigate how the composition of income differs across households we calculate the proportion that each element contributes in different income deciles. The results are presented in Figure 4.2 (a and b). It is evident that the proportions of non-farm earnings – wages, commerce and remittances remain relatively constant across income deciles. Wages and commerce fluctuate between 20% and 30% of total income, intersecting twice, with no other discernable trend to their contribution to total income. Remittances are present in all deciles, never rising above 5%. On the other hand, there are distinct trends within farm-based income. The proportion devoted to subsistence falls from over 30% for the poorest households to 20% for the most well-off. Livestock sales gradually rise in significance while crop sales, in particular, become an increasingly important element for higher income households.

The next tests are designed to tease out the economic and demographic factors and identify the drivers of this agricultural output. In agricultural economics, the typical approach to this problem is to estimate a production function. A production function measures the relationship between inputs and outputs. In our case, output (Q) is value of all agricultural production, including that self-consumed, measured at market prices. The inputs are land (K), labor (L), and technology (I), seed, fertilizer, etc. Thus, Q depends on K, L, I or Q = f (K, L, I). Production functions can have many functional forms. In our case we use an exponential functional form $Q = eK^{b1}L^{b2} I^{b3}$, where e is the base of the

natural logarithm. The most attractive aspect of this function is that, in its logarithmic form, it allows for non-linearity in the variables while still being linear in its coefficients, thereby allowing for standard ordinary least squares regression. Forcing linearity on the variables would mean that we are assuming, without any justification, that there is a simple linear relationship between them. We add three dummy variables to account for particular independent demographic variables. The fact that it is linear in its coefficients also implies that the elasticity of the output value with respect to the value of an input is constant. By elasticity we mean the change in the level of output caused by a one percent change in the value of an input, holding all other inputs constant. We add three dummy variables to our basic equation. The purpose of a dummy variable is to allow us to take account of categorical variables such as the sex of household head. The Form variable (FormDum) values nuclear households at 0 and non-nuclear at 1, implying that we expect that the non-nuclear form has a positive impact on output. Similarly, the Sex variable (SexDum) values males at 1 and females at 0 while the Education (EdDum) variable values any education at 1 and lack of education at 0.

$$LnQ = b_0 + b_1 lnK + b_2 lnL + b_3 lnI + b_4 FormDum + b_5 SexDum + b_6 EdDum \qquad (4.1)$$

Our second model adds a variable – the proportion of the land owned (OWNPROP) to test for any evidence for a relationship between output and security of tenure.

$$LnQ = b_0 + b_1 lnK + b_2 lnL + b_3 lnI + b_4 FormDum + b_5 SexDum + b_6 EdDum + b_7 OWNPROP \qquad (4.2)$$

Table 4.7 (a) Model I coefficients

Model 1	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	t	Sig.
(Constant)	3.633	0.2093		17.3601	0
lnK	0.3919	0.057	0.2454	6.8738	0
lnL	0.648	0.1078	0.2043	6.0107	0
lnI	0.2385	0.0407	0.2015	5.8533	0
FormDum	0.298	0.1123	0.0873	2.6533	0.0081
SexDum	0.0184	0.1341	0.0046	0.1371	0.891
EdDum	0.2262	0.1101	0.0669	2.0541	0.0403
Model 2	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	t	Sig.
(Constant)	3.7677	0.2475		15.2248	0
lnK	0.3988	0.0574	0.2497	6.946	0
lnL	0.6484	0.1078	0.2044	6.0148	0
lnI	0.234	0.041	0.1977	5.7101	0
FormDum	0.2997	0.1123	0.0878	2.6681	0.0078
SexDum	0.0022	0.135	0.0006	0.0164	0.9869
EdDum	0.2297	0.1102	0.068	2.0847	0.0374
OwnProp	-0.1528	0.1499	-0.0332	-1.0195	0.3083

Table 4.7 (b) Model 2 Coefficients

Table 4.7 shows the coefficients for both models. In both cases the principal drivers are land, labor and inputs, as expected. All are significant at the .05 level. The standardized coefficients - which allow us to compare their effects directly - indicate that land is the most significant predictor. Each of the dummy variables has the appropriate sign, indicating some predictive value - male households, non-nuclear forms and some education all account for a modest increment in output, as expected, although only the sex variable is significant at the .05 level. The most surprising result is the negative sign

for the OWNPROP variable where we might have expected to see some positive impact of ownership status on output.

Table 4.8, the Model Summary, shows a slight increase in explanatory power of Model 1 over Model 2, but not in the expected direction. The relatively modest overall explanatory power of the models is most likely explained by variation in agricultural productivity across land holdings and lack of specific data linking crops to plots. Nevertheless, for our purposes – testing for the effects of Form, Sex, and Education on output - the results are convincing.

Model	R	R Square	Adjusted R Square	Std. Error
1	0.4978	0.2478	0.2417	1.4649
2	0.4989	0.2489	0.2417	1.4649

Table 4.8: Model Summary

Tests 4.20 and 4.21 confirm that we reject the null hypothesis that there is no relationship between the explanatory and dependent variables.

	Statistic	Significance	Result
Test 4.20: Model One Predictors	F = 40.41 (6, 736)	1.315E-42	**Reject**
Test 4.21: Model Two Predictors	F = 34.79 (7, 735)	5.264E-42	**Reject**

Subsistence persists across all income levels, albeit falling to 20% of total income in the highest income households from a peak over 30% in lower income levels, as illustrated in Figure 4.2(b). In order to examine this persistence, we identify households that

simultaneously engage in both selling and consuming their own agricultural output. Of the 1402 households, 610 meet this criterion. We label those that sell more than they consume as "market-oriented" and those that consume more than they sell as "subsistence-oriented". The summary statistics for how the two groups differ from each other are presented in Table 4.9. Of these variables, only income from commerce (Commerce) and post-remittance monetary income (MonPostRem) demonstrate statistically significant differences between the two groups (Test 4.22), implying that more access to money overall and from non-agricultural sources is what separates market-orientation and subsistence-orientation.

	Age		Workers		Dependents		Dep_rate		Wages		Commerce		MonPostRem	
	market	subst	market	subst	market	subst	market	subst	market	subst	market	subst	market	subst
N	177	428	180	430	180	430	180	430	180	430	180	430	180	430
mean	46.37	45.63	2.4	2.65	4.08	4.11	0.57	0.56	1975.92	1417.5	3178.53	2130.61	13421.3	6187.4
s.d.	14.59	15.37	1.46	1.55	2.85	2.66	0.25	0.23	3931.57	3337.6	6410.54	4933.49	21155.7	10249
Test 4.22: t =	0.542		1.819		-0.117		0.368		1.786		2.182		5.679	
Sig.	0.588		0.069		0.907		0.713		0.096		.030*		.000*	

*Significant at .05 level

Table 4.9: Summary Statistics for Subsistence Drivers
Test 4.22: T-tests of differences between market-oriented and subsistence-oriented households

None of the potential categorical drivers for differences in orientation – Sex, Form or Migrant status – demonstrated any explanatory power (Test 4.23-4.25).

	Chi-Square	d.f.	N	Significance	Result
Test 4.23	0.003	1	610	0.953	**Fail to Reject**
Test 4.24	0.811	2	610	0.667	**Fail to Reject**
Test 4.25	5.622	3	610	0.132	**Fail to Reject**

Test 4.23: Chi-square test of independence of orientation and sex
Test 4.24: Chi-square test of independence of orientation and form
Test 4.25: Chi-square test of independence of orientation and migration

4.6 Vulnerability

.The economic challenge for the household is to sustain itself. We can express this as ensuring that its total income equals or exceeds its total expenditure. The income side of the equation has two components, subsistence from auto-production and monetary income. The later, in turn, is comprised of income from the sale of agricultural produce, income from non-agricultural sources such as commerce and labor, and income from migration. Expenditure also has two primary components – food and non-food.

Risks to household sustainability can likewise be divided into these two categories. On the income side, we can identify natural or environmental risks as those introducing uncertainty into agricultural production and affecting both subsistence and agricultural sales. Political and economic risk will affect the capacity to sell produce, earn a non-agricultural income, or generate migrant remittances. On the expenditure side, both categories of risk affect the availability and the price of purchased goods and services.

Sustainability itself can be understood in two ways. One meaning is that the household is able to continue its current living standard. This is the meaning described above as the relationship between income and expenditure. Another meaning is that the household is at least able to sustain its level of food intake – its food sustainability.

There are both empirical and conceptual difficulties with each of these meanings. Ultimately, food sustainability is a function of the capacity to maintain a minimal level of calorific intake per person, rather than buying and selling foodstuffs. Furthermore, limiting the idea of sustainability to food implicitly imposes an etic valuation on choices

involving trade-offs between food, health, ceremonial, and educational expenditures, among others. The empirical difficulty relates to the nature and type of data available. We have cross-sectional data and do not know if the household variables measured relate to just one point in time or are typical of long-term circumstances. Furthermore, in the absence of more fundamental data such as calorific intake and measures of emic valuations of utility, we cannot say that an excess of the monetary valuation of income over expenditure indicates that a household has reached some position worth sustaining.

That being said, in order to take advantage of the data at our disposal, we must make some rather heroic simplifying assumptions. We define resilience as the capacity to maintain current living standards and measure it as the difference between the monetary value of total income and total expenditure. It seems reasonable to assume that households will be unable to sustain negative values of this measurement over time. Test 4.26 uses Spearman rank order correlation measures to test for the relationship between negative cash balance and six independent variables for male-headed and female-headed households, considered separately. Our hypotheses are that:

1. Positive cash balance has a positive correlation with the number of workers, the age and level of education of the household head, and household size.
2. Positive cash balance has a negative correlation with the dependency rate.

For male-headed households, we fail to reject the hypothesis in four of the five cases. The relationship with the dependency rate has the right sign (negative) but fails to reach significance. For female-headed households, we fail to reject the hypothesis in the cases of workers, education levels and size. The signs are correct for both the dependency

rate and the age of the household head but the values do not reach significance. The most surprising result is that – in both cases - we reject the hypothesis that there is a negative correlation between positive cash balance and the dependency rate.

