

## WILD FOOD PLANTS: BALANCING CONSERVATION AND UTILIZATION

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### 1. INTRODUCTION

Wild food plants provide substantial sustenance for people around the globe. The world's forests directly and indirectly supply food for 200-300 million people (Pimental *et al.*, 1997). Even though wild foods make up a substantial part of many diets while adding nutritional and culinary value to the forest, they are understudied because domesticated foods usually have a higher status than wild food (Pimental *et al.*, 1997; Smith *et al.*, 2007). They are significant in terms of nutritional and cultural importance and wild foods also add economic value to the forest. Wild food plants can provide an alternative to commercial food crops, in part because gathering wild food plants is a more efficient use of time than engaging in the market economy. Villagers usually add food collecting to an activity which they are already pursuing. The food collected from wild sources reduces the need to purchase other edible goods (Delang, 2006).

Focusing on wild foods can provide a conservation incentive to maintain the forest from which the edible items are collected. Materials that are not marketed, such as most wild food plants, are often ignored when looking at the value of Non-Timber Forest Products (NTFPs). However, research shows that directly consumed NTFPs can play a more important role than some marketed items (Delang, 2006). More research and a better understanding of non-marketed NTFPS are important so policy makers can make informed decisions about protected areas and NTFPs.

A better understanding of wild food collection, consumption, and cultural importance is beneficial for conservation and sustainability work. Nongovernmental organizations (NGOs) and governments working in protected ecosystems can better organize their programs with improved understanding of the roles of wild food plants. Moreover, this research can help locals understand their own patterns and aid their self sustainability. This research can be applied in the following ways: 1) government agencies can create appropriate policy about the delineation of protected areas and appropriate extraction, 2) conservation advocates and sustainable development agents can effectively work to protect the local environments and the human populations who collect resources within these areas, and 3) the locals can make informed decisions about their own land use practices.

The purpose of the research is to better understand how people use, collect and categorize wild edible plants. This project is a case study of *mestizo* and Afro-Ecuadorian wild food use in northwestern Ecuador. Both groups use wild plants similarly, so differentiation between them will not be made in this research. The majority of wild food plant studies, of which there are few, concentrate mostly on indigenous populations (*e.g.*, Lu, 2007). Data are rare for edible wild plants for non-indigenous forest dwellers (Van den Eynden *et al.*, 2003), such as those addressed in this study. This research explores: 1) the role that wild plants play in local diets, 2) collection strategies, 3) hierarchy of plant/part importance, 4) gender and age determined knowledge, and 5) conservation and sustainability.

These data are collected in the Mache-Chindul Ecological Reserve located in northwestern Ecuador. This reserve is of particular interest, because it is one of the hot spots of biodiversity and only five percent of this kind of forest remains in Ecuador (Dodson and

Gentry, 1991). The Mache-Chindul Ecological Reserve is continually being challenged from the outside as loggers cross over the boundaries, and internally as many locals are resistant to the reserve's restrictions. The government created the reserve after the settlers had already made their homes and farms. The residents carefully navigate between following the rules and rejecting them, with many trying to do both. These decisions are directly related to how they personally value the forested land on which they live. Looking at food plants can help to increase not only environmentalists' and governmental comprehension, but also local awareness. Increased understanding can foster an expanded appreciation about what the locals themselves obtain from the forest, and the importance of keeping that ecosystem intact.

## 2. STUDY AREA

The Mache-Chindul Ecological Reserve is located in northwestern Ecuador (Figure 1). The plant community is lowland wet forest (Holdridge, 1967). The majority of the vegetation consists of tall, dense evergreen flora. There is high rainfall in the region, reaching between 2,000 and 3,000 mm of precipitation annually (Neill, 2003). The majority of the residents in the Mache-Chindul Ecological Reserve are people who have settled there from other areas. In the late 1940s Afro-Ecuadorians who had been living in the Esmeraldas region migrated inland. Various groups of permanently settled in what later became the reserve. The *mestizos*, most of whom come from the provinces of Loja and Manabí, have comprised the majority of the reserve's population since the 1950s (INEFAN, 1999). The Chachi, an indigenous group, also live in the area, but were not included in this study because of time constraints. There are a total of 31 communities, 760 families, and about 6,000 people in the 111,000 hectare reserve.



