

NONTIMBER FOREST PRODUCTS IN DANIEL BOONE NATIONAL FOREST REGION—ECONOMIC SIGNIFICANCE AND POTENTIAL FOR SUSTAINABILITY

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Abstract.—Household members who gather nontimber forest products (NTFP) in and around the Daniel Boone National Forest (DBNF) in eastern Kentucky were interviewed. Participants reported that a wide variety of NTFP were economically and culturally important to them. Forty-three species of plants were sold commercially and 120 were used in households. Ginseng (*Panax quinquefolius* L.) provided the greatest cash income. Social relationships were the primary means of access to private lands. Although the DBNF issues mandatory permits to gather specified products, permit records revealed that no permittee renewed his or her initial permit. This finding casts doubt on the effectiveness of this regulatory approach. Although almost all participants were familiar with the primary ecological and biological characteristics of ginseng, it is not apparent that the institutions necessary for community-based self-regulation required for sustainable harvest levels are present. A regulatory approach, however, is not likely to succeed. The resources necessary for an enforcement program are not available, and it is unlikely that a strict enforcement program would receive the community support necessary for success. We conclude that it would be appropriate to consider the development of community-based programs leading to increased self-enforcement of harvest levels and methods.

INTRODUCTION

The central Appalachian region is one of the poorest rural areas in the nation (Tickamyer and Duncan 1990). It lacks stable employment, opportunities for mobility, diversity of social structure, and investment in community assets (Duncan 1999). In recognition of rural poverty and the potential economic contribution of forest land, policymakers and land managers now emphasize the role of nontimber forest products (NTFP) in forest ecosystem management. The U.S. Congress enacted legislation in 1999 mandating that the U.S. Forest Service (USFS) charge fair market value for NTFP harvesting permits, and ensure that harvesting levels are sustainable. The U.S. Bureau of Land Management, and U.S. Fish and Wildlife Service have also begun to include NTFPs in their plans.

STUDY AREA

This study was conducted in six contiguous counties in the Daniel Boone National Forest (DBNF) region of Kentucky (Hembram 2007). This specific area was chosen because the most recent land management plan of the DBNF emphasizes management of NTFP and communities' socioeconomic needs. Except in one rather urbanized county, more than 85 percent of the population lives in rural, isolated, hilly areas with an average population density of 46.7 persons per square mile. Communities are characterized by geographical isolation, and persistent and chronic poverty. They are economically distressed as measured by poverty, unemployment, and per capita income (Appalachian Regional Commission 2006).

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Two primary models have been advanced for the causes and possible remedies for Appalachian poverty. The “culture of poverty” model explains poverty in terms of the behavior of families and individuals, and the social dynamics interconnected to geographical, socio-cultural, and economic isolation. The model links poverty to the mountain culture and value systems embedded in individualism, traditionalism, and fatalism. It also suggests that cultural and geographical isolation has led residents to resist programs that would bring them into contact with the outside world, thereby improving their economic lives (Weller 1965). The “internal colonialism” model views Appalachian residents and the region’s natural resources as having been exploited by absentee corporate owners who monopolized land, mineral resources, and politics in the region. Caudill (1962) in his classic work on cultural and economic history of Appalachian Kentucky advanced the internal colonialism model by linking it to the cultural isolation of mountaineers.

Nontimber Forest Products

The concept of NTFP is ambiguous (Belcher 2003), but generally refers to all biological materials other than timber extracted for human use from within and on the edges of natural, manipulated, or disturbed forests. According to the United Nations, Food and Agricultural Organization, NTFP consist of goods of biological origin other than wood, derived from forests, other wooded land and trees outside forests (Vantomme 2003). These products are derived from plants, fungi, ferns, mosses, animals, and their parts. People use them as food, medicine, decorations and ornaments, furniture, crafts, and utensils to be consumed at home or exchanged in markets for cash income. In both developing and developed countries, collection of these products generally falls outside the formal market economy.

Informal Economic Activity

The term “informal economic activities” refers to activities that lie outside the scope of the institutional regulations of the state and social environments where similar activities are regulated (Portes and Haller 2005, Portes and Sassen-koob 1987). These activities may be inherently illegal or simply escape taxation and inclusion in the economic data used to determine qualification for social services and welfare. Many scholars include in this category both non-monetized activities and market exchanges such as barter, self-provisioning of goods and services, and domestic works used as livelihood strategies (Jensen and others 1995, Mingione 1991, Tickamayer and Wood 1998).

