

**Nicaragua Case Study -  
Gendered Access: Commodity Chain Analysis of Non-timber  
Forest Products from Laguna de Apoyo Nature Reserve,  
Nicaragua**

**Fundación Nicaragüense Pro Desarrollo Comunitario Integral  
(FUNDECI)  
Managua, Nicaragua**



**Prepared by  
Laura Shillington  
January 2002**

*Funded by Women in Development Technical Assistance (WIDTech) and  
United States Agency for International Development (USAID)*



### *Abstract*

This research focuses several questions surrounding NTFPs, conservation and gender: (1) the different roles that Nicaraguan women and men play in household economics and NTFP markets (in terms of access to resources, distribution of surplus, and contribution to the household income); (2) how these gender roles situate women and men as conservation stakeholders; (3) how significant NTFPs are to household income and, therefore, to the informal economy; (4) are these NTFP activities promote forest conservation (i.e. are they 'sustainable'); and lastly, (5) how these NTFPs can be managed congruently with conservation and the possible alternatives to extraction (i.e. agroforestry and cultivation outside the reserve). Using a gendered commodity chain analysis as the foundation this case study examines these questions in the markets of two NTFPs, straw brooms and coco baskets, which originate in Laguna de Apoyo Nature Reserve, Nicaragua. The case study shows that Nicaragua women play a large part in the processing and marketing of these NTFPs, while men play a larger part in the extraction and processing. It also reveals the large role that Nicaraguan women play in maintaining and managing household income. Women depend on and manage household income from NTFPs much more than men. This prominent role of women in NTFP extraction, processing and marketing necessitates the inclusion of gendered perspectives in conservation management plans.

## *Table of Contents*

<b>I. INTRODUCTION.....</b>	<b>1</b>
<b>II. BACKGROUND INFORMATION.....</b>	<b>2</b>
A. Case Study.....	2
B. Non-timber forest products.....	3
C. Commodity chain analysis.....	5
<b>III. METHODOLOGIES.....</b>	<b>7</b>
<b>IV. RESULTS AND DISCUSSION.....</b>	<b>8</b>
A. Extraction.....	9
B. Cultivation.....	16
C. Production.....	17
D. Household traders.....	19
E. Intermediaries.....	22
F. Retail vendors.....	23
G. Overall Analysis.....	25
<b>V. CONCLUSION AND RECOMMENDATIONS.....</b>	<b>33</b>
<b>VI. LITERATURE CITED.....</b>	<b>35</b>
<b>VII. APPENDIX 1: MAPS.....</b>	<b>40</b>
<b>VIII. APPENDIX 2: FIGURES.....</b>	<b>41</b>
<b>IX. APPENDIX 3: TABLES.....</b>	<b>44</b>

## *Index of figures*

CHART 1: IMPORTANCE OF BROOMS AS A SOURCE OF HOUSEHOLD INCOME (AS REPORTED BY ACTORS IN THE DIFFERENT STAGES IN THE BROOMS COMMODITY CHAIN).....	12
CHART 2: MANAGEMENT OF TOTAL HOUSEHOLD INCOME BY GENDER (AS REPORTED BY ACTORS IN DIFFERENT STAGES OF THE BROOM COMMODITY CHAIN) .....	12
CHART 3: IMPORTANCE OF BASKETS AS A SOURCE OF HOUSEHOLD INCOME (AS REPORTED BY ACTORS IN THE DIFFERENT STAGES OF THE BASKET COMMODITY CHAIN) .....	15
CHART 4: MANAGEMENT OF TOTAL HOUSEHOLD INCOME BY GENDER (AS REPORTED BY ACTORS IN THE BASKET COMMODITY CHAIN).....	15
TABLE 1: CLASSIFICATION OF PRODUCERS.....	17
TABLE 2: THE GENDERED DIVISION OF LABOUR BY ACTIVITIES REPORTED .....	27
CHART 5: GENDER PARTICIPATION ALONG THE COCO BASKET COMMODITY CHAIN .....	28
CHART 6: GENDER PARTICIPATION ALONG THE STRAW BROOM COMMODITY CHAIN .....	29
MAP 1: NICARAGUA AND LAGUNA DE APOYO NATURE RESERVE.....	40
FIGURE 2: COCO BASKET COMMODITY CHAIN.....	42
FIGURE 3: GENDER MAP OF THE STRAW BROOM COMMODITY CHAIN.....	43
FIGURE 4: GENDER MAP OF THE COCO BASKET COMMODITY CHAIN .....	43
TABLE 3: SUMMARY OF BROOMSTICK EXTRACTION .....	44
TABLE 4: SUMMARY OF BEJUCO AND PALM LEAF EXTRACTION .....	44
TABLE 5: THE NUMBER OF LOCATIONS .....	45
TABLE 6: SUMMARY OF RETAIL VENDOR INFORMATION FOR STRAW BROOMS.....	45

## *Glossary*

1. Commodity → something that can be bought and sold.
2. Commodity chains → a network of labour and production processes whose end result is a finished commodity (Hopkins and Wallerstein 1986:159).
3. Extractor → a person who extracts natural resources from a forested area for sale or use (for subsistence use or to produce a sellable commodity).
4. Final consumer → this actor is the last actor in the chain and purchases the commodity from retail vendors (for household consumption/use).
5. Home-based work → “work carried out by a person, to be referred to as a home-based worker, (i) in his or her home or in other premises of his or her choice, other than the workplace of the employer; (ii) for remuneration; (iii) which results in a product or service as specified by the employer, irrespective of who provides the equipment, materials or other inputs, unless this person has a degree of autonomy and of economic independence necessary to be considered an independent worker under national laws, regulation or court decisions.” (International Labour Organisation 1996 as cited in Prügl 1999: 154).
6. Household → “... households can be commensal and residential unites, and/or units of joint property ownership, production consumption or investment, or they can constitute some intersection of these dimensions. They also vary in membership composition from units of single persons, to those of parents and children, and those with additional relatives: siblings, grandparents and so on” (Agarwal 1994: 52-53).
7. Household trader → a person of the same household as the producer (or at times the producer as well), who sells the commodity produced. The household trader does not purchase the commodity for resale, but obtains the commodity from their household. These traders are also referred to as informal traders (Chen 2001).
8. Income → in this paper, income is used to signify cash that is produced from the sale of NTFPs and other activities that the household realises.
9. Informal Economy → “those activities unregulated by the institutions of society in a legal and social environment in which similar activities are regulated.” (Castells and

Portes as cited in Prügl 1996: 53-54n7). Some characteristics of the informal economy (from Hahn 1996: 232n1):

- Ease of entry and exit
- Low pay
- Hidden costs
- Lack of employee rights
- No fixed contract
- Frequent health risks and hazardous work conditions
- Small-scale production
- Labour intensive
- Low-skill work
- Little or no fixed or working capital

10. Intermediary → a person who buys a commodity from a local trader (or other vender, such as stall vendor or other intermediary), and then sells it to stores, stall vendors, or directly to the consumer. They also sell outside of Nicaragua (usually in Costa Rica or Honduras) and at times in remote locations within Nicaragua (i.e. the Atlantic/Caribbean coast or the far north).
11. Non-timber forest products (NTFPs) → generally all products, with the exception of timber, that can be harvested from the forest ecosystem. More specifically, “all the biological material (other than industrial round-wood and derived sawn timber, wood chips, wood panels and pulp) that may be extracted from natural [forest] ecosystems, managed plantations, etc., and be utilised within the household, be marketed, or have social, cultural or religious significance.” (Wickens 1991: 3).
12. Producer → a person who produces/manufactures a commodity for household use and sale. In this case study, the producer is also a home-worker.
13. Product → Anything produced or obtained as a result of some operation of work, as by generation, growth, labour, study or skill (Lund 1998).
14. Stall vendor → a person in the local markets who runs a stall that purchases commodities from a local trader or intermediary and sells them directly to the consumer (a few stall vendors sell to intermediaries as well, but mostly just to consumers). Also referred to as a retail vendor.
15. Store vendor → a person running/managing a store who buys commodities from local traders or intermediaries and then sells directly to consumers. Also referred to as a retail vendor.

## I. Introduction

Throughout the developing world many rural households depend on forests both for subsistence needs and cash income. Non-timber forest products (NTFPs) - all biological products, with the exception of timber, that can be harvested from the forest ecosystem – serve as the main resource for many local self-employed craft producers. The production of these crafts and other saleable NTFP items is more often than not carried out in the home, and as such the workers are referred to as home-based workers. NTFPs are the basis for much home-based work and serve as an important source of income. The international development community, local non-governmental organisations, and national governments have, in the past several decades, begun to recognise that NTFPs are important income generators for rural communities as well as potential tools for forest conservation. Much research has been carried out on the various aspects of NTFPs, such as economics, ecology and management. Many of these studies have realised that NTFPs encompass and are situated within an interrelated and complex web of socio-economic-political actors and issues. Gender relations are an important aspect of this web and are the foundation of the current case study. It has been recognised that women play a critical role as NTFP users, and therefore their knowledge and roles must be incorporated into management schemes.

The main purpose of this case study is to understand how gender roles and responsibilities interact with the extraction, production and marketing of non-timber forest products (NTFPs) and, ultimately, conservation biodiversity in Central Pacific Nicaragua. To achieve this, the project focused on two specific NTFPs produced by rural home-based workers – straw brooms and coco baskets. Commodity chain analysis<sup>1</sup> was used as the research framework. This involved following the products from their origins in the forest through the processing and marketing chain. By doing this, the case study attempted to shed light on several aspects of NTFPs: (1) the different roles that Nicaraguan women and men play in household economics and NTFP markets (in terms of access to resources, distribution of surplus, and contribution to the household income); (2) how these gender roles situate women and men as conservation stakeholders; (3) how significant NTFPs are

---

<sup>1</sup> Commodity chain analysis is the examination of each stage in a particular product market and can be used to determine a variety of aspects, such as gender relations and the distribution of surplus. See Hopkins, T.K. and I. Wallerstein. 1986. Commodity chains and the world economy prior to 1800. *Review* 10 (1): 157-170.

to household income and, therefore, to the informal economy; (4) how these NTFP activities promote forest conservation (i.e. are they 'sustainable'); and lastly, (5) how these NTFPs can be managed congruently with conservation and the possible alternatives to extraction (i.e. agroforestry and cultivation outside the reserve).

## **II. Background Information**

### **A. Case Study**

This case study is situated in Central Pacific Nicaragua and focuses on the collection, production and marketing of NTFPs from Laguna de Apoyo Nature Reserve (LANR) (see Map1 in Appendix 1). The reserve is located halfway between the cities of Masaya and Granada and approximately 35 km from Managua. Three main communities surround LANR: Valle de Laguna, Catarina, and Diría. More than 174,000 individuals live in these communities, within 3 km of the reserve's boundary (INTA 1994). Inside the park, there are approximately 70 families, who work as caretakers of vacation homes along the north shore of the lake. LANR was established as a nature reserve in 1991 (Sanchez 1999). Management objectives for nature reserves are to conserve and restore natural ecosystems and wildlife habitats as well as produce sustainable benefits and services to communities (MARENA 1999). LANR, although classified as a nature reserve, does not have a management plan outlining sustainable uses or regulating illegal activities, such as timber extraction. The Reserve consists of a volcanic crater lake and a heavily forested cone interior around it. The lake in the centre of the Reserve has a surface area of 21 km<sup>2</sup>, with a maximum depth in excess of 200 meters (Waid *et al.* 1999). The watershed, which constitutes the remainder of the Reserve, is about 1700 hectares, mostly steeply graded closed tropical dry forest (Salas 1993), making it among the 5 largest forests of this type remaining in Nicaragua.

NTFPs are important resources for many families in the surrounding communities, as they provide materials for housing, food, medicine, and cash income. In the communities of El Valle, Quebrada Honda, Pacayita, and El Chilamate, all located on the north edge of Laguna de Apoyo Nature Reserve, NTFPs serve as important sources of cash income. Households in these communities utilise the Reserve to extract firewood (both for household consumption and sale) and materials for the production of artisan goods. In a recent study on NTFP extraction from the Reserve, it was estimated that two tons of

firewood per day are removed from the reserve (McCrary *et al.* 2001). Almost all of the wood extracted was freshly cut and green, which by park regulations is illegal. Only dead (or dry) wood is legal to extract. They also reported that broomstick extraction per day is approximately 340 lbs (McCrary *et al.* 2001). In Nicaragua, these communities, particularly El Valle, are renowned for straw broom production. The majority of the products extracted from LANR end up in the Masaya market, but can also be found in the majority of urban areas on the Pacific side of Nicaragua.

