

 NTFP RESEARCH –
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**RAINFOREST ALLIANCE'S
KLEINHANS FELLOWSHIP:
REFLECTIONS FROM OVER 20 YEARS
OF NTFP RESEARCH**

Biennially since 1989, the Rainforest Alliance has offered two years of financial support to a graduate-level scientist whose research strives to understand and enhance the role of non-timber forest products (NTFPs) in community development and forest conservation. Funded through the generosity of Elysabeth Kleinhans, to date the Rainforest Alliance has awarded 12 Kleinhans Fellowships to a diverse group of researchers whose scientific rigour, curiosity and dedication to the well-being of forest-dependent communities is second to none. Post fellowship, these researchers have stayed remarkably active in the field of NTFPs and forest conservation.

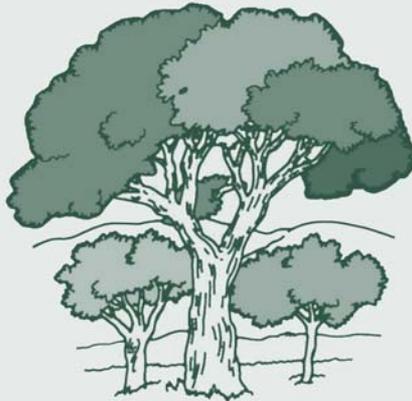
As part of Rainforest Alliance's 25th anniversary celebration this year and as a tribute to Elysabeth Kleinhans, we have asked past Kleinhans Fellows to reflect on the current field of NTFPs and the changes they have observed since the time of their Kleinhans-supported research. Nine of the 12 past fellows were available to do so. The essays that they have written are as diverse as their authors and, it is our hope, will contribute to ongoing discussions of the current and future role of NTFPs in the fields of forest conservation and community development.

In his essay, *Wil De Jong* provides the historical context and argues that the positioning of NTFPs greatly depends on the broader forestry discourse in which it is immersed. He traces how the dominant forestry discourse changed from tropical deforestation in the 1980s to forest-based poverty reduction in the 1990s to climate change around 2007. De Jong warns that current REDD+ initiatives must be structured so that the gains achieved during the earlier phases of NTFP discourse – such as community autonomy and acquired rights to resources – are maintained and enhanced.

Amy Duchelle describes two new REDD+ projects that incorporate NTFPs and have been designed to improve local livelihoods in efforts to reduce emissions from deforestation

and forest degradation. Located in a 300 000 km² region comprised of the states of Madre de Dios (Peru), Acre (Brazil) and Pando (Plurinational State of Bolivia), the first of these projects involves government support for the commercialization of diverse NTFPs as a way to increase the value of standing forests. The second project aims to increase the economic value of Brazil nut-rich forests through improved processing facilities, while simultaneously enhancing local governance through participatory forest monitoring and capacity building.

In her essay, *Carla Morsello* describes her concerns about the long-term viability of REDD+ and other schemes involving payments for environmental services (PES).



What was the inspiration for the Kleinhans Fellowship? In the late 1980s, Elysabeth Kleinhans felt that tropical forest conservation was focused too narrowly on trees – and not enough on alternative forest uses. After hearing a lecture by Rainforest Alliance co-founder Daniel Katz about the innovative ways that his new organization was working with forest owners, Ms Kleinhans woke late at night with an idea: she could help give forest-dependent communities alternatives to logging by supporting NTFP research. And the Kleinhans Fellowship for Non-Timber Forest Products was born.

While such programmes have some advantages over NTFPs – forest owners are only paid if forests are conserved and no labour-intensive training on trade and marketing is required – Morsello reminds us of some potential drawbacks of the PES concept. First, the indefinite monitoring requirements are costly and may ultimately restrict the ability of conservation organizations to conserve large tracts of land. Second, as forests are conserved, increasing opportunity costs in the face of lucrative competing land uses may make the conversion of additional forest lands cost prohibitive.

In her work on epiphytic bromeliads in the cloud forests of Mexico, *Tarin Toledo Aceves* has seen firsthand how lucrative and devastating competing land uses can be. There, the cultivation of epiphytic bromeliads to increase community income and reduce pressure on forests is challenged not only by sharp declines in bromeliad populations, but also by insufficient support to sustainable forestry operations and forest restoration. Toledo observes that a narrow focus on NTFPs alone will not be sufficient to conserve the cloud forests. However, recent changes in attitudes of community members give her hope that NTFPs might act as a trigger to prompt other activities geared towards cloud forest recovery.

As with epiphytic bromeliads, many of the primary forests on which rattan plants depend have been destroyed by competing land uses. As described by *Steve Siebert*, the loss of primary forests in Southeast Asia, combined with overharvesting and government refusal to recognize the rights of local rattan harvesters, has reduced the availability and use of this NTFP. Despite these challenges, rattan use and management persist in many areas, and the increasing demand for palm hearts may encourage smallholders to cultivate rattan for both canes and shoots.

A different kind of governmental barrier to NTFP production is described by *Catarina Illsley Granich* – one that, she argues, has dire consequences for the small communities in Mexico that have grown agave as an NTFP for artisanal mezcal production for centuries. In her essay, Illsley describes how three proposed Appellations of Origin designations will favour mezcals made from a narrow range of agave species that are grown in monocultures, and will ultimately create insurmountable barriers to market access for small mezcal producers. This, just as the demand for artisanal mezcals is rising both in Mexico and abroad.



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One essay, however, provided concrete examples of government actions that have breathed new life into NTFP commercialization efforts. *Richard Wallace* describes how government investment in a Brazil nut factory in Acre, Brazil, has helped producers overcome many of the challenges that had hindered their earlier efforts, with current prices for unshelled Brazil nuts ten times higher than those in 1996. Similarly, a state-sponsored condom factory in the region has revived the rubber tapping industry, paying eight to 15 times the price per kg of rubber than rubber tappers received in 1996.

Research into the impacts of another realm of government – land tenure policies – is the subject of the research of current Kleinhans Fellow *Kennedy de Souza*. In his essay, de Souza presents the first results of his analysis of how different land tenure policies in Acre, Brazil, affect deforestation rates and the percentage of household income from NTFPs. He finds an inverse relationship between these two variables, with communities in which NTFPs contribute most to the total family income having the lowest deforestation rates.

The final essay in the series takes a very personal look at one researcher's experiences working with indigenous communities in the Brazilian and Peruvian Amazon. With keen insight and refreshing humility, *Campbell Plowden* distills 15 years of successes (and a few false steps) into a set of seven guidelines that anyone working with indigenous communities would do well to follow.

Do any themes emerge from the perspectives of these diverse scientists, whose combined research spans six countries and at least a dozen NTFPs? I believe they do.

First, the essays illustrate how the viability of any given NTFP as a tool for forest conservation and improved livelihoods can change quickly and dramatically depending on the context. Whether that context is the tenure system and its associated ease of access to NTFPs, the presence of government-sponsored processing facilities, lucrative competing land uses, or the presence of technical market barriers, the essays show just how difficult it is to generalize about the success or failure of an NTFP without reflecting on these immediate factors. Encouragingly, many of these factors lie within the sphere of influence of national governments and the conservation community. The question is whether the political will to influence them exists.