The choice of cash balance as a measure of vulnerability is problematic. Approaches to creating more comprehensive measures are discussed in Chapter Seven

Test 4.26: Correlations		Balance (log)	Workers	Dep_rate	Education	Age	Size
Male	Balance (log)	1	0.157**	-0.013	0.082*	0.086**	0.135**
	Workers		1	-0.516**	-0.069*	0.239**	0.396**
	Dep_rate			1	0.081**	-0.119**	0.508**
	Education				1	-0.308**	-0.003
	Age					1	0.149**
	Size						1
Female	Balance (log)	1	0.255**	-0.015	0.228**	0.141	0.272**
	Workers	0.255**	1				
	Dep_rate	-0.015	-0.618**	1			
	Education	0.228**	-0.012	0.017	1		
	Age	0.141	0.199**	-0.218**	-0.420**	1	
	Size	0.272**	0.469**	0.346**	-0.005	0.019	1

** Significant at .01 level

Test 4.26: Spearman rank order correlation of relationship between negative cash balance and six independent variables for male-headed and female-headed households.

4.7 Conclusion

The most significant feature of household income is just how unequal it is. Over 48% of households share just 10% of the income and 50% of the income is divided among 89% of the households. Male-headed households have higher incomes, both total and monetary, than female-headed households. Nuclear households have lower incomes than non-nuclear households. Households whose heads have some level of formal education have higher incomes than those whose heads have none.

Across all income levels, the proportions deriving from wages, commerce, and remittances remain broadly constant. Those households in the higher income levels derive a much lower proportion of their incomes from subsistence and a much higher proportion from agricultural sales.

The level of agricultural output depends on the level of land, labor, and inputs. It also shows a positive relationship with male-headed households, the level of education of the household head, and non-nuclear households. We found no meaningful relationship between the level of output and the extent of land ownership.

Just over 26% of households have migrant members. There is no significant relationship between the dependency rate and migration. Nor is there any evidence of a "spare labor capacity" explanation for migration. There is significant evidence that migrant remittances reduce the per-person income gap between migrant and non-migrant households.

There is considerable evidence in support of the human capital explanation for migration. Migrants with some formal education are more likely to have non-agricultural

jobs than those without. The educated are also more likely to migrate further. Short- term migration, less than a year in duration, is more likely among males than females and more likely among household heads than those in another position.

The capacity of the household to sustain itself is positively related to the sex, age, and education of the household head and to the size and number of workers in the household. Surprisingly, there is no significant relationship between such resilience and the dependency rate.

5. META-ANALYSIS OF HOUSEHOLD SURVEYS

5.1 Introduction

In this chapter we extend the analysis of key household characteristics identified in Chapters Three and Four. We do so by conducting a meta-analysis of the data from the Northwest survey in 1995 and the two subsequent surveys of the North/Central and South from 1996. The availability of such large, homogenous, and detailed data-sets allow us an extraordinary opportunity for hypothesis generation and testing. Using meta-analysis we can synthesize the findings of multiple studies, test for consistency across them, and moderate the effects of outlier results. Ideally, this will allow us to make statistically significant statements about populations and offer us the possibility of contributing to theory refinement in economic anthropology.

The meta-analysis will focus on four elements of household economic behavior – migration, household form, education and vulnerability – for all households and for male-headed and female-headed households considered separately. In each case we generate our hypotheses from the findings in Chapters Three and Four where we analyzed the earliest dataset from the Northwest. We then test these hypotheses against all three sets separately and, most importantly, a composite measure. The results show, with some minor exceptions, remarkable consistency across the surveys, lending weight to the overall predictive value of the results.

In meta-analysis the statistic of interest is the effect size, a measure of the strength of the relationship between two variables. Depending on the type of data and tests used in the original studies, we can create different measures of effect size. In the cases under

investigation here we are primarily concerned with group contrasts for both continuous and categorical data. For continuous data where differences between means are tested for by t-tests or ANOVA we measure the Standardized Mean Difference. In the case of categorical data the appropriate statistic is the Odds Ratio – the ratio of the odds of an event in one group to its odds in another. For example, if we have two groups, men and women, and two outcomes, college graduate and non-graduate, we can calculate an odds ratio to measure the strength of association between gender and education. A ratio of one indicates independence. A ratio greater than one indicates a positive relationship between the variables while a ratio of between zero and one indicates the relationship is negative. We have recoded categorical data into binary form to allow for testing e.g. for household relations we identify just two variables – household heads and all other relationships.

For calculation purposes, analysis of mean differences and odds ratios are performed on their logarithmic forms with results then converted back to the original format. Fisher's Z performs a similar function when the meta-analysis is concerned with correlations. The model used throughout this chapter is a fixed-effect model. We assume that all studies in the analysis have effect size and the summary reflects that. In a random-effects model, on the other hand, the true effect size may vary by model. Here we use the fixed-effect model for simplicity and because there is no reason to believe that its underlying assumption is violated.

5.2 Migration

In this section we continue to test for evidence of the conventional microeconomic explanations for migration introduced in section 4.2., namely that people migrate because the reserve wage, the opportunity cost of not migrating, is too high and that education is the primary driver of this reserve wage. We are restricted to indirect indicators because we have no direct way of associating an educational level with a wage rate. While we know the remittances and education level of each migrant, we do not know his or her total migration earnings nor the time needed to earn that total.

In Test 5.1 we test for the relationship between a migrant's education and work. Continuing with our rather strong assumption that non-agricultural jobs pay more than agricultural jobs we would expect to see a positive relationship between the two variables. As noted earlier, we have recoded categorical variables into binary form. For education, the two categories are some education and none. We noted in Section 4.3 that this is the most significant differentiation for the education variable. For the work variable the categories are agricultural and non-agricultural with other job categories such as fishing and petty commerce excluded.

The results are mixed. Overall, the model indicates a positive relationship, with an odds-ratio greater than one (ψ = 1.4382). With $p < .05$ we can reject the null hypothesis that there is no relationship between education and job category in favor of the null hypothesis that there is a positive relationship. Note, however, that the p-value barely crosses the .05 significance level. It is evident that the effect of the South data, where we

fail to reject the null hypothesis that there is no relationship between education and jobs, is to weaken the overall apparent strength of the relationship.

Test 5.1	Odds ratio	Lower limit	Upper limit	Z-Value	p-Value
North	1.7370	1.0717	2.8153	2.2409	0.0250*
North/Central	3.7917	1.3782	10.4319	2.5811	0.0098*
South	0.6753	0.3504	1.3016	-1.1727	0.2409
Fixed Effect	1.4382	1.0003	2.0677	1.9617	0.0498*

* Significant at .05 level

Test 5.1: Relationship between migrant education and occupation

Test 5.2 examines the relationship between educational status and migrants' destination. A positive relationship is indicated by the odds-ratio, ψ = 2.2492. Z = 4.9104 and $p < .05$, allowing us to reject the null hypothesis that there is no relationship between the variables. This result is consistent with what we would expect from the economic theory of migration. People with more education are willing to endure the added cost of migrating further in return for the expectation of higher rewards, such expectations ensuing from their educational attainments. Here, the South Survey, with an odds ratio less than one, contradicts the predictions of the other two.

Test 5.2	Odds ratio	Lower limit	Upper limit	Z-Value	p-Value
North	2.4260	1.6387	3.5916	4.4273	0.0000*
North/Central	2.7857	1.2017	6.4578	2.3882	0.0169*
South	1.3868	0.6355	3.0264	0.8213	0.4115
Fixed Effect	2.2492	1.6275	3.1085	4.9104	0.0000*

* Significant at .05 level

Test 5.2: Relationship between migrant education and destination

Employing the same microeconomic approach to migration, we would expect that, to account for the added cost of migrating further, a long-distance migrant would stay away longer. Test 5.3 presents convincing evidence of this (ψ = 5.5307, Z =

8.6965, p = .000). The South Survey indicates the same positive relationship as the others but its results do not reach statistical significance.

Test 5.3	Odds ratio	Lower limit	Upper limit	Z-Value	p-Value
North	4.7450	3.1107	7.2381	7.2274	0.0000*
North/Central	13.9243	4.8040	40.3599	4.8505	0.0000*
South	6.6486	0.8600	51.4029	1.8154	0.0695
Fixed Effect	5.5307	3.7616	8.1317	8.6965	0.0000*

* Significant at .05 level

Test 5.3: Relationship between migrant destination and duration

Test 5.4 examines the relationship between duration of migration and the migrant's household position, which we divide into two categories – the household head and all other positions. An odds-ratio of less than one, $\psi = .1772$ and failure to reject the null hypothesis allows us to infer that heads of household are less likely than other household members to migrate for longer periods. This may tell us something about differences in migration motivation among different household members. Household heads migrate for shorter periods, perhaps because of competing obligations or because of unexpected financial need. Longer term migration by other household members may be an element of overall household strategy.

Test 5.4	Odds ratio	Lower limit	Upper limit	Z-Value	p-Value
North	0.1575	0.0918	0.2702	-6.7102	0.0000*
North/Central	0.1785	0.0221	1.4390	-1.6182	0.1056
South	0.2792	0.0966	0.8064	-2.3575	0.0184*
Fixed Effect	0.1772	0.1109	0.2832	-7.2328	0.0000*

* Significant at .05 level

Test 5.4: Relationship between duration and household position

Data from the South study has weakened the overall results in a number of these migration tests. Table 5.1 suggests why. The issue is not whether there is any evidence of the relationships observed elsewhere but whether there are any significant differences

within the cross-tabulations. For example, in the South, those with education are more likely to seek non-agricultural work than agricultural but so are those without education. Similarly, both the educated and non-educated are more likely to travel further afield rather than stay close to home.

Education	Travail Agricole Salarie	Travail Non-Agricole		in-region	out-of-region
none	28	49		18	106
some	33	39		12	98
Total	61	88		30	204

Table 5.1: Relationship between Education, Job and Destination

Tests 5.5 and 5.6 continue our exploration of the potential drivers of migration. Test 5.5 shows that there is no relationship between the sex of the household head and the likelihood of migration.

Test 5.5	Odds ratio	Lower limit	Upper limit	Z-Value	p-Value
North	1.2860	0.9866	1.6763	1.8604	0.0628
North/Central	1.0689	0.8009	1.4265	0.4525	0.6509
South	1.1073	0.8723	1.4056	0.8371	0.4025
Fixed Effect	1.1513	0.9898	1.3390	1.8275	0.0676

Test 5.5: Relationship between the sex of the household head and migration.

