Chapter II

Literature Review

2.1 Definition of non-timber forest products (NTFPs)

There are different views about the definition of non-timber forest products (NTFPs) or non-wood forest products (NWFPs) around the world. According to He Pikun (2001), the FAO defined that all renewable products produced in the forest or on any land with similar functions (excluding timber, fuel wood, charcoal, stone materials, water and tourism resources) are considered to be NTFPs or NWFPs. However, Rijsoort (2001) states that in most cases, people would refer to "all biological materials other than industrial timber, that are (or can be) harvested from forests for human use. This includes all kind of plants and animals (and products therefore) used for subsistence and/or commercial purposes, including fuelwood and wood used for construction, agricultural tools, household items, canoes, etc. Sometimes it even includes services like eco-tourism and grazing". For this study, we focus on NTFPs collected from natural forests such as wild vegetables, mushrooms, bamboo, rattan, fuelwood, fodder, insects and their products as well.

2.2 Significant roles of NTFPs

Traditionally, NTFPs were viewed to be of less economic and ecological important and government policies and activities were focused mainly on timber. The

neglect of the benefits from NTFPs can result in unsustainable paths for timber extraction or to the conservation of forestland to alternative land uses.

Greater attention is now being paid to the importance and value of NTFPs. Many studies have contended that the real potential of NTFPs is substantial. A study in Amazon forest, however, indicated that economic value of NTFPs was in fact bigger than that of the timber in the long run (Peters *et al.*, 1989; Bann, 1998). Other studies have shown that NTFP are important sources of fuelwood, building materials, fodder, food and income to the rural people. As in Thailand and China, it has been shown that NTFPs are important not only to the rural but also to the national income (FAO, 1996).

The importance of NTFPs lies in the huge number of people involved in gathering, hunting, processing, trading and other aspects of their production and use (Arnold, 1995). The FAO (1996) emphasizes that NTFPs have great significance for communities in all parts of the world, including mountain areas, because of their uses for subsistence e.g. food and nutrition, medicine, construction materials, and household and cultural uses. NTFPs contribute to self-sufficiency and has generally remained more important for upland areas, which are isolated from mainstream market economies, than for lowland areas. Most rural and upland households rely on NTFPs for their essential food, nutrition, medicine, fodder, fuelwood, and mulch.

The reason that NTFPs are widely used by the forest people, as indicated by de Beer and McDermott (1989), is the fact that NTFPs are free- an important consideration to persons engaged primarily in subsistence farming with limited cash

for purchasing. This is more so in the more remote areas where the purchased goods tends to be expensive. Poor households depend on NTFPs because these people usually have easier access to the forest than to other resources, such as markets.

Yet, among the different economic strategies, the purpose for NTFPs use is not the same. For those who have enough crop output to cover their consumption needs, NTFPs are harvested mainly to meet home needs in medicines, rattan and bamboo tools or building materials. For the others, however, NTFPs use is crucial for generating income to meet daily food needs. This was supported in some cases where people have had relatively unrestricted access to forests, forest foods and forest products income are often particularly important for poorer groups within the community (Ogle, 1996). In other case, Gunatilake *et al.* (1993) pointed out that the poor usually derive a greater share of their overall needs from forest products. Moreover, the need for income from forest products can result in the diversion of supplies from poorer household consumption to the market. A recent village study in Vietnam, for instance, found that NTFPs like vegetables, bamboo shoots and mushrooms, that were consumed by wealthier households, were sold by poorer households in order to be able to purchase rice (Yen, *et al.*, 1994).

2.2.1 NTFPs and food security

Forest products play a crucial role in providing food security. Forests foods include fruits, leaves, seeds and nuts, tubers and roots, fungi, gum, honey and wildlife. The concept of food security, as defined by Arnold (1995), in developing countries encompasses all factors affecting a household's access to an adequate year round

supply of food. Thus, it is concerned not just with the household's production of food crops, but with the availability of income to the household with which to purchase food, where this is necessary. Thus, in examining the households use of NTFP, we therefore need to identify its effectiveness in both gathered foods that contribute to food self-sufficiency, and saleable products that could supplement income needed to purchase food.