## **B. Non-timber forest products**

Non-timber forest products (NTFPs) are among the oldest traded commodities and include products such as latex, resin, fruit, nut, and in some circumstances fuel wood <sup>2</sup> (Panayotou and Ashton 1992; Iqbal 1993). They provide materials for housing, food, medicine, and cash income. Harvesting, processing, consumption and trade of NTFPs has traditionally and is still carried out by people living in and around forested areas (Panayotou and Ashton 1992; Iqbal 1993; Tewari 1994; FAO 1995). During the last decade, there has been a dramatic increase in the interest and research of non-timber forest products (NTFPs). The increase in research was initiated by studies that acknowledged two main characteristics of NTFPs. First, several studies that have shown certain NTFPs produce greater income than timber harvesting and have both commercial value as well as subsistence and cultural value. Second is the potential of NTFPs to maintain the biodiversity of the forest (Butler 1992; Nepstad and Schwartzmann 1992; Tewari 1994). Due to these two characteristics, NTFPs have been identified as a tool for both community development and forest conservation.

The enthusiasm for NTFPs in community development and conservation grew primarily from reports of their high economic value. Such reports include Peters *et al.*'s (1989) research on fruit and latex extraction in the Amazon in which they reported that the net present value of fruit and latex was more than twice that of timber. They argue that even though a specific timber harvest can have a greater value than that of NTFPs, when measured over a longer period of time the net present value of NTFPs can exceed that of timber (Peters *et al.* 1989). Balick and Mendelsohn's (1992) report on medicinal plants in

---

<sup>2</sup> Fuelwood can be included in the definition of non-timber forest products if it does not involve the removal of standing trees from the forest.

Belize also concluded that income generated by timber was less than certain plant species. Many NTFPs, such as medicines, latexes, resins and oils, contain unique chemical properties characteristics and offer high value-added potential when collected in the wild (Panayotou and Ashton 1992). Ginseng is a good example of this; when collected from the wild, ginseng brings in almost ten times more profit than the cultivated variety (Hankins 2000). Certain species, such as ginseng are only found in specific locations, and therefore have a greater potential value. As Panayotou and Ashton (1992: 87) point out, “many NTFPs derive their value neither from industrial applications nor from direct consumption as food, but because they are unique or special.” NTFPs also provide many local industries, particularly home-based, with raw material and therefore become value-added commodities providing numerous households with both primary and supplementary income. Economic valuation of NTFPs initiated the theory that the harvesting of NTFPs provides potentially improved incomes at the same time as it can decrease the rate of deforestation and environmentally degrading activities.

The link between conserving biodiversity and sustaining human communities is based on the idea of sustainable harvest. This idea has prompted much debate surrounding the definition of “sustainable” harvest. Yet, the view that harvesting of NTFPs is less damaging than timber harvesting has been noted in many studies (Nepstad and Schwartzmann 1992; Panayotou and Ashton 1992; Plotkin and Famolare 1992). The collection of NTFPs from forests, when carried out in a non-destructive manner, results in minimal disturbances and threats to forest species. If certain tree and plant species produced more income as an NTFP than as timber, there is an incentive to conserve that species. For example, tree species that produce valuable fruits, nuts, latexes and resins are not harvested for timber, but are left standing for the continued collection of those products.

However, the harvesting and planting of NTFPs in the forest also has triggered criticism around the issue of sustainability, both ecological and economic (Browder 1992; Godoy and Bawa 1993; Godoy et al. 1995). NTFPs that obtain high prices in the markets risk being over harvested or cultivated on plantations in previously forested areas, causing deforestation. Over harvesting of a species can, in the long run, decrease its economic potential. The production of NTFP species as plantation crops increase the supply and

therefore decrease the value. Plantations established specifically for the production of NTFP species also tend to shift the role of independent home-workers to that of salaried employee or contract worker.

NTFPs are the basis for much home-based work and constitute a large portion of the informal economy. NTFP literature has tended to ignore the discussions of home-based work in their examination of social, economic and political issues (see for example Panayotou and Ashton 1992; Ruiz Pérez and Arnold 1998; Wollenberg and Ingles 1998). Yet, home-based workers are critical to the NTFP markets, especially domestic markets. Chen (2001) defines three types of home-based workers: (i) dependent subcontract workers (also referred to as homeworkers), (ii) independent own account producers, and (iii) unpaid workers in family businesses. Households extracting and/or producing crafts from NTFPs constitute all three categories of home-based workers. A large segment of artisan products and crafts produced from NTFPs are manufactured by home-workers, generally women, in rural areas of many Third World countries. Carr *et al.* (2000: 127) outline three basic facts about home-based work: (1) it is an important source of employment in many parts of the world; (2) home-based work is an especially important source of income for women; and (3) home-based workers comprise a significant share of workforce in key industries. Carr *et al.* (2000) also recognise the significance of NTFPs in the global market and the importance of home-workers to those chains. In domestic economies, there are generally more NTFPs in the markets and even more home-workers that depend on them for income. As part of the informal economy, home-based workers are also connected to chains that involve additional home-based workers, street vendors and other informal economy actors. Research suggests that the informal sector is both directly and indirectly linked to the formal economy. This link can be identified by tracing the chain of a commodity from its beginnings as an NTFP to final consumer.

### **C. Commodity chain analysis**

Commodity chain analysis is a concept that has been developed out of world system theory (Vellenga 1985; Hopkins and Wallerstein 1986; Gereffi et al.1994; Dunaway 2000). This concept, as defined by Hopkins and Wallerstein (1986: 159), is “a network of labour and production processes whose end result is a finished commodity” - something that can be bought and sold. The commodity chain contains several stages (often referred to as

‘boxes’ or ‘nodes’) where a particular production process takes place. Gereffi and Korzeniewicz (1994: 51) identify five sequential stages of a commodity chain: input acquisition, manufacturing, distribution, marketing, and consumption. Within each of these stages, Hopkins and Wallerstein (1986: 162) suggest that there are four characteristics: (a) the relation of production within the ‘node’ (or stage), (b) the organisation of production, (c) the geographic location of that stage within the chain, and (d) the flows between the stage, other stages in the chain, and with other commodity chains. From processing through to consumption, commodity chains are sites of continuous capital (and non-capital) exchange and accumulation. As such, each stage of the chain accumulates an unequal portion of the total surplus (Hopkins and Wallerstein 1986, 1994; Korzeniewicz and Martin 1994). Hopkins and Wallerstein (1986) contend that the most crucial research question in commodity chain analysis is to determine the division of surplus among the stages.

Dunaway (2000) critiques this ‘crucial’ research question as predominantly macro-level and that it excludes the unequal distribution of surplus within the stages. She argues that “a commodity chain is indeed the global mechanism that insures the inequitable division of surplus among the core, semi-periphery and periphery,” and it is important to examine these at the global level (Dunaway 2000:10). However, she continues to argue that this excludes the unequal distribution and contribution of households at the micro level. Examining the unequal distribution between stages at the macro level fails to acknowledge the questions of “how and by whom that surplus is produced ” and the gender division of both labour and surplus (Dunaway 2000:10). In addition, she argues, commodity chain analysis tends to emphasise the products as opposed to humans. Commodity chain analysis “documents the construction or creation of a market product, overlooking far too often many human and ecological aspects” (Dunaway 2000: 9). To address her concerns, Dunaway maintains that women and households must be examined at every stage. The commodity chain must be viewed as “a network of nodes [stages] at which human laborers and natural resources” are exploited either directly or indirectly (Dunaway 2000: 11).

### III. Methodologies

This research follows the concept of engendering commodity chains as proposed by Wilma Dunaway (2001). Following the idea of commodity chain analysis, this research examines all possible stages of each chain<sup>3</sup>. This is similar to the methods of other NTFP studies, such as outlined in Belcher (1998), but focuses on gender as opposed to profits. The research was carried out in several locations in the Central Pacific region of Nicaragua. The majority of the research was done in the departments of Masaya, Catarina and Managua, with a small portion in Granada. Data for all stages were collected between 21 August and 25 October 2001 using semi-structured interviewing techniques and observation (Berg 2001). A total of 26 participants in the coco basket commodity chain were interviewed. In this chain there are only 7 individual households that produce coco baskets, all of which are related except one household. Of those households, 6 participated in the project. Although most of the participants were in the same household, each actor was interviewed independently of other household members.

In the straw broom commodity chain, a total of 51 participants were interviewed. The research began with households producing the commodities and/or extracting the materials in the communities of El Valle, Quebrada Honda, Pacayita, and El Chilamate, all located on the edge of Laguna de Apoyo Nature Reserve. All of these communities are in either the departments of Masaya and Catarina. Households interviewed were chosen on the basis of whether they produced either straw brooms or coco baskets, or extracted materials used to produce those goods. Next, interviews with local traders, or household members who sell the product produced in the household, were carried out. Some of the sample population was identified through “snowball sampling techniques” using a local key informant. Walking through the villages and observing households producing the selected products identified additional participants. Households were only interviewed if they were interested and able.

The second location of the research was carried out in markets of Masaya, Granada, and Managua, as well as small food/variety shops, flower shops, and street stalls. The

---

<sup>3</sup> For the stages of intermediaries, particularly those who sell outside the country, only a few participants were located and interviewed. For this reason, some stages are more thoroughly examined than others. Many of the intermediaries are constantly travelling, and therefore are very difficult to locate.

market stall sample population was identified by walking around the market and finding stalls that sold either straw brooms or coco baskets. The same method was carried out for small food/variety stores. Interviews with personnel in flower shops only applied to questions about the coco baskets. These participants were located by snowball sampling techniques – obtaining names and addresses from the producers and local traders of coco baskets. An equal number of males and females were sought, but the results produced more female interviews than male. At these locations, intermediaries were also identified and interviewed. Many of the intermediaries were identified through snowball sampling using producers and local traders. Some intermediaries provided additional names of market participants.

#### **IV. Results and Discussion**

Each of the stages in the two commodity chains were identified and mapped, as shown in Figures 1 and 2 of Appendix 2. The straw broom commodity chain is categorised into seven distinct stages: extraction, cultivation, production/processing, household traders, intermediaries, retail, and final consumption. Each of these stages is linked to another through the monetary or non-monetary exchange of a product. Non-monetary exchange occurs when there is an exchange of goods between two stages without the act of buying and selling. There is usually a non-monetary exchange when the actors of the different stages are the same person or in the same household. In the broom commodity chain, this type of exchange occurs between cultivator and producer, extractor and producer, and producer and household trader. In many households, the producer also cultivates broom straw, so there is no monetary exchange to acquire the necessary straw. This also is the case with broomsticks – some producers collect their own broomsticks. In all cases, the household trader does not purchase the brooms from the producers, as they are in the same household. The household trader takes the brooms from the house to the market and urban centres. This commodity chain is primarily domestic; no one interviewed knew if the brooms were sold outside Nicaragua.

The coco basket commodity chain is simpler than the straw brooms commodity chain and involves fewer actors. There is six stages to this commodity chain and involve the following actors: extractors, producers, household traders, retail vendors, intermediaries,

and the final consumer. Again, each of these stages is linked to another through monetary or non-monetary exchange of a product. The non-monetary exchanges in the coco basket chain are situated between extractor and producer, and producer and household trader. As in the broom commodity chain, the extractor gives the producer the necessary supplies, as they are in the same household. The same is true of the household trader – the producer gives the baskets to sell. The coco baskets are sold primarily inside Nicaragua, but there are several intermediaries who sell the baskets in Costa Rica and Honduras. In this chain, there are fewer monetary exchanges, as most of the actors are within the same household.

### **A. Extraction**

Summaries of extraction for both chains are found in Tables 3 and 4 of Appendix 3.

#### ***Broomsticks***

There are three main species harvested for broomsticks: *Guazimo ulmifolia* (guácimo), *Tecoma stans* (Patre), and *Gliricidia sepium* (madero). When these species are not available, other species such as achote, chaperno, or capulin are harvested. Both extractors and producers reported that the best specie for broomsticks is *Guazimo ulmifolia* because it grows very straight with few knots and is a lighter wood. *Guazimo ulmifolia* is harvested most often and at times extractors go long distances<sup>4</sup> to find perfect sticks. The tree shoots<sup>4</sup> from *Guazimo ulmifolia* (and the other two main species) are harvested with a machete near the base of the shoot. The bark is peeled immediately after cutting for three reasons: easy removal of bark while fresh, to remove excess weight, and to prevent any stains from the bark. Extractors claim that the harvesting of the shoots does not harm or kill the tree, but instead promotes the growth of more shoots. Several studies on *Guazimo ulmifolia* and *Tecoma stans* have shown that these species sprout very readily and are able to reproduce from cuttings (Francis 1991). All three of the broomstick species grow in open areas, or medium to low canopied forests (Francis 1991; Salas 1993). They are considered pioneering species and tend to colonise open and disturbed areas. *Guazimo ulmifolia* is a small tree and very shade intolerant, so it is not found in high-canopied forests.