FIGURE 1  
ECUADOR MAP SHOWING THE MACHE-CHINDUL ECOLOGICAL RESERVE

### 3. METHOD

Interviews were conducted with the grandparents, parents and children of 20 families: 11 *mestizo* and nine Afro-Ecuadorian. These interviews took place from field work in December 2000 to December 2001 and July-August 2005. The *mestizo* communities included Cuadrado, Perrera, Tigrillo, and San Pedro. The Afro-Ecuadorian informants were from Chiva (Figure 2). To protect the privacy of the participants, the names of communities have been changed. Criteria for choosing communities included those with whom the researcher had worked previously and who expressed an interest in this project. In order to maximize the efficiency in obtaining data within the fieldwork period, the selection of families was purposefully nonrandom.

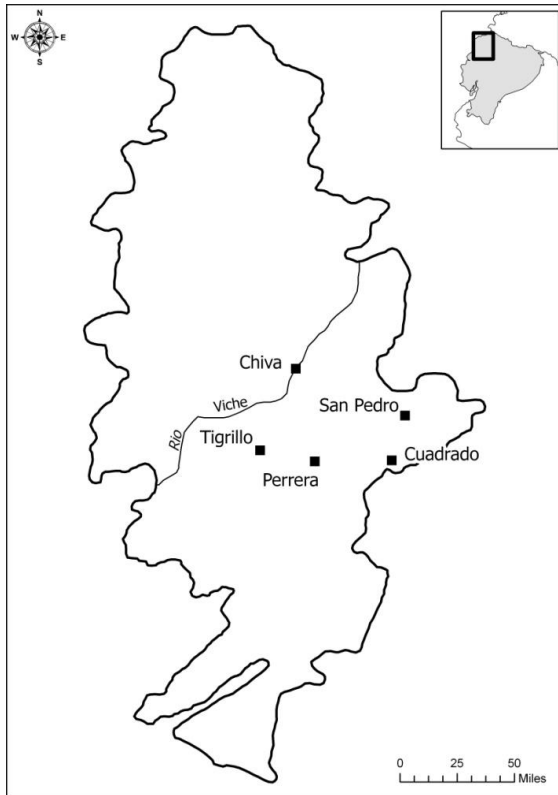


FIGURE 2  
MACHE-CHINDUL ECOLOGICAL RESERVE WITH STUDY COMMUNITIES

All interviews were conducted with informed consent in Spanish (spoken by the researcher). Each discussion began with outlining the objectives and procedures of the interview as outlined by Fraser *et al.* (2006). Topics covered were: 1) what wild edible plants were considered most important, 2) what plant parts were used and how they were prepared, 3) who had the most knowledge in terms of age and gender, and 4) how were plants collected. Additionally, the researcher helped with plant collection, preparation and consumption, while engaging in participant observation, a method described by Bernard (2006).

Initially, the informants created lists ranking the food plants from most important to least important. The interview structure allowed them to free list which created the food

categories. The way the informants ordered plants in terms of family, food type and plant part, and the frequency of each, is how the researcher determined the ranking of importance. The initial set of information acted as the base to construct the hierarchy for local wild food plant classification. From the information gathered from early discussions, in-depth interviews with select villagers were then conducted. Most interviews were in a family setting, either in homes or walking through the forest. Interviews were semi-structured, with the researcher asking each informant a similar set of questions in a conversation format, without a rigid list of questions (Bernard, 2006). Through discussion-oriented interviews, the researcher could follow the interests of the informant; each interview developed according to the knowledge and experience of the person being interviewed (Fraser *et al.*, 2006). The basic ideas were introduced by the researcher, but the specific study categories came from those being interviewed (Telfer and Garde, 2006). This qualitative method does not lend itself to statistical analysis, because not all interviewees discussed identical questions. However, through lengthy interviews repeated throughout the study period, collective views emerged from which patterns and results could be understood. This is a method outlined by O' Brien (2006).