Test 5.6 shows that there is no evidence to support our earlier suggestion that the availability of "spare" adults is a factor in the migration decision.

Test 5.6	Std diff in means	Standard error	Variance	Lower limit	Upper limit	Z-Value	p-Value
North	-0.0337	0.0623	0.0039	-0.1558	0.0884	-0.5407	0.5887
North/Central	0.0476	0.0672	0.0045	-0.0841	0.1792	0.7081	0.4789
South	0.0687	0.0549	0.0030	-0.0389	0.1764	1.2510	0.2109
Fixed Effect	0.0304	0.0351	0.0012	-0.0385	0.0992	0.8651	0.3870

Test 5.6: Relationship between spare capacity and migration

It is striking that, for the most part, a relatively simple economics-based theory of migration has performed so well across these tests and that non-economic factors such as sex do not appear to be significant. It is, however, premature to discount any potential role for sex in the migration decision. As noted elsewhere, household female-headedness is a rather broad and heterogeneous category and further research is needed into its causes and whether differences there result in differential consequences.

5.3 Education

Test 5.7 examines the relationship between the age of the household head and the extent of education. As before, we have recoded our categorical data into binary form. Household heads have some education or none, and are aged 45 or younger or over 45. The cut point of 45 is the mean age of household heads across the three studies.

The results indicate a statistically significant negative relationship between age and education. Younger heads are more likely than older ones to have some education.

Test 5.7	Odds ratio	Lower limit	Upper limit	Z-Value	p-Value
North	0.3000	0.2393	0.3760	-10.4425	0.0000*
North/Central	0.3425	0.2685	0.4371	-8.6164	0.0000*
South	0.4517	0.3631	0.5619	-7.1347	0.0000*
Fixed Effect	0.3622	0.3174	0.4133	-15.0796	0.0000*

* Significant at .05 level

Test 5.7: Relationship between the age of the household head and education.

Test 5.8 confirms that the difference in education levels between male and female household heads is significant overall and in all three studies, females being more likely than males to have no formal education.

Test 5.8	Odds ratio	Lower limit	Upper limit	Z-Value	p-Value
North	3.1251	2.4204	4.0349	8.7398	0.0000*
North/Central	3.4590	2.6019	4.5983	8.5426	0.0000*
South	2.7125	2.0661	3.5611	7.1849	0.0000*
Fixed Effect	3.0754	2.6315	3.5943	14.1243	0.0000*

* Significant at .05 level

Test 5.8: Relationship between sex of household head and education

In Test 5.9 we test for a positive relationship between total income and the education level of the household head. This is a test of continuous data – income – and the results are measured in standard differences between the means. The overall result of

the model is that there is a statistically significant difference in incomes between those with some education and those without. Considered individually, the North/Central data has the expected sign but the difference is not significant.

Test 5.9	Std diff in means	Standard error	Variance	Lower limit	Upper limit	Z-Value	p-Value
North	0.2029	0.0545	0.0030	0.0960	0.3098	3.7203	0.0002*
North/Central	0.0942	0.0590	0.0035	-0.0215	0.2099	1.5956	0.1106
South	0.2160	0.0548	0.0030	0.1086	0.3235	3.9402	0.0001*
Fixed Effect	0.1748	0.0323	0.0010	0.1114	0.2382	5.4052	0.0000*

* Significant at .05 level

Test 5.9: Relationship between education of household head and household income

We have to turn to migrant data to test for any direct link between individual education and job because for non-migrants employment data is aggregated to the household level. Test 5.10 examines the relationship between the presence of formal education and the type of job pursued. The model demonstrates a positive (ψ = 1.4382) and significant (p = .0498) relationship between education and job type, migrants with some formal education are more likely to have non-agricultural jobs than those without.

Test 5.10	Odds ratio	Lower limit	Upper limit	Z-Value	p-Value
North	1.7370	1.0717	2.8153	2.2409	0.0250*
North/Central	3.7917	1.3782	10.4319	2.5811	0.0098*
South	0.6753	0.3504	1.3016	-1.1727	0.2409
Fixed effects	1.4382	1.0003	2.0677	1.9617	0.0498*

* Significant at .05 level

Test 5.10: Relationship between education and occupation

At the household level, there are significant results for the relationship between the education of the head and household income. Household income is measured in terms of per person income to allow for differences in household size and we work with the logarithmic form to ensure that the income variables are normally distributed.

Test 5.11	Std diff in means	Standard error	Variance	Lower limit	Upper limit	Z-Value	p-Value
North	0.2863	0.0558	0.0031	0.1769	0.3956	5.1305	0.0000*
North/Central	0.1686	0.0613	0.0038	0.0486	0.2887	2.7530	0.0059*
South	0.0123	0.0565	0.0032	-0.0984	0.1231	0.2179	0.8275
Fixed Effect	0.1562	0.0333	0.0011	0.0909	0.2215	4.6892	0.0000*

*Significant at .05 level

Test 5.11: Relationship between education of head and per capita household monetary income.

Test 5.11 shows that there is a statistically significant positive relationship between the education of the household head and household monetary income. Test 5.12 shows an equally significant relationship for total income.

Test 5.12	Std diff in means	Standard error	Variance	Lower limit	Upper limit	Z-Value	p-Value
North	0.2753	0.0552	0.0030	0.1671	0.3834	4.9884	0.0000*
North/Central	0.2230	0.0607	0.0037	0.1041	0.3420	3.6755	0.0002*
South	0.1005	0.0557	0.0031	-0.0087	0.2097	1.8038	0.0713
Fixed Effect	0.1988	0.0329	0.0011	0.1343	0.2634	6.0377	0.0000*

* Significant at .05 level

Test 5.12 Relationship between education of head and per capita household total income.

Overall, this set of tests confirms the expected relationships between education and income for household heads at both individual and household levels. Furthermore, we have shown a link between education and sex, males being more likely than females to be educated. We have also identified a relationship between education and age, younger household heads being more likely than their elders to have some formal education. While none of these results is particularly surprising, testing general hypotheses for validity in particular temporal and cultural settings adds to their veracity and value.

5.4 Vulnerability

We use the same simple variable as before – Monetary Income minus Total Spending to estimate a basic form of household vulnerability. The same caveat about its crudity also applies here. Nevertheless, an excess of spending over monetary income must be unsustainable. In Test 5.13 we examine the relationship between the dependency rate and household vulnerability i.e. whether an increase in the ratio of dependents to household size will increase vulnerability and reduce the capacity of the household to sustain itself. We reject the null hypothesis that there is no relationship between the two in favor of the alternate that there is a significant positive relationship.

Test 5.13	Std diff in means	Standard error	Variance	Lower limit	Upper limit	Z-Value	p-Value
North	0.1548	0.0542	0.0029	0.0485	0.2610	2.8552	0.0043*
North/Central	0.1917	0.0620	0.0038	0.0702	0.3132	3.0931	0.0020*
South	0.0833	0.0652	0.0043	-0.0446	0.2111	1.2766	0.2017
Fixed Effect	0.1462	0.0346	0.0012	0.0784	0.2139	4.2253	0.0000*

* Significant at .05 level

Test 5.13: Relationship between dependency rate and household vulnerability

Test 5.14 examines the relationship between the sex of the household head and vulnerability. All three studies and the overall model agree that there is a significant difference between male-headed and female-headed households, the latter being more vulnerable throughout.

Test 5.14	Odds ratio	Lower limit	Upper limit	Z-Value	p-Value
North	1.6582	1.3004	2.1144	4.0786	0.0000*
North/Central	2.0142	1.5095	2.6876	4.7580	0.0000*
South	2.0917	1.5081	2.9011	4.4215	0.0000*
Fixed Effect	1.8653	1.5870	2.1925	7.5617	0.0000*

* Significant at .05 level

Test 5.14: Relationship between the sex of household head and vulnerability.

The positive odds ratio measure and the significance test (p = .0000) indicate that there is strong evidence in Test 5.15 that increases in the capacity rate are associated with avoidance of household vulnerability.

Test 5.15	Std diff in means	Standard error	Variance	Lower limit	Upper limit	Z-Value	p-Value
North	0.1548	0.0542	0.0029	0.0485	0.2610	2.8552	0.0043*
North/Central	0.1917	0.0620	0.0038	0.0702	0.3132	3.0931	0.0020*
South	0.0430	0.0654	0.0043	-0.0851	0.1712	0.6582	0.5104
Fixed Effect	0.1350	0.0346	0.0012	0.0671	0.2028	3.8992	0.0001*

Significant at .05 level

Test 5.15: Relationship between capacity rate and avoidance of household vulnerability.

It is somewhat surprising that we can find no relationship between the age of the household head and the likelihood of household vulnerability anywhere in our analysis as demonstrated by Test 5.16.

Test 5.16	Std diff in means	Standard error	Variance	Lower limit	Upper limit	Z-Value	p-Value
North	0.0396	0.0544	0.0030	-0.0670	0.1462	0.7283	0.4664
North/Central	-0.0913	0.0626	0.0039	-0.2140	0.0315	-1.4572	0.1451
South	0.0409	0.0655	0.0043	-0.0874	0.1693	0.6253	0.5318
Fixed Effect	-0.0004	0.0348	0.0012	-0.0686	0.0678	-0.0114	0.9909

Test 5.16: Relationship between age of head and vulnerability

The results of Tests 5.13 through 5.16 add to our knowledge of vulnerability. Vulnerability is greater when households have high dependency rates and where they are headed by females. These results should be treated with circumspection. Our analysis is limited, by necessity, to household level data. Hence, it does not identify the existence or extent of extra-household relationships including any communal strategies for minimizing exposure to vulnerability. This issue is examined in Chapter Six.

5.5 Household Form

On average, nuclear households have fewer members than non-nuclear ones. Test 5.17 shows uniform consistency across all studies in this conclusion. This result is not quite as self-evident as it may seem. We can expect that non-nuclear households will display a wider range of membership because there are more kinship relationships available to them. There is, however, no kinship-based reason why, non-nuclear households could not be as small or even smaller than simple nuclear households. A two-person household could be occupied by people in some form of marital union but it could equally well be occupied by two people in any other kinship relationship.