Access

Access refers to social actors’ ability to use a resource given all the rights and opportunities they face. Access to natural resources is mediated through institutions defined by statutes and regulations, social norms, norms of behavior, and conventions that prohibit and/or permit individuals to undertake activities within their social settings (Leach and others 1999, Ribot and Peluso 2003, Mehta and others 1999, North 1990, Scoones 1999). Formal institutions that legitimize effective control and command over natural resources are property rights (Bromley 1992, Schlager and Ostrom 1992). Social scientists recognize a parallel mechanism of access, one where social actors gain access to resources through social connections, i.e., social capital (Coleman 1990, Lin 2001).

Based on property rights, resources can be private property, common property, state property, or open access depending on who has rights to derive benefit streams from a resource and regulate access by other users. Open-access resources are free of entry costs for all users since no mechanism is in place to regulate access. In other instances, exclusion of potential users is difficult by any means due to the nature and extent of the resource (Berkes and others 1989, Ostrom and others 1999). Such resources become de facto open access.

In Kentucky, about 89 percent of forest land is privately owned (Smith and others 2004). Within the DBNF proclamation boundary, nearly 67 percent of forest land is private and 33 percent is owned by the U.S. Forest Service and state agencies. Access to the DBNF is regulated by a permit system depending on the product and use. The harvesting permit for personal consumption of permitted NTFP is free, but the Forest Service charged a fee of \$20 for each permit used for commercial harvesting. Collection of ginseng root required payment of fees regardless of commercial or personal use. This permit had both enabling and constraining features. It enabled holders to enter onto DBNF lands and withdraw a specified category of products, but the gathering was constrained by restrictions on time, duration, season, location, and harvest level. The permit holders for ginseng roots were required to dig only plants at least 10 years of age, plant back one-half of the seeds from the harvested plants within 50 feet of the harvest site, and bring the other half of the seeds to the office of the Ranger District issuing the permit. There is no enforcement mechanism for these regulations.

American Ginseng

American ginseng is one of the most commercially important NTFP in North America. Total export of wild harvested dry ginseng root in the United States in 2001 was 150,000 pounds worth U.S. \$59 million (Chamberlain 2005). It is a perennial forest herb ranging from Quebec and Manitoba in Canada to northern Florida, Alabama, Louisiana, Arkansas, and Oklahoma in the United States (Anderson and others 1993). Its tuberous roots are dug primarily for export as a herbal medicine. Large-scale domestic cultivation takes place in the United States; however, wild roots command higher prices than cultivated roots. The wild population is declining and becoming rare throughout its North American range (U.S. Fish and Wildlife Service 2005). In 1973, the species was listed in Appendix II of the Convention on International Trade in Endangered Species of Wild Flora and Fauna, enabling regulation of its trade (Robbins 1999).

Sustainable Harvesting Practices

We examined harvesting practices for American ginseng. Analysts of traditional ecological knowledge (TEK) suggest that resource users with historical continuity in resource use are more likely to carry out sustainable practices through appropriate institutions and social norms. Such societies are generally non-industrial or less technologically advanced, many of them indigenous or tribal (Berkes and others 2000). Since we were studying a population in a developed country, we carefully investigated the prevalence of these practices through in-depth interviews. The objective was to determine whether historical continuity in the use of NTFP existed in the households included in our interviews.

METHODOLOGY

We used a mix of qualitative, inductive inquiry and quantitative measurements similar to Patton (1990). Identifying and gaining access to harvesters was problematic because these activities are of dubious legality (Gaughan and Ferman 1987). An initial sample of harvesters was identified from the permit records of the DBNF. The sample was expanded by snowball and respondent-driven sampling, and through referrals. Twenty-five participants from 21 households were eventually recruited. In-depth interviews were conducted by the lead author using a set of semi-structured open-ended questions. Interviews were tape recorded when participants consented; otherwise responses were journaled. Transcripts and journals were analyzed following Strauss and Corbin (1998). Open coding was used to capture these concepts and ideas and to link and organize them into initial categories. The frequently recurring codes were compared in an effort to understand the issue and develop categories. Selective coding was used to further develop and refine categories.

