



Management issues for development of non-timber forest products

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Non-timber forest products have always been and continue to be an important element of the forest resource as a whole. However, until recently, insufficient attention has been devoted to ensuring their sustainable management and use. This article examines some of the issues related to sustained development of non-timber forest products within the context of overall forest management.

The task of forest managers is to maintain or increase the productivity of forest resources while protecting them from overexploitation, with the aim of providing essential products and services and simultaneously allowing for the needs of rural people. With regard to non-timber forest products, the challenge therefore becomes one of assisting "development" while at the same time promoting the continued and even increased utilization of these products on a sustainable basis.

Ironically, in some cases increased understanding about non-timber forest products has been directly linked to a process that resulted in their destruction. As cultures and communities move toward a market economy, the subsistence use of non-timber forest products tends to decrease; unfortunately, this decrease has generally not been paralleled by an increase in the management of selected non-timber products as a part of the development process. As a result, traditional knowledge about these products can be lost. Far too frequently the true value of non-timber forest products to the community and the nation is only understood (at least at the national level) when the sources of supply have disappeared, through either lack of appropriate management or narrow-vision development.

For example, the changing domestic utilization of non-timber forest products by the Mbeere of Kenya has been documented by Riley and Brokensha (1988). From a relatively neglected and isolated population in the 1920s, the Mbeere have been thrust into a modern Kenya. Field studies conducted over a 15-year period have shown a dramatic change in both the incidence and uses of some 465 plants. In the face of rapid population growth and parallel increases in land pressure, a number of species that could be useful to the present population either have disappeared or are no longer readily available. The change from communal to individual land tenure with new values brought about by modernization has also been an influential factor (Brokensha and Riley, 1986).

In another example, prior to European contact the Alyawara aborigines of central Australia survived by hunting and gathering; their highly variable pattern of movement depended on the distribution of food and water, a pattern determined by the climate and a knowledge of the

ecology of both flora and fauna. However, during the past half-century the Alyawara have been increasingly drawn into semi-permanent settlements with European-style supplies and food, although 70 percent of their meat still comes from hunting.

Non-timber forest products defined

In the present context, non-timber forest products are defined as all the biological material (other than industrial roundwood and derived sawn timber, wood chips, wood-based panels and pulp) that may be extracted from natural ecosystems, managed plantations, etc., and be utilized within the household, be marketed, or have social, cultural or religious significance. Thus, non-timber forest products include plants used for food, forage, fuel, medicine, fibres, biochemicals, etc.; as well as animals, birds, reptiles, fish, insects, etc. for food, fur, feathers, etc. The use of the ecosystems for recreation, nature reserves, catchment management, etc., is regarded as forest services.

[In many developing countries, government accounting does not consider production of non-timber forest products, including fuelwood](#)

Policy reorientation

The examples presented above are not intended to suggest that the exclusion of forest-dwelling peoples from the development process would be desirable; rather they point up the fact that in many cases the potential negative effects of "development" on the use of non-timber forest products were simply not considered. Therefore, the first step toward improved management of non-timber forest products is policy reorientation (adapted from de Beer and McDermott, 1989). For the most part, non-timber forest products constitute a neglected resource; this neglect must cease. In the formulation of land-use and forest policies and the evaluation of development projects, the impact on non-timber forest product resources and their potential role in the rural and wider economy should be considered routinely and without exception. This will require changes to ensure that non-timber as well as timber assets of forest land are valued, conserved and developed.

Another fundamental constraint on the sustained development of non-timber forest resources is a lack of knowledge about the resources themselves and the demand for and value of their products. Ideally, the compilation of a sound management plan requires a knowledge of the complete life cycle of the species concerned and their interaction with other species, as well as an understanding of their present roles and future potential in community development. Unfortunately, little or nothing is known about the interrelationship between the majority of non-timber forest species and their surrounding environment. The essential qualitative and quantitative information required for estimating present and future productivity as well as demand is often unavailable. Nutritional values for most wild foods (both plant and animal) and the active principles for the majority of medicinal plants are noticeably lacking. The need for an international data base pooling available knowledge and plans for expansion of this base have been discussed by Lucas and Wickens (1988).