Test 5.17	Std diff in means	Standard error	Variance	Lower limit	Upper limit	Z-Value	p-Value
North	0.3777	0.0549	0.0030	0.2701	0.4852	6.8837	0.0000*
North/Central	1.3662	0.0808	0.0065	1.2079	1.5246	16.9128	0.0000*
South	0.4301	0.0533	0.0028	0.3256	0.5345	8.0687	0.0000*
Fixed Effect	0.5806	0.0346	0.0012	0.5129	0.6483	16.8015	0.0000*

* Significant at .05 level

Test 5.17: Relationship between household form and size

Test 5.18 demonstrates that non-nuclear households have higher dependency rates than nuclear households. Their greater size does not coincide with a proportionate increase in workers. This is surprising. Nuclear households comprise parent(s) and unmarried children. Through much of the life-cycle of a nuclear household, we should expect that many of these children will be dependents. Non-nuclear households allow for the presence of members of all relationships and ages.

Test 5.18	Std diff in means	Standard error	Variance	Lower limit	Upper limit	Z-Value	p-Value
North	0.0883	0.0544	0.0030	-0.0182	0.1949	1.6245	0.1043
North/Central	1.1416	0.0793	0.0063	0.9863	1.2970	14.4018	0.0000*
South	0.1512	0.0528	0.0028	0.0478	0.2547	2.8647	0.0042*
Fixed Effect	0.3104	0.0342	0.0012	0.2435	0.3774	9.0841	0.0000*

Test 5.18: Relationship between household form and dependency

Given the results above, it comes as some surprise that nuclear households are more likely to be vulnerable than non-nuclear ones. Test 5.19 demonstrates that finding with a positive odds ratio (ψ = 1.6898) and a p-value significant at the .05 level. One possible explanation is that the research design for these surveys assumed that children have no economically productive role to play. If, in fact, this is not the case in rural Haiti, as Schwartz (1995) has argued, then we have over-estimated dependency rates and under-estimated household labor forces.

Test 5.19	Odds ratio	Lower limit	Upper limit	Z-Value	p-Value
North	1.2449	1.0036	1.5443	1.9924	0.0463*
North/Central	4.6981	3.5183	6.2734	10.4866	0.0000*
South	1.165	0.9014	1.5058	1.1671	0.2432
Fixed Effect	1.6898	1.4642	1.9502	7.1745	0.0000*

* Significant at .05 level

Test 5.19: Relationship between household form and vulnerability

Test 5.20 demonstrates that that there is a significant relationship between household form and the sex of household head, non-nuclear households being more likely to be headed by males. When we link this with the finding in Test 5.19 that nuclear households are more likely to be vulnerable, we go some way to explain the perceived relationship between female-headed households and vulnerability.

Test 5.20	Odds ratio	Lower limit	Upper limit	Z-Value	p-Value
North	1.6420	1.2984	2.0765	4.1401	0.0000*
North/Central	0.4077	0.2912	0.5706	-5.2309	0.0000*
South	2.2788	1.7938	2.8948	6.7459	0.0000*
Fixed Effect	1.4154	1.2183	1.6444	4.5397	0.0000*

Significant at .05 level

Test 5.20: Relationship between household form and sex of head

Test 5.21	Std diff in means	Standard error	Variance	Lower limit	Upper limit	Z-Value	p-Value
North	0.2526	0.0548	0.0030	0.1452	0.3600	4.6106	0.0000*
North/Central	-0.6596	0.0778	0.0061	-0.8122	-0.5071	-8.4743	0.0000*
South	0.0679	0.0528	0.0028	-0.0355	0.1714	1.2871	0.1981
Fixed Effect	-0.0004	0.0342	0.0012	-0.0673	0.0666	-0.0113	0.9910

Significant at .05 level

Test 5.21; Relationship between household form and age of head

We had suggested that household form might follow a life-cycle, beginning and ending as nuclear, and becoming non-nuclear in mid-life. The results from Test 5.21 do not permit us to reject the hypothesis that there is no significant relationship between form and age. It should be noted, however, that there are two strong assumptions used in the test. We do not have a measure of the age of the household. Instead, we have used the age of the head of the household as a simple proxy. While older people may not be likely to head newly formed households, there is no reason that an older household could not have a relatively young head supporting parents or other older relatives. We cannot assume that the head was the household founder.

5.6 Female-Headed Households

Test 5.8 demonstrates that female heads of household are less likely to have any formal education that their male counterparts. Test 5.20 tells us that they are more likely to head nuclear households and we know from Test 5.14 that female-headed households are more likely to be vulnerable than their male-headed counterparts. It is not surprising that they also suffer in comparison to male-headed households when testing for differences in dependency rates and income per capita. The male-headed household dependency rate is significantly lower than that of the female-headed. as demonstrated in Test 5.22. Test 5.23 shows that female–headed households have significantly lower incomes per capita than male-headed households do.

5.22	Std diff in means	Standard error	Variance	Lower limit	Upper limit	Z-Value	p-Value
North	-0.1114	0.0594	0.0035	-0.2277	0.0050	-1.8765	0.0606
North/Central	-0.1688	0.0648	0.0042	-0.2957	-0.0418	-2.6058	0.0092*
South	-0.1352	0.0589	0.0035	-0.2506	-0.0198	-2.2970	0.0216*
Fixed Effect	-0.1367	0.0351	0.0012	-0.2056	-0.0679	-3.8936	0.0001*

- Significant at .05 level

Test 5.22: Relationship between dependency and sex of household head

Test 5.23	Std diff in means	Standard error	Variance	Lower limit	Upper limit	Z-Value	p-Value
North	0.1310	0.0594	0.0035	0.0146	0.2474	2.2064	0.0274*
North/Central	0.2863	0.0649	0.0042	0.1590	0.4136	4.4086	0.0000*
Fixed Effect	0.2017	0.0438	0.0019	0.1158	0.2876	4.6032	0.0000*

* Significant at .05 level

Test 5.23: Relationship between income per capita and sex of head

Households acquire access to land in a variety of ways. The most permanent of these is obviously ownership. If we regard ownership as an indicator of wealth we can test for such a wealth effect by looking at differential levels of ownership. Test 5.24

indicates that female-headed households own less land than their male counterparts but the difference is not statistically significant. On the other hand, when we test for land usage, a clear difference between female and male emerges. Female heads cultivate significantly less land than males.

Test 5.24	Std diff in means	Standard error	Variance	Lower limit	Upper limit	Z-Value	p-Value
North	0.0972	0.0594	0.0035	-0.0191	0.2136	1.6383	0.1014
North/Central	0.0284	0.0647	0.0042	-0.0984	0.1552	0.4390	0.6607
South	0.0596	0.0588	0.0035	-0.0557	0.1749	1.0138	0.3107
Fixed Effect	0.0636	0.0351	0.0012	-0.0052	0.1324	1.8117	0.0700

Test 5.24: Relationship between sex of head and land ownership

Test 5.25	Std diff in means	Standard error	Variance	Lower limit	Upper limit	Z-Value	p-Value
North	0.2735	0.0620	0.0038	0.1520	0.3950	4.4117	0.0000*
North/Central	0.0475	0.0706	0.0050	-0.0909	0.1859	0.6732	0.5008
South	0.4008	0.0593	0.0035	0.2846	0.5170	6.7600	0.0000*
Fixed Effect	0.2613	0.0366	0.0013	0.1895	0.3331	7.1326	0.0000*

* Significant at .05 level

Test 5.24: Relationship between sex of head and land usage

We have included all households where a female member is identified as head in the above analyses but while we can test for various differences by gender, we are still faced with definitional issues regarding female-headed households. We need to know what we mean by a female-headed household. Are we to include cases where the female has a male partner or had one who died, migrated, deserted or was a member of another household? The number of qualifying cases depends on this level of specificity. In our surveys we know that 1,181 households identified a female as head. In 580 of these cases there were also male co-heads. Of the rest, 101 identified themselves as being in a placage or mariage relationship. If we exclude all of these households we are left with 500 households in which 202 female heads were widowed, 112 were separated, and 67 described themselves as single.

5.7 Conclusions

The meta-analysis has yielded some interesting results about Haitian households. Perhaps most striking is the education effect. We have shown that education is positively related to household income – monetary and total. We have also shown that education levels are higher for the young than the old and for male than female. In the subset of cases where we can link individuals' education and job types – migrants – we have shown a broadly positive relationship between education and the likelihood of having a non-agricultural job.

The economic theory of migration stood up well to empirical testing. The educated went further and stayed longer. Household heads were more likely to migrate for shorter periods, reflecting their higher opportunity costs. On the other hand, our hypothesis that migration may be driven by spare capacity did not hold water.

Vulnerable households have higher dependency rates. They are more likely to be female-headed than male-headed but the age of the head is not a factor. Nuclear households are more likely to be female-headed and vulnerable.

Finally, female-headed households have lower per capita income rates than male-headed. Regarding their permanent wealth, they are no worse off than males in terms of land ownership. However, they cultivate less land, perhaps reflective of land quality.

The major caveat surrounding these conclusions is that they are, by necessity, derived from household-level data. Hence, we have implicitly assumed that all of the significant causal relationships are intra-household in nature. There are two related reasons for this. Empirically, we need a unit of analysis, either an individual person or

some collectivity of people. We need this for both data-collection and as a basis for comparison. If we opt for a collectivity, however defined, we face twin dangers. We may be imposing a categorization alien to a particular culture and lacking a concomitant equivalence. We may also be artificially emphasizing certain causal relationships over others. The second reason is that we need a theoretical construct sufficiently robust to enable us to measure the extent and consequence of extra-household variables. That households and individuals are enmeshed in a dense network of cultural relationships is hardly alien to anthropological thinking. Quite how to capture a quantitative measure of that network or how to interpret its significance is another matter. The theory and measurement of Social Capital offers one potential solution. This is explored in the next chapter.

6. BEYOND THE HOUSEHOLD

6.1 Introduction

Throughout this paper we have relied on data drawn from household surveys to create and test hypotheses about economic behavior in rural Haiti. The unavoidable consequence is that the household becomes the unit of analysis at the center of our research. By extension, we are assuming that this analytical construction, is – similarly – at the center of the lived economic experience of rural Haitians

This issue is somewhat mitigated by the pains taken by the researchers to ensure that the category was understood by respondents to correspond to a *lokou* or compound which can comprise a number of subsidiary units to the main household, and is understood to be central to Haitian modes of living (Mintz 2010).