## 4. RESULTS

### 4.1 PALMS/STEMS

A crucial aspect in looking at how people value their resources is the ranking of importance. Informants listed those items that were most important, and continued in descending order of importance. The locals delineated the ranked categories in more than one way. The first realm of importance was a plant family. For the subsequent categories the informants shifted to discussing the importance of plant parts, irrespective of taxonomic similarity. The first plants mentioned in reference to wild food plants were palms (Arecaceae). The palm family stands out because 97 percent of the time it was the first family mentioned. Also palms made up a high percentage (41 percent) of all plants listed in this study. The palms listed were: *Oenocarpus bataua*, *Bactris setulosa*, *Coco nucifera*, *Aiphanes* sp. *Bactris* spp., *Astrocaryum standleyanum*, *Scheelea* spp., *Attalea* spp. , *Iriartea deltoidea* and *Phytelephas aequatorialis*.

The palm part first mentioned by most informants was the heart (the terminal palm bud) consumed either raw or cooked. After harvesting people would snack a little in the field, but most of the heart was brought home to the family. Interestingly, this favorite and most commonly mentioned part of the plant involved the least intention in collecting. Villagers most commonly ate the heart when they were harvesting the palm for other reasons, such as thatch, flooring, walls, or fruit. Rarely, if ever, did locals fell the palm only to eat the heart.

Although less central to the diet than palm hearts, other plants from which people consume the stems of the plants were canes. For *Cana gaudua* (Poaceae) villagers cut the cane, peeled off the outer layers, and ate the innermost portion raw. The collectors preferred the younger growth as it is sweeter and juicier. Another plant stem collected, in this case solely for its juice, was the Zingibraceae, commonly called *Cana agria*. When thirsty while walking, the locals cut the stalk, peel off the outermost layer and then sucked on the innermost portion. The flavor is sour, and produces enough liquid to quench thirst. *Cana agria* was often used as a portable drink on long treks.

### 4.2 LEAVES

Leaves arose as the second most important category after palms. Some examples include *Xanthosoma sagittifolium* (Araceae) and *Carludovica palmata* (Cyclanthaceae) from which the locals consumed the youngest unopened leaf. Another plant from which they ate the immature part, were the still furred fern fiddle heads (Pteridophyta). Villagers ate not just unopened leaves, but also young leaves. Both unopened and young leaves are less bitter than fully developed mature leaves. These leaves were harvested from *Carica* spp (Caricaceae),

*Amaranthus* spp. (Amaranthaceae), *Laportea aestuans* (Urticaceae), and *Manihot esculenta* (Euphorbiaceae). Almost all leaves are brought home and cooked.

The last plant mentioned, *Manihot esculenta*, commonly called manioc, is not technically wild. Manioc is a domesticated cultivated plant, and respondents collected the leaves from their planted fields. Despite this, 88 percent of the respondents listed the leaves of manioc as greens in the wild category. Moreover, when listing wild plants, not one informant mentioned the manioc root, the part of the organism for which they specifically cultivate the plant. 'Wild' refers in this case to just one part of the plant, not the organism as a whole.

#### 4.3 FRUIT

The third most important category mentioned was wild fruit. The most commonly discussed fruit plants included *Herrania cf. balaensis* (Theobromaceae), *Chrysophyllum cf. argenteum* (Sapotaceae), *Annona muricata* (Annonaceae), *Inga* spp. (Fabaceae), *Garcinia* sp. (Clusiaceae), *Pouteria* spp. (Sapotaceae), *Diospyros* sp. (Ebenaceae), *Pourouma guianensis* (Cecropiaceae) and, *Vanilla planifolia* (Orchidaceae). For wild papaya and other wild versions of domesticates, the fruits are smaller and less sweet than cultivated version. In terms of fruit, palms once again played an important role. Added to the above list are the fruits from the palms previously discussed. Most fruits are ingested by being "chupado," sucked. Rarely did respondents discuss fruit in terms of actually eating the entire piece. Wild fruits are almost always consumed in the field, with only occasionally some being brought home in a child's pocket.