In LANR, *Guazimo ulmifolia* is found primarily in the north end of the reserve where several open, disturbed areas are located close to the road. There are a few scattered open

---

<sup>4</sup> Tree shoots are individual limbs that grow from stumps or partial stumps of certain tree species.

areas around the edge of the reserve as well. Near the lakeshore, *Guazimo ulmifolia* also grows successfully. Most extraction occurs inside the reserve near the roads. However, several extractors reported that they have to go further into the reserve to find ideal broomsticks; some stated that they have to walk an average of 6 km further than 10 years ago. They walk to open areas less used, as the areas near the roads are used intensely for firewood extraction. *Guazimo ulmifolia* is also considered ideal firewood as it splits and dries easily, and burns well with little smoke (Francis 1991). As noted earlier in this paper, the extraction of green firewood is illegal in the reserve (only dry, dead wood extraction is legal). Yet, it is estimated that two tons of firewood per day is removed from the reserve - almost all of which is freshly cut and green. The cutting of broomsticks is also illegal, as it is considered green wood, but all extractors stated that they never have to pay fines or bribes to the park guard. One extractor responded that the guard is more concerned about timber.

Extraction of broomsticks occurs throughout the year. Extractors reported an average of 3 times per week (the responses varied from 1 a week to 6 days a week). Each time, approximately 9 dozen sticks are extracted in a period of 10 hour. In one week, approximately 27 dozen are extracted. One bundle of brooms is considered a dozen, although there may be slightly more or less than 12 broomsticks in the bundle. Each stick is about 1 metre in length and an average of 1 inch in diameter. Some extractors stated that sometimes they collect firewood at the same time as broomsticks, although most collect firewood separately. When asked what other products they extract from the Reserve besides firewood, the only additional product mentioned by one household was a small animal (molluscs) for household consumption (not for sale).

The majority of extractors (70%) also produce brooms and only sell broomsticks if there is extra or cash is needed. Only two extractors sell broomsticks all year long and do not produce brooms. Broomsticks are sold directly to the producer at an average of 8 Cordabas<sup>5</sup> per dozen (\$0.50). Chart 1 below shows the importance of broom to household income. The first column represents the importance of broomsticks to household incomes of extractors. As the chart illustrates, the majority of extractors reported that broomsticks were one of the main sources of household income. The categorisation is defined as

---

<sup>5</sup> At the time of the research, 13.56 Cordabas equalled \$1 US.

follows: ‘only’ refers to the only source of income – there are no supplementary forms; ‘main’ refers to when the activity contributes the largest part to household income, but there are also supplementary sources; ‘one of main’ refers to when participants have more than one main source of income, that is more than several activities contribute equally to household income<sup>6</sup>; ‘supplementary’ is when the activity is only an additional source of income and may be combined with many other activities.

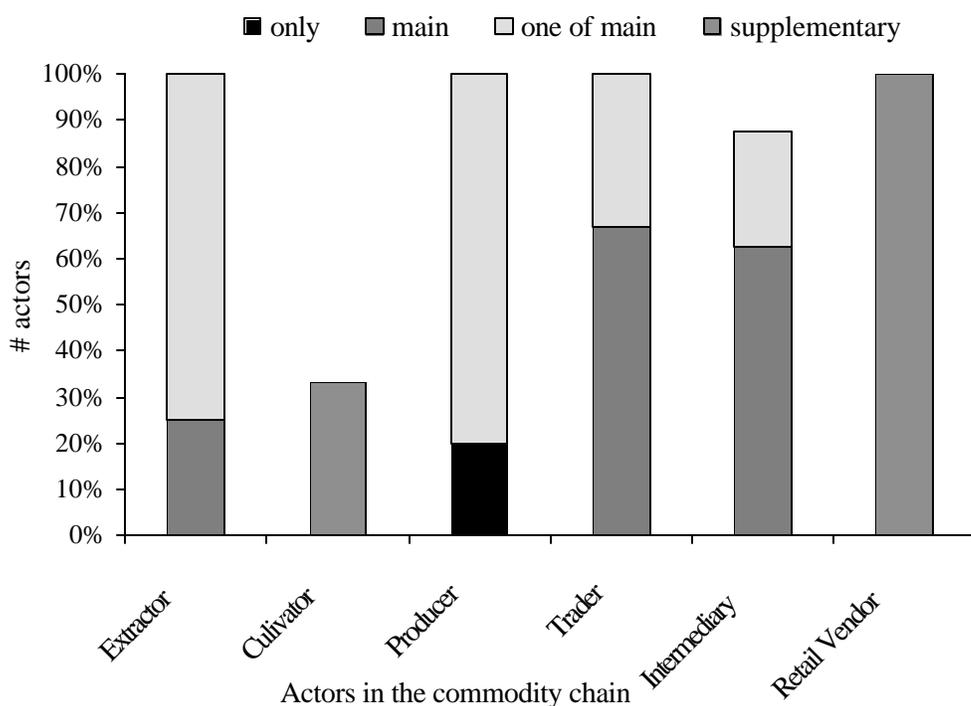
All of the broomstick extractors interviewed were male and most responded that the extraction of material is usually the male’s responsibility, but when they do not have time or when extra help is needed, the females will assist. This was confirmed by observing one of the participants extracting broomsticks in the Reserve with his spouse along with two young boys, although he had responded that he was the only member in the household to extract broomsticks. When asked about the management of household income, most extractors reported that it was the shared responsibility between both spouses<sup>7</sup>, as is shown in Chart 2 below.

---

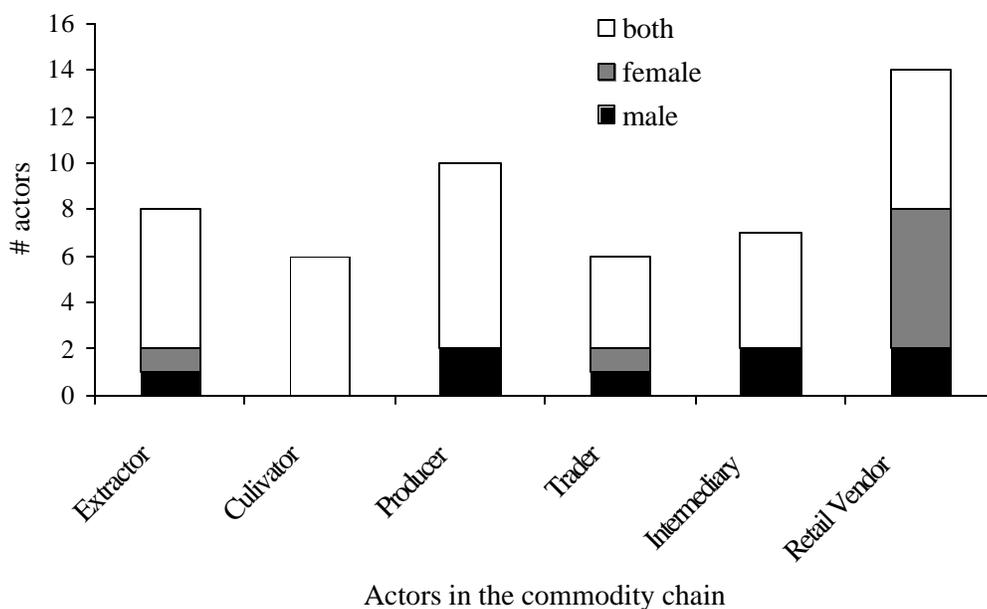
<sup>6</sup> Agriculture was the other main source of income reported (usually the cultivation of beans and corn).

<sup>7</sup> The term spouse is used here to represent common law and married partners. In Nicaragua, many couples do not formally get married but common law is considered equivalent to marriage.

**Chart 1: Importance of brooms as a source of household income** (as reported by actors in the different stages in the brooms commodity chain)



**Chart 2: Management of total household income by gender** (as reported by actors in different stages of the broom commodity chain)



### ***Crespillo and coco palm***

One species of vine, locally called crespillo, is extracted from the Reserve for the production of baskets. This species has been identified as a species of fern, *Lygodium venustum*, by staff at the Arboretum at the Central American University. *Lygodium venustum* is a type of climbing fern and grows in disturbed areas of secondary forests, at the edge of roads, in pastures, and gallery forests, and usually grows over trees and shrubs. This species of fern is ubiquitous in tropical America and is considered very weedy. It is by far the most abundant species of *Lygodium* in the Americas at low elevation.

The palm leaves collected are from the coconut palm *Cocos nucifera*. The veins of the leaflets are used to weave the main body of the basket. Crespillo is used to weave the base. The entire palm leaf (or *frond*) is extracted from *Cocos nucifera*, and then the individual leaflets are cut and bound for transport. The stems of the frond are also used to make a star shaped base with which to weave the crespillo. It is not a native species and does not grow wild in the Reserve. The *Cocos nucifera* leaves are extracted from the Reserve as well as from surrounding areas. The palms are located in private property inside the Reserve and bought from the owners or caretakers. Usually, the crespillo and palm leaves are collected at the same time. This is done to save time and because all material needs to be ‘fresh’ or ‘green’ for the baskets to be produced correctly. Therefore, all material is collected the day before baskets are produced.



**Photo 1** Rolls of *Lygodium venustum* right after harvest

The average amount of *Lygodium venustum* extracted each time is about 20 to 30 rolls (each roll has an average of 25 vines of varying length) and about 10 to 30 dozen palm leaves. The price for one dozen palm leaves – *fronds* - range from 5 to 15 Cordabas per dozen (\$0.35 to \$1.10), depending on the property. It was reported that some times caretakers will give them for free, as they will trim the coco trees to encourage increased

fruit production. All extractors stated that the guard has never given them problems and that the extraction of the vine helps the growth of larger tree species, as the vine tends to

choke out seedlings. Most extractors stated that sometimes they collect firewood at the same time as crespillo and palm leaves. Some of the extractors collect firewood separately.

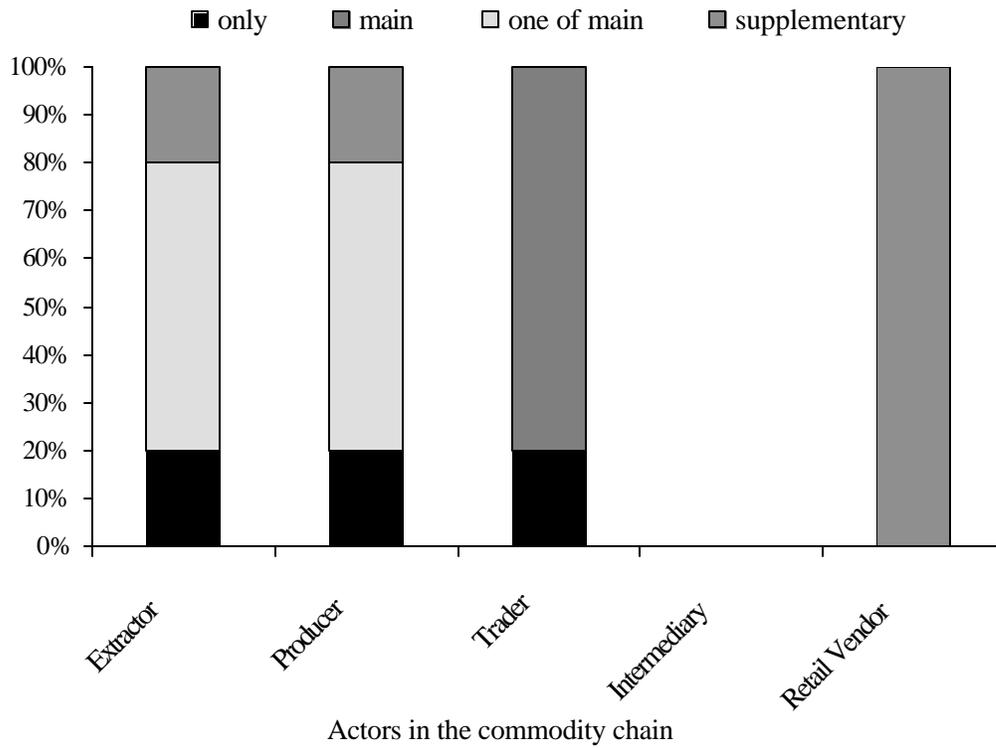
Both females and males share the extraction of crespillo and palm leaves. In certain households it is males who extract with the assistance of females, and other households it is primarily the female. In two basket-producing households, the females normally extract the vines and palm leaves because the males in these households held salaried jobs outside the house or were not interested. As mentioned previously, all material needs to be ‘fresh’ or ‘green’ for the baskets to be produced correctly. If the male is not able to extract the material when needed, the female members of the house are then responsible, as it is the females who produce the baskets. In one household, it was reported that the male always extracts and that the female very rarely assists. Yet, it was observed on several occasions that both the males and females were extracting materials together. In addition, none of the participants felt that there was a distinct separation as to what women extracted from the Reserve and what men did. The only product that was labelled as exclusively male was timber harvesting. Other products such as firewood and broomsticks are considered more of a male activity than female, but as many men leave to find work outside the community (or country, such as Costa Rica), the activities have become equally female (and children’s) activities.

As illustrated in Chart 3 below, crespillo and palm extractors reported that the extraction/production of baskets is one of the main sources of income. Other main sources of income are agriculture and broom production.<sup>8</sup> Chart 4 below shows that the management of household income is in most cases a shared responsibility (as reported by the extractors of the households).