The essays also illustrate how the conservation and development toolbox – and the relative position of NTFPs within that

toolbox – has changed over time. New initiatives such as REDD+ and other payment for environmental services schemes hold promise, although they are not without their own unique risks. Past fellows seem to agree that NTFPs can and should be incorporated into new approaches when possible, but that we must not forget what three decades of research and projects have taught us: community autonomy and rights to resources must be kept front and centre. Given the continued socio-economic importance of NTFPs for the lives and livelihoods of millions of people around the world, forgetting this lesson would be shortsighted indeed.

(Contributed by: Deanna Newsom, Manager, Kleinhans Fellowship, Evaluation and Research Program, Rainforest Alliance, 665 Broadway, Suite 500, New York, NY 10012, United States of America. E-mail: dnewsom@dra.org)



THE NTFP WALK THROUGH FOREST DISCOURSES

Fellow: Wil de Jong

Fellowship years: 1991–1993

Fellowship topic: Alternatives to deforestation: forest management practices of Dayaks in West Kalimantan, Indonesia.

Non-timber forest products (NTFPs) became of particular interest in the late 1980s, but this was not the first time that foresters had paid attention to them. As early as the nineteenth century, foresters talked about “minor” or “secondary” forest products, referring to essentially the same thing: NTFPs. The adjective “non-timber” illustrates that NTFPs supposedly provide profitable alternatives to the logging of (mostly) tropical forests. In the prevalent discourse of

the late 1980s, NTFPs also provided profitable alternatives to the conversion of forests to agriculture. The launching of the term NTFP and its conjectured potential to save tropical forests from destruction concurred with international concern for tropical deforestation. The tropical deforestation discourse shaped the international NTFP discourse in important ways: its focus, justification and the funding of related forestry projects.

Nowadays, evolving issues of societal concerns are often projected as “discourses”, and (environmental) discourse analyses contribute to the understanding of how issues, including proposed solutions to environmental problems, are shaped by other discourses of larger magnitudes. An analysis of the evolution of NTFPs or related discourses shows how much these were influenced by dominant forest discourses.

Since the 1980s, when the NTFP discussion was imbedded in a tropical deforestation discourse, forestry discourses have evolved significantly. The focus on NTFPs appeared to decline in the early 1990s, when the community of experts started to question the high expectations of NTFPs. It was during this time that I conducted research on local forest management by Dayak groups in West Kalimantan, Indonesia – work supported by the Kleinhans Fellowship which I had received in 1991. After the fellowship, the focus on NTFPs declined in my work and among many researchers worldwide, because the dominant forest discourse had shifted. The tropical deforestation focus was replaced by a focus on forest-based poverty reduction. As a result, the discussions shifted from NTFPs to the contribution of the forest to rural incomes. It was still widely recognized that much forest income resulted from the harvesting of NTFPs, either for sale or personal consumption. In a sense, a discourse of community forestry replaced the NTFP discourse. One important change in that shift from NTFP to community forestry has been the focus on timber as a possible source of rural income. Some community forestry researchers have argued that the wider community forestry project will only work when communities focus on high-value forest products that have international market demand, and timber remains the most promising candidate.

The shifts in dominant forest discourse and related NTFP and community forestry discourses have strongly influenced how

people talk about the issues and, just as important, have affected field level praxis. During the early years of the NTFP discourse, practitioners invested much effort into the marketing of NTFPs, directly as harvested from the field, or after a process of transformation. Often these activities were carried out in so-called integrated development and conservation projects. Once the focus shifted to community forestry and timber, the scope of support activities expanded and began to include titling of communal forest lands, assuring a legal communal status, and building forest management and administrative skills, often under a banner of communal enterprises.

Since 2007, the dominant forest discourse has changed once more, this time to climate change mitigation. The conservation of tropical forests is now considered one of the most promising options to reduce a prospective increase in atmospheric carbon dioxide, the gas that traps heat in the world's atmosphere. This is to be achieved by encouraging the reduction of emissions from deforestation and forest degradation, which can include any sustainable forest management initiative and is called REDD+. This can also happen in locations where a zero intervention scenario would not include massive future deforestation; hence, there would be little net carbon gain.

REDD+ provides payments for maintaining carbon stocks by maintaining forest cover. Some observers have pointed out that NTFPs have been nearly absent from the discussions on forests and climate, and the same can be said for community forestry. There is widespread concern about how the shifting focus to climate change mitigation will affect local communities. Communities will have the opportunity to derive forest-based incomes from REDD+ payments; however, the mechanisms to make this happen, and the actors and interests involved, are perceived to pose significant threats to the local communities that were to benefit from NTFPs and community forestry. On the other hand, it can conceivably be argued that the accumulated experiences of NTFP commercialization and community forestry will be useful for implementing REDD+ initiatives that actually benefit communities and do not require them to relinquish the two achievements of the NTFP and community forest discourses: acquired rights and autonomy. **(Contributed by: Wil de Jong, Professor, Center for Integrated**

Area Studies, Kyoto University, 46 Shimoadachi-cho, Yoshida, Sakyo-ku, Kyoto, Japan 606-8501. Fax: 81-75-753 9602; e-mail: wdejong@cias.kyoto-u.ac.jp; www.cias.kyoto-u.ac.jp/)



MULTIPLE USE OF NON-TIMBER FOREST PRODUCTS AND ENVIRONMENTAL SERVICES: THE CASE OF THE MAP REGION IN SOUTHWESTERN AMAZONIA

Fellow: Amy Duchelle

Fellowship years: 2005–2007

Fellowship topic: Study of the production of Brazil nuts in the face of major landscape changes in the western Amazon.

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Multiple-use forestry, which includes NTFPs, timber and environmental services, has gained momentum among researchers, practitioners and policy-makers as a way to promote forest conservation and livelihood development in the tropics. There have been a multitude of initiatives towards integrated management of NTFPs and timber, but less of a focus on environmental services in these multiple-use systems. Recent strategies (REDD+) to reduce carbon emissions through avoided deforestation and forest degradation and enhancement of carbon stocks have opened up new opportunities for integrated management of NTFPs and environmental services.

As a Kleinmans Fellow from 2005 to 2007, I conducted research on the conservation and livelihood outcomes of Brazil nut (*Bertholletia excelsa*) management by rural communities in the MAP trinational frontier region of

southwestern Amazonia. The approximately 300 000 km² MAP region is comprised of the states of **Madre de Dios**, Peru; **Acre**, Brazil; and **Pando**, the Plurinational State of Bolivia. I focused my comparison on Brazil nut production in these three adjacent areas, because while resident communities have a similar natural resource base, the forest management regimes, property rights systems and specific livelihood strategies in the three countries are different. Many communities in the MAP region collect Brazil nuts, and the combined ecological and economic characteristics of this species give it the potential to promote forest conservation while contributing to rural livelihoods. My research results highlighted minimal deforestation and high forest income dependence in regional Brazil nut-producing communities. Also, I observed a much greater incidence of reported nut thefts in Pando, which likely resulted from the Bolivian producers' insecure property rights and extremely high income dependence on Brazil nuts. Finally, organic and fairtrade nut certification schemes were associated with post-harvest management and financial benefits, while Forest Stewardship Council certification promoted pre-harvest and tree health practices, despite its lack of market benefits.