The analysis relies on two assumptions about households. The first is that the household is a self-contained unit within which household activities are conducted. This precludes the possibility that activities can be simultaneously within and between households. Perhaps a male helps provide for a female in another household with whom he has no formal relationship? Perhaps children are fed in both their own households and those of their friends? Baro (2002) draws attention to cooperative work groups – *kwadi, konbit* – that are major sources of agricultural labor, working the fields of each member in turn. These and other inter-household transactions, if they exist, are not easily identified using a household model.

The second assumption relates to a larger issue. There is no formal treatment of an external environment within which household activities take place – whether institutional, natural, political, or economic. As such, much of the activity analyzed throughout this work happens in a kind of "black box". We know that there are inputs and outputs to the system but we do not know how one is transformed into the other.

This chapter discusses a number of recent theoretical and empirical approaches to addressing these issues in future research. In the theoretical section of this chapter we discuss the development of the theory of Social Capital and its relationship to institutional analysis as a way to address causal factors external to the household. We review the origins of ecological anthropology and the development and potential of the field of political ecology. We examine how the Transformational Growth Matrix provides a framework to help identify and measure the changing relationships between economic, social, cultural, environmental, and political forces

In the empirical section of the chapter we review how political ecology can be applied by critically reviewing two case studies. Finally, we use the data from our three surveys to create a Transformational Growth Matrix for the economy of rural Haiti.

6.2 Theoretical Issues

6.2.1 Institutions, Social Capital and Development

When they have been participants in development processes, anthropologists have often been tasked with issues related to Social Development. In general, this has tended to refer to providing cultural insight with a view to making development projects more palatable to the recipients. For the purpose of carving out a unique field, Midgley (2003) suggests that the term has been poorly defined and lacks well-articulated normative theory. Historically, social development as a field appears to respond passively to prevailing economic doctrines. Whether the doctrines are those of modernization, statist planning, neoliberal in nature, Midgley suggests that social development seems to be little more than the practical concomitant of such forces. While this may be understandable for such an applied field, it leads to weaknesses in particular with regard to organizing principles and exposing implicit assumptions. He suggests that it is necessary to begin developing a theoretically informed set of principles incorporating cultural norms, conflict management and community empowerment.

Arce (2003) takes these ideas further. He describes Social Development as occupying the middle ground between macro level national regimes and micro level individual actions. The appropriate locus for the field is where policy and people meet at a meso level between micro and macro. It is at this level that policies are translated into practical action via institutions and where they will encounter the articulated voices of the community. Social Development, thus understood, enables us to go beyond the narrow

economic view of rational resource allocation to address issues of rights, entitlements, and community control of material life.

The Copenhagen Summit on Social Development (United Nations 1995) committed U. N. member states to the pursuit of stable, safe and just societies. In its adherence to these objectives, the World Bank employs an operational understanding of social development as the process of transforming institutions in order to empower people. It sees institutions as a society's rules (formal or informal), norms and values. The three operating principles adopted by the World Bank for incorporating social development into its activities are inclusive and accountable institutions and cohesive societies. Inclusive institutions are those that promote equal access to opportunities and sharing in the benefits of progress. Cohesive societies will allow needs to be addressed, diverse interests to be represented, and constraints to be overcome in a non-confrontational way. Accountable institutions are transparent and responsive to the public interest. Institutions of this kind permit a society's assets to be marshaled in the most productive manner in pursuit of well-being and poverty reduction (World Bank 2005). Hence, Social Development is seen as paying attention to the manner in which needs are articulated, projects and programs defined, and priorities defined.

Employing World Bank definitions, a society's assets include Natural, Physical, Human, and Social Capital (Grootaert 1998). Recognition of the existence of a resource called Social Capital is relatively recent. Social capital is understood to comprise a set of associations between people, fostering cooperation between them for the mutual benefit of the community. It is a network of institutions and individuals that creates a hospitable

environment for interaction. By so doing, it facilitates beneficial interaction between other resource types, thereby contributing to system sustainability (Feldman and Assaf 1999). Its economic usefulness is that it is a positive externality, facilitating transmission of knowledge about technology, markets, and the behavior of others. It discourages opportunism and market failure and provides for efficient market operation (Collier 1998). It has even been mooted as the missing link in development. Where it has been lacking, traditional engines of growth, human, natural, and physical capital have not been organized in an optimal manner for growth and development (Grootaert 1998).

A positive externality implies that too little of a good or service is being supplied. Collier (1998) offers the obvious economic solution – supply government social capital to augment civil social capital and promote civil social capital. The first could be accomplished by, for example, promoting the rule of law, creating property rights, creating a functioning financial system. The second could be achieved through investment in public infrastructure to facilitate trade and communication. These alternatives have different political ramifications. The latter, with its emphasis on active government and donor involvement is suggestive of the kind of World Bank project-based activity common in the mid-late 20th century while the latter could well be seen as a rolling-back of direct involvement and a reliance on the market (Schuurman 2003).

Missing from the World Bank approach is the recognition that social capital is not freely and equally available to all. Bourdieu (1985) argues that those with higher levels of inherited cultural capital are best able to access other capital forms, all of which are ultimately derived from unequally distributed economic capital.

In terms of economic change, Social Development promotes the goal of sustainable growth, as distinct from unstructured economic growth. Sustainability, based on an elementary demand for impartiality, within and between generations, is not a concept alien to economics. Anand and Sen note that there are two general traditions in economic theory. One emphasizes human development, the other, growth and material well-being. They differ in two respects, with regard to their ultimate objectives and to the perceived effectiveness of different instruments. The first tradition promotes sustainability by viewing economic growth as a means of attaining and expanding human development potential. The requirement of sustainability focuses attention on improvement of overall living standard as the appropriate goal (Anand and Sen 2000).

Sen's work on entitlements had a significant influence on the World Bank's understanding of Social Development, serving as a basis for its treatment of assets and capabilities and the underlying institutions to mobilize them (World Bank 2005). By entitlements he meant a relationship connecting one set of ownership to another. In a private market economy, the entitlements are: Trade-based, where one is entitled to own what one gains by trade; Production-based, where one is entitled to what one produces; Own-labor based where one is entitled to work for gain and Inheritance and Transfer-based where one is entitled to what is willingly given. The essence of this approach is that the institutions of ownership and exchange provide a better basis for understanding conditions of poverty and famine than an emphasis on resource availability.

6.2.2 Culture and the Environment

Early attempts to understand the relationships between humans and their environments were characterized by functionalist approaches to human behavior and an ecological perspective drawn from systems theory (Kottak 1999). The ecological population was seen as discrete and isolated and the environment was treated as bounded, closed, passive, and unchanging. The social structure was seen as balanced with the habitat in such a way as to serve the needs of the people and the society (Schneider 1971). Even more recent developments in Cultural Ecology were not immune from treating the environment as passive, although they treated social structures as adaptive and cultural attitudes as demonstrating selective advantage (Netting 1986). One of the most interesting recent developments in natural resource economics is the reintroduced concept of ecological entropy, an irrevocable qualitative degradation of free energy. This reminder of the thermodynamic basis for life has long been missing from economics although, ironically, it has been identified in the works of Marshall (Georgescu-Roegen 1971). Acknowledging a thermodynamic foundation for economic activity implies recognition that entropy costs are running down the planet's ecological capital and opens the door for conceptualizing an alternative approach to optimizing economic activity. It implies recognition that the planet's carrying capacity imposes limits on the extent of human activity. In an attempt to tease out the consequences of this development for economic growth, Daly (1996) differentiates between an anthropocentric and a biocentric optimum. An anthropocentric optimum is reached when the scale of human activity

expanded to the point where the marginal benefit to society of additional physical capital equals the marginal cost to humans of surrendering natural capital. A biocentric optimum acknowledges the intrinsic value of nonhuman species and habitats and preserves them at levels greater than the point of collapse. It also incorporates an element of the currently unknown value to humans.

The relationship between the economic and the biological is, Rappaport suggests, a relationship between the instrumental and the fundamental. Employing his principle of contingency, the existence of any cultural system is contingent upon the biological-ecological system. The converse is not true. Moreover, it is also the relationship of the easily modifiable to the virtually inflexible (Rappaport 1993).

The theory underlying the pricing of nonrenewable natural resources presents another fruitful line of inquiry for Political Ecology. The conventional approach is to apply Hotelling's rule. We choose a price for natural resources that equals the marginal cost of production plus the value of holding an additional unit of the resource off the market until a future period. This is the option price, the amount that an individual would pay to preserve the opportunity of future use.

This approach to pricing exemplifies the mechanical model discussed above in that all price and cost elements are internal to the private owner and all resources assumed to be infinite. Such an approach can result in a rather blithe attitude toward the use of natural resources as a recent Federal Reserve paper demonstrated. It concluded that between 1870 and 1998 there was little evidence of increased resource scarcity for thirteen common minerals, including copper, coal, iron, and lead solely because their

prices had not risen relative to the prices of capital and labor (Brown and Wolk 2000).

The economics approach to project evaluation also requires investigation for a similar reason. Even if we employ the use price and option prices as defined above, we need to capture the prices associated with nonuse. We can think of two situations - nonuse values related to the enjoyment of a resource by others and values unrelated to human use. The former are captured most frequently through externalities. The real difficulty resides in valuing nonuse. Applied economists may try to make use of surveys of Contingent Valuations where the potentially affected are asked about the valuations they would place on ensuring that use does not happen – their "willingness to pay" (WTP) or alternatively, how much they would have to be compensated if the resource is exploited – their willingness to accept (WTA). These measures are replete with measurement and theoretical difficulties, not least of which is the contravention of the assumptions of consumer behavior by the almost universal occurrences of WTA measures exceeding WTP even though neo-classical theory concludes that they should be equal (Diamond and Hausman, 1993). One possible explanation for this is endowment effect – people place a higher value on things they have than things they do not. Another is that the WTP has to be constrained by the capacity to pay while WTA has no limit.