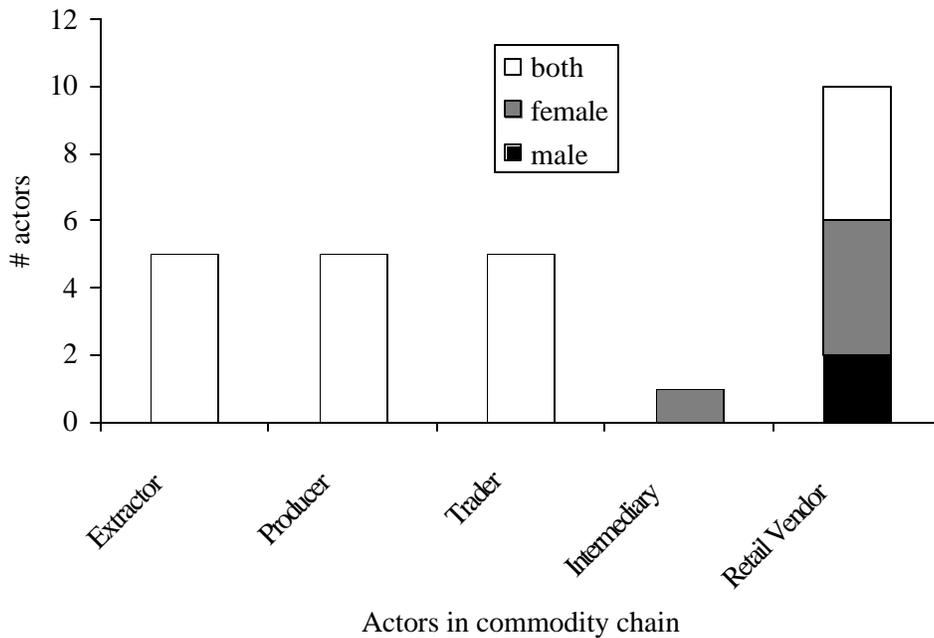
---

<sup>8</sup> Note that there is no data for intermediary as only 1 actor was interviewed; therefore there is not enough data to conclude.

**Chart 3: Importance of Baskets as a source of household income (as reported by actors in the different stages of the basket commodity chain)**



**Chart 4: Management of total household income by gender (as reported by actors in the basket commodity chain)**



## **B. Cultivation**

### ***Straw Brooms***

The cultivation of straw is only part of the broom commodity chain. All cultivators are male, but during harvest time, the cultivators reported that their spouses assist. Broom straw is grown in several places by these cultivators: Masaya, El Valle, Granada, Tisma, and Tipitapa. The majority of straw cultivators rent land in the areas surrounding Granada and Masaya, not in El Valle. Straw is not usually grown near the household. The straw is grown primarily for broom production, but the seeds are also used for animal feed. When questioned about how long they had been growing broom straw, the responses ranged from 3 to 35 years, an average of 20 years. These years also corresponded, in most cases, to the number of years that they had also been producing straw brooms, as most cultivators also produce brooms.

There are two harvests of straw: May and June. The price of brooms is directly related to the harvest of straw. During the two harvests, when straw is widely available, the price of brooms (and broomsticks) is lower. The price of brooms is highest in March/April when straw is scarce. Although most of the cultivators do not sell their straw, there are a few who sell extra straw to other broom producers. The average price of straw is 1400 Cordabas per manzana<sup>9</sup>. Most cultivators responded that one manzana of straw is enough to make between 50 and 60 dozen brooms. Straw can be stored for several months, but is usually used to make brooms as soon as it has dried. Almost all cultivators grew broom straw with other crops such as corn, beans, and vegetables. One cultivator only grew straw. It was mentioned by several cultivators that they grow straw because it is more economic and is not damaged by as many diseases as other crops. There is a less physical input needed to cultivate straw and it is more resistant during the dry season than other crops. When asked about the management of the income from straw and other household incomes, all responded that both they and their spouses shared responsibility.

---

<sup>9</sup> One manzana is equal to about 1 hectare.

## C. Production

### *Straw Brooms*

The communities surrounding Laguna de Apoyo Nature Reserve (LANR), particularly El Valle, are known as the broom producing area. There are other communities, such as Tisma that produce brooms, but the majority of brooms for the Pacific market are produced in El Valle and surrounding communities. All of the broom production takes place in the household, and as such are family run businesses. All the producers interviewed were male, as they are considered the main producer. The male producers responded that the males of the household carry out the whole process of brooms and women only assist in the production of brooms when needed. Most of the assistance in broom production is by the younger males of the house. The only female that assisted in the brooms process is the older female (usually the spouse of the producer). Most producers stated that women usually only assist with the final weaving and finishing, although, in several households it was observed that the women were participating in the entire process. There were two main reasons why females are not main participants in broom production: males are stronger and therefore can produce more durable brooms in less time, and that traditionally it is a male occupation. Another reason mentioned why women do not normally participate in the production of brooms was that they are usually too busy with housework. Some of the producers had been producing brooms for over 25 years. Others had only recently entered the market.

Four different ‘categories’ of broom producers were identified. These are classified depending on what materials they supplied themselves and what they purchased, as shown in Table 1 on the following page.

Table 1: Classification of Producers

	Producer A	Producer B	Producer C	Producer D
Straw Cultivation	Yes	Yes	No	No
Stick Extraction	Yes	No	Yes	No
Total # Producers	3	5	0	2

All producers bought the miscellaneous inputs needed to produce the brooms – nails, rope, and wire. These items were normally bought in the Masaya market by female

household members at the following prices: wire (6 Cordabas/pound or \$0.44/pound), rope (5 Cordabas, 3 Cordabas, and 2 Cordabas depending on the size of the ball or \$0.37, \$0.22, \$0.15), nail (5 Cordabas/pound or \$0.37). The price paid for one dozen (bundle) of broomsticks are between 8 and 10 Cordabas (average 9 Cordabas) and producers usually buy twice a week. Broom straw costs approximately 1400 Cordabas per manzana. One manzana of straw produces 55 dozen of brooms, equating to the cost of 25 Cordabas per dozen of brooms. All but one producer makes brooms all year at an average of 3 ½ days per week. Each producer can make on average 6-dozen brooms per day, or 21 dozen per week. It takes an average of 5 minutes to make one broom.

Producers A and B responded that broom production was not the only source of income, although it was a main contributor. They cultivated food crops alongside the broom straw. The producers (Producer D) that have to purchase all materials reported that broom production was at times their only source of income. The producers that purchase all of the materials are those whose household depends almost exclusively on brooms as the main source of income. In these households, brooms are sold all year long regardless of price, and the men participate more in the selling than in other households (this will be expanded on in the household trader discussion below). Those households that have alternative or supplementary sources of income do not sell brooms until the price increases (during the summer) and more profits can be realised.

### *Coco baskets*

In contrast to the broom producers, all the main producers of the coco baskets were females. In two of the households, the main producers were younger girls aged 17 to 22. Generally, all the females (including younger females) in the households participate in the production of baskets, with the younger males assisting. In two households, the older male(s) assisted when needed, but females carry out the majority of the weaving and finishing. The men in most of the households hold outside jobs or are involved in the production of straw brooms, furniture, and agriculture. Several males in the



**Photo 2** 17-year-old woman weaving baskets at home

households reported that this gendered division of labour is because the process of making baskets is very precise and time consuming and men do not have the patience.

It is interesting to note that the technology of coco basket production was taught by an El Salvadorian couple to two local adolescent males 18 years ago. Only one of these males continued to work in the production and taught the process to his family members and several other households in El Valle. Today, it is his household that produces the baskets. There another family that produces baskets, and the main producer is a male. The original design of the basket did not include the use of crespillo; this was a style that was developed by several members of the family. They stated that several different types of vines were experimented with, but that crespillo is the only one that weaves well and maintains its strength (i.e. does not become brittle when dry).

As with broom production, the entire process is located in the home. Most producers work an average of 4 to 5 days a week and produce approximately 15 dozen baskets per week. One household produced 15 different styles of baskets, while the other households produced only 6 or 7. The production of baskets is continuous all year in all but two households. These households produce baskets the last 5 months of the year. The highest demand for these baskets is in November and December, during the Christmas season. Because of this, some of the households only produce baskets at this time. In these families, baskets are only supplementary income. In the other families, it is considered one of the main income sources. All producers stated that baskets are the main income generator for the household. Because three of the 5 producers were children working in their parents' home, they responded that they did not manage the income from baskets. The three girls worked during the mornings and went to school in the afternoon. Two of the girls stated that their mother sells the baskets and therefore keeps the cash income. When they need something such as clothing or school supplies, they request it from their mother. All three responded that both their parents share in the responsibility of household income. The other producers responded that it was also a shared responsibility between spouses.

#### **D. Household traders**

In both commodity chains, a female member of the household takes the goods produced and sells them in the markets and streets. In the broom commodity chain, all the

household traders identified were females and all but one in the basket commodity chain. Over 90% of the household traders in both chains combined are females. When asked about why in both commodity chains the vendors are almost always female, the response was consistently 'tradition'. It has been customary in Nicaragua for the females to sell fruit and vegetables from the household yards as well as certain products from the agricultural land. Along with the fruit and vegetables, the females also traditionally sell any artisan or craft products produced in the house. Most participants were not able to give a specific response as to why this is, but several males claimed that selling requires patience and females have more patience than males. This corresponds with the rationalization given for the gender division of labour in the basket production stage. Male vendors are present in the markets, but the majority of them run permanent stalls. The household traders walk around both the markets and streets in urban centres selling goods. Fewer males than females were observed walking around the markets and street selling goods such as brooms and agricultural producer (fruits and vegetables).

The broom household traders sell primarily in the Masaya market. This is the closest large urban market and also the easiest to reach. There are direct buses from El Valle to Masaya every hour or two depending on the day. To get to Managua or Granada, one has to take the El Valle-Masaya bus to the main highway and transfer to a Granada-Managua bus. The other option is to go to Masaya and transfer to a Managua bus (or Masaya bus, or any other town). The bus fare is affordable, but household traders usually have to pay extra to have their goods transported as well. It is also much more difficult to transport goods when several bus transfers are necessary. For this reason, the majority of the household traders sell in the Masaya market. The coco baskets are much easier to transfer than brooms, as they are smaller. This may be why basket household traders sell in more markets than broom traders.

The main selling location for broom household traders is an alleyway in the Masaya market. Here, brooms are sold to intermediaries and retail vendors during the morning. Saturday morning is considered the busiest and most important selling day (between 6 and 7:30 am). After the alleyway sales the household traders walk around the market selling to stall vendors and consumers. They also walk through the streets of Masaya and other urban areas to sell brooms to store vendors and consumers (directly to the household). Household

traders sell the brooms either per unit or per dozen. The prices of brooms vary depending on the season. The lowest price for one dozen brooms is 50 Cordabas during winter (July



**Photo 3** Selling brooms through residential streets of Granada

to December). During winter the price per unit is 5. In summer, the price per dozen can reach as high as 120 Cordabas with an average price of 100 Cordabas (between 10 and 12 per unit). Some brooms are better quality and obtain better prices. For example, if a broom has more weaving to make the straw compact, it may cost 1 or 2 Cordabas more per unit (as explained in box 1).

As in the broom commodity chain, the most of the basket household trader sell in Masaya. But, they also more routinely go to several different markets in Managua, as well as Granada. They also sell the baskets to flower shops in all three of those cities. Two of the household traders responded that several times a year they sell baskets to intermediaries who then export them to Costa Rica. One of these intermediaries is from Costa Rica and the other two that were mentioned are from Masaya. Although the basket household traders do not walk around the streets and markets specifically to sell baskets, they do sell them per unit out of their homes as well as in the markets. One basket trader also sells the straw brooms produced by her husband. If she is able to, she will sell baskets while selling brooms. Most of the household traders sell per dozen and the prices of the baskets depend on the styles. The average price of one dozen baskets ranges between 20 and 240 Cordabas (or \$1.45 and \$17.50), depending on size, style, and degree of difficulty (usually measured by the time required to make one basket). The household traders usually sell them by the dozen, but at times sell per basket. The price per basket ranges from 5 to 25 Cordabas (or \$0.35 to \$1.80).

Given that household traders sell goods directly in the markets and streets, they receive the cash income directly. In both commodity chains, the household traders responded that the management of income was a shared responsibility. Several replied that they manage what cash they receive and their spouses manage what is theirs. Two traders, including the

one male trader in the basket chain, stated that they are the ones who manage all the cash income. All household traders replied that once they receive the cash income, they purchase any necessities for the household as well as materials needed for the production of brooms/baskets. Both spouses manage the amount that is left over. Yet all of the household traders are from poor, rural households with many members, so the cash income provides for necessities and not much is saved.

