

## **CHAPTER II**

### **LITERATURE REVIEW**

#### **2.1 The Significance of Non-Timber Forest Products (NTFPs)**

Non-timber forest products (NTFPs) or non-wood forest products (NWFPs) include market or subsistence goods and services for human or industrial consumption derived from non-wood renewable forest resources and biomass for augmenting rural villager's incomes and employment. These products include plants used for food, beverages, forage, fuel, and medicine; animals, birds, and fish for food, fur, and feathers, and their products, such as honey, lac, and silk (FAO 1991). Wild plants make a significant contribution to the nutritional quality of peoples' diet, adding minerals, vitamins, and diversity (FAO, 1989).

FAO (1996a) emphasised that NWFPs has great significance for communities in all parts of the world, including mountain areas, because of their uses for subsistence *i.e.* food and nutrition, medicine, construction materials, and household and cultural uses. NWFPs contribution to self-sufficiency 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 NWFPs for their essential food, nutrition, medicine, fodder, fuelwood, and mulch. Poor households depend on NWFPs because these people usually have easier access to the forest than to other resources such as markets.

Forest foods include fruits, leaves, seeds and nuts, tubers, roots, fungi, gum, honey, and sap. Forest wildlife is also an important source of food. These foods often provide essential vitamins, minerals, carbohydrates, and proteins. Besides direct nutritional contributions, they offer a 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 (FAO, 1996a).

In Lushoto, Tanzania, wild leaves are used in 81% of the relishes prepared to accompany the staple porridge. Wild greens provide cash income including uses for food, fodder, agricultural crop protection, for and other miscellaneous activities. The most important food trees for human are *Parkia* sp. and *Prosopis* sp.. *Parkia* sp. are also the most extensive livestock fodder in semi-arid areas (FAO, 1989).

Bann (1997) states that NTFPs are the variety of physical products other than timber that are derived from forests. They are used either for subsistence purposes, traded, or sold. Bann also notes that forest value has been traditionally based on the commercial worth of its timber, ignoring the non-timber aspect. The economic value of NTFP is, in fact, bigger than that of timber in the long run. The omission of non-timber values and benefits in economic analyses means that forest resources are undervalued. This can result in unsustainable timber extraction or the conversion of forest land to alternative and degraded land uses, since these options appear more attractive initially. He also describes the possible techniques for valuing NTFPs using market price, direct and indirect substitute, barter exchange, and opportunity cost of labour approaches.

## **2.2 Women and Non-Timber Forest Products (NTFPs)**

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

Over 3,000 plant species in India are economically significant and are integral components of local economies and culture. For nearly 500 million people living in and around forests, NTFPs are a critical part of their sustenance (Tewari and Campbell, 1997). More importantly, NTFP activities are predominantly undertaken by women, children, and the poorest or most marginal of rural people. For women, however, these NTFPs are of top priority because of their contribution to ensuring family survival and well-being (Wickramasinghe, 1992).

In Nepal, cultural constraints have forced women to work more within the household. The crops controlled by women have lower yields than by men due to lower input intensity. Women have to spend time to do other activities such as fuelwood and water collection and housework (Quisumbing, 1996). The study in Bangladesh by Akhter and Sarker (1998) found that women did other work, besides household work, such as with home gardens, livestock, poultry, and agricultural crop management. Women also took part in fuelwood collection and grass cutting and bundling. Clearly, women have many activities involving not only housework, but

also other work to support their households. Wild plant gathering from many areas is one activity that is important for everyday food consumption diet. Furthermore, FAO (1996a) concluded that rural women continued to have primary responsibilities for domestic activities. Women tended to rely on NWFPs more than men for household use and income. In mountain areas, women were responsible for household tasks, such as collection of forest food, fuelwood, and medicine, and tending grazing livestock.

The processing of forest products and foods is specialised by gender. All family members help with collection, but women are usually responsible for processing these items (FAO, 1996a).

Women have a leading role in caring for and using forests. They gather food to feed their families, fuelwood for cooking, fodder for livestock, and compost for fields as well as collecting bark, roots, and herbs to use for medicines. They manage nurseries for income, conserve valuable forest species, plant trees to prevent soil erosion and floods, and help to preserve forest ecosystems whose existence depends on biological diversity (FAO, 1998b).

In another study by FAO (1989), it was found that forest plant foods can be categorised as leaves, seeds and nuts, fruits, tubers and roots, fungi, gum, and sap. These foods provide protein, vitamins, and essential minerals to the human diet. Some are collected and consumed raw, while others require complex processing before they can be eaten. In Upper Shaba (Zaire), for example, it was found that leaves from 50 different tree species were eaten and 48 were consumed in Swaziland.

Seeds and nuts, which generally supply calories, oil, and proteins, are eaten almost every day in parts of northern Togo. Wild fruits are popular and often eaten by rural people. Studies in Swaziland identified 110 edible wild fruit species. In addition, mushrooms are favourites in many culture and are often consumed as meat substitutes. In Zaire, mushrooms are gathered by women and children, who frequently spend up to two or three hours a day gathering them in the rainy season (FAO, 1989).

Mushrooms have become an important forest product in Thailand. They are found in forests in all regions, especially during the rainy season. Some wild mushrooms such as *Termitomyces* spp. and *Russula delica*, are delicacies and are sold in local markets. Similarly, in the Mae Sa Valley in northern Thailand, many species of mushroom are collected in the rainy season for consumption and sale (Subsansenee, 1994). As in Dong Yai, a big forest in Ubon Ratchathani province, Thailand, Chuntaparb (1993) found that the amount of food products extracted there includes 260,000 kilograms of edible plants, 104,458 kilograms of mushrooms, and 17,676 kilograms of bamboo shoots. Mushrooms are part of the daily diet of families for over one third of the year, while 70 percent is utilised for domestic consumption and 30 percent is sold.

