Non-wood forest products: utilization and income generation in the Czech Republic, Finland and Lithuania[1]

[1] The material for this article is drawn from three papers presented at the International Expert Workshop on the Sustainable Development of Non-Wood Goods and Benefits from Boreal and Cold Temperate Forests, held in Joensuu, Finland from 18 to 22 January 1998. The papers, by L. Sisak; A. Rutkauskas; and O. Saastamoinen. J. Kangas, A. Naskali and K. Salo, have been published in the workshop proceedings (see Bibliography).

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Statistics regarding collection and utilization of plant and animal NWFPs.

Boreal and temperate forests are endowed with a variety of non-wood forest products (NWFPs). In many countries most. it not all, of these products may be collected by virtually anyone, and free of charge. While a great deal of the NWFPs harvested are used for personal consumption, a significant proportion is destined to markets (both domestic and export). Nevertheless, the figures presented by experts at a recent meeting on the sustainable development of NWFPs in boreal and cold temperate forests suggest that only a small fraction of some of these goods (e.g. mushrooms, berries) is actually harvested. In this article, barriers to the commercialization of such products are identified and some examples of measures and conditions that stimulate the use of non-wood forest resources are discussed.

Figures are presented to provide a background on the production and income-generation potential of the main NWFPs found in boreal and cold temperate forests. The cases of the Czech Republic, Finland and Lithuania are followed by some general comments and recommendations. In each case, it is apparent that the NWFP sector is an important source of employment and income, in addition to contributing to recreation and tourism.

NWFP COLLECTION IN THE CZECH REPUBLIC

According to Article 19 of the latest Forest Act of 1995, individuals are entitled to enter forests at their own risk to collect any forest berries and dry waste wood for their own needs. While doing so, they must not damage the forest or interfere with the forest environment and must follow the instructions of the owner or tenant and the staff of the forest. All forest stands are accessible to people, and people can pick NWFPs freely, and free of charge, irrespective of the forest ownership.

Unfortunately, the Forest Act does not mention mushrooms and medicinal plants explicitly,

which can cause some confusion and misunderstandings. These products are widely collected and treated in the same way as forest berries. Another problem can result from the unclear expression "for their own needs", which could be interpreted to mean that NWFPs collected free of charge by forest visitors cannot be sold. However, in practice, NWFPs are sold freely (with the exception of mushrooms, for which sales must be licensed).

Only a comparatively small part of NWFPs picked free of charge is marketed in the Czech Republic. The greater part is collected by forest visitors and consumed within their own households. Personal collection of NWFPs influences the market because the NWFPs are consumed instead of other similar products of agricultural origin bought at market prices.

The importance of NWFPs should be expressed both in terms of non-market (recreational) functions and in terms of market (production) functions.

The economic significance of NWFPs in the Czech Republic

In spite of the fact that the collection of NWFPs is a very popular activity, there was no objective information about the importance of NWFPs in the Czech Republic before the Grant Agency of the Czech Republic and the Czech Ministry of Agriculture (Forestry Branch) funded a large investigation on the socio-economic importance of NWFP collection, which was launched in 1994. Figures demonstrating the economic importance of NWFPs in the Czech Republic are now available; a selection is given in Table 1.

TABLE 1. **Annual value of NWFPs collected in the Czech Republic**

Products	**1994**	**1995**	**1996**	**Average**
	(*million CK*)[1]			
Mushrooms	1 314	1 658	1 082	1 351
Bilberries	881	1 164	456	834
Raspberries	180	248	173	200
Blackberries	161	169	129	153
Cranberries	22	43	42	36
Elderberries	140	137	113	130
Total	**2 698**	**3 419**	**1 995**	**2 704**

[1] CK 1 = US$0.028.

The total average yearly value of the collected NWFPs reached about 2 700 million koruny (CK) (CK 1 = US$0.028) for the period 1994 to 1996. This is a surprisingly high value, equivalent to between one-fourth and one-third of the timber sold annually in Czech markets in recent years (which varied from CK 9 000 million to CK 12 000 million from almost 2.6 million ha of forests -one-third of the Czech Republic's area). The value of products collected from 1 ha of forest land reached on average CK 1 100 yearly. The value of bilberries picked from 1 ha of a bilberry cover reached more than CK 4 000, which is similar to the average value of timber extracted from 1 ha in an average year (CK 4 000 to CK 5 000). Bilberries cover almost 10 percent of total forest land in the Czech Republic.

