Sustainable Development of Non-Wood Goods and Benefits from Boreal and Cold Temperate Forests
SUSTAINABLE DEVELOPMENT OF NON-WOOD GOODS AND BENEFITS FROM BOREAL AND COLD TEMPERATE FORESTS

Proceedings of the International Workshop
Joensuu, Finland
18-22 January 1998

Edited by H. Gyde Lund, Brita Pajari and Minna Korhonen

European Forest Institute

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<table>
<thead>
<tr>
<th>Author</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pekka Alhojärvi</td>
<td>Non-Wood Forest Products in the International Cooperation Financed by Finland</td>
<td>9</td>
</tr>
<tr>
<td>Paul Vantomme</td>
<td>Other Similar International Meetings on Non-Wood Forest Products</td>
<td>19</td>
</tr>
<tr>
<td>H. Gyde Lund</td>
<td>The Non-Wood Forest Resource Mystery</td>
<td>29</td>
</tr>
<tr>
<td>Olli Saastamoinen</td>
<td>Non-Wood Goods and Benefits of Boreal Forests: Concepts and Issues</td>
<td>47</td>
</tr>
<tr>
<td>Paul Vantomme</td>
<td>Non-Wood Forest Products from Boreal and Cold Temperate Forests</td>
<td>59</td>
</tr>
<tr>
<td>Linda L. Langner</td>
<td>Non-Wood Goods and Benefits in the UN-ECE/FAO Temperate and Boreal Resources Assessment 2000</td>
<td>69</td>
</tr>
<tr>
<td>Jiang Chunqian</td>
<td>Non-Wood Forest Products in the Cold Temperate Area of China: The Case of Vaccinium spp.</td>
<td>75</td>
</tr>
<tr>
<td>Zhu Zhaohua</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ludek Sisal</td>
<td>Importance of Main Non-Wood Forest Products in the Czech Republic</td>
<td>79</td>
</tr>
<tr>
<td>Michal Kalinowski</td>
<td>Non-Wood Forest Products in Poland</td>
<td>87</td>
</tr>
<tr>
<td>Algirdas Rutkauskas</td>
<td>Non-Wood Resources and their Utilisation in Lithuania</td>
<td>93</td>
</tr>
<tr>
<td>Leide Vilkriste</td>
<td>NWFP Resources and their Future Utilisation in Latvia</td>
<td>103</td>
</tr>
<tr>
<td>Taimi Paal</td>
<td>Non-Wood Plant Products in Estonian Forests</td>
<td>109</td>
</tr>
<tr>
<td>Olli Saastamoinen</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Taimi Paal</td>
<td>Utilisation and Research of Non-Wood Products in the Former Soviet Union</td>
<td>119</td>
</tr>
<tr>
<td>Peter Munk Plum</td>
<td>Denmark: Non-Wood Forestry in a Densely Populated Temperate Country</td>
<td>125</td>
</tr>
</tbody>
</table>
The promotion and development of Non-wood Forest Products (NWFP) is a key priority of FAO's Forest Department work programme. Since 1991, the Food and Agriculture Organization of the United Nations (FAO) has collaborated with several agencies and has conducted a series of regional expert meetings on Non-wood Forest Products (NWFP): Asia and the Pacific (1991), Africa (anglophone) 1993, Latin America and the Caribbean (1994), and the Near East (1997). In addition, preparations are underway for a regional workshop on NWFP in Central Africa (1998). Until now, no similar meeting has been held for the Boreal and Cold Temperate forest regions.

The European Forest Institute (EFI) and the Ministry of Agriculture and Forestry of Finland (MAF) organised an International Expert Workshop on the Sustainable Development of Non-wood Goods and Benefits from Boreal and Cold Temperate Forests in co-operation with FAO and the Economic Commission for Europe (UN/ECE). The meeting was held 18-22 January 1998 at EFI headquarters in Joensuu, Finland.