Since my Kleinmans research, the increase in community timber management initiatives throughout the MAP region has highlighted opportunities and limitations associated with multiple-use forestry systems that are focused on Brazil nuts and timber. For instance, while Brazil nut regeneration may be unaffected by low logging intensities, complicated legal requirements and high operational costs may prevent communities from assuming authority over formal timber operations. Additionally, despite the positive perceptions of a diversity of regional stakeholders about integrated timber and Brazil nut management, policy and economic constraints, along with threats of logging damage to Brazil nut stands in Pando and Madre de Dios and reinvestment of forestry income into cattle in Acre, are notable barriers to adoption of this multiple-use forestry model.

More recently, the emergence of subnational REDD+ projects in the MAP region shows potential for multiple-use management of Brazil nuts (and other NTFPs) and forest carbon. There are two

interesting examples of REDD+ projects that have incorporated NTFP management in their plans to reduce deforestation and forest degradation. The first is Acre's state System of Incentives for Environmental Services (locally known as SISA), which was passed into law in 2010, and the second is a private-sector REDD+ project in Madre de Dios led by BAM (Bosques Amazónicos S.A.C.), which focuses on the conservation of Brazil nut concessions. In Acre's SISA, support for multiple-use forestry projects is explicitly included as a way to increase the value of standing forests. In one area with high potential for SISA activities, Acre's government has already invested in the cultivation of *açaí* (*Euterpe precatoria*) seedlings in local communities to simultaneously enrich degraded forests and promote livelihood development through the sale of this other regionally important NTFP. In the Chico Mendes Extractive Reserve, another important focal area for SISA, enhanced opportunities for commercialization of a diversity of NTFPs – including Brazil nuts – by local extractivists will likely be supported through SISA. In Madre de Dios, BAM is working with the local Brazil nut producers' federation to promote sustainable management of Brazil nut concessions, which face threats of illegal logging and forest fires, largely because of the development of the Interoceanic Highway through this Brazil nut-producing area. The BAM REDD+ project intends to increase the economic value of these Brazil nut-rich forests by installing a local nut processing plant and helping harvesters develop secondary products, such as Brazil nut oil and soap. Additionally, BAM intends to enhance local governance through participatory forest monitoring and building the capacity of the local Brazil nut producers' federation to promote forest conservation.

These experiences from the MAP region are clear examples of potential ways to bolster the promised conservation and livelihood benefits of NTFPs through linking their management to emerging markets for environmental services on a broader scale. It is yet to be seen whether such synergies can actually be achieved. **(Contributed by:** Amy Duchelle, Field Research Coordinator in Latin America, Global Comparative Study on REDD+, Center for International Forestry Research [CIFOR], Rua do Russel 450, Sala 601, CEP: 22210-010, Rio de Janeiro, RJ, Brazil. E-mail: a.duchelle@cgiar.org/)



NTFPs ARE DEAD, LONG LIVE NTFPs!

Fellow: Carla Morsello

Fellowship years: 2003–2005

Fellowship topic: Company-community partnerships for commercializing non-timber forest products in the Brazilian Amazon: drivers, problems and consequences.

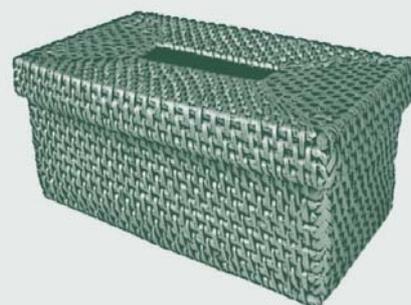
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Around 30 years ago, we thought we'd found a match made in heaven: we could promote forest conservation and local people's development through the trade of NTFPs. With NTFPs we could win on both sides, conserving forests for humankind while improving the well-being of poor forest inhabitants. So, why is the academic discussion of NTFPs dying while the trade in NTFPs is booming in some regions such as the Amazon?

NTFP trade as a conservation strategy has lost momentum as a win-win solution because, rather than heaven, it has become purgatory for both development and conservation. For development, accumulated evidence suggests that NTFPs often increase cash incomes and may work as a safety net, but they are unable to decrease poverty in a meaningful way, may generate inequalities and induce conflicts over resource use. From a conservation perspective, NTFP extraction can negatively impact the species exploited and their dispersers or predators, and may cause landscape transformations due to trail opening and road building. More important, people can adopt NTFP extraction without abandoning other land uses more harmful to forests, such as agriculture or timber extraction. NTFP trade can even serve as a stepping stone to capital accumulation before converting to other more harmful land uses.

For a while, the unconvincing results of NTFP trade drove a new wave of projects and research on strategies that could improve

outcomes, such as adding value by product processing or certification, targeting niche markets, or establishing partnerships with companies to facilitate trade and increase the value received. For instance, findings from my Kleinhans Fellowship research on partnerships and product processing in the Amazon indicated that these strategies tend to be associated with increased total income, NTFP income, food consumption and gender equality, but are also associated with a decrease in leisure time and, in some cases, with less cooperation among households. Partnerships and product processing may further contribute to decrease deforestation but, on the contrary, are associated with higher rates of hunting. Other research has shown that most of these strategies are able to improve the outcomes of NTFP trade in economic terms, but some problems in the conservation domain often persist. Confidence in the ability of the NTFP approach to conserve forests has therefore shrunk further and, consequently, the interest in projects and the number of scientific articles on NTFPs have been steadily decreasing since 2005.

The reduced emphasis on NTFPs in the academic debate is, however, in direct opposition to the reality of NTFPs in some forested regions of the world. In the Brazilian Amazon, initiatives for commercializing NTFPs have proliferated in the last decade. Traditional Amazonian products such as Brazil nuts have gained new markets, as have a plethora of new NTFP-based products such as handicrafts (using various fibres to create baskets, bags and mats, and artisanal paper [e.g. *Orbignya phalerata* Mart., *Ischnosiphon* sp., *Heteropsis* spp.] and seeds for biojewellery [e.g. *Bagassa guianensis* Aubl.]); car parts (e.g. using natural rubber for seats and vegetable leather [*Hevea brasiliensis* (Willd. ex A. Juss.) Müll. Arg.]) and ice cream (e.g. made with Brazil nuts [*Bertholletia excelsa* Humb. & Bonp.], *açaí* [*Euterpe oleracea* Mart.], *cupuaçu* [*Theobroma grandiflorum* (Willd. ex



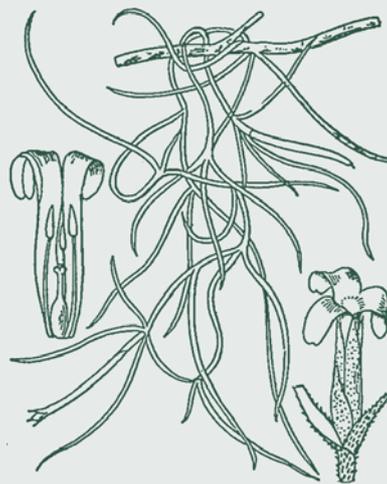
Spreng.) K. Schum.]). In the cosmetics and food industries, demand for herbal products has boomed and gone mainstream, no longer restricted to niche markets. For instance, ten years ago, handmade soaps from Amazonian vegetable oils could only be found in fairtrade or boutique cosmetic shops; today, most large companies produce at least one type of bath soap based on Amazonian NTFPs.