FAO (1995b) pointed out that forest product including fruits, leaves, seeds and nuts, tubers and roots, fungi, gum, honey and sap, and forest wildlife is an important source of food. These foods often provide essential vitamins, minerals, carbohydrates and protein. Besides direct nutritional contributions, they lend variety and taste to a diet and can be particularly important for children's diets. Poor and landless people often depend more heavily on forest foods than other groups. Recent studies on NTFPs have indicated that rural communities are reliant upon NTFPs for their daily subsistence. In Northern Thailand, Boonchote & Pasandhanatorn (1998) found that about 80% of households collected various kinds of NTFPs. A study of Jintana *et al.* (2001) found that over 80% of households collected bamboo shoots, wild vegetables and bamboo culms, 50-90% collected insects and 100% of households collected fuelwood.

In Lao, it is also reported that NTFPs from forest play an extremely important role for the existence of the Lao population. It is especially important in providing a "food net" and shelter for 80% of the Lao population (Joost & Sounthone, 2000).

Forest foods are most extensively used to help meet dietary shortfalls during particular seasons in the year. This is supported by Byron & Arnold (1997) who state that many agricultural communities suffer from seasonal food shortages, which commonly occur at the time of the year when stored food supplies have dwindled and the harvesting of new crops have only just begun. Forest products are also valued during the peak agricultural labor period when less time is available for cooking and people consume more snack foods. It is especially important as a source of foods during emergency periods such as floods, famines, drought and wars. Often this food resource differs from resources exploited in other periods. In famine periods, roots, tubers, rhizomes and nuts are most sought after. They are characteristically energy rich, but often require lengthy processing.

Firewood collected from the forest is the only source of fuel for cooking for the forest dwellers. It is essential to nutrition and disease prevention, as cooking is necessary to make many foods digestible, to kill pathogenic microorganisms and to remove parasites. Jintana *et al.* (2001) have found that a 100% of households in Nan watershed of Thailand. And 87% of households in Kandy, Sri Lanka collected fuelwood (Bogahawatte, 1999). Similarly in Vietnam, one of the most important NTFPs for daily life of the mountainous people is fuelwood. Mai (1999) found that 100% households of the M'Nong in Dak Lak district collected fuelwood from forest for home consumption and it has been considered as the only fuel source in the region. It is the same with the people living around the Buffer zone of Bach Ma (Lan and Ziegler, 2002).

NTFPs from the forest not only play an important role in providing food and fuelwood to people, it also provides various kinds of medicinal plants. According to FAO (1999) medicinal plants constitute one of the most important groups of wild plants in terms of their contribution to the economy and well-being of farm households.

It has been estimated by the World Health Organization that 80% of the developing world's population meets its primary health care needs through traditional medicines. In China for example, about 1000 million people, both urban and rural, depend largely on plant-based medicines. And about 800 million people in South Asia rely on herbal medicines (FAO, 1999).

Very large number of people are using many kinds of medicinal plants but the number of species frequently used are different within each community. For example, about 81 species of medicinal plants were used in a community in Xiaruo Township in China (Jinfeng *et al.*, 2001). While more than 400 species were collected and used by the local people who live in Daweishan area (Sihui, 2001).

Medicinal plants collected from the wild are regarded as the main source of traditional drugs used by forest peoples. For ages, "oriental" traditional health care has developed hand in hand with the development of Western conventional medicine from the traditional medical knowledge of the Chinese and the Vietnamese people, and there is also the traditional medical knowledge of uplands using only medicinal plants. According to Chu (2001), most medicinal plants used in Vietnam are collected from forests. For example, the ethnic minority groups like Muong and Tay

rely much on medicinal plants from forest as traditional remedies. A study by Miller (2001) states that all Tay women still follow a number of traditional practices after they give birth (e.g. the mother will drink a boiled mixture medicines for at least a month, which the baby will also be bathed in) as they believe that it is very important for the health of the baby and their own health as well. The reason for continuing to follow traditional practices is because they find no alternatives in modern medicine to the traditional plant remedies and practices.