### **E. Intermediaries**

The broom trade seems to be centred in El Valle, as it was discovered that even some intermediaries are from the communities surrounding the Reserve. All of the intermediaries were interviewed in the Masaya market alleyway, and three were from El Valle, 3 from Masaya and 1 from outside Masaya. In the broom commodity chain, the intermediaries interviewed were equally female and male. All buy the brooms from the Masaya market, even the intermediaries from El Valle. Although the intermediaries from El Valle may be able to purchase brooms cheaper there, it is preferred to buy in Masaya to avoid the hassles and costs of transportation. Intermediaries purchase the brooms only by the dozen at an average price of 60 (\$4.40) Cordobas during winter and 100 Cordobas (\$7.30) in summer. They then sell the brooms to market vendors in several urban centres throughout Nicaragua. They also sell brooms directly to the consumer. The brooms are sold from 80 up to 150 cordobas/dozen (\$5.90 to \$11.00), or 10 to 20 Cordobas per unit, depending on the season and place. Managua is considered more expensive, so brooms are sold at a higher price.

All of the female broom intermediaries responded that they manage the money, and all but one female are single (widowed). In addition, all females responded that the buying and selling of brooms was the main source of income, in several cases the only source of income. Two males responded that they manage the household income and that brooms are the main source of income, with the sale of spices as supplementary. The other male responded that the management of household income was shared and that both he and his spouse sold brooms.

There were no intermediaries for baskets in the Masaya market. The household traders for baskets stated that none of them sell to intermediaries except for two specific women who sell in Costa Rica and Honduras. Only one intermediary was interviewed, as the

others were located in Costa Rica. The one intermediary sells baskets in Honduras and Costa Rica. She buys the baskets from one basket household trader. She buys 3 or more dozen baskets 10 times a year. Depending on the style, the price ranges from 130 to 240 Cordabas per dozen (\$9.50 to \$17.50). She only purchases two styles of baskets. In Honduras and Costa Rica, she sells the baskets at temporary fairs. These fairs are set up at certain times of the year for importers to sell their goods. In Honduras, she only goes to the capital – Tegucigalpa, while in Costa Rica she sells in several large urban centres. The prices for baskets in Costa Rica range from 400 to 600 Colones<sup>10</sup> per basket (\$1.15 to \$1.80). In Honduras the prices are approximately the same. Along with baskets, she also sells clothes and shoes in both Costa Rica and Honduras, which she and her spouse make. She stated that she manages the household income that she produces and her husband manages his.

#### **F. Retail vendors**

There are two types of retail vendors: market stall vendors and store vendors. In the both the broom and basket commodity chains, intermediaries and household traders sell to both types as well as directly to the consumer. The market stall vendors sell a variety of goods alongside the brooms and baskets. The store vendors constitute varying types: supermarkets, small corner stores, variety shops as well as flower shops. The basket household traders sell mainly to flower shops, which then sell the baskets with artificial flowers – a value-added process.

Stall vendors are located inside the markets in urban centres. Table 5 in Appendix 3 gives a detailed summary of the retail vendors. The majority of stall and store vendors in both chains were females. The reason for this may be that the final consumers of both items are female (as indicated by the responses of retail vendors to that question). The straw brooms are sold in stalls and stores along with other household items such as cleaning supplies, kitchenware, and hardware (rope, canvas, wire, etc.). In some cases, the straw brooms are sold alongside manufactured imported plastic brooms, which have become major competition. Baskets are sold in the artisan sections of the markets alongside wood-turned crafts and other artisan goods. There is a large male presence in the

---

<sup>10</sup> At the time of the research, US \$1.00 was equivalent to 336 Costa Rican Colones.



**Photo 4** Broom stall vendor in the Masaya market

market, but selling products such as firewood, timber, hardware (i.e. tools, construction material) and furniture.

The prices retail vendors' pay for brooms differs slightly between Managua and other locations. Generally, in Managua, the price per dozen is 10 to 20 Cordabas (\$0.75 to \$1.50) higher. The average purchase price in Masaya and Granada is between 70 and 150 Cordabas/dozen (\$5.15 and \$11.00) depending on the season. Some small stores purchase per unit at between 8 to 10 Cordabas (\$0.50 - \$0.75). The majority of the stall vendors purchase brooms

once or twice a week and usually buy only 1 or 2-dozen each time. Storeowners purchased brooms less often, on average once every two weeks. In Managua, the majority of stall and store vendors buy the brooms from intermediaries. These intermediaries are predominantly male. In contrast, the stall and store vendors in Masaya and Granada buy brooms mainly from household vendors, who are predominantly female. See Table 6 in Appendix 3 for more details.

Both stall and store vendors in Masaya, Granada and Managua purchase directly from the household traders. The demand for baskets is more seasonal than brooms, as they are not used on a daily basis the same as brooms. A broom lasts on average one month, depending on the use, whereas a basket usually last more than a year. The demand for baskets is highest during Christmas and New Years when they are used as gifts and ornaments. As such, the purchasing of baskets by retail vendors is at its peak in the months between October and January. Some of the stall vendors buy baskets on a regular basis – once or twice a week – and increase purchasing during the busy months. Flower shops were found to do the same. Other retail vendors only buy during the busy months. The majority of stall vendor and flower shops buy on a per month basis, approximately 1-2 times a month. Flower shops will special order baskets, as will some stall vendors.

Retail vendors buy the baskets per dozen at a price between 35 and 250 Cordabas (\$2.50 and \$18.00) depending on the style and size. They sell the baskets per unit between

the prices of 3 and 20 Cordabas (\$0.22 and \$1.45). The flower shops sell the baskets with floral arrangements, so their prices are higher. These prices range from 40 to 140 Cordabas (\$3.00 and \$10.30) per basket with flowers – this price depends both on the style of basket and type of flowers. The prices of both vendors increase slightly during the busy months (end of October to January). Household traders reported no fluctuation in their prices during the high demand months.

## **G. Overall Analysis**

### ***Roles Women and Men Play in Household Economics and NTFP Markets***

It was found that the straw broom and coco basket chains represent different distributions of gender roles. Males in the straw broom commodity chain play a more dominant role than the females. In the coco basket chain, females have a more dominant role. This is not to say that one chain is ‘male’ and the other is ‘female,’ but they characterise a fundamental aspect in Nicaraguan society. In Nicaraguan society, there is a tradition of *machismo* and *marianismo*, where women and men have defined roles. In these traditions, men and women exist in separate social spheres: women in the private sphere (the home) and men in the public sphere. In the public sphere, men attain access to certain privileges as well as power and control. This power and control creates the ideal of machismo, which is defined generally as aggressive, stubborn, inflexible, and chauvinistic. Women, inhabiting the private sphere, are to follow ideals based on motherhood, homemaking, purity, and goodness.

In a report on the aspects of gender in conservation and management of natural resources in Nicaragua by the Food and Agricultural Organisation (FAO), it is noted that the males generally hold the land title (or rental agreement of both the house and agricultural land) and they decide how the land is to be used. They have greater access to salaried employment, and have access to the majority of cash income and control over it (van der Borg 1994)<sup>11</sup>. Because the males have title to the land, they are considered the head of the family. Women, the FAO study notes, only have control over the small area of

---

<sup>11</sup> In July 2000, an earthquake was centred in Laguna de Apoyo Nature Reserve, displacing several of the 70 families in the Reserve as well as several dozen in the surrounding areas. The government relocated many families to lands closer to Managua, giving the land title to the women of the household, thus changing the gender relations. This is becoming common practice in Nicaragua as well as other parts of Latin America -

land surrounding the house and the household, and control income produced from this land. Females, aside from their activities in the house and yard, also assist the males in agriculture. The sale of goods from the land is also documented as separate: males sell the products from the agricultural land and women that of the yard/house, which include fruits and a few vegetables.

This study has shown that women do not only participate in the private sphere, but also play an important role in the public sphere for the benefit of the household. The majority of households in this study were rural poor, and therefore the ideal roles of males and females (machismo and marianismo) cannot be realised. Necessity requires that women enter into the public sphere, while simultaneously continuing to carry out their role in the private sphere (i.e. childcare, housework). In most cases, men do not undertake work in the private sphere. Fernandez (1996:52) reports that the informal sector in Nicaragua consists of 60% female, while the formal sector is 59.2% male. Yet, women's involvement in the public sphere does not "threaten" the ideals machismo and marianismo as the majority of informal sector work is the same as work normally carried out in the private sphere (the household), such as cooking, cleaning, and childcare. The condition of being lower class has created roles for women outside the private sphere that have become perceived as normal female roles under the traditions of machismo and marianismo. In Nicaragua, as reported by many households in this study, the role of woman as vendor is tradition. There are certain commodities that a woman sells and those that men sell as well as different arenas where these commodities are sold. Women tend to sell more of a variety of products from foodstuffs (fruit, vegetables, meats) and household goods (clothing, cleaning products, kitchen utensils) to firewood. These products are sold in municipal markets as well as on the streets. In comparison, men tend to sell larger products such as firewood, lumber, furniture, large quantities of produce and grains (i.e. livestock and seed), and agricultural products (fertilisers). The men tend to sell these products on the edges of the markets in specialty areas and out of the home.

Table 2 on the following page lists the different activities reported by males and females of both basket and broom producing households.

---

please see *Empowering Women: Land and Property Rights in Latin America* by Carmen Diana Deere and Magdalena Leon (2001). University of Pittsburgh Press.

Table 2: The gendered division of labour by activities reported

FEMALE	MALE
<ul style="list-style-type: none"> <li>▪ Assist in agriculture (i.e. harvesting)</li> <li>▪ Assist firewood collection</li> <li>▪ Assist in broomstick collection</li> <li>▪ Crespillo and palm leaf collection<sup>12</sup></li> <li>▪ Assist in broom production</li> <li>▪ Basket production</li> <li>▪ Sell agricultural products (i.e. vegetables)</li> <li>▪ Sell baskets</li> <li>▪ Sell brooms</li> <li>▪ Purchase material for production of brooms and/or baskets</li> <li>▪ Purchase household goods (food, clothing, etc.)</li> <li>▪ Cooking</li> <li>▪ Cleaning - house</li> <li>▪ Washing - clothes</li> <li>▪ Yard maintenance</li> </ul>	<ul style="list-style-type: none"> <li>▪ Agriculture - cultivation</li> <li>▪ Firewood collection</li> <li>▪ Broomstick collection</li> <li>▪ Crespillo and palm leaf collection</li> <li>▪ Broom production</li> <li>▪ Assist in basket production</li> <li>▪ Sell agricultural products</li> </ul>

The composition of the household influences the different roles that females and males play. Where a female is the head of the household, the traditional roles are ambiguous. In this research the 58% of women interviewed identified themselves as married. Of the un-married women, 5 are under age 21 and 4 are widowed. The stages in the commodity chain where female heads of households (those un-married women) are the majority are intermediaries and stall vendors. The majority of women in this study had children - an average of 4.5 children per woman.

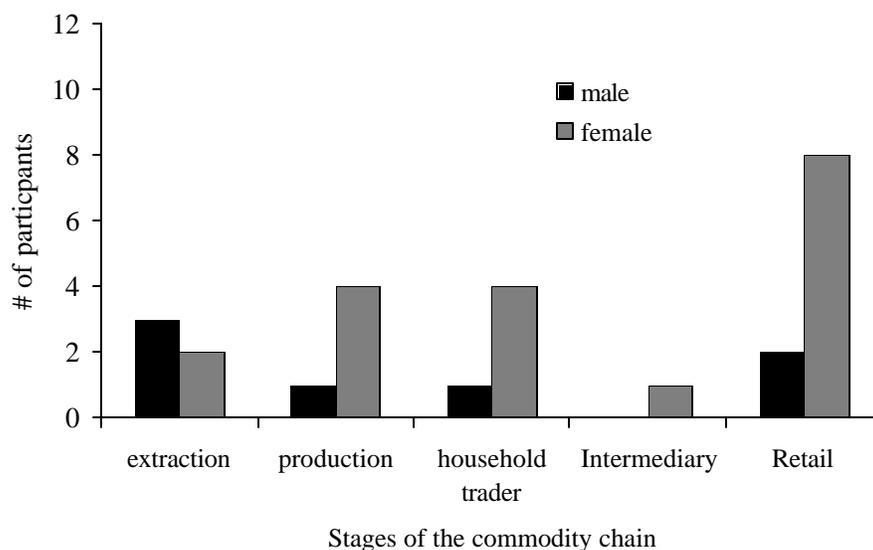
In both chains, the distribution of gendered participation can be summarised as follows: males are the principle extractors, straw cultivators and brooms producers, females are the principle basket producers, household traders, intermediaries and retail vendors. There is a strong trend in the data to show females as the main actors further along the chain, although they participate to some extent at each stage. Figures 1 and 2 (Appendix 2) map out the gender participation along the commodity chains, while Charts 5 and 6 on the following pages illustrate the distribution of gendered participation in the coco basket and straw broom chain respectively. Both these charts are based on the responses of participants in this study. At all stages both males and females play some role. For

---

<sup>12</sup> In some cases, the females in the household only assist. In other households they are the main collectors of bejuco and palm leaves. This also applies to the males – some only assist in the collection.