The mismatch between academic interest and on-the-ground reality has occurred because conservationists and academics alike are chasing a new fad to avoid tropical forest loss: payments for environmental services (PES). As with NTFPs long ago, these are believed to be a win-win strategy that avoids the main pitfalls of NTFPs. The logic of NTFP extraction is that trading depends on standing forests, so people's reliance on NTFPs will conserve forests for life. But people may trade NTFPs and, concurrently, sell timber or agricultural products. Moreover, teaching people how to trade takes more effort and resources than previously thought. PES, on the other hand, are a more direct and efficient way of achieving conservation because people benefit only *if* and *when* they conserve.

In a sense, the logic is straightforward. Yet, might PES become the new purgatory in 30 years if we do not learn from the lessons of NTFPs? NTFPs and PES share many characteristics. People's incomes rise, so they may accumulate and later switch to more harmful land uses. If you monitor their territory, there is a chance they will perform harmful activities somewhere else since the demand for products persists, simply displacing the problem. Moreover, PES have problems that are absent with NTFPs. For instance, because of their recurring costs and reliance on monitoring, PES are unlikely to be implemented in vast tracts of forested regions because the total cost would likely be out of reach of most conservation organizations. Yet this is exactly what must be done to prevent dramatic ecological and climatic disasters. Moreover, the costs of PES are ongoing and likely to increase in the future because the larger the area under PES and conservation, the higher the opportunity costs to conserve new areas. Each new economic crisis will thus imperil PES continuity.

We must therefore stop discarding one panacea for the next and start combining different approaches. We also need to go back to the field and understand the impact of the increased demand for NTFPs: are

people still combining NTFP extraction with more harmful activities, or has the increased demand for a variety of NTFPs removed the incentives to do so? And what are the ecological impacts of extracting multiple NTFP products at the local level? There are still many questions to answer, and the fact that conservation science periodically coalesces around fashionable topics is counterproductive to biological conservation. (**Contributed by:** Carla Morsello, Escola de Artes, Ciências e Humanidades, Universidade de São Paulo, Rua Arlindo Bettio 1000, CEP03828-000, São Paulo (SP), Brazil. E-mail: morsello@usp.br; www.parceriasflorestais.org/)



Tillandsia multicaulis

EPIPHYTE MANAGEMENT? THE ANSWER IS YES

Fellow: Tarin Toledo Aceves

Fellowship years: 2009–2011

Fellowship topic: Harvesting of epiphytic bromeliads: an opportunity for cloud forest conservation.

Cloud forests are of great strategic value for sustainable development because they play a key role in the maintenance of hydrological cycles and act as reservoirs of biodiversity. Despite their importance, these are among the most rare and threatened ecosystems globally, occupying only 2.5 percent of the total area of the world's tropical forests. The main threats to cloud forests are conversion to pasturelands and global warming. Given their location within a narrow belt in the mountains where clouds frequently cover

the vegetation, cloud forests are unsuitable for timber production because of their relatively low productivity, low resilience, low wood quality and poor access.

Although the high species diversity of cloud forests means that most non-wood forest products (NWFPs) are unavailable in the quantities required for commercial purposes, there is an exception: epiphytic bromeliads, which are conspicuous, abundant and aesthetically attractive plants. The leaves and inflorescences of many epiphytic bromeliad species are sold in important international horticultural markets and have been used in traditional ceremonies in Latin America for centuries. From an ecological perspective, epiphytic bromeliads are an essential source of food and habitat for a great variety of animals within the canopy. They also contribute significantly to nutrient and water cycling in the forest. Unfortunately, bromeliad overexploitation threatens their survival in the remaining patches of cloud forest. In various Central American countries, bromeliads have been the subject of illegal trade, precipitating the depletion of their populations.

As a Kleinhans fellow, I examined whether the science-based management of epiphytic bromeliads in southern Mexico could simultaneously increase rural income, preserve local traditions and foster the conservation of the plants and the forests they inhabit. In order to establish harvesting potential, analysis of population dynamics is a key tool with which to determine whether the population growth rate (λ) of a given species is at or above its equilibrium value, i.e. whether the population is in growth, stasis or decline. Such studies are very useful for designing sustainable harvest guidelines for NWFPs, but are time consuming and complex: hundreds of plants within the forest canopy must be identified and monitored for a minimum of two years in order to obtain a representative picture of the population status. In my study, I found the populations of each of the three species evaluated (*Tillandsia multicaulis* Steudel. [*tencho trecinta*], *T. punctulata* Schldl. & Cham [*tencho camarón*] and *T. butzii* Mez.) to be in decline. Recent studies in Mexico show that 15 out of 16 populations of epiphytic bromeliads analysed in cloud forests, including those of my study, are declining even in the absence of extraction. Whether climate



The logo depicts water in the centre, from which liquid ambar trees emerge, supporting different lifecycle stages of epiphytic bromeliads. Each leaf in the crown was designed by a different child from the community of Rancho Viejo.

change, fragmentation, illegal logging and/or forest disturbance are responsible, the outcome is the same: in their current condition, cloud forests cannot sustain viable populations of epiphytic bromeliads. If this is the case for the most abundant species, the less common ones are at even greater risk.

Given these pressures, can epiphyte management really contribute to cloud forest conservation? If the remnant fragments cannot sustain viable populations, what are the alternatives? My results show that because of the small contribution of seed production and early establishment to population growth, the reintroduction of seeds and seedlings into the forest canopy would have a very low impact in terms of population recovery. Most species have low rates of growth, making it very expensive to cultivate plants for reintroduction as adults – and this is before taking into account the practical challenges of working in the canopy. In the short term, one strategy for producing income while increasing forest conservation is the collection and utilization of fallen plants. One of the main causes of natural death in epiphytes is detachment from the support tree. I found that from the floor of a relatively modest forest fragment of less than 5 ha, thousands of plants may be recovered in good condition for commercial purposes with no impact on the population.

Ultimately, however, what is needed in the long term is the management and restoration of the cloud forest ecosystem as a whole. The challenge is complex, but an isolated attempt to manage one resource is only likely to fail. If epiphytic bromeliads are considered to be indicators of forest condition, then recovery of the whole system requires investment in the collection of native tree seeds for reforestation in the most fragile and degraded areas, fencing to impede livestock grazing within the forest, and the education and cooperation of the local landowners. The list is long and each of these activities requires a considerable investment. Profit from trade in epiphytes is currently insufficient to compete with other more lucrative enterprises such as construction and the illegal timber trade.