In Thailand, medicinal plants are also widely used by the Karen, the largest ethnic highlander group in Thailand. The plants are used for the treatment of minor ailments and symptoms. It is also used for cosmetic purposes (Nawichai, 1999). In general, it was estimated that about 30 to 40% of the Thai population rely on traditional remedies rather modern health services (FAO, 1998).

2.2.2 NTFPs and income generation

NTFPs are not only collected for consumption but also for market exchange. Many studies have shown the importance of NTFPs in rural economies. A study in Sri Lanka by Gunatilake (1991) found that the annual income derived from NTFPs by those living in the periphery of Sinharaja National Heritage wilderness area amounted to US$13 per ha. Communities living in the Peak Wilderness Sanctuary derived up to 53% of their income from NTFPs or up to 58%, if subsistence products are taken into account (Wickremasinghe, 1993). NTFPs play a greater role in low-income families, accounting up to 31% of their total income (Gunatilake, 1991) . Thus, dependence on income from NTFPs has been shown to be inversely related to

family income in dry-land India (Jodha, 1990), and Sri Lanka (Gunatilake *et al.*, 1993)

Similar percentages are also observed in Lao, China, and Vietnam. For villagers who live near forest areas in Lao, NTFPs were found to provide on the average 55% of a family's cash income (Joost & Sounthone, 2001). In the Shirong village of China, the investigation on the income of the locals done by Jinfeng *et al.* (2001) found that income from NTFPs is 65% of the family cash income. Finally, in Vietnam, a study of Phuc (2001) on the livelihood of the Dao community in Northern Vietnam found that NTFPs contribute to more than 60% of household income on the average.

2.2.3 Seasonal importance of NTFPs

Poor people often live precariously, with no cushion against adversity. Forest and tree stocks have an important role as a reserve or safety net, providing both subsistence and income in times of crop failures, shortfalls, unemployment or other emergencies, hardships, or exceptional needs. Forest foods are most extensively used to help meet dietary shortfalls during particular seasons in the year. Energy-rich forest foods such as roots, tubers, rhizomes and nuts are especially important in emergencies such as floods, famines, droughts and wars.

For rural Laotians, the forest provides a variety of products necessary for the survival of household members. It was suggested that nearly all rural residents use the forest like a welfare subsidy during difficult crop years when drought, insects, or

flooding destroy crops, the forest provides a "safety net", providing food and income in time of economic insecurity (Ireson, 1995).

Similarly, Arnold and Manuel (1998), have pointed out that NTFPs are generally most extensively used to supplement household income during particular seasons in the year and to help meet dietary shortfalls. For example, during the transition period of food shortages, the consumption of forest foods increases. Similarly, they have also pointed out that income-earning activities based on marketable forest products may be seasonal or year-round, or may be occasional when supplementary cash income is needed. Season may reflect availability, needs for additional cash at particular points in the annual cycle. Thus, the importance of forest foods and income often lies more in its timing than in its magnitude as a share of total household inputs. NTFPs are also widely important as a subsistence and economic buffer in hard times (FAO, 1995a; de Beer and Mcdermott, 1989).

Income from forest products seldom appears to account for a large share of a household's total income. But it is often important in filling seasonal or other cash flow gaps, and in helping to cope with particular expenses or to respond to unusual opportunities. In Western Neiger, it was found that income from forest products from the commons rose as a share of household income from 2% in the harvest season to 9% in the hot and rainy seasons and 11% in the cold season. Cash income from these sources was sufficient to purchase between 9 and 28% of a household's annual caloric needs (Hopkins *et al.*, 1994). This can be explained by the seasonal species occurrence in study of Aidong (2001) in China. His study found that fewer species

are appearing in the dry season (39 species, occupying 40% of the total), compared to the wet season (58 species or more, 60% of the total). This is also the case given by him in other communes that in the dry season, 27 species (37% of the total) are appearing, in the wet season 45 species (63% of the total).