Early works in ecology have been criticized for the manner in which they understood the environment as a passive object transformed by human action and an excess reliance on an equilibrium-centered view, emphasizing the qualities of stability and negative feedback (Peterson 2000). This systems-based approach cannot account for evolutionary change with its reliance on specificity and opportunism. Nor can it foresee

the specific processes or institutions that people develop in coping with environmental change (Vayda and McCay 1975). We should look, rather, at the qualities of homeostasis and resilience. Resilience is the amount of disruption that will cause an ecosystem to switch from being maintained by one set of mutually reinforcing processes and structures to another. Homeostasis is the quality that allows ecological systems to survive by evolving tactics to keep the domain of resilience broad enough to absorb the consequences of change. It is, perhaps, a little ironic that anthropologists adopted a model which was fundamentally incapable of evolutionary change.

Peterson (2000) characterizes the ecosystem as following an adaptive cycle containing elements of rapid growth, conservation, collapse, and reorganization. As weakly connected processes interact, some processes reinforce one another, building structures and organization. Such organization channels and simultaneously constrains interaction processes. With tighter organization, advantage shifts away from actors able to grow despite environmental variation towards those that can benefit from facilitative interaction, thereby reducing the opportunities to enter the system. The system will be stable but over a decreasing range of conditions. (Paulson and Watts 2003).

Eakin and Luers (2006) identify three strands in the literature on Vulnerability: Risk-Hazard, Ecological Resilience, and Political Economy/Political Ecology. The Risk/Hazard literature is concerned with identifying bio-physical hazards. In this approach, vulnerability is understood to be the potential for loss resulting from such risk. Ecological resilience focuses on understanding the ability of systems to respond to change and the underlying processes controlling it. Political Economy and Political

Ecology expands the examination of vulnerability by incorporating analysis of economic and political processes to examine how differential access to resources and the capacity to marshal usage explain how and why places and people differ in both their susceptibility and their capacity to recover.

6.2.3 Political Ecology

We no longer see either the population or the environment as isolated from or independent of external forces. Modern Political Ecology is characterized by its use of multiple levels of analysis, from local to global, recognizing that power is wielded at many levels. Integration into broader economic systems implies a greatly expanded role for market forces. Finally, assumptions about biocultural equilibrium have been replaced by insights informed by an understanding of a dynamic tension between ecological and human change where the capacity for resilience replaces the condition of stability. The effect of these changes in perspective has been to locate the analysis of ecological issues in deeper contexts of space, time, economy and power.

Ecological issues are played out in a political context, both internal and external to the environment under investigation and a sophisticated Political Ecology needs to recognize the nature and significance of the relationships of power between actors, and assess their consequences, whether in terms of differential access to resources, exposure to risk, or enjoyment of rewards. This is all the more true as local communities are incorporated into a world system where state and global level impacts of markets, social inequalities and political conflict contribute to the undermining of the local social and cultural capacity for independent action (Paulson 2003). The significance of the global scale for the local is further amplified by a physical distancing of power relations caused by the centralization of corporate, bureaucratic, and urban hierarchies (M'Gonigle 1999).

Heynen and Robbins (2005) identify four consequences of this politicization of

nature. The natural environment becomes a candidate for governance and, as such, subject to the forces of political compromise through which it is negotiated. Natural resources, which had previously been held in trust, may become candidates for privatization. An inevitable consequence of this is enclosure through the capture of common resources and exclusion from them. Finally, privatized natural resources become subject to valuation, having been commoditized through pricing.

Power, in the sense that it used here, comprises two of the four modes identified by Wolf (1990). It is both tactical and structural. Tactical power is international. It is the capacity of an actor to exercise control over energy flows in another's environment which we can take to mean the exercise of coercion and delimitation of action both endogenous and exogenous to the environment. Structural power shapes the political economy in which actions takes place, delimiting what is even possible through politics. Vayda and Walters (1999) warn of the tendency of some political ecologists to seek political explanations for all environmental change, a reaction to the omission of politics from earlier work in ecology. They suggest that this is an example of "question-begging research" where prior assumptions blind researchers to the significance of other factors. Their own prescription is to follow an event ecology, beginning with the environmental event and working backwards and outwards in time and space to construct causal chains. They also identify a tendency among certain political ecologists to make a priori judgments favoring a community form of control of resources and shaping their research approach accordingly. This is a reminder that a

sophisticated Political Ecology guards against confusing the instrumental with the fundamental.

Adopting a Political Ecology perspective forces us to recognize that applying economics to natural resources requires moral precepts. We must accept as appropriate an anthropocentric perspective with regard to their use and adopt a market-based mechanism with regard to their allocation. Neither of these is beyond challenge. We can look beyond the technical precision of neoclassical economics to a broader and deeper treatment of scarcity and choice (M'Gonigle, 1999).

Greenberg and Park (1994) locate Political Ecology at the nexus of political economy and ecology, recognizing that many of the most interesting contemporary issues are neither uniquely socially constructed nor naturally delineated. Rather, the great issues in the natural environment – degradation, stress, vulnerability, and resilience are played in an social environment subject to its own stresses and both issues and stresses are intertwined and codependent.

The implication of this recent work is that the power of Political Ecology must take into account the relationships between political economy and ecology (Greenberg and Park 1994). It must focus attention on the between possibility of environmental disequilibrium and system-wide maladaptation and focus attention on environmental stress, resilience, and the processes of change.

The Structural Adjustment Policies of the World Bank provided textbook-like examples of differing conceptions of economic efficiency and allocative and distributive justice as Greenberg's study of the Dominican Republic demonstrates. Implicit in these

policies was the assumption that the economy is a model, a machine amenable to adjustment at a macro level from which the entire system will benefit. Typical policies included cutting commercial credit by raising interest rates, cutting government spending, and devaluing the local currency. Such a menu should help a government control its debt, encourage exports, and stimulate economic growth. If we think of the economy as a process through which signals and incentives are transmitted from national to local environments and mediated by Meso level institutions, the results are by no means as clear as the model suggests and the potential for perverse unintended consequences increases. These may include environmental degradation through exploitation of marginal land, unstable rural incomes and agricultural prices, and out-migration. The ultimate net effect on the economy remains unquantified (Greenberg, 1997).

Rappaport (1993) suggests that anthropology has not and should turn its attention to recognizing and defining social disorder. He argues that a prevalent form of disorder occurs when values are disordered and fundamental values are subordinated to the contingent and instrumental. Furthermore, differential power relations allow quite narrowly defined interests to dominate. The resulting disorder produces both overspecialization, which reduces self-sufficiency, and over centralization where regulatory functions are remote and unresponsive and the power of global process is privileged at the expense of local systems and self-autonomy. One of the consequences of this is a reliance on money and price as measures and generalized monetization of conceptions of value and cost-benefit calculation. But not all values are monetizable or known or indeed, knowable.

Kottak (1999) lists five candidates for future evaluation: sustainable development, biocultural diversity, risk perception, ecocultural rights, and, what he describes as environmental racism. Among the themes running through this list are those developed in this paper. The argument that sustainable development can provide a compromise solution between the competing goals of developmentalism and environmentalism is, fundamentally, an economic argument about carrying capacity and depends on the competition between anthropocentric and biocentric optima. The issue of biocultural diversity is predicated on questions about ecology and power. By what values are biodiversity defined and according to what interpretation of resilience? Issues of risk, rights, and the role of NGOs in environmental management fall squarely into the question of power relations at local, national, and international levels. Finally, placing a disproportionate burden of environmental hazards in areas occupied by the socially excluded and disempowered contains elements of all three themes, involving considerations of power differentials, the economics of resource use, and testing environmental resilience in the face of instrumental process.

6.2.4 The Transformational Growth Matrix

The Transformational Growth Matrix (TGM) first developed by Nell (2005) offers a potentially fruitful technique for identifying and measuring the changing relationships between economic, social, cultural, environmental, and political forces operating in a society. Nell adapts a traditional tool of economic planning, the input-output model, and uses it to identify and measure relationships which had hitherto been unrecognized in any formal manner. The TGM variables are:

1. Pop: This is the population variable, as measured by the number of people per square mile of useful land, holding age and gender constant.
2. Env: This is the environmental variable, measured by an index of pollution levels. In our model, we have expanded the definition to include potential pollution-causing processes.
3. AdlSoc: This is an adolescent socialization variable as measured by the hours and quality of non-parental adult training, supervision, and social contact. It will also incorporate the ratio of adults to adolescent children.
4. SocInf: This is a social infrastructure variable as measured by a composite index of schooling, communications, transportation, and policing
5. HhH: This is a household health variable which is measured by living standards, and indicates the capacity of households to deliver healthy children and workers to the labor force.

6. DemG: This is a democratic government variable measured by an index of responsiveness to grievances and to public opinion. It will also include a measure of the extent and effectiveness of public institutions.
7. EconG: This is an economic growth variable, incorporating full employment output and the employment/unemployment rate.

	Pop	Env	AdlSoc	SocInf	HhH	DemG	EconG
Pop							
Env							
AdlSoc							
SocInf							
HhH							
DemG							
EconG							

Table 6.1: A TGM Matrix

Table 6.1 shows a sample TGM. It is a matrix of impacts received and delivered. Each row describes the effect of each column variable on that row i.e. the fraction of the unit amount of the row variable, which can be attributed to each column variable in turn. Thus the EconG row shows how much of the change in the economic growth variable that should be attributed to social infrastructure, household health etc. Each column shows impact delivered. The economic growth column shows how much of the change

in variables such as adolescent socialization or the environment can be attributed to changes in economic growth. Finally, the diagonal shows the effect of each variable on itself. A positive relationship implies that a variable is self-augmenting, population growth stimulating further growth.

A fully worked-out model will show the magnitude and direction of the relationship between each variable. . It is important to note that the matrix shows changes in variables rather than their levels. Furthermore, it does not imply that the variables are inputs to each other in a causal sense. We cannot say, for example, that population change generates environmental change. Rather, these relationships indicate effects, direct and indirect. Population pressure can affect the environment. Economic growth can have an effect on adolescent socialization through changing the extent and quality of adult supervision and contact.

Its main strength is in analyzing ripple effects throughout the system of economic, demographic or environmental changes. Such changes may be cumulative where a change in one may set a sequence of consequences affecting others. Naturally the cumulative effects need not be benign. Potential negative secondary effects of a variable change can be of two sorts undermining or offsetting.