However, since I began working on this project, I have observed changes in the way the community views the forest, and that makes me optimistic that epiphytic bromeliads could function as a trigger to prompt other activities geared towards forest recovery. Forest owners no longer permit the illegal collection of plants by outsiders, students at the community school have painted bromeliads in a mural depicting the forest resources they value, and many community members have planted trees to rehabilitate deforested areas. If the goal is to contribute to the recovery of an enduring, respectful relationship between communities and forests, learning along the way and presenting alternatives is really the only option. Is there a role for epiphyte management in cloud forest? The answer is yes. (**Contributed by:** Dr Tarin Toledo Aceves, Department of Functional Ecology, Instituto de Ecología A.C., Carretera antigua a Coatepec # 351, C.P. 91070, Xalapa, Veracruz, Mexico. E-mail: tarintoledo@gmail.com/)



THE CHANGING WORLD OF RATTAN

Fellow: Stephen F. Siebert

Fellowship years: 1989–1991

Fellowship topic: Rattan cultivation and management in hillside farms and forest preserve buffer zones of Kerinci-Seblat National Park, Indonesia.

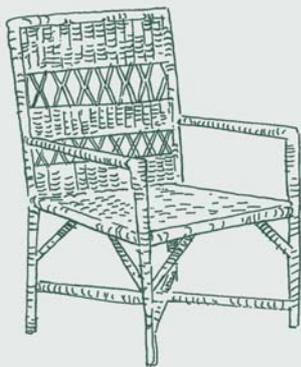
Rattan, arguably the world's most important non-timber forest product, has been used by rural people for binding, basketry, home construction, food and many other domestic, non-market purposes for centuries throughout the Old World tropics. Rattan canes also fuelled the multibillion dollar international furniture, handicraft and mat-making industries during the twentieth century. E.J.H. Corner, one of the last of the great British naturalists, conveyed the socio-economic importance of rattan when he noted: "Ever since man had the means of cutting their stems, they have been exploited. ... rattans were so invaluable to village life that one can speak of the rattan civilizations of Southeast Asia".

Rattan is also ecologically important. It is often the most abundant plant on the ground as well as in the canopy of Asian tropical forests. In research supported by a Kleinhans Fellowship, for example, I recorded an average of 284 *Calamus exilis* with 1 910 m of harvestable cane per hectare in Kerinci, Sumatra and 38 *C. zollingeri* with 2 660 m of harvestable cane per hectare in northern Sulawesi, and these were only one of dozens of rattan species in each site. Quite simply, rattan is a defining component of moist tropical forests throughout Southeast Asia. In addition, insects, amphibians, reptiles and mammals use the long, sinuous canes of rattan as three-dimensional highways with largely unknown implications for population dispersal, foraging strategies, predator avoidance and countless other plant and animal interactions. Rattan canes

also bind trees to one another so stoutly that they alter tree fall and forest disturbance regimes, which in turn affect light, temperature and humidity conditions, plant germination, seedling establishment, insect and fungal populations, organic matter decomposition rates and other basic ecological processes, including forest succession. In addition, most rattans are rapid growing, disturbance/gap-associated species and many can reproduce vegetatively (i.e. coppice). If seeds or coppicing species are present, rattan can quickly re-establish in even small patches of disturbed forest.

The diverse economic, cultural and ecological values provided by rattan are associated with trees, particularly primary forests. However, primary forests are increasingly a memory in Asia as a result of decades of rapacious timber harvesting and forest conversion to oil palm and other export cash crop plantations. In addition, excessive cane harvesting for the furniture industry, government refusal to acknowledge or respect the traditional rights of local residents to rattan and other forest resources, and fortress conservation practices that separate humans from nature have reduced supplies of and access to rattan resources. At the same time, cultural change and modernization, specifically a desire for less arduous work and the loss of traditional ecological knowledge among young people, have transformed social life throughout the tropical world.

Nevertheless, rattan continues to be valued and used by local communities and the world at large. The ready availability of strong, durable and inexpensive or free canes encourages their use as cordage and in basketry, particularly as nylon, plastics and other petrochemical products become more costly. Rattan handicrafts continue to be widely produced for domestic and international markets and there is growing interest in rattan as a food.



Rattan shoots (i.e. palm hearts) have been eaten by rural people for generations. For example, wild shoots of *Daemonorops robusta* and *Calamus zollingeri* are eaten on a daily basis throughout much of rural Sulawesi, Indonesia, while *Plectocomia himalayana* collected from lowland subtropical forests is marketed throughout Bhutan. Even more impressive has been the emergence of commercial rattan shoot cultivation in mainland Southeast Asia. In Thailand and the Lao People's Democratic Republic, thousands of hectares of *C. viminalis*, *C. siamensis* and *C. tenuis* are cultivated by smallholders to supply growing domestic and international markets. The cultivation of shoots is attractive to farmers because they can be harvested on an annual basis after just one or two years, in contrast with a decade or longer to produce marketable canes. In addition, shoots can be cultivated more intensively than canes and do not require trees for support.

Despite rapid and profound socio-economic, political and ecological change, rattan persists and its use by rural and urban populations continues, albeit in very different ways from those described by Corner five decades ago. Many commercially important rattan species used in the furniture, handicraft and mat-making industries can be repeatedly harvested on a sustainable basis given at least some trees upon which to grow and the presence of locally appropriate and respected management regimes. Furthermore, growing market demand for palm hearts offers smallholders the opportunity to cultivate and manage rattan for both canes and shoots.

Harun, a rattan artisan from Kerinci, Sumatra, aptly captures the enduring importance of these remarkable plants when he notes that "rattan is like *sambal*; we prefer fish *sambal*, but if there is no fish, we will have vegetable *sambal*, if there is no vegetable, we will just have *sambal*, but we must have *sambal*". (Author's note: *sambal* is a fiery hot chilli paste consumed by the Kerincinese at every meal.) (Contributed by: Stephen F. Siebert, Professor and Coordinator, International Conservation and Development, College of Forestry and Conservation, University of Montana, Missoula, MT 59812, United States of America. E-mail: Steve.siebert@cfc.umt.edu/) (Please see pages 40 and 74 for information on Professor Siebert's new book *The nature and culture of rattan*.)



Agave

AGAVES AS NTFPS AND MEZCALS IN MEXICO: AN OPPORTUNITY FOR SUSTAINABILITY?

Fellow: Catarina Illsley Granich

Fellowship years: 2001–2003

Fellowship topic: Development of a management plan for the production of mezcal from *maguey papalotl* (*Agave cupreata*) in peasant communities of the Montaña de Guerrero, Mexico.

Mezcal is a generic name given in Mexico to agave distillates. Traditional artisanal mezcals are part of Mexico's biological and cultural heritage. Their production is part of a gastronomic culture that began at least 11 000 years ago, when agaves were baked for food. Later, perhaps even in pre-Hispanic times, distillation of the agave's fermented juices created mezcals. Thirty-nine *Agave* species and close to 50 varieties are currently used for mezcal production in 24 states of the country.

Most *Agave* species are wild, succulent plants that inhabit temperate and semi-dry forests of the country. Others are cultivated varieties, differentiated from their wild relatives by the human selection carried out over centuries by diverse native peoples of Mexico. The extreme case of domestication is the blue variety of *Agave tequilana* Weber, used to make the most famous mezcal, tequila. This variety has been cloned for 200 years and is now cultivated in intensive monocrop systems that have high environmental impacts, including the eradication of other *Agave* species and varieties, deforestation and soil erosion. Also, because this variety contains no genetic variability, it is highly vulnerable to diseases and pests, leading to excessive agrochemical use and, ultimately, soil and water contamination.