The workshop concentrated on the promotion and development of non-wood forest products (NWFP) of boreal and cold temperate forests. The goals were to:

- Gain better insights into the resource situation and the present utilisation status of major NWFP in the boreal and cold temperate regions, including their potential, problems and issues involved during their harvesting, processing, trade, and marketing.
- Assess and raise awareness of the importance of NWFP for rural development, the environment (biodiversity conservation), and for sustainable forestry.
- Identify key constraints and possible solutions related to the development of the NWFP sector.
- Provide suggestions and recommendations for actions at various levels to support national/regional efforts for NWFP resource management and conservation and for the sustainable development of their products.

25 experts from the region including senior government staff of relevant agencies, technical experts covering various NWFP related disciplines, representatives of NGO and GO agencies on forestry and rural development, forest conservation, and the private sector participated. All of the goals were met. Papers given, key findings and recommendations of this workshop are presented in these proceedings. The results will be brought to the attention of any relevant fora including the TBFRA -2000 process, European Forestry Commission, the Helsinki/Montreal Secretariats on Criteria and Indicators for Sustainable Forest Management, national forest agencies, etc. to ensure appropriate follow-up and to promote implementation of the proposals and recommendations.
We gratefully acknowledge the contributions of all those who attended this workshop and their active participation in the discussions. We further thank all the people who have kindly provided financial and technical support to this meeting and for the publication of the proceedings, and in particular Pekka Alhojärvi from Ministry of Agriculture and Forestry; Brita Pajari, Risto Päivinen, Leena Roihuvuo, Minna Korhonen, Gyde Lund and others from EFI, and Leo Lintu and Paul Vantomme from FAO.

It gives us great pleasure to release this document in the hope that it will provide essential information so that NWFP can be given their rightful place in the sustainable development of the Boreal and Cold Temperate forests.

January 1998

Ian Hunter
Director
European Forest Institute

K.H. Schmincke
Director
Forestry Division
Food and Agricultural Organization of the United Nations
EXECUTIVE SUMMARY

The meeting was attended by 25 experts from the Boreal and Cold Temperate Forest region and included: Armenia, China, Czech Republic, Denmark, Estonia, Finland, Italy, Latvia, Lithuania, the Netherlands, Poland, Russia, and the USA. FAO, ECE, EFI, MAF, Universities, Ministries as well as NGOs were represented. Also invited, but unable to attend, were experts from Canada, Germany, Korea, Sweden, Norway, CIFOR, UNIDO, and IFEAT.

Issue papers, case studies and country reports were presented and discussed in plenary. The meeting identified four themes – those involving people and social needs, resource inventory (including monitoring) and assessment, planning, management and harvesting, and finally processing, marketing, and trade – for further group work review. The four groups identified 12 issues and made over 20 recommendations and 30 proposals for the sustainable development of NWFP in the Boreal/Cold Temperate Forest Region.

Recommendations fell into three categories – those involving policy, research and institutional strengthening. Implementation of the proposed recommendations can be grouped along the following programme:

Strengthening the co-ordination and interaction between ongoing research and development programmes, activities and projects on NWGB in and relevant to the region, and in particular to:

- Develop locally available consumer-producer information systems and develop a forecasting information system.
- Collect and supply information on the latest processing technologies and on market realities to assist governments and administrations in policy-making, taxation, legislation, etc.
- Develop summaries of local/indigenous knowledge on NWFPs for different countries with boreal and cold temperate forests.
- Identify and recommend appropriate proposals for support/incentives/ subsidies/ compensations schemes and regulations for multiple use forest management planning for private forest owners for their submission to relevant ministries and other relevant agencies to be considered for incorporation into national or international forest policies and regulations, in line with the relevant international Criteria and Indicators for Sustainable Forest Management and/or other UNCED recommendations.
- Co-ordinate a comparative and comprehensive review in the region of the "state of the art" of existing approaches, resource data information systems, technology needs and practices to incorporate NWGB effectively into multiple purpose forest management planning, implementation, monitoring and participatory evaluation; and
Based on the outcome of this study, identify gaps and appropriate actions, programmes or projects for submission to relevant donor agencies.

- Conduct case studies of NWFP regulations to identify disjunctures between the intent of regulations and how they actually work out in practice.

