SWIDDEN AGRICULTURE IN A FOREST SOCIETY: LIVELIHOOD STRATEGIES IN THE MAYA BIOSPHERE RESERVE COMMUNITY OF UAXACTÚN, PETÉN, GUATEMALA

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Abstract

Milpa, or slash and burn agriculture, is one of many livelihood strategies utilized by most households in Uaxactún, a small Guatemalan community located inside the borders of the Maya Biosphere Reserve. Participatory Rural Appraisal and Rapid Rural Appraisal revealed that although household livelihood systems are primarily based on the extraction of non-timber forest products (NTFPs), milpa is of fundamental importance. These approaches also suggest that households shift in and out of subsistence as they respond to changes in their sources of cash earnings. Ethnographic linear programming supports this premise, showing that households also modify their livelihood strategies in response to changes in the environment. How households choose to strategize and the intensity with which they participate in each livelihood activity, however, is driven by their composition and the household ratio of consumers to producers. These two factors not only determine their cash and nutritional needs, but also the size of their labor force, enhancing or inhibiting their ability to support themselves.
Introduction

Uaxactún is a community located in Guatemala’s Petén, its northern-most department (state) that shares borders with Mexico and Belize. Although the Petén comprises one-third of the country’s area, it was largely ignored by the Colonial Spanish and early Guatemalan governments because of its remoteness and inhospitable climate. It was not until the mid-1960s that colonization began in earnest (Schwartz, 1990). Explosive growth continues, driven by severe land shortages in the country’s highlands and the return of refugees following Guatemala’s civil war.

Uaxactún is located within the borders of the Maya Biosphere Reserve (MBR), designated in 1990 through a cooperative effort between the Guatemalan government, Conservation International, and The Nature Conservancy. The MBR covers more than 1.6 million hectares (ha) and is the largest contiguous tract of tropical forest left within Central America. The reserve consists of five national parks and three biotypes (biological reserves) surrounded by a large Multiple Use Zone (MUZ). While permanent settlement is not allowed within parks or biotypes, it is permitted in the MUZ. Small-scale agriculture and exploitation of above and below-ground resources, subject to certain regulations, are also allowed within the MUZ.

Uaxactún is located in the MUZ some 83 kilometers north of Flores and is a small, relatively isolated community of 136 families (Organización Manejo y Conservación, 1998). The village lies along an unpaved road running from Tikal National Park, 24 kilometers to the south, to the Mexican border some 100 kilometers to the north. This community was originally the center of a Maya city state from about 278 to 889 A.D. (Smith, 1950, cited in McNab, 1999). Contemporary presence of man followed in the late 1800s and early 1900s when Uaxactún was used as a chicle camp. Today, most families base their livelihoods upon a combination of hunting, wild allspice (*Pimenta officinalis*) harvesting, xate cutting, an understory palm of the *Chamaedora* species, chicle (*Manilkara zapota*) extraction, used as a base for chewing gum, and milpa, or slash and burn agriculture.¹

Uaxactún was awarded an 83,558 ha community forest concession in early 1998 by the Guatemalan government, formally giving the community management and usufruct rights to all above-ground resources. Under the terms of the concession, the community must meet governmental requirements (outlined in McNab, 1999) for managing the area and pay a lease of $142,049 over a ten-year period. Taxation of selected non-timber forest product (NTFP) sales, such as xate, is currently generating some income for payment of the lease fee and management of the concession area. The community is also pursuing other income-generating possibilities such as ecotourism and small local industry.

The Wildlife Conservation Society (WCS) has consistently worked with Uaxactún for several years throughout the concession solicitation process as well as in wildlife conservation. Presently WCS partners with two other non-governmental organizations (NGOs) to assist the community with technology transfer, training, and all aspects of

¹ Milpa is also used as a descriptor of where maize and other crops are grown, much like the words “field” or “farm”.

concession management. WCS wished to learn the extent to which village households depended upon milpa or swidden agriculture. While milpa was generally perceived to be a subsistence activity, much about its importance to household livelihoods was not understood prior to this research.

**Purpose and Objectives**

This study was undertaken to determine the relative importance of milpa to households within the context of household livelihood systems (Chambers & Conway, 1992; Hoon, Singh & Wanmali, 1997; Scoones, 1998). This study also sought to determine if milpa’s relative importance as a livelihood strategy (Devereux, 1999) changed as intra- and extra-household conditions changed. The following objectives were developed to guide the study: (1) ascertain the relative importance of milpa to other household livelihood activities, namely harvesting allspice, chicle, xate, and cash employment to Uaxactún’s families; and (2) examine the response of modeled households to three different scenarios (a change in the natural environment, a shift in markets for NTFPs, and a new option for local employment).

**Methods and Data Sources**

Research for this investigation was carried out from July to December of 1998 by the lead author of this study (Litow, 2000). Data gathered were not used only to build a qualitative understanding of how livelihood systems in Uaxactún work, but to model descriptively and quantitatively how households function.