[In a study, Kayapo Indians of Brazil cited uses for more than 98 percent of a sample of 120 species of woody vegetation](#)

Increased research on non-timber forest products

Therefore, increased research on non-timber forest products - their abundance, distribution, variation, ecology, reproductive biology; traditional and new methods of propagation, cultivation and use; identification of market and non-market value; etc. - is essential. Because the nature, use and importance of non-timber forest products are so closely related to local ecological, economic and socio-cultural conditions, most research will need to be location-specific. Case-studies should demonstrate how non-timber forest products are used, the

extent of these uses and how they are changing. They should identify who uses non-timber forest products and which groups are most dependent on them for their subsistence and income-generation benefits. The potential of new products should also be considered. To be effective, this research must be interdisciplinary, long-term and participatory.

An understanding of market and non-market values is also essential. Unfortunately, there is often no commercial yardstick for measuring the value of many of the non-timber forest products used in the domestic economy of a rural community, especially those of the developing countries. For example, in the Sudan the government accountancy does not credit the Forests Department with the production of non-timber forest products, whereas fuelwood is used by 75 percent of the population and accounts for 82 percent of the Sudan's total energy consumption (Badi *et al.*, 1989).

The existing research, although limited, is sufficient to indicate the wide variation in use and management associated with non-timber forest products. At one extreme, natural resources already may be managed and maintained on a sustainable basis by the community. For example, the so-called "primitive" forest-dwelling communities of Amazonia exhibit a high degree of sophistication in the utilization and conservation of local non-timber forest products. The Kayapo Amerindians from Gorotire village in southern Para State, Brazil, cited uses for over 98 percent of a sample of 120 species collected from clumps of woody vegetation (*apete*) within the local scrub savannah (*campo cerrado*). Furthermore, suitable planting media are prepared by the Kayapo from litter, termite and ant nests, and these are brought to the *apete* and selected useful wild species planted therein. Some desirable species may even be brought from considerable distances (Anderson and Posey, 1989).

Similarly, the swidden cultivation of the Ka'apor Amerindians is cropped and abandoned in such a manner as to create a succession of diverse habitats for the maintenance of both flora and fauna. The secondary forest is being manipulated for the sustainable production of non-timber forest products by use of vegetation zones in different stages of recovery (Balée and Gély, 1989). In these two cases, the management challenge is to that these sustainable systems continue to survive as the communities are exposed to the outside world.

On the other hand, not all communities that depend significantly on non-timber forest products manage these products for sustainable yields. For instance, although the inhabitants of Toconce, a high-altitude, treeless, semi-desert community in the Andean foothills of northern Chile, have assigned uses to 98 percent of the 134 wild native species found in the area (Aldunate *et al.*, 1981), there is considerable overexploitation. For example, the shrubby herbs that are gathered for fuel and herbal medicines are simply pulled up by the roots, even though these are often discarded later. In this case, there is a clear need for the introduction of more sustainable management practices.

Even where non-timber forest products are used efficiently, however, population growth will eventually create a need for improved productivity and management practices.

Improved productivity

The production of non-timber forest products can be improved either by increasing the populations of desirable species or by improving the yield of the species. Within the natural forest, increased populations can be produced by ensuring the micro-environmental requirements of the desired species, perhaps by the removal of competing species in a given area, by provision of extra light or shade, or by the use of prescribed burning as demonstrated by the Alyawara aborigines (O'Connell *et al.*, 1983). Productivity may also be improved by selection or breeding; the latter method will not be considered here, as it enters that grey area between natural non-timber forest products and the cultivated crop. Selection involves the provision of seeds, cuttings or bud graftings from wild trees with desirable phenotypes. In the

Sudan, for example, seed from select trees are used for increased gum arabic production from *Acacia senegal*.

Improved harvesting and transport of non-timber forest resources would increase their value

In southern Nigeria successful grafting and budding techniques have been developed for the propagation and improvement of wild fruit trees, for use within the forest or surrounding farmland. Not only do the cultivated, protected and wild tree species provide cheap, high-quality dietary supplements (often during a period when many of the staple agricultural crops are unavailable or in short supply), many have multipurpose functions too, including erosion control, improvement and maintenance of soil fertility and provision of poles, timber, fuel, fibres, herbal medicines, dyes, etc. (see article by Okafor; also Okafor, 1977, 1980).

