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# Application of traditional knowledge in forest management: Ethnobotanical indicators of sustainable forest use

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ABSTRACT

Forest management has been usefully defined in terms of production, utilization and distribution of products, and the institutional or organizational arrangements by which they are carried out. Both technical and social aspects of forest management are treated as parts of a single system. Traditional knowledge of the use and management of forests still has a vital role to play in forest management today. This is because traditional practices are believed to be often favourable towards conservation and sustainable use. It is therefore valuable to establish a framework to evaluate the contribution of traditional knowledge to forest management today. Accordingly, a framework, based on ethnobotanical information, is proposed in this paper, with quantitative and qualitative indicators suggested for different variables relating to traditional knowledge. The discussion is based on ethnobotanical case studies from Yunnan and other provinces of China in which we have been working.



## 1. Introduction

Forests not only provide local people with food, medicine and livelihoods, but also contribute to the maintenance of indigenous culture (Kareiva, 1994; Baird and Dearden, 2003). All over the world, societies with long-established relationships with forests have accumulated much knowledge about how to use them on a sustainable basis. The economic value of forests to local people can be very high—for example, the value of non-timber forest products collected from tropical rainforest near Iquitos, Peru is greater than that of the timber (Peters et al., 1989). Traditional knowledge of forest conservation and sustainable use is attracting increasing attention from policy-makers and scientists (Salick et al., 1995; Gould et al., 1998; Ros-Tonen, 2000; Dhillion and Gustad, 2004). Indigenous people and their knowledge about nature have assumed major importance in modern conservation practice including in relation to protected areas (Gunatilleke et al., 1993; Anderson and Putz, 2002; Rist et al., 2008). Simply stated, forests are often distributed around and maintained by indigenous communities, who know how to maintain them in a healthy condition.

Forest management has been usefully defined in terms of production, utilization and distribution of products, and the institutional and organizational arrangements through which these processes are carried out; both technical and social aspects of forest management are treated as part of a single system (Fisher, 1989). On the technical side, forest management covers harvesting, distribution, protection and regeneration (Tamang, 1990). On the social side, the traditional knowledge of local people forms a fundamental element of most forest management systems in developing countries. This traditional knowledge is, therefore, of great relevance not only to the cultural future of local societies, but also to scientists and planners striving to improve local livelihoods.

This paper describes an analytical framework and some suggested indicators for evaluating the status of forest utilization and conservation. It is based on ethnobotanical field studies carried out over recent years in China and some other Asian countries. Our objective here is not to provide definitive conclusion, but rather to stimulate discussion which will eventually result in an improved framework and reliable quantitative indicators.

## 2. Scientific understanding of traditional knowledge

The World Conference on Sciences (WCS) organized by UNESCO in cooperation with ICSU was convened in Budapest, Hungary in 1999 to discuss the role of science and sustainable development. At this meeting 'traditional knowledge' was defined as: 'a cumulative body of knowledge, know-how, practices and representations maintained and developed by people with extended histories of

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interaction with the natural environment. These sophisticated sets of understandings, interpretations and meanings are part and parcel of a cultural complex that encompasses language, naming and classification systems, resource practices, rituals, spirituality and world-views' (ICSU, 2002). The Convention on Biological Diversity defines traditional knowledge as the: 'knowledge, innovations and practices of indigenous and local communities deriving from customary uses of biological resources and associated cultural practices and traditions; traditional knowledge is a body of knowledge and beliefs transmitted through oral traditions and first hand, observations about the local environment, and as a system of self management that governs resource use, and plays important role in sustainable development of the world today'.

Today, sustainable management of forests is a critical global issue, as global forest resources continue to decline, and global climate change accelerates. Rural poverty remains a big issue in many developing countries. At the same time, traditional knowledge about forest management is disappearing rapidly in many parts of the world. Understanding, recognizing, respecting and protecting traditional knowledge is urgently needed to save the world's forests, the environmental services that these forests provide and the people of this planet.

## 3. Ethnobotanical indicators of sustainable forest use

Ethnobotany is the scientific field concerned with studying human interactions with plants and their habitats, often with an emphasis on traditional use and with the management of plants viewed from an historical perspective. Forest ethnobotany, which has been a central theme in the field of ethnobotany, involves the investigation, documentation and quantitative assessment of traditional knowledge and practices relating to forest use and management. Based on many years' ethnobotanical studies in forested areas of Yunnan Province (China) and in some southeast Asian and other Himalayan countries (Pei, 2002, 1996a,b, 1995; Pei et al., 1993), we can affirm that sustainable use of forests and plant resources can be measured and monitored by ethnobotanical methods and approaches. We contend that it is possible to establish monitoring systems concerned with the sustainable use and management of forests within local communities based on traditional knowledge.