#### 4.4 GENDER/AGE/COLLECTION

Not only did most people (93 percent) partake of fruits by sucking on them instead of consuming the entire fruit, the category of fruit was most associated with children. Adults relegated most wild fruits as an item "for children to suck". Children exhibited a higher knowledge about wild fruit than they did about other wild plants. In 83 percent of the interviews children could think of more wild fruits than their parents, although their knowledge of specific names was limited. This phenomenon matches the trend found in various studies (e.g., Smith 2007).

Although food preparation is most often the domain of women, men demonstrated more comprehensive wild food plant knowledge than did women. Ninety eight percent of wild food collection occurred opportunistically. People collected while in the forest pursuing a different activity, such as hunting or traveling to fields or neighboring villages. Men participated more often than women in the latter activities. Knowledge and ability to use wild plants perhaps presents a limitation to women's sphere of influence and mobility. In looking at the spatial dimensions of plants through gendered space women usually are more connected to cultivated plants (Fadiman 2005).

#### 4.5 CONSUMPTION AND VALUE

Families consumed wild food plants as an addition to their afternoon or evening meal five to six times a week. These wild collections comprise the bulk of the meal about once a week. Children consume more wild plants than their elders, because they eat wild fruits whenever they find them. Most children spend time in the forest every day, walking to school, the fields and accompanying a parent in visiting or hunting. Children consume some wild fruits at least five times a week. If a preferred tree is fruiting on a regular route, fruit intake can be increased to seven days a week. For men, they will almost always (94 percent of the time) consume wild cane or bamboo when walking or hunting. They consume wild foods from four to five times a week as a snack. Although participants rarely discussed wild foods as being as valuable to them as their cultivated crops, they collect and consume some wild foods, especially the children and men, almost every day either in the fields or on the table at home.

## 5. DISCUSSION AND CONCLUSIONS

### 5.1 HIERARCHICAL RANKING

Understanding that the palm family is of primary consumptive importance can aid NGOs, governments and locals to protect entire ecosystems by targeting certain species. The practice of leaving palms standing when clearing the forest in order to cultivate, can be supported and encouraged. This practice not only encourages soil fertility and environmental health, but also these plants provide a popular food source. Palms preserved in fields may be considered “managed” and no longer wild. In terms of completely wild plants, NGOs can utilize the emphasis on palms to choose forest conservation sites. Locals can be encouraged to protect areas that have a high number of palms. People may be more receptive to the restrictions of the reserves when it is emphasized that in doing so, they are also protecting one of their favorite wild food sources.

Since leaves are an important source of vitamins and minerals, and except for manioc, greens are not cultivated, policy makers’ and locals’ recognition that almost all green consumption comes from the wild solidifies a crucial connection with the ecosystem. When promoting the virtues of the forest in terms of nutritional value, intact forest can be emphasized as the primary source for certain nutritional and culinary diversity. Furthermore, those plants that are brought home for consumption, such as palm heart and greens, were valued more than other foods which were considered more supplementary and appropriate for snacking. The recognition of this phenomenon furthers the process of a true understanding and collaborating with people who live in the forest. The recognition of the importance of fruits, as is discussed more fully in the next section, reinforces the multi-generational connection to the forest.

### 5.2 COLLECTING, GENDER and AGE

The ranking of fruits in the third category was surprising. The common assumption is that fruits would have been ranked higher, because of how common fruit consumption is from the literature (Smith *et al.*, 1997), and as witnessed by the researcher during fieldwork. This ranking may be in part attributed to the fact that fruits are associated with children and thus fall into a lower category. Also, since fruit is most often sucked and not eaten it may be that the food classifications presented by the researcher were interpreted differently by the interviewees. People may not have considered something “sucked” in the same category as something “eaten”. This ranking may have more to do with terminology than the actual importance of each category.

Along the lines of terminology, in order to effectively communicate it is important that researchers and activists are mindful about how the people with whom they work categorize their own world. In looking at the concept of ‘wild,’ clearly there was a different local definition than that which the researcher understood. The informants were comfortable considering only part of a plant as wild, such as manioc leaves, while they recognize other parts (*e.g.*, the root) as domesticated.