The shadow net income for the population (based on the difference between market value and expenses) reached almost CK 2 500 million per year. Shadow profits (the net of the cost of picking time and resulting forest damage) amounted to CK 211 per hectare. By comparison, the profits from timber production were CK 290 per hectare before taxes in 1995.

The figures given here do not overestimate the importance of forests and forestry as

producers of NWFPs. Apart from the products discussed, people also collect and use free of charge other commodities on a large scale. For example, responses to the 1994 study indicated that 2.8 million kg (dry weight) of medicinal plants were collected, an important part of them in forests.

New possibilities for Czech forestry

In the Czech Republic, NWFPs are still not commercially produced, harvested or marketed by forest owners, tenants or entrepreneurs on a large scale. Nevertheless, the prospects for planned cultivation of some NWFPs (especially medicinal plants and certain berries) are very good. A large part of the NWFPs (forest fruits, mushrooms, medicinal plants) could be considered as alternatives to agricultural production and produced to a great extent without chemicals. Forests could be managed for a kind of symbiosis, merging the goals of classical forestry (timber, environment) and production of NWFPs.

Cloudberry* (Rubus chamaemorus) *is Finland's most valuable wild berry

This more comprehensive conception of forest management could increase the attraction, flexibility, stability and sustainability of forestry and forest management, especially in some regions of the Czech Republic. However, the current Forest Act does not address the possibility of planned production and harvest of NWFPs by forest owners and tenants nor does it protect forest producers against collectors of commercially produced NWFPs. According to Article 19, the relevant state forest administration body can decide (at the request of the owner) to enforce temporary restrictions on entry to the forest only for forest protection reasons, or in the interests of the health and safety of the public. Random public collection of NWFPs for commercial purposes is not restricted.

NWFP COLLECTION IN FINLAND

Berries, mushrooms and herbs

In a good year, the biological yield of wild berries in forests and peatlands in Finland is about 1 000 million kg (Table 2). In a poor year the yield of berries might be about 500 million kg (Salo, 1994). Collectable yield can be estimated to be about 30 percent of the biological yield. In recent years, however, only about 5 to 10 percent of the biological yield of wild berries has been collected.

In many parts of the country, picking for sale is very important. Since 1977, annual records have been kept on income from wild berries and mushrooms as well as garden berries bought by organized trade and enterprises (Table 3). There are large annual variations in the value of berries sold. In most years, the value of wild berries has been greater than that of garden berries.

Cloudberry is Finland's most valuable wild berry, and in recent years its price has been 40 markkaa (Fmk) per kilogram (Fmk 1 = US$0.17). This "orange of the north" has for centuries been an important source of vitamin C for the inhabitants and helped to keep them free of scurvy.

TABLE 2. **Estimates of annual berry yields in Finland in poor and good crop years**

Berry	Poor year	Good year
	(*million kg*)	
Lingonberry	200	500
Crowberry	150	250
Blueberry	150	200

Bog whortleberry	20	50
Rowanberry	10	50
Cloudberry	20	30
Cranberry	10	20
Raspberry	5	10
Juniper	0.1	0.2
Wild strawberry	0.1	0.3
Buckthorn	0.1	0.3
Arctic bramble	-	0.1
Black bearberry	-	0.1
Stone bramble	-	<0.1
Bearberry	-	<0.1
Total	**565.3**	**1 111.2**

Source: Salo, 1994.

TABLE 3. **Incomes from picking wild berries, edible mushrooms and garden berries and percentages of total, Finland, 1977-1996**

Year	Wild berries		Edible mushrooms		Garden berries		Total
	(*1 000 Fmk*)[1]	(%)	(*1 000 Fmk*)	(%)	(*1 000 Fmk*)	(%)	(*1 000 Fmk*)
1977	72 295	87	719	1	10 233	12	83 247
1978	45 805	76	2 593	4	12 313	20	60 771
1979	50 071	72	1 720	3	17 332	25	69 123
1980	57 755	76	1 915	3	15 983	21	75 653
1981	35 277	51	3955	6	29 391	43	68 623
1982	53 235	50	2 454	2	51 711	48	107 400
1983	89 447	60	3 811	3	55 163	37	148 421
1984	31 601	36	3 340	4	53 813	60	88 754
1985	54 907	42	8 588	7	65 236	51	128 731
1986	44 669	41	4 396	4	60 058	55	109 123
1987	41 982	47	6 504	7	40 606	46	89 092
1988	85 304	62	11 646	8	41 140	30	138 090
1989	56 786	51	3 727	3	50 357	46	110 870
1990	52 073	48	6 801	6	48 965	46	107 839
1991	73 554	60	10 266	8	39 462	32	123 282
1992	45 667	49	6 001	7	41 242	44	92 909
1993	27 220	39	3 086	4	39 157	57	69 463
1994	136 276	80	5 919	4	26 780	16	168 975
1995	58 725	70	4 253	5	20 640	25	83 618
1996	52 158	63	4 090	5	25 960	32	82 209