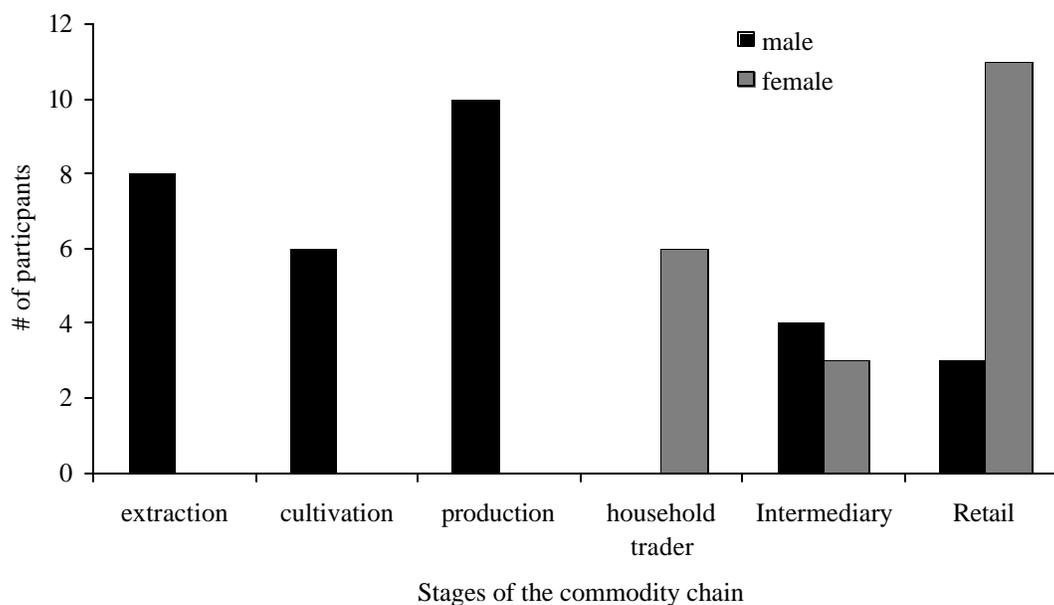
example, it was mentioned by several extractors that females also assist, usually when needed. In the basket production, several producers reported that males in the household assist in certain parts of the production process. The results of the study indicate that females assist in more stages than males, as shown in the list of activities detailed in Table 2 above.<sup>13</sup>

Chart 5: Gender participation along the coco basket commodity chain



<sup>13</sup> Note that the final consumer stage is not included, as no final consumers were interviewed directly. Nearly all household traders and retail vendors reported that the majority of consumers are female (in both commodity chains). These responses are shown in Table 6 of [Appendix 3](#). Observations in the markets of Masaya and Managua confirm these responses.

Chart 6: Gender participation along the straw broom commodity chain



The participants in the study associated the distribution of distinct roles primarily with tradition and custom. This is also the case with the FAO report described above. It could be, as well, that brooms are generally an item purchased by women, as shown in the results. The quality of patience seems to be more associated with females than males and was claimed by several male participants as the reason why females produce baskets and sell, while males produce brooms, extract and work in agriculture. One male brooms producer stated that females generally sell in the market because they are better salespeople, as they are persistent, and have louder voices. The economic situation of almost all participants was poor. Except for the retail vendors and some intermediaries, just about all participants belonged to poor, rural households. Consequently, the gendered division of labour may be based more on tradition and necessity than qualities such as patience.

***How these gender roles situate women and men as conservation stakeholders***

As direct users of Laguna de Apoyo Nature Reserve (LANR), both males and females should be considered important conservation stakeholders. Although it was reported that males tend to be the main extractors of NTFPs used in both commodity chains, females also operate as extractors, particularly when resources are needed immediately. Females

extract firewood and smaller NTFPs independently of males; larger NTFPs such as broomsticks are usually extracted with males. Since females tend to extract more on a need basis – that is when resources are needed for immediate use/consumption – they tend to extract closer to the household, which is for the most part on the north side of LANR near the main paved entrance. This side of the Reserve is an intensively used area both for extraction and cultivation. The males have a tendency to venture further into the forest to extract broomsticks and firewood. The crespillo used for baskets is only collected on north side of the Reserve, which is extracted equally by males and females.

Production of both straw brooms and coco baskets depends greatly on the access to the resources in LANR. Most producers do not have control of large areas of land in which to cultivate tree species for brooms (or plant species for baskets). As such, the availability of resources in LANR is important to the household. As a result, many households use the Reserve daily to extract important NTFPs, including firewood. The daily use of the Reserve situates both females and males in the communities as important stakeholders. The females are the major stakeholder of areas close to the village and roadways, while the men have interests in areas further from the roads and villages. This conclusion corresponds with much of the NTFP and conservation literature.

***How significant NTFPs are to household income and, therefore, to the informal economy***

The NTFPs used in both the brooms and basket commodity chains have been reported as significant sources of income for the majority of households. Further up the chain, in the stage of retail vendors, the income from these NTFPs is much less significant, as they sell a large variety of goods alongside brooms and baskets. For example, many retail vendors in the broom commodity chain sell cleaning supplies such as mops, cloths, plastic and straw brooms, as well as other household items. Thus, if straw brooms were no longer available, they would be replaced by another saleable commodity. However, many of their intermediaries reported that the buying and selling of brooms is their main (or only) source of income. In the households where the production process occurs, the sale of these NTFPs is a significant source of income. Both the males and females in these households benefit directly from the use of resources

Households that depend on brooms as a major source of income, if denied access to the resources necessary (i.e. broomsticks), may resort to other forms of earning income, such as increased firewood cutting and timber harvesting or salaried employment. Because males carry out the majority of fire wood cutting and timber harvesting as well as the sale of these forest products, the substitution of broom production for these activities will result in loss of income generating activities for females as well as loss of control of income. This is due to the fact that females are the ones who sell the brooms, and therefore directly receive the cash income. This cash income they use immediately to purchase household necessities. With the loss of the ability to control this income, it may mean that less income is spent on household needs, as literature suggests that males tend to use less of their income for household expenses (Mies 1986; Ghatak 1995; Prügl 1999; Nuemann and Hirsch 2000).

***Do these NTFP activities promote forest conservation (i.e. are they ‘sustainable’)***

The participants from this study have reported that the extraction of both broomsticks and crespillo does not kill or damage the tree/plant. The extraction of crespillo is viewed by the park guard as ‘cleaning the forest,’ as the species tends to grow over paths and choke seedlings, preventing maturation of trees. As stated earlier, this fern species is considered weedy. All extractors claimed that even though they harvest a certain amount of crespillo each week, the density never seems to decrease. Crespillo is abundant in the north area of LANR, where it is harvested as well as along the main paved road into the Reserve.

Species identified in broomstick products are all considered secondary, pioneering species. All are native to Nicaragua and Central American in general. The species reported as the best for broomsticks, *Guazimo ulmifolia* is a common species in Central America and has been used in many reforestation projects. This species is known to sprout rapidly when cut (providing the roots are not damaged). Many farmers in Nicaragua use *Guazimo ulmifolia* as living fenceposts, as it reproduces from cuttings. The extraction of *Guazimo ulmifolia* sprouts from LANR is a continuous activity. The species grows in previously disturbed areas of the Reserve, which are scattered around the edge of the Reserve, as well as open canopy area and around the lake front. It is shade intolerant and does not grow in high forests. These findings support several studies that show that less diverse forests contain more commercial NTFP species (Peters 1992).

Because this species and the other two main species grow only in secondary forests and more open forested areas (as verified in plot studies completed February 2000 by Shillington and McCrary), the cutting of limbs can produce several outcomes depending on where it is harvested. In secondary areas, harvesting may prevent the tree from developing to full maturity, which may assist in the growth of non-pioneering native species (if the disturbance level is minimal while harvesting). This may assist in re-establishing native forest that had been harvested for timber or grazing/cultivation land. Or, if the secondary forest is heavily disturbed while harvesting, the growth of pioneering species may be encouraged. In areas where harvesting is carried out in natural open canopies or by the lakefront, with minimal disturbance, extraction can be carried out sustainably, affecting the composition of the forest little.

***Can these NTFPs be managed congruently with conservation or do alternatives to extraction exist (i.e. agroforestry and cultivation outside the reserve).***

The possibility of both agro forestry and cultivation for all species used to make brooms and baskets exists outside the Reserve, as does the ability for the species to be managed sustainably with the Reserve. It has been observed that the three important species of trees for broomsticks are not killed or severely damaged by the cutting of limbs. All species re-sprout rapidly. The main concern is with the general disturbance to the entire area while extraction is taking place. The bark is removed at the site of extraction, therefore disturbance may be higher than if cutting was the only activity. If extractors are going further into the Reserve to find open canopy forests, more paths may be created, thereby making access to other important species easier (i.e. for firewood). Although, the extraction of green firewood is illegal, the park guard only patrols certain entrances. Additional paths inside the forest may lead to the creation of more entrances into the Reserve. In terms of cultivation, all extractors and broom producers responded that the three main tree species grow very rapidly and would be easy to cultivate. Several extractors claimed that if a *Guazimo ulmifolia* stick were stuck in the ground, within six months it would have several shoots. In addition, *Guazimo ulmifolia* is an important reforestation species and has been established as plantation crops for the use of firewood (Martinez 1985).

The extraction of crespillo from the Reserve is done with minimal disturbance. Methods of extraction involve no tools and are usually done while standing on established footpaths, as the vine tends to grow along and over paths. None of the extractors or basket producers has attempted to cultivate crespillo, but all thought that it might be possible, as it reproduces very quickly under any condition. It was reported that the vine can be extracted in both the rainy and dry season and there is little if any change to its growth rate.

## **V. Conclusion and Recommendations**

This study has shown that gender roles and responsibilities interact with the extraction, production and marketing of non-timber forest products (NTFPs) at differing levels and sites along the commodity chains. Although there seem to be established gender roles and responsibilities, there is a tendency for them to shift and change under different circumstances. Both the straw brooms and coco basket commodity chain follow a similar pattern of gendered division of labour: both show vendors being predominantly female, while extractors are male. The production processes for the chains are opposite – males produce brooms and females produce baskets. Females play a more prominent role in the basket commodity chain than in the brooms chain.

The role of conservation in both chains is important for the households involved in the majority of the stages. Access to resources defines the gendered organisation and relations within the household. If access to a resource is changed, the household must also shift its income producing methods, which may have an impact on either the man or the woman, depending on the resource involved. The roles played by females and males along the chain also situate them as specific stakeholders in conservation. The position of males as main extractors and females as “need-be” extractors necessitates a conservation strategy involving both as separate and equal stakeholders. Ghatak (1995: 174) lists three key constraints to involving women in NTFP development: (1) limited access to markets, value-added technology, training, and credit, (2) lack of decision-making power, and (3) foresters’ lack of awareness and skills to elucidate women’s knowledge, needs and preferences, and to incorporate them into interventions. This case study has shown that women have a large presence in the markets, and in many cases more so than men. Because of this, Nicaraguan women are not subjected to the first key constraint listed by

Ghatak. Women in Nicaragua are generally more knowledgeable about the market (the informal market) than men and directly receive much of the household income. It appears, in terms of decision-making powers in the household, men tend to have more power than women. Yet women's knowledge of markets for NTFPs is vital for the incorporation of NTFPs in a management plan. Conservation management in Nicaragua has not incorporated many gender issues, but as only a few of the protected areas have management plans, there is a large potential for the integration of gender.

This study has further exposed the need for additional research into the use of NTFPs in LANR and other forested areas in Nicaragua. For example, more research into the growth patterns of *Guazimo ulmifolia* and the other tree species in LANR is needed to make an informed decision as to whether broomsticks are currently being extracted sustainably. The use of commodity chain analysis was useful in this study to identify where in the chain NTFPs benefit individuals and households. It was found that females sell the majority of NTFPs and that the income produced is directly managed and spent by these females. This aspect of NTFPs is important to consider when planning conservation management strategies. As mentioned earlier in the paper, LANR does not have a management plan, and as an important forested area in central pacific Nicaragua one is needed to ensure the sustainability of both human and forest communities.

The potential of agro forestry is also an area where more research would be beneficial to both forest conservation and community development. The communities surrounding LANR are predominantly poor and will continue using the Reserve for income generating products. For this reason, conservation management must take into consideration all the possible NTFP and forest product activities occurring in the Reserve to facilitate a functional and realistic method of management, including the limited resources of the Nicaraguan government to regulate.