An undermining effect is where a positive development in one area of the system could be undermined by its interaction with the rest of the system, reversing the initial effect. Productivity increases will produce positive economic growth but may also lead to negative environmental, health, and demographic effects that will ultimately combine to reverse the initial productivity gain. Alternatively, the sequence of secondary

interactions could leave positive economic processes intact but negative social and demographic consequences maybe so costly that the benefits of growth are offset.

The TGM will vary by time and place. Indeed, this is its major strength. Rather than assuming that relationships are constant and common, we can construct a TGM for a particular society or region that will help determine whether policy prescriptions will have their hoped-for effects. This will likely require collecting a great deal of ethnographic data of the kind used in this paper and combining it with extra-household data on social capital and the economic and political environment.

3 Applications

6.3.1 Case Studies in Political Ecology

Two Political Ecology case studies offer guidance as to its application in the analysis of rural economic activity. Langworthy and Finan's (LF) study of agricultural policy in Cape Verde provides an interesting early example of considerations of exogenous environmental change and multiple levels of power source and application. The object of analysis is the agricultural household. Its production decisions are based upon a wide range of variables over which it has varying degrees of autonomy. Its resource management strategies depend first on its own physical and human endowments – land, labor, and capital. Its access to other resources is conditioned by a variety of enabling institutions, public and private. Public enabling institutions comprise the legal system, public infrastructure, national agriculture and water policies, and market conditions. Private enabling institutions include inheritance patterns, labor-sharing institutions, and the emigration network that is also an income source. There is, also, a feedback loop from household income to agricultural resources that plays an important role in the argument. Cape Verde has limited agricultural and water resources. As these are used up in production, the available resource base shrinks in both quantity and quality. Future decisions will be made in an environment affected by such shrinking resource availability. Today's production decisions will constrain tomorrow's options (Langworthy and Finan, 1997).

In their study of land use in Alamos, Mexico, Vasquez-Leon and Liverman (VLL) offer an interpretation of Political Ecology that emphasizes the interactions between the environment, government policy, and land use. The environment, both its nature and its use, is contested. The authors demonstrate that climatic, biophysical, and policy-driven forces drove the transformation of the environment of Alamos and that national level economic policy unmodified to take account of local conditions can have profound and unforeseen environmental consequences (Vasquez-Leon, and Liverman, 2004). In both case studies, the authors enlist the use of a Political Ecology approach to their analysis.

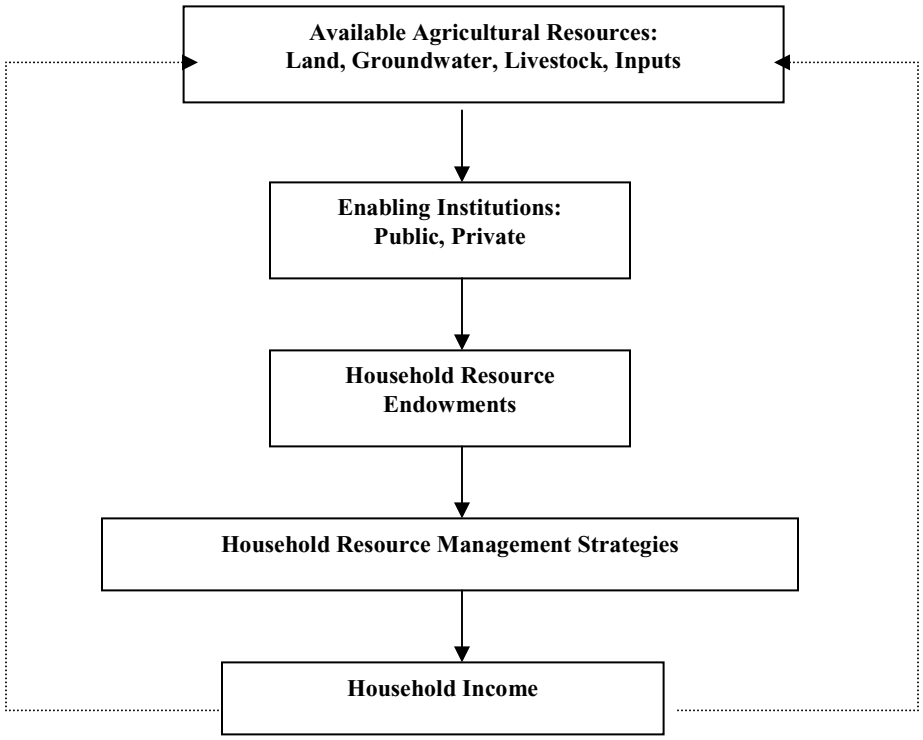


Figure 6.1: Langworthy and Finan's model of Political Ecology

LF's conceptualization of Political Ecology is illustrated in Figure 6.1, which is taken from their text. It illustrates a flow of causation from the macro level of environment and policy to the micro level of individual decision-making as mediated by the meso levels of local formal and informal institutions.

The individual unit of analysis is the agricultural household in Cape Verde. The production decisions it makes - its resource management strategies - are based upon a wide range of variables, over which it has varying degrees of autonomy. The household's resource management strategies depend first on its own physical and human endowments – land, labor, and capital. Its access to other resources is conditioned by a variety of institutional arrangements, public and private. These, LF label "Enabling Institutions". Public enabling institutions comprise the legal system, public infrastructure, national agriculture and water policies, and market conditions. Private enabling institutions include inheritance patterns, labor-sharing institutions, and the emigration network which is also an income source. The overall environment in LF's model is the set of available agricultural resources, land, water, livestock, and other inputs. These resource–based and institutional factors all place limits on access to, use of, and potential expansion of agricultural production. They delimit and help define the agricultural decision-making process and, thereby, the size of household income.

For the most part, this model is unidirectional, beginning with environmental constraints and ending with household income–generating capacity. There is, however, a feedback loop from household income to agricultural resources which plays an important role in LF's argument. Cape Verde has limited agricultural and water resources. As

these are used up in production, the available resource base shrinks in both quantity and quality. Future decisions will be made in an environment affected by such shrinking resource availability. Thus, in this narrow sense, LF's model is a dynamic one; today's production decisions will constrain tomorrow's options.

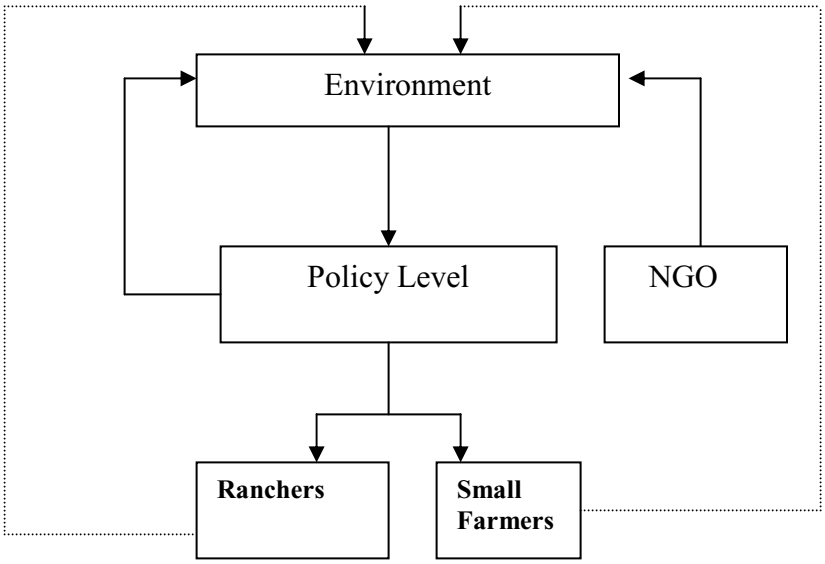


Figure 6.2: Vasquez-Leon and Liverman's Political Ecology Model

Figure 6.2 attempts to capture VLL's conceptualization of Political Ecology. This model does not appear in their text but represents our attempt to illustrate their argument in a manner analogous to LF's to facilitate comparison. This model is somewhat more complex than the LF model, containing more variables, and having more causal interactive relationships. It also allows for the treatment of competition, both at the policy framing level and among end-users. In this model, there are two major end users

of environmental resources, ranchers and small farmers, and environmental policy is understood as having different impacts on them.

LF's model of Political Ecology tries to capture the context within which the agricultural households of Cape Verde make economic decisions. In a manner consistent with models of household behavior employed in neoclassical economics, the immediate determinants of productive capacity are the resource endowments of the household. LF's framework, however, places particular emphasis on the point that these production decisions are made in particular environmental, administrative, and cultural contexts. Their theoretical argument centers on a Macro-Meso-Micro understanding of the manner in which the forces constraining and shaping household behavior are transmitted to it. The empirical work operationalizes this approach with some success. The authors collected vast amounts of data on household demographics and economic activity. They provide comprehensive discussions on agricultural research, groundwater availability and irrigation infrastructure. They discuss the nature and extent of Cape Verdean agricultural policy at some length. They deal with such relevant social institutions as Djunta-mon, a reciprocal short-term labor sharing system between neighbors and kin. To this extent, then, they succeed in relating their fieldwork and analysis to their organizing scheme. They are less convincing, however, in conveying the dynamics of the system they describe. Perhaps because they are trying to construct a set of econometric models of household behavior, their approach can be seen an exercise in partial-equilibrium statics rather than one of general equilibrium. Thus, we see the end results for the household are

captured very well but the dynamic processes by which they came about and changed over time are less convincingly handled.

VLL offer an interpretation of Political Ecology that emphasizes the interactions between the environment, government policy, and land use. They succeed in demonstrating that climatic, biophysical, and policy-driven forces drove the transformation of the environment of Alamos. They are particularly convincing in their demonstration that "one size fits all" economic policy had profound and unforeseen environmental consequences. Their model of contested resource allocation and use is a sophisticated addition to the Macro-Meso-Micro model. However, they are less successful in conveying the mechanisms of power. How and why did one policy or one use win out over another?

The most significant difference between the two models is that VLL explicitly provides for competition. The environment, both its nature and its use, is contested. Mexican government policy provided tangible incentives for land-clearing and buffelgrass introduction. Non-governmental conservation groups, both Mexican and American had other visions for the land and, as an adjunct to NAFTA, succeeded in transforming a least some portion into a reserve where ranching, agriculture, and wood harvesting are limited. On the user end, it is evident that big ranchers, ejidatarios, and small farmers have different uses for and access to land and were differently affected by government policy.