[1] Fmk 1 = US$0.17.
Source: Food and Farm Facts Ltd, 1997.

In a good year, the biological yield of mushrooms in Finland is about 2 000 million kg; in a

very poor year about it is 400 million kg (Salo, 1994). In recent years the amount of wild mushrooms collected in Finland has been from 5 million to 10 million kg (Salo, 1994). As Table 3 indicates, the commercial utilization of forest mushrooms is much smaller than that of berries.

In the early 1980s it was estimated that the annual value of herbs collected was Fmk 1 million to Fmk 3 million (Saastamoinen, 1984). Ten years later an estimate of Fmk 20 million was given for the commercial collection and household use of domestic herbs (Salo, 1994).

Estimates of the value of wild berries and edible mushrooms collected indicate that the combination of professional sale, direct sale and market sale of wild berries amounted to Fmk 105.5 million in 1998, while the value of wild berries destined for domestic use was Fmk 340 million. In the same year, the value of edible mushrooms destined for professional sale or direct and local market sale combined amounted to Fmk 14.3 million, while that of edible mushrooms destined for domestic use amounted to Fmk 104 million. In other words, between one-tenth and one-third of the edible NWFP harvest is sold and therefore generates income.

Other plant-derived NWFPs

There are numerous other less important NWFPs. Birch sap, rich in sugars, amino acids, vitamin C and minerals and traditionally used as a health drink, was neglected for a long time but has attracted renewed interest since the 1980s. Bee-keeping has grown considerably, and pan of that activity occurs in forest lands. The burning of tar - one of the oldest forest products - continues on a small scale, while resin tapping has ceased entirely. Ants' eggs were used for a specific export product, but now they are collected only on a very small scale. A large group of NWFPs comprises small parts of trees such as conifer twigs for decoration, twigs of deciduous trees used as brooms or bath whisks, bark of willow, birch and conifers and roots and knars of trees. So far, there are no recorded data available concerning the quantities or value of these products.

Reindeer and game

In the northernmost parts of Finland, reindeer husbandry is an important local means of livelihood. As it is geographically limited to northern Finland (the county of Lapland and the northern part of the county of Oulu), at the national level the pure monetary value of venison production from reindeer husbandry is smaller than that of hunted moose. Most of the reindeer herders in northernmost Finland are indigenous Saami people. Thus in addition to generating income, reindeer husbandry assists in the preservation of the original cultural values of Lapland.

Reindeer husbandry is the only important form of forest grazing in Finland. In recent years, reindeer meat production has varied between 2.7 million and 3.5 million kg annually and its value has ranged from Fmk 70 million to Fmk 100 million annually. The Association of Reindeer Herding Units has estimated that the total regional economic importance of reindeer husbandry is Fmk 200 million annually and total employment in the industry is about 1 400 person-years. All reindeer are privately owned, although the mode of management is mainly collective.

In the hunting year 1995/96, the total value of game was Fmk 293.9 million (Finnish Forest Research Institute, 1997). Deer, waterfowl and gallinaceous birds contributed Fmk 181.6 million, Fmk 40 million and Fmk 24.7 million, respectively.

The economic importance of NWFPs in Finland

In the 1970s and early 1980s the economic importance of NWFPs (berries, mushrooms, wildlife, decorative lichens, reindeer husbandry and other minor products) was estimated to be

about 8 percent of the delivery value of timber harvested (Saastamoinen, 1984). This figure was nearly 9 percent in 1994, but on average about 7 percent in the period 1990 to 1994 (Saastamoinen, 1996). These estimates include some uncertainties, for example concerning how much of the collected berries and mushrooms are for household consumption or the value of less well-known products such as herbs. The relation between the annual value of NWFPs and of timber varies not only because of the large variation in the yields of non-wood products, but also because of changes in annual cutting volumes and stumpage prices for wood.