The casual context in which people collect wild plants can explain why men know more than women. Men walk through the forest on the way to fields and for hunting. Women on the other hand, are more likely to remain closer to the home using the cultivated plants around their houses (Fadiman 2005). Understanding women’s spatial role in terms of wild plants increases our understanding about how social identities are determined by space, and in turn how space reflects social identities (Niranjana 2001). Understanding gendered space in relation to planting and collecting spheres is vital when looking at the role of women in the family, in the home and the forest. The women’s sphere of greatest influence is in the home, with the children, and in the kitchen. Much of women’s connection to wild plants are once the plants have been brought home. The men’s influence extends from the fields and the forest into the women’s space, the kitchen, through providing the wild foods. Kitchen space, often

thought gendered as female (Christie 2008), actually becomes a shared space. Although the cultivated foods still take precedence in the kitchen, they are supplemented, and some meals dependent upon those foods brought in by the men.

When conservationists and development experts from NGOs and the government do outreach in the villages, they most often approach the male as head of household and ignore the female. As an exception, because of the food correlation with women, these workers most often approach the females when discussing food (Sundberg 2008). Given the results from this research, it may make more sense to talk to the men and children in relation to collecting wild foods. Men actually are those family members most actively involved in the addition of wild foods to the family's meals. It is effective to approach the most receptive individuals within a community. It then follows that since children already identify with fruit in the forest, environmental education programs for children should have a focus on this food source.

### 5.3 CONSUMPTION AND VALUE

The concept of valuing the ecosystem in which one lives can be subtle. Although wild food plants are clearly included in the diet, people may denigrate edible wild plants, because less conscious effort is put into obtaining them. For example, since collecting is opportunistic, when asked out of context about wild food plants their importance index may be low. However, this lack of effort in obtaining wild goods actually adds to their value, because little extra time or effort is expended in their collection (Delang 2006). Furthermore, in the cultural context of what is even considered wild, the research shows that for some plants, such as the manioc, people focus on the root (the cultivated part). They refer to the leaves as wild, which may be because they do not regard them as highly as the roots. In terms of the socioeconomic aspect, those people who can afford to purchase greens may not even know that manioc leaves are edible. For the rural families in the Mache-Chindul Reserve who do use the leaves as greens, these nutrients are crucial to their diet. As this study shows, wild plants are an important food for these people. Wild foods supplemented the diet of every informant with whom the researcher spoke. When locals are deciding between logging proposals and forest protection, the recognition that it is advantageous to maintain an ecosystem in which they can continually collect food can help to promote environmental integrity.

### 5.4 CONSERVATION AND SUSTAINABILITY

Wild plant consumption can be more sustainable than crops because forest residents do not need to clear the forest in order to plant the fields. Villagers collect many wild foods in such a way that the plant continues to grow. Examples include leaves and fruit, for which collection can be sustainable. Even so, over harvesting must be considered for renewable plant parts as well. For example, when gathering leaves collectors must leave enough foliage so that the plant can still effectively photosynthesize.

Fruit is often thought to be one of the most sustainable consumable NTFPs. In certain instances, human influence can help the reproduction of the plant. For example, if one consumes fruit along a trail and discards the seed at the edge, the seedling may benefit from the increased edge effects of light and less competition. On the other hand, human consumption can reduce reproductive potential as well. If after eating the fruit the consumer does not deposit the seed in an area conducive to growth then this reduces the reproductive potential of the plant. Furthermore, because people are likely to consume the largest and sweetest fruits, if they do not deposit the seed somewhere beneficial to growth, this removes these prime seeds from the gene pool. Even more detrimental is when people consume the seed itself, such as with the coconut (*Coco nucifera*). However, as long as overharvesting is controlled, any fruit collection can be sustainable, because the main body of the plant continues to grow and reproduce.

In order to provide a more complete picture of wild edible food plant collection and consumption in the Mache-Chindul Ecological Reserve, future studies will include working with the indigenous people, the Chachi. This indigenous group also lives in and around the reserve. Since the Chachi have resided longer in the reserve, data collected from this group may help to elucidate the different or similar ways that long term residents and more recent arrivals obtain their forest knowledge. Increased understanding of how all groups in the region utilize, collect, and rank wild food plants may help NGOs, governments, and locals maintain a balance between forest preservation and forest use.

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