

Preliminary Data for Estimating the Demand and Supply of
Non-Wood Forest Products in the United States

by
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Abstract

The primary objective of forest management in the United States has been, historically, timber production. The issues of sustainable forest management in the 1990s bring attention to the values of products and services other than timber, including non-wood forest products (NWFP). This paper presents the basis for demand and supply analysis to demonstrate the economic impact of NWFP in the forested regions of the U.S. The informal structure of most NWFP markets presents several challenges to predicting consumer and producer behavior. Background data for the U.S. are provided with a look at the challenges of estimating economic benefits from NWFP and analyzing the case study of wild ginseng.

BACKGROUND

Historically, forests have served as a reservoir of wealth and benefits to forest communities. Forests have provided communities with building materials, food, medicines and recreation. Attention to the holistic functions of forests changed, however, with the development of agriculture and trade. Maximization of timber production therefore became the primary objective of forest management. In the U.S. there was less dependence on the diversity of wild forest products, with the exception of the forest dwellers who utilized some of the products on a subsistence basis (Molina et al. 1997).

In the 1990's products other than wood have attracted global attention. For example, Agenda 21 and the Forest Principles adopted at the United Nations Conference on Environment and Development (UNCED), the Earth Summit, held in Rio de Janeiro in 1992, identified non-wood forest products (NWFP) as important resources for achieving environmentally-sound and sustainable economic development. After UNCED, criteria and indicators of sustainable forestry were adopted during the Montreal Protocol and the Santiago Declaration in 1995. Criterion 6 of the Santiago Declaration specifically addresses the issue of the maintenance and enhancement of long-term multiple socio-economic benefits to meet the needs of societies. This includes both wood and non-wood forest products. Before the Earth Summit, the promotion of the use of NWFP was concentrated in tropical forest areas. The knowledge of NWFP has been transferred from generation to generation through oral traditions in most forest societies for millennia. This is still prevalent in most developing countries and especially among the estimated 15,000 indigenous peoples in the world

(Molina et al. 1997).

Today, millions of people worldwide depend on NWFP for their subsistence consumption and income needs (FAO 1995a). Some countries with temperate and boreal forests, particularly the Scandinavian countries, Australia, Japan, and to some extent the United States (Pacific Northwest region), also promote the utilization of NWFP. Moreover, interest in NWFP, at both governmental and non-governmental levels, has increased enormously since the Earth Summit. For example, international criteria and indicators of sustainable forestry require the measurement and analysis of trends in the values, production and consumption of NWFP (Journal of Forestry 1995).

In this paper, we use the terms non-wood forest products to refer to "all tangible goods of biological origin, other than wood of all forms, derived from forests or land under similar use" (Chandrasekharan 1995). This term has been adopted by the Food and Agriculture Organization (FAO 1995b) and the criteria and indicators of the Santiago Declaration, of which the U.S. is a participant. Forests in this definition include natural forests, managed forests, agro-forestry systems and plantations. Thus, NWFP are harvested from forest settings which are diverse in scale and composition and are traded in diverse markets.

In preparation for future studies on NWFP, we require an understanding of the information gaps and challenges of employing demand and supply analysis to demonstrate the economic benefits of NWFP on forest communities in the U.S. This paper summarizes some preliminary historical data for NWFP in the U.S. that will support the quantification of criteria and indicators of sustainable forestry, test the relationship

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between supply of NWFP and alternative sources of employment, and the relationship between demand for NWFP and income.

NWFP IN THE UNITED STATES

The NWFP industry is said to be a partial solution to the unemployment problem in rural America (Thomas and Schumann 1993). This is because the NWFP industry provides both seasonal and year-round employment and has become a significant contributor to local economies (Schlosser and Blamer 1995). The Montana huckleberry industry grew by 55 percent -- from \$980,000 in 1990 to \$1.53 million in 1996 (Jahrig et al. 1997).

According to Schlosser and Blatner (1999), most harvesters and processors of NWFP in the United States consist of urban and rural poor. For example, in the Pacific Northwest, most commercial harvesters are urban immigrants who derive or supplement their income from NWFP (Molina et al. 1997). Due to reduced federal timber harvests in the Pacific Northwest and the use of labor-saving technological innovations in the forest sector, growing numbers of ex-loggers are turning to harvesting NWFP from the wild, either as a source of employment or to supplement their incomes (Goldberg 1992). For example, in the state of Washington, many ex-loggers harvest wild mushrooms and berries.

The global increase in demand for NWFP not only benefits harvesters and producers, but also forest landowners (both public and private). Although leases and permits are used to control harvesting on public forest lands, they have now become a major source for a more even flow of supplemental revenues. For example, during the 1997 matsutake mushroom harvesting season, Winema and Deschutes National Forests received a total of more than \$345,439 for 4,358 permits (Winema National Forest 1997). Many private forest landowners also lease their forest land to NWFP harvesters and to hunters in order to enhance their incomes.