Regional and local differences in the relative importance of non-wood products are wide. They are most important in Finnish Lapland, where material non-wood products (reindeer husbandry, berries and mushrooms, value of catch) accounted for 16 percent of the value of wood production in 1980 (Saastamoinen, 1986) and 28 percent in 1994 according to the data of the new forest strategy of Lapland (Kajala, 1996).

From the employment point of view, considerations of relative importance are not straightforward because NWFP utilization in some cases includes a mix of economic and recreational activities. Nevertheless, it can be concluded both from the estimated national data (Työryhmämuistio, 1995) and from the data collected in Lapland (Kajala, 1996) that non-wood forest utilization is much more labour intensive than wood production and processing. This emphasizes the role of NWFPs in regional and local economies.

Overcoming barriers to the commercial utilization of non-wood forest resources

Inflexible labour policies (which are not suitable for seasonal work), extensive permission requirements and ambiguous taxation are among the barriers to increased commercial exploitation of non-wood forest resources in Finland. Other barriers include low levels of value added, uneven quality of products and, in some cases, long distances to markets.

In response to some of these problems, a working group established by the Ministry of Agriculture and Forestry prepared a programme in 1995 to develop the natural products sector (wild berries, mushrooms, herbs, etc.). The targets of the programme were to increase the present rates of utilization by 30 percent, to increase the industrial use of the products by 10 percent, to raise the quality of products by adopting quality control systems in processing enterprises, to increase the value added of the products and to improve marketing (Työryhmämuistio, 1995). The implementation of the programme was divided into nationwide activities (e.g. national coordination, picking campaigns, development of quality standards for products) and regional activities (developing regional natural product support units, training, product development, promotion campaigns). The final target year of the programme is 1999.

The creation of new income-earning and employment opportunities is a central goal of such programmes. In order to devise plans for stimulating employment creation in the NWFP sector, however, the barriers to the development of nature-based businesses and other non-wood-related activities must first be identified. Once the preconditions for the development of such businesses are in place, the next step is to promote small nature-based businesses that make good use of non-wood forest resources. Table 4 gives an indication of the employment contribution of such enterprises.

TABLE 4. **The estimated monetary value and employment level of the main branches of nature-based business in Finland**

Branch	**Value** (*million Fmk/year*)[1]	**Employment** (*person-years*)
Collected products	1 800	9 000
Small-scale wood processing	2 200	4 000

Nature tourism	1 100	1 700 full time
		1 450 part time

[1] Fmk 1 = US$0.17.

NWFP COLLECTION IN LITHUANIA

Table 5 presents information on the main products harvested in Lithuanian forests in 1996. Income from 1 ha of forest area amounted to 240 litai (Lt) (US$60). Income from non-wood products made up 13 percent of the total amount earned from forest activities. Especially significant was the harvest of mushrooms. Their export has increased considerably. However, the kinds and extent of non-wood production have differed over time.

TABLE 5. **Main products collected or harvested from Lithuanian forests, 1996**

Product	Total volume	Value (*1 000 Lt*)[1]
Wood	5 537 000 m^3	404 201
Mushrooms	3 026 tonnes	39 558
Berries	4 328 tonnes	9 886
Medicinal herbs	44 tonnes	379
Christmas trees	280 000 units	2 100
Game meat	781 tonnes	4 840
Furs	8 040 units	777
Antlers	18 tonnes	358
Hunting trophies	101 units	286

[1] 1 Lt = US$0.25.

Berries, mushrooms and herbs

Currently, about 70 to 80 percent of mushrooms and berries collected are used to satisfy personal needs and 20 to 30 percent are intended for sale.

Large areas of Lithuanian forests are covered by bilberry, raspberry and cowberry. The bilberry harvest is not collected completely, while the demand for cowberry and cranberry exceeds supply. The greatest demand on domestic and foreign markets is for cowberries, cranberries, bilberries and ashberries. Wild strawberries and raspberries are in demand on the domestic market, while bog whortleberries are collected only to satisfy personal needs. Mean annual exploitable harvest in Lithuanian forests comprises about 5 000 tonnes of berries. From 1970 to 1979 an average of 1 700 tonnes of forest berries, mostly cranberries, bilberries and ashberries, were sold for processing annually. From 1980 to 1989, forest berry exports were about 1 000 tonnes per year.