The tendency in Mexico has been to promote the most commercialized and domesticated *Agave* species and their industrialized products, leaving the vast majority of agaves virtually invisible and relegated to poor, “backward” communities. Yet, over the past ten years, we have witnessed a sharp rise in demand for traditional, artisanal mezcal and recognition of the quality and amazing diversity of these distillates, now ranked among the best in the world. A set of terms and indicators has been established that allows for the differentiation and characterization of quality of the many mezcals.

Public policies related to mezcals have had controversial effects. Three Appellations of Origin (AO) have been declared, protecting only six *Agave* species in ten states. Barriers to markets have been created for mezcals from regions not protected by an AO. Most critically, only one AO may use the generic name “mezcal”, preventing hundreds of producers in 19 states (who use 34 *Agave* species) from using a term with centuries-old historical and cultural associations.

At present, there are two legal initiatives under consideration that, if passed, would strengthen these barriers, putting traditional artisanal producers at a serious disadvantage in the marketplace and, in some cases, providing incentives for the eradication of species and varieties not under AO protection. Both initiatives seek to regulate the term “agave” for the exclusive use of producers under AO. They would also prohibit all other producers from using the set of terms and indicators that have evolved over the years to denote the characteristics of mezcal differentiation and quality. By banning non-AO mezcal producers from offering information to consumers, these regulations would create strong commercial advantages for the established AO producers.



There is much debate at the national and international levels over the impacts of these regulations on the rights of producers to access markets and the rights of consumers to precise and consistent information. Debate has also focused on social justice and the protection of the country’s biological and cultural heritage. Sustainability has hardly been mentioned. Yet, especially in times of climate change, it should also be part of the discourse. Is it wise to foster an increasingly intensive monocrop cultivation? What are the alternatives? Are poor peasants capable of responsible management of their resources? Could these resources – which their cultures created and have guarded over centuries – trigger development processes that combine sustainability and social justice? What policies are needed to do this?

Between 2001 and 2003, a Kleinmans Fellowship allowed me to study wild agaves and the people who use them, researching basic agave biology as well as local knowledge and management, including practices, rules and organization. The Group for Environmental Studies has been working over the past ten years on a case study of one species, *Agave cupreata*, in highly marginalized communities in the state of Guerrero, one of the three poorest in the country. Research has shown that, at the community level, agaves are a common resource that is managed using practices that maintain stable populations and are articulated with strong rules and organizations to enforce them.

Research and a process of participatory monitoring over several years have led to the first community-based agave management plan. Later, in a farmer-to-farmer process, other communities from Guerrero, and more recently from other states such as Oaxaca, have come to learn from the project and in some cases have created their own management plans. The farmer-to-farmer exchanges have brought about discussions on the pros and cons of the different ways of producing agaves: as NTFPs, as elements of complex agrosilvopastoral systems, as monocrops. One conclusion is that productivity may be lower when agave is treated as an NTFP, but so are environmental costs; managing agaves as one of many resources in a diversified system decreases both economic and environmental risks.

These incipient initiatives, together with the growing number of bars and restaurants

willing to buy differentiated, high-quality, limited production mezcals, show that, with proper coordination, it is possible to establish fair partnerships that benefit producers and their communities. With political will, agaves could sustain processes that promote food and water security in marginalized areas, and could contribute to the protection of the country’s biological and cultural heritage. But, if the regulations now under consultation pass, it will be much more difficult to foster this type of development in the future. (**Contributed by:** Catarina Illsley Granich, Biologist, Coordinator, Program for Peasant Management of Natural Resources Group for Environmental Studies, GEA Allende 7, Santa Ursula Coapa, Coyoacán, México DF 04650, Mexico. E-mail: catillsley@gmail.com; gea@laneta.apc.org/)



THE EVOLUTION OF A TRADITIONAL RESOURCE: NEW PRODUCTS AND NEW QUESTIONS FOR RUBBER TAPPERS IN THE CHICO MENDES EXTRACTIVE RESERVE IN THE BRAZILIAN AMAZON

Fellow: Richard Wallace

Fellowship years: 1995–1997

Fellowship topic: Building sustainable marketing models for non-timber forest products: a critical link to environmentally benign socio-economic development in extractive reserves in Acre, Brazil.

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I first ventured into the Chico Mendes Extractive Reserve in Acre, Brazil in March 1996. It was still in the thick of the rainy season and there was a light drizzle. Accompanied by a handful of rubber tappers from the community of Rio Branco, my destination, I slogged through the shin-deep mud of *Estrada Petrópolis*,

the feeder road that rises and falls relentlessly as it heads north out of Xapuri, then veered on to a path that snaked through the forest to arrive at the community centre. I did my best to keep up. Even in the dry season, *Estrada Petrópolis*, with crevices often several feet deep, was nearly impassable by vehicles, and only tractors (and then rarely) could make their way up the road. After a five-hour-plus hike, I was exhausted on my arrival at Rio Branco.

With support from a Kleinhans Fellowship, I spent the next 18 months exploring the role of NTFPs in the lives of people living in the Reserve. Just six years after its creation, many families had abandoned rubber tapping because of the low price paid for rubber (*Hevea brasiliensis*) and CAEX, the rubber tappers' cooperative created in the late 1980s to help them obtain higher prices for their products (and pay less for supplies), was struggling to remain financially viable. With CAEX and its in-forest trading posts experiencing capital problems, it was not uncommon to see itinerant traders with mule trains ambling through the forest laden with either dry goods to sell to households or rubber to take to the city. While these traders provided households with an outlet for their extractive goods, their prices (both buying and selling) were often seen as exploitive. Yet without them, households deep into the forest would have no market outlet.

Despite these challenges, rubber and, to a greater extent, Brazil nuts (*Bertholletia excelsa*), remained an important source of income for households and provided critical access to credit from itinerant traders. Many households spoke enthusiastically about identifying and developing other products for sale; however, relative isolation, low prices for products, and a lack of interest by state government leaders to creatively engage the extractive sector left many rubber tappers eyeing a future based on agriculture and off-farm labour.

Many changes have occurred since 1996 that have brought both great optimism to NTFP development as well as new challenges to regional conservation and development. The Acre "Forest Government", led by the Worker's Party, was elected in 1998 and implemented a number of policies aimed at promoting sustainable development and aiding the non-timber extractive sector. These included the establishment of a Secretary of Forestry and Extractivism; the enactment of



Bertholletia excelsa

a rubber subsidy payment called the Chico Mendes Law; the formation of COOPERACRE, a group of rural extractive cooperatives that infused new life into the extractive sector; and major investments in rural infrastructure, including the construction of feeder roads that enabled regular market access during the dry season. Follow-up research in 2001 and 2006 confirmed the continued importance of extraction for forest households for subsistence and the market, particularly for lower-income households. During these periods, I travelled to the community of Rio Branco by hired motorcycle or small pick-up, or hopped a ride on the municipal or state vehicle that travelled the feeder roads if not daily, at least on scheduled market days.