## VI. Literature Cited

1. Agarwal, Bina. 1994. *A field of one's own: Gender and land rights in South Asia*. Cambridge University Press. Cambridge, Great Britain.
2. Allegretti, Mary Helena. 1990. Extractive reserves: An alternative for reconciling development and environmental conservation in Amazonia. In *Alternatives to deforestation: Steps towards sustainable use of the Amazon rain forest* edited by A. Anderson. Columbia University Press. New York. 252-264.
3. Ames, M. 2000. Assessing the profitability of forest-based enterprises. In *Incomes from the forest: Methods for the development and conservation of forest products for local communities*. E. Wollenberg and A. Ingles. CIFOR. Bogor, Indonesia. 107-136
4. Balick, M.J. and R. Mendelsohn. 1992. Assessing the economic value of traditional medicines from tropical rainforests. *Conservation Biology* 6: 128-130.
5. Belcher, B.M. 1998. A production-to-consumption systems approach: Lessons from the bamboo and rattan sectors in Asia. In *Incomes from the forest: Methods for the development and conservation of forest products for local communities* edited by E. Wollenberg and A. Ingles. CIFOR. Bogor, Indonesia. 57-83.
6. Benería, L. (ed) 1982. *Women and development: The sexual division of labor in rural societies*. Praeger Publishers. New York.
7. Belcher, B. 1998. A production-to-consumption systems approach: Lessons from the bamboo and rattan sectors in Asia. In *Incomes from the forests: Methods for the development and conservation of forest products for local communities* edited by E. Wollenberg and A. Ingles. CIFOR. Bogor. Indonesia. 56-84.
8. Berg, B.L. 2001. *Qualitative research methods for the social sciences*. Allyn and Bacon. Massachusetts.
9. Boris, E. and E. Prügl. 1996. *Homeworkers in global perspective: Invisible no more*. Routledge. New York.
10. Browder, J. 1992. Social and economic constraints on the development of market-oriented extractive reserves in Amazon rain forests. In *Non-timber forest products from Tropical forests: Evaluation of a conservation and development strategy* edited by D. Nepstad and S. Schwartzman. *Advances in Economic Botany* 9. New York Botanical Gardens. New York. 33-42.
11. Carr, M., M. Alter Chen, and J. Tate. 2000. Globalization and home-based workers. *Feminist Economics* 6 (3): 123-142.

12. Chandrasekharan, C. et al. 1996. *Desarrollo de Productos Forestales No Madereros En America Latina y el Caribe*. FAO. Santiago, Chile.
13. Chen, M. A. 2001. Women in the informal sector: A global picture, the global movement. *SAIS Review* 21 (1): 71-82.
14. de Beer J.H., and M.J. McDermott. 1989. *The economic valuation of non-timber forest products in South-east Asia*. Netherlands Committee for IUCN. Amsterdam, Netherlands.
15. Deere, C.D. and M. León. 2001. *Empowering women: Land and property rights in Latin America*. University of Pittsburgh Press. Pennsylvania.
16. Dunaway, W.A. 2001. The double register of history: Situating the forgotten woman and her household in capitalist commodity chains. *Journal of World-Systems Research* 8(1): 2-29.
17. Food and Agriculture Organization of the United Nations (FAO). 1995. *Non-wood forest products for rural income and sustainable forestry*. FAO. Rome, Italy.
18. Francis, J.K. 1991. *Guazuma ulmifolia* Lam. USDA Tree fact sheet # SO-ITF-SM-47. September. United States Department of Agriculture, Forest Service.
19. Gereffi, G. 1994. The organisation of buyer-driven global commodity chains: How U.S. retailers shape overseas production networks. In *Commodity chains and global capitalism* edited by G. Gereffi and M. Korzeniewicz. Greenwood Press. Westport, Connecticut.
20. Gereffi, G. 1999. A commodity chains framework for analysing global industries. Forthcoming in *American Behavioural Scientist*.
21. Gereffi, G. and M. Korzeniewicz (eds). 1994. *Commodity chains and global capitalism*. Greenwood Press. Westport, Connecticut.
22. Gereffi, G., M. Korzeniewicz, and R. P. Korzeniewicz. 1994. Introduction: Global commodity chains. In *Commodity chains and global capitalism* edited by G. Gereffi and M. Korzeniewicz. Greenwood Press. Westport, Connecticut.
23. Ghatak, S. 1995. A recipe for success: Women and non-timber forest products in Southwest Bengal, India. In *Voices from the field: Sixth workshop on 'Community management of forested lands'* edited by J. Fox, D. Donovan, and M. DeCoursey. East-West Center, Honolulu, Hawaii. 164–179.
24. Godoy, R. and K. Bawa. 1993. The economic value and sustainable harvest of plants and animals from the tropical forest: Assumptions, hypothesis, and methods. *Economic Botany* 47(3): 215-219.

25. Godoy, R., Brokaw, N, and D. Wilkie. 1995. The effect of income on the extraction of Non-timber forest products: Model, hypotheses, and preliminary findings from the Sumu Indians of Nicaragua. *Human Ecology* 23: 29-52.
26. Hahn, J. 1996. Feminization through flexible labour: The political economy of home-based work in India. In *Homeworkers in global perspective: Invisible no more* edited by E. Boris and E. Prügl. Routledge. New York. 219-238.
27. Hankins, A. 2000. *Ginseng Fact sheet*. Virginia Cooperative Extension. Richmond, VA.
28. Hopkins, T.K. and I. Wallerstein. 1986. Commodity chains and the world economy prior to 1800. *Review* 10 (1): 157-170.
29. Hopkins, T.K. and I. Wallerstein. 1994. Commodity chains: Construct and research. In *Commodity chains and global capitalism* edited by G. Gereffi and M. Korzeniewicz. Greenwood Press. Westport, Connecticut. Pp. 17-50, 48-50.
30. Iqbal, M. 1993. *International trade in non-Wood forest products: An overview*. FAO Forest Products Working Paper Misc/93/11. FAO, Rome, Italy.
31. INTA, 1994. *Diagnóstico Agrosocioeconómico*. Instituto Nicaraguense de Tecnología Agropecuaria. Masaya, Nicaragua.
32. Korzeniewicz, R.P. and W.F. Martin. 1994. The global distribution of commodity chains. In *Commodity chains and global capitalism* edited by G. Gereffi and M. Korzeniewicz. Greenwood Press. Westport, Connecticut. Pp. 67-91.
33. MARENA (Ministerio de Ambiente y recursos naturales). 1999. *Reglamento de áreas protegidas de Nicaragua*. Decreto No. 14-99. MARENA (SINAP).
34. Martinez, H. 1985. Producción de leña en la zona seca de Guatemala. In *Técnicas de producción de leña en fincas pequeñas* edited by R. Salazar. IUFRO. Turrialba, Costa Rica. 77-90.
35. McCrary, J.K., A.L. Hammett, M.A. Barany, A.E. Machado, B.J. Garcia, and J.I. Barrios. 2001. Illegal extraction of forest products in Laguna de Apoyo Nature Reserve, Nicaragua. Unpublished report.
36. Mies, M. 1986. *Patriarchy and Accumulation on a world scale: Women in the international division of labour*. Zed Books Ltd. London, UK.
37. Molyneaux, M. 1985. Mobilization without emancipation? Women's interest, the state and revolution in Nicaragua *Feminist Studies* 11: 227-254.

38. Nepstad, D. and S. Schwartzmann. (eds)1992. *Non-timber forest products from tropical forests: Evaluation of a conservation development strategy*. Advances in Economic Botany 9. New York Botanical Garden. New York.
39. Neumann R. P. and E. Hirsch. 2000. *Commercialisation of non-timber forest products: Review and analysis of research*. CIFOR. Bogor, Indonesia.
40. Panayotou, T. and P. Ashton. 1992. *Not by timber alone: Economics and ecology for sustaining tropical forests*. Island Press. Washington, DC.
41. Peters, C.M. 1992. The ecology and economics of oligarchic forests. In *Non-timber forest products from tropical forests: Evaluation of a conservation development strategy* edited by D. Nepstad and S. Schwartzmann. Advances in Economic Botany 9. New York Botanical Garden. 15-22.
42. Poncela Fernandez, Anna M. 1996. The disruptions of adjustment : Women in Nicaragua. *Latin American Perspectives*. 23:1 (8): 49-66.
43. Prance, G., W. Balee, and B. Boom. 1992. Quantitative ethnobotany and the case for conservation in Amazonia. In *The Rainforest harvest: Sustainable strategies for saving the tropical forests?* Edited by S. Cousell and T. Rice. Friends of the Earth, London. 117-29.
44. Prügl, E. 1999. *The global construction of gender: Home-based work in the political economy of the 20<sup>th</sup> century*. Columbia University Press. New York.
45. Ramamurthy, Priti. 2000. The cotton commodity chain, women, work and agency in India and Japan: The case for feminist agro-food systems research. *World Development* 28 (3): 551-578.
46. Ribot, Jesse. 1998. Theorizing Access: Forest profits along Senegal's charcoal commodity chain. *Development and Change* 29: 307-341.
47. Salas, J.B., 1993. *Arboles de Nicaragua*. IRENA, Managua.
48. Salafsky, N., Dugelby, B.L., Terborgh, J.W., 1993. Can extractive reserves save the rain forest? An ecological and socioeconomic comparison of non-timber forest product extraction systems in Petén, Guatemala, and West Kalimantan, Indonesia. *Conservation Biology* 7: 39-52.
49. Salick, J., Mejía, A., Anderson, T., 1995. Non-timber forest products integrated with natural forest management, Río San Juan, Nicaragua. *Ecological Applications* 5: 878-895.
50. Sánchez, M.L., 1999. Areas Naturales Protegidas. In *Biodiversidad en Nicaragua: Un Estudio de País*, MARENA, Managua. 387-426 pp.

51. Shillington, L.J. and McCrary, J.K. 2000. Results from forest plot studies in Laguna de Apoyo Nature Reserve, Nicaragua. Unpublished.
52. Tewari, D.D. 1994. Developing and sustaining non-timber forest products: Policy issues and concerns with special reference to India. *Journal of World Forest Resources* 7: 151-178.
53. Thomas-Slayter, B., A Lee Esser, and M. D. Shields. 1993. *Tools of Gender Analysis: A Guide to Field Methods for Bringing Gender into Sustainable Resource Development*. ECOGEN Handbook. Clark University. Worcester, MA.
54. Tinker, I. 1990. *Persistent inequalities*. Oxford University Press. New York.
55. van Buren, A., 1990. The Woodfuel Market in Nicaragua: The Economics, Sociology, and Management of a Natural Energy Resource. Centre for Latin American Research and Documentation (CEDLA), Amsterdam, 257 pp.
56. van der Borg, B.J. 1994. Conservación y manejo de los recursos naturales en la vertiente occidental de la cordillera de los maribios: Consultaría en aspectos de género. FAO-MARENA GCP/NIC/019/NET.
57. Vellenga, D.D. 1985. Women, households and food commodity chain in southern Ghana. *Review* 8 (3): 293-318.
58. Waid, R.M., R.L. Raesly, K.R. McKaye, and J.K. McCrary. 1999. Zoogeografía íctica de lagunas cratéricas de Nicaragua. *Encuentro* 51: 65-81.
59. Wickens, G.E. 1991. Management issues for development of non-timber forest products. *Unasylva* 42 (165): 3-8.
60. Wollenberg, E. and A.S. Nawir. 1998. Estimating the incomes of people who depend on forests. In *Incomes from the forest: Methods for the development and conservation of forest products for local communities*. E. Wollenberg and A. Ingles. CIFOR. Bogor, Indonesia. 157-188.
61. Wollenberg, E. and A. Ingles. (eds) 1998. *Incomes from the forest: Methods for the development and conservation of forest products for local communities*. CIFOR. Bogor, Indonesia.