RESULTS

The nature of the subject and sample population make it very difficult to draw definitive conclusions. The sample size was not adequate to represent the entire population of NTFP gatherers in the DBNF region. In addition, there was no way to verify the estimates of quantities provided by respondents. Nevertheless, the results shed light on the sustainability of critical NTFP given the existing institutional arrangements and harvesting practices.

Economic Significance

Participants were diverse in terms of gender, age, ethnicity, educational attainment, and household attributes. Seventy-five percent had an educational level of high school or less. Three were employed at the time they were interviewed. Annual household income of nearly half of the households was less than \$10,000, below the poverty threshold for 2005.

They reported use of organs and tissues from 105 forest species, including bark, twigs, branches, sap, roots, wood, flowers, leaves, shoots, vines, fruit, nuts, berries, ferns, mosses, and mushrooms. These products were used for food and beverages, medicine, decorative materials, firewood, crafts and furniture, and oils, dyes, and perfumes.

A majority of these products were consumed by the harvesters or members of their households. Edibles and medicinals constituted the bulk of the products for home use. The 46 wild edibles reported included mushroom, berries, nuts, fruits, wild greens and ferns. Although not the primary source of food, they supplemented diets and saved money by replacing purchased food. Although some participants quantified their annual consumption, the quantities reported are not reliable because of cognitive limitations, and over- and understatement by participants to please outside researchers. Nevertheless, their responses clearly indicate the importance of NTFP to their household budgets.

In aggregate, respondents reported using 49 plant species for herbal medicine at home. Their use was described as a “mountain” or cultural tradition. Participants attributed their use to a number of factors, including family tradition derived from TEK and practices, household income, and actual efficacy of herbal medicine or socially embedded beliefs about their usefulness. However, 20 percent of households indicated that use of NTFP started with their generation, motivated by their need for additional income and their ability to learn about harvesting practices from other members of their communities.

A large number of marketed products contributed significantly to annual household income. Cash income came primarily from roots and bark of medicinal plants, including ginseng, goldenseal, blood root, black cohosh, blue cohosh, trillium, lady's slipper, wild ginger, Virginia snake root, star grove, cranesbills, Indian tobacco, sassafras, mullein, wild yam, spikenard, stone root, willow, slippery elm, walnut, sumac, catnip, boneset, and papaw. Other tradable products included moss, decorative plant materials such as grapevine and Christmas tree, and wood-craft products. Certain wild edible products were also traded locally. Among the tradable medicinal products, ginseng root commanded the highest price in the local market, about \$350 a dry-pound. The price of other materials ranged from less than a dollar to nearly \$60 a dry-pound. Harvesters reported that they focused on those products with the highest net payoff when the market price is compared to the total cost to gather and market.

We attempted to quantify the proportion of households that relied on NTFP for income and their contribution to total annual household income. We asked participants to recall the annual quantity of each of the products they sold and the income received. We assume that participants tended to underreport income to avoid tax or the denial of welfare benefits (Gaughan and Ferman 1987). A local buyer reported that many harvesters in the region have a “fixed, stable income” in the form of government welfare benefits and for this reason, they did not want to be identified or they did not want to reveal income information.

Household income from selling NTFP depended on time spent on harvesting activities. Household members who harvested full time during the season earned more money than those who harvested less frequently. Responses indicate that full-time harvesters earned about \$3,000 annually. Other households reported NTFP income of \$200 to \$1,000 annually. According to local buyers, a few harvesters earned as much as \$5,000 to \$15,000 annually.

Access Mechanisms

Participants relied more on private forest lands than on the DBNF due to its limited geographical area and permit requirements. They also objected to the process used to issue permits, notably the need to interact with USFS employees.

An analysis of permit records revealed that participants drawn from the pool of permit holders did not purchase harvesting permits every year, but most continued to harvest commercially on a regular basis. In addition, based on the volume purchased by buyers, the number of harvesters in the region was estimated to be higher than the number of permits issued: 11, 6, 15, 63 and 45, respectively, for 2000 through 2004. Each of the local buyers interviewed reported purchasing from as many as 100 individuals in the region every year.

Access to private forest lands was mediated through social relationships. Harvesters required permission from the landowners who provide discretionary access. Permission was oral and free of cost. The harvesters' ability to get permission from a landowner depended on their social relationships, which ranged from mutual acquaintance to strong personal ties. Responses suggest that when a personal acquaintance is lacking, access was denied, indicating the discretionary nature of access.