More recent changes are also transforming the extractive economy. Natex, a state-sponsored company that produces condoms made from locally extracted rubber, began operations just outside the city of Xapuri in 2008. Natex, with a contract to sell 100 million condoms to the Ministry of Health per year, has breathed new life into the rubber sector with many returning to tap rubber; approximately 500 Reserve families now extract and supply latex – the raw material used to make rubber – to the condom factory. Supported by a state subsidy for liquid latex production, households selling to the factory receive R\$7.80/kg of latex. In comparison, in 1996 nearly all households received between R\$0.50 and 1.00/kg of latex. The factory itself employs approximately 180 workers.

Price increases are also evident in the Brazil nut sector. In 2011, the price for 12–14 kg of unshelled Brazil nuts (called a *lata*) reached approximately ten times that of 1996. The Xapuri Brazil nut factory, financed by the state and now managed by COOPERACRE, seems to have overcome the many sourcing, transport, processing and market challenges encountered by CAEX in the 1990s.

The resurgence of the rubber and Brazil nut economies suggests that with state support, new market opportunities can be developed that can reinforce traditional cultural activities, raise forest household incomes and boost urban employment (both managerial and labour jobs) while conserving the region's forests. Undoubtedly, forest families in these economies are also supporting urban enterprises as they make purchases in more accessible cities.

However, a number of important parallel questions also emerge. With increased returns from rubber and Brazil nut sales, how are households investing income and what are the implications of these investments for future development and conservation in the Reserve? What are the sociocultural implications of a resurgent extractive sector now coupled with increased cattle production and plans for community timber management in the Reserve? What other NTFPs present opportunities for Reserve households as COOPERACRE expands its operations to processing locally extracted fruits, such as *açaí* (*Euterpe precatoria*) and *cajá* (*Spondias mombin*)? And what will happen if a state government is elected that is less inclined to support the extractive sector and reduces subsidies and infrastructure investments in feeder roads, transport and factories? The changes in the non-timber forest economy in Acre make it both an exciting and critical time for research in the Chico Mendes Extractive Reserve. (Contributed by: Richard Wallace, Assistant Professor, Department of Anthropology, Geography and Ethnic Studies, California State University, Stanislaus, One University Circle, Turlock, CA 95382, United States of America. E-mail: rwallace@csustan.edu/)



Cajá



DIVERSE PEOPLE, MULTIPLE STRATEGIES AND DIFFERENT OUTCOMES: A LONGITUDINAL ANALYSIS EVALUATING THE EFFECT OF NTFPs ON FOREST CONSERVATION IN AMAZONIA

Fellow: Kennedy de Souza

Fellowship years: 2011–2013

Fellowship topic: Working towards cooperative non-timber forest management: integrating economic, institutional and ecological analysis to balance community livelihoods and forest conservation in western Amazonia.

The Brazilian Amazon is not only one of the most biodiversity-rich biomes in the world, but is also home to thousands of people who depend on its resources to subsist. NTFPs are critical to rural livelihoods in the region. Over the past decades, local communities have consistently attempted to manage their forests and meet their economic needs by combining a set of NTFPs. However, in the state of Acre, the rate of deforestation of community-owned lands tripled between 1990 and 2010. To what extent have NTFPs led to reduced forest conversion among these communities? How do the incomes from NTFPs and deforestation relate to one another? How does this relationship change across land tenure arrangements and over time? These are critical aspects in the ongoing debate of the future of conservation in the region. With support from a Kleinhans Fellowship, I combine longitudinal data representing diverse land tenures together with economic and

remote sensing/GIS methods to provide some insights on these questions.

This study examines the linkages between NTFPs and forest change in three different land tenure arrangements. The first is extractive reserves (ER), which are federal lands collectively managed by rubber tappers under concession regimes. Concession holders combine Brazil nut harvesting with the extraction of rubber, oils, seeds and herbs to support their livelihoods. Logging is prohibited in ER, and crops and cattle are limited to family subsistence. The second tenure arrangement I examine is agro-extractive reserves (AER), which are lands under a common property regime and governed by a local association. While timber management is allowed in these areas, inhabitants also include NTFPs, crops and livestock in their land uses. Third, I examine agrarian colonization settlements (ACS), which are privately owned lands. Cattle and crops are the main activities practised by inhabitants of these areas. However, as deforestation has increased, residents of ACS have attempted to expand the economic importance of NTFPs as a way to conserve their remaining forests.

In my research, seven communities, which represent these three land tenure policies, are compared over a 20-year period to evaluate how NTFPs, household economics and forest conservation are linked to one another. The communities are located in the state of Acre (western Amazonia) and include one ER (Chico Mendes), three AER (Porto Dias, São Luis do Remanso and Cachoeira), and three ACS (Peixoto, Humaitá and Boa Esperança). Taken together, approximately 9 000 people live in these seven areas and manage almost 2.95 million acres (approximately 1.194 million ha) of forests. Landsat images for 1990, 1995, 2000, 2005 and 2010 are being used to determine how land-use strategies have affected forest cover. Longitudinal socio-economic data were collected from approximately 300 families – a sample of the population for the seven areas – in 1996, 2005 and 2010. Econometrics and landscape ecology analyses have been combined to identify how family income varies within and across community categories and how this variation relates to forest cover change. A spatial econometric model was developed to illustrate the importance of NTFPs to counteract the human pressure to deforest under different policies.



Results illustrate the importance of NTFPs in the protection of local forests. My model estimates that as deforestation increases, the economic importance of NTFPs in the total family income decreases. In the Chico Mendes ER, where NTFPs provide almost 50 percent of residents' total income, deforestation rates were lowest (>5 percent of the total area). In contrast, while the economic importance of NTFPs among families is relatively lower in AER and ACS areas, deforestation is more intense. I found that even though deforestation tends to increase in AER communities, the forest conversion rate declines in areas where NTFPs have been economically more important. Most important, the model suggests that in ACS areas, which had the highest percent of deforestation over the period (18–70 percent of the total area), NTFPs had no significant importance in family income.

Like other researchers, I have found that deforestation is occurring in all land tenure systems. However, I do not support the contention that deforestation is an inevitable Amazonian tragedy; rather, my findings reaffirm the strategic importance of NTFPs for the future of forest conservation in the region. ER continues to be a worthy conservation policy and its elimination, when compared with colonization settlements, might contribute to increased deforestation in the state of Acre. Results for AER indicate that any policy or resource use strategy based on a single product (e.g. timber) tends to fail in its attempt to protect local forests and livelihoods. Diversification of families' economic sources must be an inevitable piece of the solution.

In fact, a hybrid resource management scheme might be the best approach in reducing forest degradation and supporting the economic welfare of communities in Amazonia. For example, in Cachoeira AER, where inhabitants have always combined multiple products in their resource strategies, the contribution of NTFPs to total family income increased from 19 to 52 percent between 1996 and 2010. Herein, from 2005 to 2010, I found a situation of reforestation, with total deforestation declining from 8.2 to 5.1 percent of its total area.