This kind of competition is singularly absent from the LF model. This is not, of itself, a weakness of the model. It is, after all conceivable that competition over land

policy and use is not significant. Indeed, LF explicitly point out that issues of land redistribution are not part of current Cape Verdean political discourse, given the unrest such initiatives caused in the past. Nevertheless, it is clear that there is considerable inequality in Cape Verdean farming, even in terms of access to irrigated land, and this absence of the treatment of power and control is striking.

6.3.2 A Transformational Growth Matrix for Rural Haiti

	Pop	Env	AdlSoc	SocInf	HhH	DemG	EconG
Pop		**1, -**	**2, ?**	**3,?**	4	**5, ?**	**6, 0/+**
Env	**7, -**		**8, 0**	**9, +**	**10, +**	**11, ?**	**12, 0/+**
AdlSoc	**13, +**	**14, 0**		**15, -**	**16, ?**	**17, ?**	**18, +**
SocInf	**19, +**	**20, 0**	**21, ?**		**22, +**	**23, ?**	**24, +**
HhH	**25, +**	**26, 0**	**27, ?**	**28, +**		**29, ?**	**30, +**
DemG	**31, ?**	**32, ?**	**33, ?**	**34, ?**	**35, ?**		**36, ?**
EconG	**37, +**	**38, -**	**39, 0**	**40, -**	**41, 0**	**42, ?**	

Table 6.2: A (partially) worked-out TGM

In this section we use the results of the meta-analysis to begin to populate a TGM. Rather than suggest a numerical result for each cell, we will indicate the direction of the likely relationships. The most significant environmental challenge facing rural Haiti is the rapid rate of deforestation. As discussed in Section 1.3 and illustrated in Table 1.6, it is clear that there is a strong correlation between the rate of population growth and this deforestation. We may also infer that the consequent environmental degradation will have a negative effect on the carrying capacity of agricultural land. Hence, we place negative signs in Cells 1 and 7. Cell 28 is also negative because we saw, in Table 1.7, that wood use was almost entirely for fuel consumption and had little economic productive value beyond that. We can also infer from this that economic growth will not be associated with increased deforestation. It may even reduce the reliance on the production and sale of

charcoal as an income source. We will label Cell 12 as non-negative. We can find no evidence to suggest that Cells 14, 20, and 26 are not zero.

We observe, in test 5.9 a significant relationship between total income and the education levels of household heads. Without specifying causality we can infer that Cell 24 is positive. The final cell in the Economic Growth Column shows its effect on the Population variable, which refers to people per square mile of useful land. We have suggested that the effect of Economic Growth in the environment is non-negative which implies that it will, at worst, have no effect on the amount of usable land. If Growth is associated with higher prices for agricultural output, this should have a positive effect on household viability, particularly for those households which are market-oriented. These are the households with higher monetary incomes and those that earn from commercial activities as well as agricultural (Test 4.22). For relatively well-off households, the cell value is positive. We know, however, that income is very unevenly distributed across these households (Figure 4.1) and that subsistence plays a much more important role in the livelihoods of the poorer (Figure 4.2). The conclusion we must reach is that, because communities and regions have no more reason to be homogenous than states do, a particular impulse may have more than one consequence. We will label Cell 6 as positive for the better-off and as 0 for the poorer. On the other hand, a positive change in the Population variable should produce an unambiguously positive result in Cell 37. There is nothing in our research to indicate that Cells 13, 19, and 25 are anything but positive.

Our finding regarding dependency rates and migration help place dimensions on the socialization variable, specifically with regard to the ratio of adults to adolescent

children. Migration will reduce the ratio of adults to children. If we assume that economic growth will reduce the need for migration, we can conclude that Cell 18 is positive. Where dependency rates are higher, the socialization rate is negatively affected. We know that dependency rates are highest for female-headed (Test 5.22) and non-nuclear households (Test 5.18). However, while we can discuss the consequences of these situations, we have no theory to this point of their causation. Finally, inasmuch as the relationship between socialization and economic growth is related to the creation of a stable wage-labor force, the value of Cell 39 is likely to be zero where work is primarily agricultural and intra-household.

Noting that the household health measure is based on living standards, we can use our vulnerability results as proxies. Hence, if economic growth is associated with reduced vulnerability by increasing the opportunities for cash income, Cell 30 is positive. An improvement in the level of household vulnerability will lead to a positive impact on the Environment as reliance on charcoal diminishes, leading Cell 10 to be positive. It will also lead to a positive effect in educational participation, causing Cell 22 to be positive.

Our proxy for the Social Infrastructure variable is education. We have seen in Section 4.3 and Table 4.2 that the education levels of migrants exceed those of the general adult population. We have also seen that education is positively related to the kind of work and the distance travelled by migrants. We are not suggesting that education causes migration but that it raises the reserve wage, the opportunity cost if not migrating. If this is the case, there may be an indirect negative relationship between SocInf and AdlSoc as adults migrate, giving us a negative sign in Cell 15. It is even conceivable that

out-migration by the educated could be linked to an undermining effect on regional economic growth, producing a negative result in Cell 40. The relationship between SocInf and Pop is also likely to be quite complicated. Out-migration, if it occurs, will reduce the number of adults but may also provide a source of remittance income for regional households and, thereby, their long-term viability. We will label Cell 3 as unknown. By the same logic Cells 9 and 28 are positive if education is associated with reduced reliance on subsistence and with vulnerability-relieving monetary income.

The unknown variable throughout is DemG – both row and column. This, essentially, is a consequence of Social Capital for which we do not have useful data. This reinforces the points made throughout this chapter about the need to create a theoretically sound and operationally viable framework for the treatment of meso-level variables.

6.4 Conclusion

Our analysis has uncovered a great deal of information about the rural Haitian household under stress. It has done so, however, with a model that is both atomistic and static. This chapter has discussed a number of new theoretical and empirical approaches that will allow future development of general and dynamic models. The TGM offers a tool with which to analyze the interactive effects of social and economic forces operating on a society or community, allowing us to trace the ultimate consequences of any initial exogenous change. Developments in institutional analysis in both Anthropology and Economics provide the intellectual apparatus to analyze the linkages among actors and between the macro, meso, and micro levels of our model. Finally, adopting a Political Ecology approach transforms our treatment of the environment. Rather than viewing it as a passive and unchanging stage on which the human drama is played out, we now understand the environment as endogenous to our model, influenced by biophysical and human processes, moving between multiple equilibrium levels, and shaping and limiting access to and control of resources.

As intellectual developments and applied approaches such as these find their way into the design and execution of survey research, they open up the possibility of a more complete and more nuanced empirically-based economic anthropology.

7. FUTURE RESEARCH POSSIBILITIES

7.1 External to the Household

Smith (2001) describes a variety of social mechanisms through which labor is channeled for collective effort rural Haiti. *Eskwad* is a simple labor exchange system. *Konbit* involves working for a day in labor-intensive activity such as harvesting. Membership is recruited among the extended family and neighborhood. The host supplies food and drink for all. This is not understood to be compensation but as an exchange of gifts, freely given. *Kove* refers to a shorter time commitment which involves monetary payment in exchange for labor.

Groupings have different forms and membership criteria. *Atribisyon* is a small neighborhood-based organization whose members carry out *koves* together and collectively make use of the earnings. A *Sosyete* may provide labor but is also a source of more general mutual aid and acts as an informal judicial system for dispute resolution. *Gwoupman Peyizan* are groups intent on social, political, and economic change.

Clearly, these groups and activities form the basis for the social capital resources in Rural Haiti. Not only do they add greatly to the labor resources available to the household, they also form the basis for mutually beneficial social interactions. The empirical challenge is to capture their dimensions and significance. Social Network Analysis provides some potentially useful tools. It allows us to model the extent, regularity, strength and structure of social networks (Watts, 1999). The most obvious starting point for data collection is to identify the memberships of all the groupings described above by family members and quantify the frequency of their activities.

7.2 Internal to the Household

We also need a better understanding of processes and resources within the household. Driven by data limitations, we have taken a rather simple view of labor resources, one is either available for work or not. There are two obvious weaknesses with this approach. The first is that it is not sufficiently precise with its treatment of labor. The second is that it does not allow for fractional labor contributions.

A peasant household does not have a clear separation of non-economic and economic activities. Rather, it comprises a wide range of processes all of which contribute to its typical activities – production, transmission, distribution, reproduction, and coresidence (Wilk and Netting 1984).A more complete treatment of resource availability and allocation would require us to understand not only their individual demands but their interaction also. With more extensive data on time demands and use, we could conceive of an input-output matrix, analogous to the Transformational Growth Matrix, designed to capture the extent and interaction between activities, while remaining cognizant of their relationships which are simultaneously cooperative and competitive.

Schwartz (1995) has argued convincingly that children play an important economic role in household life and that fertility itself is influenced by this perception. However, our data excludes children under age 13 from the labor force, even as part-time members. Similarly, old people are either wholly excluded or included. It would be a more accurate measure of labor availability to capture full-time equivalency as a continuous variable rather than the current categorical membership variable.

7.3 Definitional Rigor

The vulnerability of a household is the probability of its falling into crisis in the future. As discussed and tested in Section 4.6, its measurement typically depends on the relationship between monetary income and monetary expenditure. The main virtue of this approach is operational, it is easy to measure. However, it no more defines the underlying position of the household than does a measure of cash balance in corporate accounting. It would be more meaningful to measure a household's "balance sheet", the relationship between its assets and liabilities. This is all the more true in a society without an established and trusted financial system. It may not make sense to hold assets in monetary form. Perhaps they are better held in non-liquid form – animals, tools, stored crops, seed, for example. We can even conceive of expenditure categories such education as contributing to the human capital asset, and providing a hedge against future disaster by broadening the income-earning of younger household members. In the cash-based approach tested in 4.6, all of these activities are treated as expenditures, weakening rather than enhancing the household's vulnerability position. On the liabilities side of the ledger, a balance sheet approach would include non-financial obligations such as any labor and time contributions due to the groups identified in 7.1.

We cannot, however, entirely dismiss the utility of the cash balance calculation. It is perfectly possible to be asset-rich and cash-poor and thereby liable to vulnerability to sudden unexpected shocks when a household's robustness may still be dependent on its liquidity- the rate at which it can turn assets into monetary form.

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