2.2.4 Women and NTFPs

In many societies, women are often the major collectors of fodder and fuelwood, and they seek out fruits and nuts to provide food for their families. In addition, they use bark, roots and herbs for medicines. A woman's gathering activities are very important to household income and nutrition. The collected products are important supplements to the family diet. Much of what people gather is processed or marketed, bringing in supplementary cash income. During periods of famine and shortage, women gather buffer foods, which would not be consumed under circumstances of less duress but can be crucial to family survival during a crisis. Beyond the immediate benefits of food and medicinal plants that are consumed by the family or sold on the market, easy access to forest products, particularly fuelwood, gives women time for other activities.

The results of a study carried out in West Bengal (Ford Foundation, 1998) found that NTFPs account for 20% of household income. Seventy-one species of plants were collected exclusively by women while men collected 23% species. Women were mainly responsible for the manufacturing of plates made from leaves and for about 75% of the marketing of mushrooms, fruits, flowers, and liquor.

A study by Nawichai (1998) on forest utilization by Karen women in Nothern Thailand shows that the main groups include food, fodder, dye, medicine, and fuelwood were utilized more by women than men. It was similar to the case in Vietnam, where the collection of natural products varied by gender. Women and men use different natural products to generate their share of their families' livelihood. Ireson and Ireson (1996) state that women gather a greater varieties of natural products and appear to spend much more time in gathering products than men and they are likely to collect plant products while men are more likely to harvest timber, hunt or trap animals.

In India, NTFPs activities are predominantly undertaken by women, children, and the poorest or the most marginal of rural people. For women, however, these NTFPs are a top priority because of their contribution to ensuring family survival and well being (Wickramashinghe, 1992; cited in Nawichai, 1999).

A study in Western Neiger by Hopkins *et al.* (1994) also pointed out that income from forest products can be more important to women than to men. For example, income from products of the commons was found to represent 27% of women's local non-farm income, as compared with 10% for men.

The same phenomenon is reported in Vietnam. In Tam Dao, Vinh Phu province. For example, women collect a greater number of different products for household eating and use than men do. The study moreover, reveals that most NTFPs-related activities are closely related to women, especially in leisure time in

January - March, June - July, November - December, about one third of their time spent for NTFP-related activities (Lam, 2002).

2.3 Economic valuation and the value of NTFPs

As mentioned above, many studies have demonstrated that the economic value of NTFPs is indeed significant and that it is more significant for the rural people of the forest and its surrounds forest resources. The neglect of true value of NTFPs can result in unsustainable timber extraction or the conversion of forest land to alternative and degraded land uses, since the options appear more attractive initially (Bann, 1998). Wollenberg and Nawir (1998) believed that estimating the incomes of people whose livelihoods depend on forests is key to understanding their well-being and use of the forest. Other studies considered income as an important indicator of a forest villager's well-being. These studies pointed out that an analysis of the forest-based portion of villagers income can provide insights about peoples' resource management and livelihood strategies (Falconer and Arnold, 1989; Anderson, 1992).

According to Turner *et al.* (1993), economic valuation is a method to evaluate the value of forests. Total economic value comprises three main types of values: direct use values, indirect use values, and non-use values. Economic evaluation of forest resources can be evaluated by using direct method and indirect method. For forest production, available products in the market can be evaluated by obtaining market prices of the products or market prices of substitution products. Bann (1998) described that the possible techniques for valuing NTFPs using market

price, direct and indirect substitute, barter exchange, and opportunity cost of labor approaches. However, in estimating the value or income from NTFPs, it is necessary to define what kind of income it is (Wollenberg and Nawir, 1998). As the income can be referring to gross income (revenues less cash costs) or net income (revenues less cash imputed costs such as depreciation or the opportunity costs of inputs). Several methods for estimating levels of income like small sample size; a limited number of products; or recall interviews, estimates or written records rather than direct observation also have been described by Wollenberg and Nawir.