However, the picture is even more complicated. Which products are economically viable? How do profitability and costs vary within and across communities? How do these aspects affect land use and land cover change? Moreover, economics alone do not explain how people successfully or unsuccessfully manage their resources. Institutions and social and cultural attributes are equally important. In the next months, I will return to these Amazonian communities with the goal of presenting the results of this study. I will use participatory methods and linear programming modelling to plan how families can diversify their land-use strategies. Working with local resource users, grassroots organizations and government agencies, a number of land-use management plans will be developed. Resource users and community leaders will be trained to implement, monitor and revise these plans. State agencies and cooperatives will be involved as strategy for influencing public policies. **(Contributed by: F. Kennedy de Souza, Indiana**

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copaiba

THE HUMAN SIDE OF NTFP RESEARCH AND DEVELOPMENT

Fellow: Campbell Plowden
Fellowship years: 1997-1999
Fellowship topic: The ecology, management and marketing of non-timber forest products in the Alto Rio Guamá Indigenous Reserve (eastern Brazilian Amazon).

I studied five different NTFPs with the Temb  Indians in the Brazilian Amazon for my doctoral research with support from the Kleinhans Fellowship and hoped my work could identify new sustainable sources of income for the community. These products were *copaiba* oleoresin, *titica* vines, *breu* resin, *andiroba* oil and *amapa* latex. Graduate school well prepared me to sample forest plots and analyse the results with statistics, but I also had to learn how to install solar panels, avoid snakes, teach field assistants to count, cope with sickness and dodge webs of native politics. My work improved my understanding of these, but it also showed that sustainably harvesting NTFPs for profit is elusive because plants are often too rare, too fragile, spoil too quickly,

produce too little, or take too long to process for the price available in local markets. I also learned that it was easier to deal with the scientific challenges of the field work than the social ones in the village.

My first summer studying *copaiba* in Tekohaw village was like a honeymoon with the Temb , and they warmly welcomed my wife and two children when they came to live with me there for a year. As my research progressed, I hired dozens of men as field assistants, provided first aid and some medicines, loaned out tools, bought or traded extra goods for handicrafts, took family photos, and taught evening maths and science classes. In trips back home, I collected donations and sold handicrafts to help fix community boats, publish a collection of traditional chants, and sponsor a land rights project.

I wanted to be both a good researcher and a good citizen in the community that called me *Zu'izu* ("white frog") and seemed to have adopted me. Over time, though, this relationship eroded and eventually broke. I enjoyed being the person helping the villages and lost some vital measure of humility. When I offered an opinion in a public meeting that differed from the one asserted by a powerful young leader, I was quickly reminded I was still a guest and shouldn't have presumed to have the status of an elder. Failing to discuss all of my activities often with the whole community led to misunderstandings about my research and questions about my integrity. I began as a colleague to men who first walked with me in the forest and gradually became more of an employer when sickness and managing multiple studies kept me more in the village. People from Tekohaw, and other Temb  and Ka'apor villages who didn't work with me, resented that I couldn't provide equal benefits to all. Mistrust and rivalries between leaders and communities ultimately spilled on to me and forced my departure.

My time with the Temb  and subsequent work with other communities in Peru taught me several lessons about developing NTFPs in communities. First, I believe people can earn more money transforming NTFPs into value-added products than selling them as raw materials. This requires building capacity and commitment in the community to tasks such as sustainable harvest, making products with consistently high quality, and taking responsibility for management and



marketing. An outside party assisting this process also needs to follow certain guidelines: (i) clearly specify the goals and methods of the enterprise; (ii) develop and periodically review agreements about what each partner will give and expects to receive; (iii) listen carefully and develop a dialogue with the whole community, not just a few leaders; (iv) act with integrity (don't make promises you can't keep); (v) act with patience and perseverance, knowing you can't achieve long-lasting results in a short period of time; (vi) respect peoples' different points of view, culture and aspirations; and (vii) don't try to meet all the needs of the community on your own – only do what you can do well and work with trustworthy allies whenever possible.

I am now trying to follow these principles in my work with the Center for Amazon Community Ecology, which I founded in 2006. We strive to blend science, traditional knowledge and creativity to support conservation and local development with forest-based communities in the northern Peruvian Amazon. We first studied the ecology and sustainable harvest of copal resin (from Burseraceae trees) in a protected forest reserve on the Ucayali River. In 2009, we began assessing copal tree and resin abundance with a Bora native community along the Ampiyacu River and are now distilling resin samples with the goal of producing an aromatic essential oil that the community can sell to fragrance companies. We also work with artisans in this and two other watersheds to develop and market innovative handicrafts made from *chambira* palm fibre, natural plant dyes and rain forest seeds. These items include beautiful baskets, belts, bags, dog collars and leashes, guitar straps, Christmas tree ornaments, trivets and jewellery. We pay the artisans an agreed



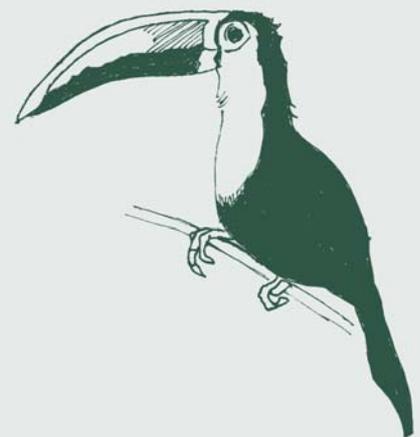
price upfront and return 20 percent of the proceeds from our craft sales to the community to fund health, education and/or conservation needs of their choosing.

I have avoided many of the pitfalls I experienced with the Temb , largely by entrusting much of our work with native communities to a capable Peruvian project manager who has visited our pilot project in Brillo Nuevo once a month for two years. She works closely with a local coordinator elected by the village, provides updates and consults with whole village assemblies, rotates the men who work as field assistants on a monthly basis, regularly meets with officials from the federation that represents all native villages in the area and sits on the management council of the regional conservation area. Yully's visits to the area have been frequent enough for the community to learn to trust her (and our organization), but not so long that she gets pulled into every local village drama. We have neither promised nor created an economic boom with our craft purchases, but the number of women artisans who work with us in Brillo Nuevo has grown from 12 to 29. New artisans joined us last year when we expanded the project to three other villages; this now gives us a base with each of the four ethnic groups in the area.

To be sure, we have encountered many challenges – some frustratingly familiar and others that are new. Artisans used to operating in an environment where demand for their products is very limited tend to view even their neighbours as competitors. Our perplexing task has been to show them that they can all make more money if they all make high-quality

handicrafts. This means that the most skilled artisans need to help the beginners improve their weaving and share their knowledge of plant dyes. They also need to learn how to exchange constructive criticism with their peers. These are the types of cultural challenges that can make the difference between making crafts as an occasional source of income and transforming this activity into a viable means of supporting a family without burning extra forest for cash crops, engaging in illegal logging or processing coca leaves for the drug trade. We are not going to solve these problems overnight, but I feel confident that paying attention to the human side of NTFP development will at least give us a chance to do so.

(Contributed by: Campbell Plowden, Executive Director, Center for Amazon Community Ecology, 1637 B North Atherton St. #90, State College, PA 16803, United States of America. E-mail: cplowden@amazonecology.org; www.amazonecology.org/) ♣



Work joyfully and peacefully, knowing that right thoughts and right efforts will inevitably bring about right results.

James Allen