It must be appreciated, however, that the climate, soils and habitat conditions impose a finite natural productivity. Although this can often be increased somewhat through good management practices, there nevertheless remains a limit to the size of the population that can utilize any increased productivity without depleting the resource.

Improved harvesting, storage, transport, processing, manufacturing and marketing

Any steps that improve the efficiency of utilization of non-timber forest products will increase the value of existing resources. Less wastage in the process of extraction and better regeneration of many non-timber forest products can be achieved by the development and application of improved harvesting techniques, equipment, training and skills. Improved storage and transport methods would result in less spoilage of raw and finished products. Producers of non-timber forest products, in particular small-scale operators, would receive greater returns from marketing their products if they were assisted in achieving consistent quality and protected from exploitation by intermediaries.

A note of caution is merited at this point. An acceleration of the production and marketing of non-timber forest products will not necessarily produce benefits for rural people, particularly the disadvantaged, who tend to depend most heavily on these resources. To ensure that they will, provision must be made for measures to control exploitation and to increase the sustainable productivity of non-timber forest resources.

Improvement of natural forest management

Where overexploitation is a current or potential problem, improved management of non-timber forest product resources in their natural habitat is essential. The surest way to maintain these resources is through the integration of their management with other forest uses. This represents not only an opportunity but almost a necessity if their full economic potential is to be realized.

Integration of management of non-timber forest products with timber management can provide local benefits and make economically feasible a slower and therefore more environmentally sustainable rate of timber extraction. This concept is advanced by Caldecott (1988) in his proposal for a review of forest policy in Sarawak. He argues for management prescriptions that would specify deliberate interventions to increase non-timber product yields, including longer felling cycles and lower harvesting intensity for timber production. The lower yields from the timber harvest would be offset by non-timber forest product revenues on a continuous basis. Furthermore, this would yield the benefits of greater ecological stability inherent in less-intensive timber extraction.

The long-term effects of such a management regime need to be carefully assessed. Ecological processes are never static and any management intervention in an ecosystem will impose stresses. Thus, any action taken to ensure the sustained production of a particular forest product will inevitably affect other biotas. A balanced approach that provides maximum benefit with the minimum of disturbance to the components of the ecosystem is required.

Domestication of forest species

For non-timber forest products for which there is a strong commercial demand, cultivation or rearing of the wild species provides a sure way of relieving pressure on natural forest stocks. At the same time it can provide income and employment in rural areas, thereby improving rural welfare and discouraging migration to urban centres. The use of indigenous rather than exotic species as cash crops may bring with it the advantages of genetic conservation and ecological stability, as well as cultural familiarity and value. Cultivation of non-timber forest products can take several forms, including commercial plantations; small-holder cultivation (fallow farming, home gardens, etc.); and enrichment planting in forest areas. In all cases, the impact on rural populations must be carefully considered.

Improvement of allocation of control over forest resources

Vesting the ownership, or management control, of forests in the communities that inhabit or surround them would renew the incentive for conservation and sustainable management of the resource - once present but now often weakened by insecurity of tenure and external threats to the resource base. This local control is also justifiable on an ethical basis. As the Bruntland report recommends, "the starting point for a just and humane policy for such [traditional] groups is the recognition and protection of their traditional rights to land and the other resources that sustain their way of life..." (World Commission on Environment and Development, 1987). The design of appropriate management systems, vesting control in forest authorities, private concessionaires, individual holders or communities, must be based on research of local conditions in every case. This is best achieved when local communities are involved as participants in the design process, rather than merely as objects of study.

Conclusion

Owing to the varied factors involved, there is no single solution to the management requirements for non-timber forest products. The situation is summarized by Poore (1989): "The management of its natural resources is the responsibility of each nation. Each nation will look upon these resources in the total context of its economic and social development - the present relation between resources and population, the present standard of living and distribution of wealth, predictions about trends in all of these, and national social and economic objectives. Each nation needs to work out a balance for the conservation and use of its tropical forest lands that is acceptable in this context. There can therefore clearly be no one answer to the question of balance which is valid for all times and all nations; nor is there a single path to reach that balance."

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