About 100 mushroom species grow in Lithuanian forests; however, only 15 to 25 are collected. In the period 1970 to 1979 approximately 450 tonnes of mushrooms were sold for export and processing; in the period 1980 to 1989 the amount was 288 tonnes. About 20 to 25 percent of collected berries and mushrooms are sold for processing.

The annual exploitable mushroom yield is 15 to 30 kg per hectare. It is thought that about 30 to 40 percent of the exploitable harvest is collected. Potential mushroom production in Lithuanian forests amounts to 24 000 tonnes and industrial production to about 8 000 tonnes.

Since 1993, mushroom production has been greatly increasing with the growth of the private sector.

Some 20 to 30 species of herbs are collected in Lithuanian forests. The greatest demand is for juniper berries, bearberry leaves and black alder bark. Resources of medicinal herbs are limited and insufficient to meet the demand.

Forests as a source of meat

Ungulate animals (moose, red deer, roe deer, wild boar) and fine fauna (hare, wild duck, gallinaceous birds) are hunted for meat. From 1994 to 1996 an average of 545 000 kg of wild animal meat was produced per year, including 505 000 kg of ungulate animal and 40 000 of fine fauna meat. In 1996 about 62 000 kg or 12 percent of ungulate animal meat was exported.

The recreational significance of game has been increasing with the growing interest shown in sport hunting, which used to be limited. Since 1990 foreign hunters have shown interest in Lithuania. Income from game in the period from 1993 to 1996 was on average Lt 1.8 million per year. There is potential for developing game tourism. The aim of hunting policy is to regulate wildlife populations, increase the productivity of hunting and prevent damage to forestry.

Cowberry* (Vaccinium vitis-idaea) *is an important non-wood forest product in Lithuania

Changes in forest activities

In Lithuania NWFPs were most utilized on an industrial scale in Soviet times, especially from 1970 to 1990. Forests were widely used for recreational purposes as well. After independence, non-wood forest production greatly decreased or even ceased for economic reasons. Recreational loading on forests decreased significantly because of reduced flows of tourists from the Soviet republics.

In the period from 1992 to 1997 legislation for the use and conservation of forest resources was given a new foundation. Preconditions for sustainable multiple forest use were created.

With the improving situation in Lithuania, forest resources are being utilized more intensively and non-wood production is now organized by private business structures. For example, private farmers are growing small plantations of berries (cranberries in particular).

To improve the utilization and conservation of forest resources, there are plans to update accounts of these resources and production statistics. The forest administration aims to prepare detailed management plans including the functional destination of forests, elaborate different forest maps and develop forest geographic information system (GIS).

CONCLUDING COMMENTS

The NWFP sector makes an important contribution to the economies of the Czech Republic, Finland and Lithuania. In some regions (e.g. Finnish Lapland), the sector is of crucial importance to the livelihoods of local populations. The fact that some form of free public access to forests prevails in each of these countries - and that collection of NWFPs for various purposes is permitted - implies that some of the NWFPs collected do not enter formal markets, although they represent an important contribution (in terms of consumption) to households in these countries.

The fact that many NWFPs are collected during recreational visits to forests may have positive implications for the future supply of these goods, in the sense that excessively high (or unsustainable) levels of extraction and damage to forests are not being encouraged. On the

other hand, the fact that only a small percentage of the biological yield of NWFPs is collected may represent a loss in terms of income and/or general welfare for the population of these countries.

An important characteristic of NWFP collection, as seen in these examples, is the large annual variation in yields and consequently also in potential incomes generated from these activities. The high variation in mushroom and wild berry yields could partly explain the low rates of collection for commercial purposes.

While efforts have been made to develop the NWFP sector in these three countries, it appears that some barriers have impeded the sector from realizing its commercial and income-generating potential. Although it seems clear that the collection of NWFPs could be increased in all cases, precautions should be taken to minimize damage to forests and to prevent unsustainable levels of extraction.

The transition to a market economy appears to be creating opportunities in Lithuania and the Czech Republic. In Finland, changes in taxation policies and regulations may lead to increases in the collection of NWFPs. Indeed, increased NWFP utilization appears to have been adopted as a goal in rural development initiatives which aim to increase income-earning opportunities while maintaining environmental quality.

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