In the United States, the Pacific Northwest (PNW) region has generated more literature on NWFP than any other region in the country. The earliest works date back to the mid-1940s and early 1950s (Von Hagen et al. 1996). In 1989 the "floral green" industry alone generated an estimated revenue of \$128.5 million in sales and provided employment for more than 10,000 people in Washington, Oregon and Southern British Columbia (Schlosser et al. 1991). In Von Hagen et al. (1996), wild edible mushrooms such as the chanterelle (*Cantharellus spp.*) and the American matsutake (*Tricholoma magnivelare*) were identified as the species with high economic

importance. In the United States, wild edible mushroom harvests contributed approximately \$40 million to the economies of Oregon, Washington and Idaho in 1992 (Schlosser and Blamer 1995).

The U.S. South holds about two-fifths of the timberland in the United States and is often termed as the "wood basket" of the U.S. Given the size of the wood products industry in the southern economy, less attention has been paid to the NWFP in that region. Although literature on NWFP in the South is almost non-existent, some of the more valuable products are pine straw, mayhaw (edible hawthorn fruit used in jellies, butters, condiments, etc.) and ginseng.

Pine straw is used as mulch in residential, industrial landscaping projects particularly in the U. S. Southeast (Mills and Robertson 1991). It is a multi-million dollar industry and also a source of employment to thousands of people in North Carolina, Georgia, Florida and Louisiana (Morris et al. 1992). North Carolina has a \$50 million pine straw industry and Louisiana has a potential of developing a \$100 million pine straw industry (Forests & People 1993). Wild ginseng is also a multi-million dollar industry in the South. The harvesting of this product is regulated by the Fish and Wildlife Authority. Mayhaw is a cottage industry in Louisiana and Georgia.

The resurgence of interest in the traditional use of native plants or "back-to-nature" corresponds with increased awareness of the value of traditional healing methods. Recent studies have indicated that between 1959 and 1980, approximately 25 per cent of prescription drugs in the United States contained one or more active ingredients from 40 to 98 different plant species (Mater 1994; Farnsworth and Soejarto 1985). The total value of plant-based prescriptions in the United States was estimated to be \$3.2 billion in 1973. By 1980, it had increased to \$8 billion.

GLOBAL VALUES OF NWFP

The economic contributions of NWFP to households and communities in the tropics have been estimated for many years (Von Hagen et al. 1996). In India, Chopra (1993) estimated the value of NWFP from tropical deciduous forests to be US\$4034-6662 per hectare. Campbell (1994) estimated that 30% to 40% of the value of woodlands in Zimbabwe is derived from native plant foods from forests. NWFP also provide up to \$253 annually per family in the communities of Knuckles National Wilderness Area in Sri Lanka (Gunatilake et al. 1993). In most developing countries women and the elderly usually make up a large percentage of the harvesting population of NWFP, especially when the products are for subsistence and commercial purposes (Falconer 1990).

The United States exports mushrooms, floral

greens, and wild ginseng. Exports of wild edible mushroom species (Table 1) from Oregon, Washington, and Idaho comprise 43% to 100% of processed volume. Approximately 100% of matsutake mushrooms are exported, primarily to Japan.

Table 1. U.S. and international markets as a percentage of the volume of morels, chanterelles, matsutakes, and boletes mushrooms processed in Oregon, Washington, and Idaho.		
Type of mushroom	U.S. Domestic market (percent)	International Market (percent)
Morels	57	43
Chanterelles	30	70
Matsutake	—	100
Boletes	73	27

(Schlosser and Blatner 1995)

FUTURE CHALLENGES IN THE ECONOMIC ANALYSIS OF NWFP

The primary objective of conventional forest management in the U.S. has been to maximize sawtimber and pulpwood production. As a result, policy-makers often underestimate the economic value of forests by focusing solely on timber and timber products. Whereas the reflection of the value of timber and timber products in the market economy is well documented, the value of NWFP is a relatively unexplored area.

Even though NWFP play a major role in local and national markets, they are often not included in national accounts, which represent primarily exports of wood and wood products as sources of foreign exchange earnings (Lintu 1995). This is because most NWFP are often sold in informal markets which do not provide specific market signals regarding product prices and distribution. For example, many transactions in the NWFP industry in the Pacific Northwest are on a cash basis (Don Collins, personal communication).

In many cases, the primary value of non-wood forest products lies in their personal consumption value as food, medicine or other uses. A number of qualitative studies have been conducted in the tropics on the socio-economic benefits of NWFP (Chopra 1993). Few studies, however, have provided

rigorous empirical analysis of NWFP markets.

In order to conduct a more detailed quantitative analysis on the economic benefits of NWFP, we face several challenges. First, data on NWFP in the US are limited. Second, available data are scattered in individual, local or regional summaries of agriculture and forestry statistics. In most cases the data do not exist at all. Another challenge is the fact that there is no universal consensus on a definition of NWFP. One product may be included in one definition of NWFP, while excluded by other definitions. There are also regional differences in the harvesting and production of NWFP, which affect the characterization of different products.