We have not investigated why private landowners provided access to other individuals to derive economic benefits from their lands. The participants' accounts, however, provide important insights. According to them, the majority of landowners granting them access did not make use of these resources themselves. However, with the growing awareness and market opportunities, more landowners have begun to derive NTFP benefits for themselves. As a result, access to such lands is getting stricter. In addition, participants' accounts and indirect evidence suggest that harvesters in the region resort to illegal access on both the DBNF and private forest lands.

Harvesting Practices

Nearly 90 percent of participants stated that they have harvested ginseng. It is the most important NTFP for these households because it commands the highest unit price in the local market.

Harvesting practices narrated by participants included temporal restrictions, protection of young plants, area rotation, artificial regeneration and retention of mature plants, and monitoring of resource abundance. According to Berkes and others (2000), these are the practices for adaptive management of ecosystems

and biological diversity to secure a sustainable flow of natural resources and ecological services. However, interviewees gave no indication of any social institutions for self-governance within the community of harvesters.

DISCUSSION AND CONCLUSIONS

NTFP in the central Appalachian region play a significant role in the economic lives of poor rural households. They fit into the diversified livelihood strategies adopted by rural households. The consumption of edible, medicinal, and other NTFP supplements diets, medicinal and other livelihood needs, and reduces costs. Individuals who pursue harvesting full time for cash income can earn \$3000 or more per year. These harvesters are also at the bottom of the socioeconomic strata with annual household income of less than \$10,000. Even if the monetary value of materials used in home consumption is not included, more than 30 percent of total household income may come from forests. Estimates of income are very rough because of cognitive problems associated with recall, small sample size, and people's reluctance to reveal their actual income. However, this study gives clear indications that these products are an important source of income that should be studied further.

Most forest land in the DBNF region is in private hands. Our findings suggest that household members in the study region rely more on privately owned forests than on the DBNF, indicating the importance of access to private forests as an income source for non-owners of forest land.

Harvesters adopt multiple access mechanisms. They recognize the social relationships of private property rights. They ask landowners for permission to harvest. Although access is free, it is not a generalized social norm. Rather, landowners provide discretionary access to individuals with whom they have social ties. Many private landowners pay limited attention to "minor forest products" on their lands and thus may believe they are not giving up too much. With growing awareness of the high market values for plants, such as ginseng and goldenseal, they have begun to look for ways to capture for themselves, the benefits that largely go to others. This new relationship can have direct influence on access mechanisms and the present role of private lands in providing benefits to poor non-owners.

Access mechanisms observed in the study region are considerably different from those of rural households in tropical countries. In these countries, poor unskilled household members who lack access to labor markets harvest the products for food and income as a gap-filling mechanism or as a means to survive unprecedented emergency situations. They use products harvested from forests as de jure or de facto open-access resources (Angelson and Wunder 2003).

This study demonstrates that knowledge of appropriate resource use practices exists among resource users in developed as well as non-indigenous societies, where users may not have legitimate command and control over the resource through appropriate institutions and social norms. The pervasiveness of these practices across central Appalachia, however, requires further empirical investigation.

There are a number of self-enforced resource use practices among harvesters that are necessary but not sufficient for sustainability of economically important NTFP. The institutions necessary for community self-governance to regulate sustainable harvest levels, however, are not present, making it appropriate to consider the development of community-based programs leading to increased self-enforcement of harvest levels, stakeholders' participation in resource management, and sustained livelihoods. However, the lack

of such institutions, despite numerous attempts by government agencies and faith-based organizations to organize them, is a root cause of poverty in the region. Thus, resource managers are faced with a challenge outside the bounds of their normal sphere of influence.

We suggest that economic policies to improve rural livelihoods in the Appalachian region must continue to take these resources into consideration. However, policies should focus on social and economic processes that are likely to improve the overall long-run economic welfare of people in the region, rather than a regulatory approach based on enforcement activities. The resources necessary for an enforcement program are not available, and it is unlikely that a strict enforcement program would receive the community support necessary. As participants' accounts and vast literature indicate, household members continue to engage in extraction activity due to lack of employment and alternative livelihood opportunities. When better livelihood opportunities are available, reliance on these resources should decline.

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