Forest wildlife is the second main category of food derived from the forest, especially smaller wildlife species. These include rodents such as the grasscutter, or cane rat, and the giant rat, squirrels, porcupines, bats, mice, and other small mammals are also eaten, together with birds and various types of insects, snails, snakes, and other reptiles (FAO, 1989).

Women are the primary selectors, gatherers, propagators and marketers of wild food resources. In northeast Thailand, village women are heavily engaged in gathering and marketing wild food products including plants, insects, rats, paddy crabs, frogs, and fish. These women comprise 94 percent of the marketers, with their wild foods sales providing significant income to their households. Food originating from paddy rice fields provided 43 percent of the total wild foods sold in markets. In the dry season, 31 percent of food production activity is for wild food gathering for domestic consumption. During the rainy season, wild foods coming chiefly from paddy fields made up some 50 percent of the total food consumed by farmers in Thailand's central northeast. In Kalasin, northeast Thailand, women are the gatherers who collect edible plants from woodlands, uplands, paddy fields, swamps and ponds, canals, and fence borders. They gathered 159 food plants from this area, of which 77 were wild plants that included trees, palms, shrubs, vines, bamboos, herbs, aquatic plants, and fungi. These wild food plants are used for domestic consumption and market sale. They also cultivated these plants on their private agricultural land or in privately owned swamps to ensure their continued supply (Price, 1997). This phenomenon is similar to the study done by Kunstadter (1978) among the Lua and Karen hill farmers in Mae Sariang District, northwestern Thailand, where women gathered wild plants from nearby forests and their fields for consumption. Some wild plants were transplanted from the forest to their home gardens and fields *e.g.* egg plants, and tea.

### 2.3 Karen's life and use of wild plants

According to Young (1961), Karen people in Thailand have a low income and concentrate on what crops they can produce, obtaining the rest of their food requirements from the forest. Their principal forest staple consists of wild yams, supplemented with various herbs and vegetables. Wild yam is a special plant for Karen because it can be used as a rice substitution. Possibly 50 percent of their annual food supply comes from the forest. In addition, women and girls also enjoy catching fish along streams and spend much time doing this if other duties permit.

They also collected mushrooms, waterweeds, the giant waterbug, larva of dragonflies and bees, and honey for household consumption. According to Karen belief, they do not overuse forest products. Karen also used medicinal plants from the forest to treat eczema (skin problem) such as *Solanum torvum* Swartz (Solanaceae) and *Broussonetia papyrifera* (L.) Vent. (Moraceae) (Ruttanakul *et al.*, 1995).

### 2.4 Indigenous Knowledge of Wild Plant Species Utilised by Women

Indigenous knowledge can be defined as the sum of experience and knowledge of a given ethnic group that forms the basis for decision making in the face of familiar and unfamiliar problems and challenges. This knowledge has accrued over many centuries and is a critical and substantial aspect of the culture and technology of any society. It can be transferred by quite elaborate systems, often involving oral transmission using stories and myths (Warren and Cashman, n.d.).

Moreover, people have local knowledge to utilize a tree for many purposes e.g. the chanar tree, *Geoffroea decoticas*. People consume the “hull” of the fruit and the bark is used for dye and as a medicine in treatment of respiratory disease. *Acaia segal* (gum arabic) is used as a food, fodder and medicine. The gum is a traditional food additive. Five hundred tons of gums are consumed annually (FAO, 1989).

Women’s knowledge of forest resources is extensive, For example, tribal women in India have medicinal uses for almost 300 forest species (FAO, 1998b). It is usually women who know about indigenous species of leafy vegetables including how to recognise and prepare them, as well as how to preserve their seeds and cultivate them. This knowledge is acquired over centuries of experience and it is passed down through the generations from mother to daughter.

#### **2.4.1 Rural women, biological diversity, and home gardens**

Rural Asian women have a key role in the sphere of biodiversity as seed selectors, biodiversity managers in home gardens, and as keepers of local knowledge of food crops, medicinal plants, wild foods, and forest products (FAO, 1996b).

A study in northeastern Thailand concluded that home gardens could be viewed as experimental stations in which women transfer, encourage, and tend indigenous species, trying them out, and adapting them for use. These gardens often represent a refuge where less common species and varieties are preserved (FAO, 1996b).



Women's home gardens are models of sustainable land use. They are typically dominated by perennial rather than annual vegetation and fertilised with mulch, manure, and crop residues. They provide sustained yields, yet cause minimal environmental degradation under continuous use. Women also grow trees together with other crops in their gardens. Home gardens at a single village in Thailand had 230 different plant species, many of which had been rescued from a neighbouring forest before it was cleared. In a single African home garden, more than 60 species of food-producing trees were counted (FAO, 1998b).

Ekasingh, *et al.*, (1999) found that Karen farmers always have home gardens with many fruits and vegetables for home consumption. Tropical fruits were common, such as mango, banana, pomelo, pineapple, and papaya; but many farmers grew temperate fruit trees in their home gardens such as peach, plum, apples, and avocado. Vegetables are also grown in home gardens such as chilli, eggplants, melons, pumpkins, ginger, green cabbages, cucumbers, and different kinds of beans and peas. The size of home gardens ranged from a few square meters to as large as 1 ha. All households were almost self-sufficient in terms of vegetable needs for home consumption.