Direct observation, informal individual interviews, Rapid Rural Appraisal (RRA), Participatory Rural Appraisal (PRA), and formal questionnaires were used to gather information about household livelihood systems and strategies, the relative importance of activities comprising those systems, and resources used and provided by household activities.

**Results and/or Conclusions**

The first objective of this study was to determine the importance of milpa to households. Thirty-three residents participated in this activity. Seventy percent of respondents considered milpa as the most important household activity, and another 27% answered that xate harvesting was most important. Two PRA sessions were conducted where milpa’s importance was examined over time. The first group of eight participants rated the importance of milpa much lower over time than other activities. This group was comprised of individuals who worked as laborers on Maya ruin restoration projects during the 1980s. The second group of nine participants, who did not have a history of working as employees, rated milpa as their most important household activity from 1980 – 1998.

Because individuals in Group 1 were receiving a steady flow of cash and likely had little time to work in their milpas, they focused more upon cash-earning activities outside of work easily undertaken for short lengths of time on weekends or vacations (harvesting chicle, xate, and allspice). Although they still tended to focus on cash activities after restoration projects ended, one notes that milpa began gaining importance relative to other activities as
they shifted their livelihood strategies towards subsistence and away from earning cash. Members of Group 2, who did not have consistent cash earnings, tended to rank xate and milpa equally.

Ethnographic linear programming was used to address the second research objective. This method diverges from traditional linear programming in the sense that socio-cultural parameters, changing nutritional requirements, evolving household compositions, and other factors, are added to enhance the models’ dynamism. This, in turn, enables the programmer to build models that better reflect reality. Six actual households and one fictitious “average household” were modeled. When the scenarios (a change in the natural environment, a shift in markets for NTFPs, and a new option for employment) were presented, the effect upon each household was analyzed based upon each household’s composition, or its unique characteristics in terms of its overall size, its members’ ages, and their sex. These characteristics determine household behavior because they affect, among other things, a household’s nutritional requirements and its ability to produce food and cash to sustain itself.

The three linear programming scenarios collectively showed several things. First, all six households and the seventh “average household” relied upon diverse sets of livelihood strategies to survive. These strategies were used in various combinations to reduce risk of extreme economic stress and hunger. The diversity of these strategies is paramount to household well-being. When one or more elements of the livelihood system fail due to environmental disturbances or economic downturns, households can turn to other options for survival.

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2 This household was created to help determine whether the use of averages, masking the diversity found in the real situation, can result in misleading conclusions.
Second, the linear programming outcomes also showed that household composition and consumer-to-producer (C/P) ratios (Chayanov, 1986) strongly affect household livelihood strategies (Table 1). Household 1, for example, was able to narrow the scope of its livelihood activities (specialize) and increase its well-being in terms of cash earnings and maize production because it had three able-bodied adult males (favorable household composition) and relatively low household stress levels (a low C/P ratio). Households with less favorable household compositions and higher C/P ratios (Households 3, 4, 5, 6) were driven to participate in a greater number of activities. This is owed to high levels of household food and labor stress, embodied in numerous young and growing children who cannot significantly add to the household’s productive capacity but who consume its food. Paradoxically, Household 2’s comparatively favorable C/P ratio hides the fact that it is under high levels of stress. Because all but one of its productive members are female, and because women in Uaxactún are unable to participate in most major food-producing and cash-earning activities, this household’s composition prohibits its members from functioning at their highest productive potential. Consumer-to-producer ratios must be examined in conjunction with household composition.

Table 1: Change in the number of household livelihood activities performed by households when comparing the three modeled scenarios

<table>
<thead>
<tr>
<th>Household</th>
<th>Household Consumer to Producer ratio</th>
<th>Number of activities performed in Scenario 1</th>
<th>Number of activities performed in Scenario 2</th>
<th>Number of activities performed in Scenario 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1.6:1</td>
<td>3</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>2</td>
<td>1.5:1</td>
<td>2</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td>2.3:1</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>4</td>
<td>2.3:1</td>
<td>3</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>5</td>
<td>2.5:1</td>
<td>3</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>6</td>
<td>3.5:1</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>7</td>
<td>2.0:1</td>
<td>2</td>
<td>2</td>
<td>4</td>
</tr>
</tbody>
</table>

*Household activities not included in this table are those undertaken to maintain the household, such as hauling water, cooking, etc., as these remain constant.

*This household would have to drastically reduce food consumption and expenses in order to survive in this scenario.