## VII. Appendix 1: Maps

Map 1: Nicaragua and Laguna de Apoyo Nature Reserve



Laguna de Apoyo

## VIII. Appendix 2: Figures

Figure 1: Straw broom commodity chain

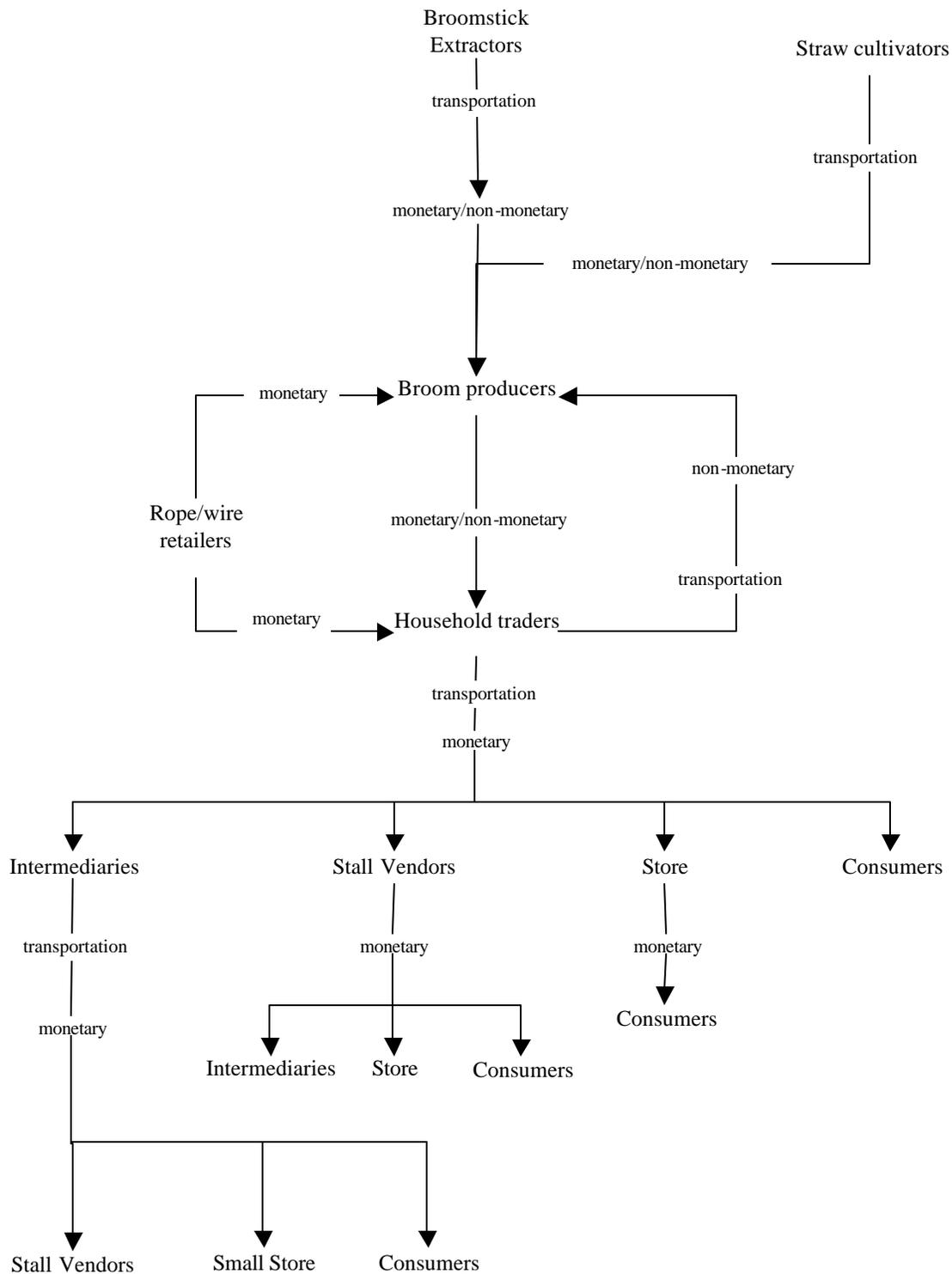


Figure 2: Coco basket commodity chain

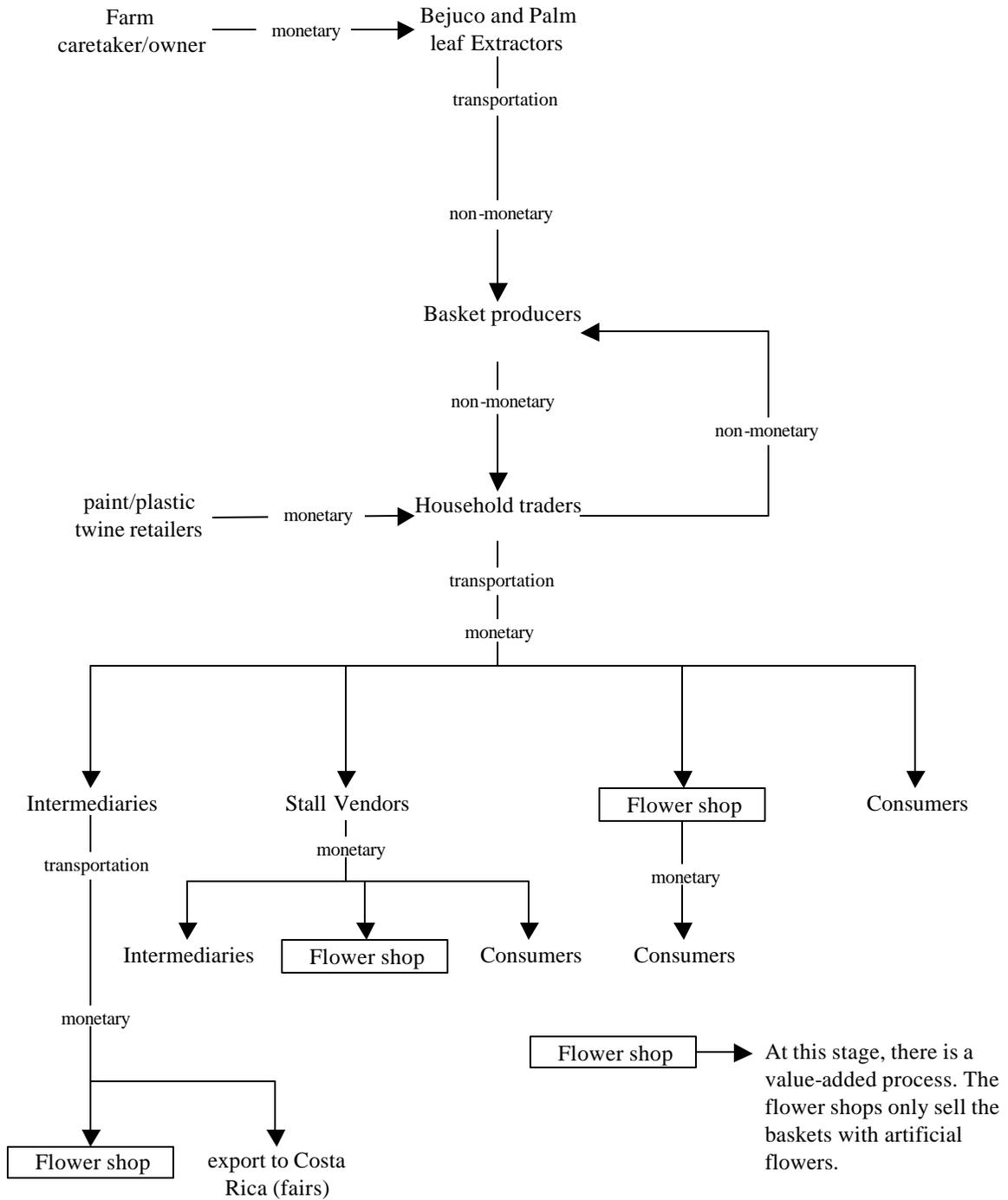
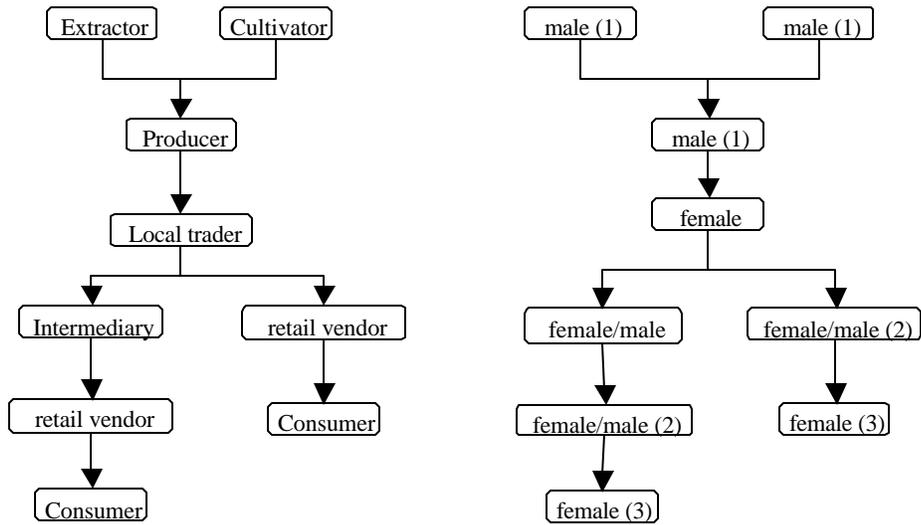


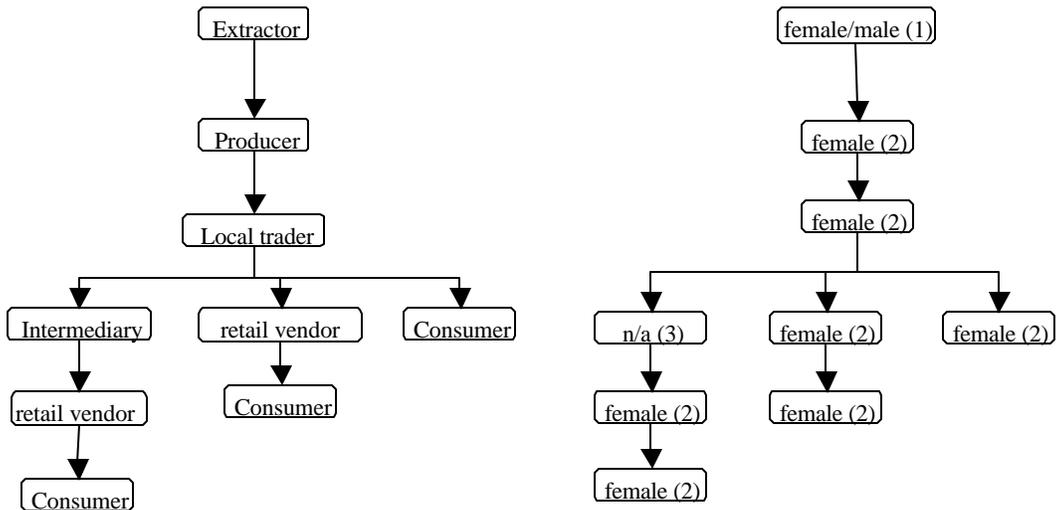
Figure 3: Gender map of the straw broom commodity chain



Notes:

- (1) Predominantly male, but females will assist when necessary (i.e. at critical times to harvest/extract more)
- (2) Both female and male participants, but more females than male.
- (3) Predominantly female, but at times there are males

Figure 4: Gender map of the coco basket commodity chain



Notes:

- (1) Both equally female and male.
- (2) Predominantly female, with some male assistance at certain times. One household, the male's occupation was producing baskets and the female worked outside the house.
- (3) Not enough data to determine.

## IX. Appendix 3: Tables

Table 3: Summary of Broomstick Extraction

Gender	Extraction location	# years extracted	# Times/week	Quantity each time	Time (hours)	Distance travel to extract	Sale price (per dozen)	Primary income source	Other sources of income	Produce brooms
M	La Laguna	30	1	3	6	5	no vende	n	y	y
M	Granada	1	1	3	6	n/a	6	n	y	n
M	La Laguna	10	3	5	7	15	7	y	y	n
M	Tipitapa	17	3	35	10	n/a	9	n	y	y
M	La Laguna	7	3	5	7	7	8	y	y	y
M	La Laguna	3	6	5	3	4	8	n	y	n
M	La Laguna	12	1	6	6	5	no vende	n	y	y
M	La Laguna	10	3	5	7	15	8	y	y	n

Table 4: Summary of Bejuco and Palm Leaf Extraction

Gender	Bejuco extraction location	Palm leaf extraction location	Extract both at the same time	# times/week	Distance travel to extract	Quantity each time (bejuco - roll)	Quantity each time (palm - dozen)	Precio compra la palma (por docena)
m	Laguna	Carratera Masaya	n	0	5	25	15	15
m	Laguna	Laguna/el Valle/Carratera Masaya	y	1	6	10	30	10
m	Laguna	Laguna/el Valle/Granada	y	2	6	10	10	10
f	no use	Granada Masaya	n	2	depende	n/a	35	7
f	no use	Laguna/el Valle/Carratera Masaya	n	1	6	n/a	12	9

Table 5: The number of locations

	# Household Traders	# Intermediaries
Masaya	6	7
Granada	1	2
Managua	1	2
León	0	2
Rivas	1	1
Jinotega	0	1
Masatepe	0	1
Carazo	0	1
San Marcos	0	1
Tipitapa	1	2
Diriamba	0	2
Caribbean (Bluefield's, Puerto Cabezas)	0	1

Table 6: Summary of Retail Vendor Information for straw brooms

Retailer Gender	Retail type	Location	Retailer Purchases brooms from				Gender of consumer
			Household trader	Gender	Intermediary	Gender	
Female	Store	Granada	Y	F	N	-	F
Female	Store	Granada	Y	M/F	N	-	F
Female	Store	Masaya	Y	M/F	N	-	F
Female	Stall	Masaya	Y	F	N	-	M/F
Female	Stall	Masaya	Y	F	N	-	F
Female	Store	Managua	N	-	Y	M	F
Female	Stall	Masaya	Y	F	Y	M	F
Female	Stall	Masaya	Y	F	N	-	F
Female	Stall	Masaya	N	-	Y	M	F
Male	Stall	Managua	N	-	Y	M/F	F
Female	Stall	Managua	N	-	Y	M/F	F
Female	Stall	Masaya	Y	F	Y	M	F
Male	Stall	Masaya	Y	F	N	-	F
Male	Supermarket	Granada	Y	M/F	Y	M/F	M/F