### 3.1. Evaluation framework for assessing sustainable use of forests based on ethnobotanical information

Based on many years research on forest resource management in different parts of China with various ethnic groups, we have found that all well-maintained forests are located in places which receive fewer impacts from outside—that is to say, the better the traditional lifestyle is maintained, the better the forest is protected (Pei, 1996a,b; Liu et al., 2000a; Xu, 2003; Pei and Huai, 2007). We contend that indicators of the likely sustainability of forest use can be developed based on ethnobotanical data and that these indicators will be useful for predicting the future and for management purposes. The indicators are related to the evaluation framework shown in Fig. 1.

The framework has five variables, each with a bearing on sustainable use. Trends in these variables over time will indicate the status of forest management. Although each of these variables is itself under complex, influences, it is postulated that it should be possible to develop this framework and establish indicators that will be practically useful for predicting the future state of a forest.

*Variable 1*: Traditional forest-related knowledge. If forest management is under a traditional knowledge system then (it is suggested) this will be helpful for sustainable use and management of the forest. If traditional knowledge on forest use shows a declining trend, and then this will produce a negative impact on the forest system.

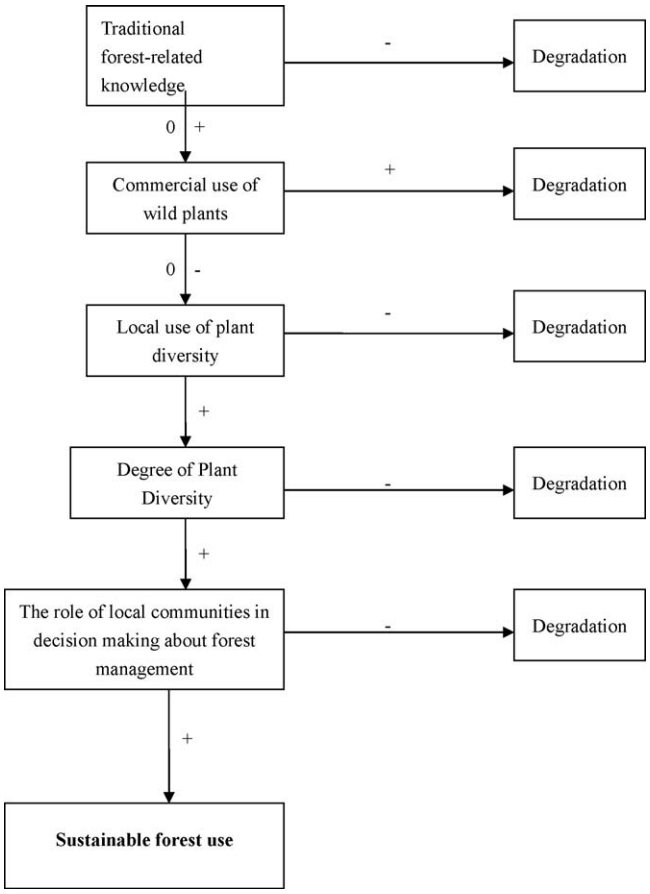


**Fig. 1.** Evaluation framework for sustainable use of forests based on ethnobotanical information. *Note:* + stands for the indicators increasing during a certain period, 0 stands for stable, and – stands for decreasing.

*Variable 2*: Commercial use of wild plants. Much research has shown that, when a forest plant has a high commercial value, then uncontrolled over-harvesting appears. So, if commercial use of wild plants in a forest is increasing, then the forest resource will be threatened and the forest degraded.

*Variable 3*: Local use of plant diversity. When local people use a diversity of plants from diverse habitats, then the pressure on any particular type of wild plant in any particular habitat will be reduced. This will help to maintain forest systems generally in a good condition, being good for species diversity as a whole. Although some species may suffer, overall this situation will produce more positive than negative impacts on the sustainability of forests.

*Variable 4*: Degree of plant diversity. A high level of plant diversity in a forest area provides more opportunities and options to local people for food, fodder, fuel, construction material, herbal medicine and non-timber forest products, which can not only reduce harvesting pressures on a more restricted number of species but also can help protection of forest being recognized as a useful ecosystem overall in local perceptions.

*Variable 5*: The role of local communities in decision-making about forest management. If local communities have a greater participation in decision-making regarding forest management, then this will benefit sustainable forest management, given that these are the people with the greatest interest in its long-term future.