Third, linear programming and actual observations showed that households adjust their livelihood strategies in response to adverse environmental change or economic difficulty. This is the case in Scenarios 1 and 2 where normal household activity mixes were disrupted. Their responses ranged from minimizing cash spending and investing more household labor in agriculture (a return to subsistence), to maximizing discretionary cash earnings by shifting household labor away from milpa into cash-earning activities (a move away from subsistence), or a mix of the two. Fourth, results of these analyses indicated that some decrease in NTFP harvests occurred in Scenario 3 when household members were given the opportunity to work for the community’s forest concession (Figure 1). It appears that new employment options may indirectly ameliorate the rate of NTFP exploitation by diverting available household labor away from extractive activities.
Figures 1: Total male labor use in seven modeled households in Linear Programming Scenarios 1 through 3

Fifth, total milpa area changed very little throughout the three scenarios (Table 2). This indicates that even when bio-physical and socio-economic conditions favor specialization in cash-earning activities, purchasing needed maize, and decreasing labor investment in milpa, households continue raising milpa. The slight differences in total milpa area comparing Scenario 1 to Scenarios 2 and 3 is attributed to differing household livelihood strategies. In Scenario 1, households were more subsistence-oriented because there were fewer cash-generating options due to bio-physical and socio-economic factors. In the latter two scenarios, households had a greater choice of cash-earning options, and thus, overall, chose to raise less maize.

Table 2: Changes in Household and Total Milpa Area in Scenarios 1-3a

<table>
<thead>
<tr>
<th>Household #</th>
<th>Scenario 1: Changes in Environment</th>
<th>Scenario 2: Shift in Markets for NTFPs</th>
<th>Scenario 3: New Employment Option</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>11.40</td>
<td>12.56</td>
<td>12.56</td>
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<td>2b</td>
<td>0.00</td>
<td>0.00</td>
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</tr>
<tr>
<td>3</td>
<td>2.00</td>
<td>2.96</td>
<td>1.77</td>
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<tr>
<td>4</td>
<td>4.20</td>
<td>1.33</td>
<td>0.79</td>
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<td>5</td>
<td>0.00</td>
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<td>2.72</td>
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<tr>
<td>6</td>
<td>2.90</td>
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<tr>
<td>7b</td>
<td>1.98</td>
<td>2.91</td>
<td>1.84</td>
</tr>
<tr>
<td>Totals</td>
<td>22.48</td>
<td>22.01</td>
<td>21.93</td>
</tr>
</tbody>
</table>

a Milpa area measured in manzanas. One manzana approximately equals 0.7 hectares.
b Note that Household 2 is a poor, exceptionally marginalized, female-headed household that barely survives; Household 7 is the “average household.”

An important point regarding Table 2 is that the size of Household 7’s milpa (the “average household”) is often quite different from that of the other six households. While
Household 7 is not representative of all households in Uaxactún, it is evident that the size of its milpa in these three scenarios is not representative of the other six households’ milpas. In Scenario 1, only Household 3 has a milpa similar in size to that of Household 7. The same pattern emerges in the other scenarios, with two households in Scenario 2 and one in Scenario 3 having similar milpa sizes to Household 7.

Basing assumptions about how much milpa area households will produce (and need) upon averages, then, is misleading. Milpa size varies according to how much labor households have available and how much maize they need annually, factors that continuously change as household composition—and hence labor supply—changes. By first analyzing this variability based on household composition, diverse households can later be grouped into household domains of similar characteristics for purposes of aggregation into community characteristics. Finally, these research findings show that milpa is an invaluable and fundamental building block of household livelihood strategies, one which is relied upon at varying levels according to household composition, the socio-economic environment with which it interacts, or bio-physical disturbances. It is important to note that except for the female-headed household, no household in any of the three scenarios stopped raising milpa. Even in times when its relative importance wanes, as in Scenario 3, households continue to rely upon milpa to reduce food expenses and as insurance against oft-occurring times of difficulty.

Educational Importance

The diversity of household livelihood systems—and thus livelihood strategies—must be maintained. It is this diversity that allows Uaxactún’s families to draw upon numerous survival strategies to sustain themselves over time. The circumstances in which households find themselves are as dynamic as the households themselves. Not all of a household’s possible strategies are available or useful in every circumstance, such as when one or more elements of the livelihood system fail; or the circumstance itself may inhibit or prevent use of livelihood strategies or their usefulness as survival tools. It is imperative that households continue to have multiple options to ensure their food and economic security.

With diversity in mind, those engaged in extension programming should use participatory approaches to planned change. Such approaches can help people and agencies identify, highlight, and prioritize problems, and determine the best courses of action. Because they are participatory, diverse and complex relationships between households, livelihood systems, and communities are recognized and included throughout diagnostic, problem-solving, and monitoring and evaluation processes. These methods respect and use indigenous knowledge, uncover the role and importance of gender, and encourage information flows between assisting agencies and stakeholders.

Ethnographic linear programming can be an integral part of such participatory processes. When done correctly, it is a useful tool that allows researchers, extension professionals, and clients to analyze the intended (and unintended) effects of planned change on individual households and domains of similar households. Together, these participatory
approaches and this tool can empower stakeholders in developing solutions more adaptable and applicable to local situations without simplifying the complexities of livelihood systems.

References