The informal structure of the NWFP markets makes it difficult to gather data. Hence, there is a lack of relevant and reliable production and consumption data on most NWFP. One NWFP that has production and trade data available which can be used for an empirical economic analysis is wild American ginseng. This is because all dealers of ginseng (both wild and cultivated) report their harvest and sales quantities of export-oriented ginseng to the U.S. Fish and Wildlife Service through their state agencies. Proxies for prices of ginseng can be derived from international trade data and other estimates from domestic markets. Thus, wild American ginseng will be used as a case study in the ongoing analysis.

Contrary to reports that American ginseng was first discovered in New England in 1750 (Persons 1994), it is believed that Native Americans used ginseng long before the arrival of Europeans to North America (Duke 1989). In 1977, the U.S. Fish and Wildlife Service implemented regulations of the Convention on International Trade in Endangered Species (CITES) of Wild Fauna and Flora which identified ginseng as an endangered plant species (Persons 1994). These regulations required hunters, growers and dealers to be registered, to maintain records and to report all harvests, sales and shipment to the government. As a result, the U.S. government maintains historical data on the quantity of ginseng harvested that dates back to 1978.

One of the meanings of the Chinese characters for ginseng (Jen Shen) is "essence of man" (Evans 1985). This is because the ginseng root resembles the shape of a man. Based on Chinese philosophy, the ginseng root has been used as an aphrodisiac for over 4000 years (Duke 1989). The Genus name for ginseng is *Panax*, meaning cure-all or panacea. Hence, ginseng is used to treat ailments from impotency to weight loss.

Ginseng is one of the most valuable plants in the world. The highest quality wild American ginseng root has been priced as high as \$550 per pound in 1997

(Persons 1997). In 1992, the average price for wild ginseng root ranged from \$210 to \$350 per pound (Persons 1994). There are about twelve different ginseng species. Due to their perceived curative properties, the American ginseng (*Panax quinquefolium* L.) and the oriental ginseng (*Panax ginseng*) are the most valued ginseng species. American ginseng grows naturally in the eastern half of North America, in southern Canada and as far as Alabama in the U.S. South. Oriental ginseng is found in Northeast Asia. (Persons 1994).

Traditional supply-demand analysis requires time series data of consumption, production and other measurable variables related to the change in quantity and price of a product. Due to the informal markets of most NWFP, this type of data are difficult to find. Previous studies have suggested certain relationships that may exist between the consumption and production of NWFP and income and regional unemployment. This ongoing study will attempt to test these assumptions using data for wild American ginseng in the U.S.

SUMMARY

Even though NWFP have contributed tremendously to humankind for centuries they have only recently attracted attention in the forest resources sector. After the Earth Summit of 1992 in Rio de Janeiro, Brazil, there has been increased interest in these resources at all levels, especially among governments, researchers and universities. Different terminologies, non-wood forest products, non-timber forest products, minor forest products, to name a few, are used to describe forest products other than wood. Like the terminology, there is no universal consensus of what forest products other than wood should be included. In this study, the term non-wood forest products refers primarily to wild forest products.

The utilization of NWFP is no longer solely a Third World issue but a global one. NWFP will continue to play a major role in the daily lives of forest dwellers as a source of livelihood and will also serve for foreign exchange in some countries. As demand for NWFP increases, they will play a vital role in the sustainable management and production of forests in the United States into the 21st century.

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Preface

These are the proceedings of the 28th Annual Southern Forest Economics Workshop, held at the Williamsburg Hospitality House, Williamsburg, Virginia on March 25-28, 1998. The workshop was sponsored by the Economics of Forest Protection and Management Work Unit, Southern Research Station, USDA Forest Service and the Department of Forestry, North Carolina State University. Special thanks to our colleagues for helping make the meeting a success.

Over 90 attendees were treated to 60 presentations on topics from traditional timber supply modeling to time series analysis of timber prices. The papers are diverse, interesting, and represent both the cutting edge as well as the established techniques of forest economics. These proceedings are organized under major headings of certification, RPA for the South, timber supply, nontimber and nonmarket, timberland investment and risk, price analysis, international, agroforestry, regional economics, hardwood markets, and other issues in forestry.

Special thanks to our invited speakers Denise Ingram, Roger Sedjo and Brian Murray who presented papers on certification at our opening session and to Fred Kaiser, Peter Ince, Steverson Moffat and Bob Moulton who presented an update of the 1998 RPA Assessment process at our closing session. Thanks also to our session moderators Jeff Prestemon, David Newman, Brian Murray, David Wear, Jay Sullivan, Erin Sills, Subhrendu Pattanayak, Tom Holmes, Steve Bullard, Mark McDill, Stuart Moss, Fred Cabbage and Chris Zinkhan.

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