Close co-ordination among the implementing agencies of these activities is essential, and could be carried out through an international network in the boreal and cold temperate zone. The meeting further recommended the following specific networking activities:

- The exchange of information on non-wood forest goods, such as food, medicine, etc. and on non-wood forest services, such as recreation, hunting, fishing, etc. Include both local knowledge bases and data gathering and analysis methodologies.
- Develop a workshop on inventory methods for non-wood products. Possible organisers: EFI and the International Union of Forestry Research Organizations (IUFRO).
- Complete the IUFRO project on common terminology ensuring NWGS are included.
- Review of TBFRA 2000 results. Identify data gaps and next steps. This could be done at the IUFRO World Congress 2000 and/or an UN-ECE/FAO workshop with country experts 2000 meeting
- Incorporate information NWFP into FAO's Forest Products Statistics. The Forest Resource Assessment (FRA) 2000 can be a starting point.
NON-WOOD FOREST PRODUCTS IN THE INTERNATIONAL COOPERATION FINANCED BY FINLAND

Pekka Alhojärvi
Ministry of Agriculture and Forestry, International Affairs Group
Helsinki, Finland

ABSTRACT

This paper discusses the international cooperation of Finland in the forest sector, with an emphasis on the role of non-wood forest products (NWFP). The main focus is in the development programmes and projects implemented in the adjacent areas of Finland, especially the Russian Federation and the Baltic states. In addition, various financing sources, the principles applied in project design and evaluation, as well as the essential needs to co-ordinate the activities between the donors both in the donor and recipient country are discussed. Also, databases of projects in European countries in transition, financed by the Nordic countries and by various other European countries, are briefly reviewed.

Key words: Sustainable development, sustainable forest management, conservation of biodiversity, financing sources, co-ordination of activities

1. INTRODUCTION

Ministry of Agriculture and Forestry in Finland has five departments covering agriculture, forestry, fisheries and game, veterinary and food, as well as rural areas and natural resources. NWFP are the responsibility of the departments of forestry and rural areas and natural resources. In recent years, a strong emphasis has been given to NWFP in Finland as a part of rural development. As a concept, NWFP cover usually also the services within the field. In fact one could say that the services are even more integrated to the products within NWFP than within forest products. Unfortunately, few activities financed by MAF in Finnish rural areas have had contact with or influenced the neighbouring areas.

However, it is evident that these activities will be further developed especially in the border regions in a much more integrated manner than before through the EU projects

and the national funding. The Finnish project development will occur mainly through the national or EU’s Interreg-programme funding. The Russian and Baltic states are eligible to TACIS (Technical Assistance to the Commonwealth of Independent States) or PHARE (Poland and Hungary Assistance for the Reconstruction of the Economy) programme funding. Also other relevant EU- or Finnish bilateral financing could be used. Many of the experiences and results gained through the Finnish projects in the field of SMEs (Small- and Medium Size Enterprises) would be applicable in the NWFP sector as well, especially in the Baltic states.

So far the projects financed in the forest sector have been either bi- or multilateral without any large scale concept of co-financing and they have been focused on woody forest products or services.

2. INTERNATIONAL CONTEXT

It is evident that in all countries involved in the international development of the forest sector, the importance of international environmental processes emphasising sustainable development and sustainable forest management, as well as the conservation of biodiversity are well known and accepted. Forest certification with the internationally developed criteria and indicators that should be applied and modified according to the national conditions describing sustainability is the result of this process and a necessary element in the development. This process is co-ordinated and monitored by the United Nations.

According to my experience, however, another vital part directing the development is the liberalisation of world trade. This process was earlier led and monitored by GATT (General Agreement of Trade and Tariffs) and currently by WTO (World Trade Organisation). It is important to understand the mechanisms of international trade and the world markets if, for instance, the NWFP sector is to be developed in an international context. Currently there are two large nations that are not members of WTO and thus can partly prevent accepting and adopting the rules and procedures of WTO, namely China and the Russian Federation. It is most likely that also they will become WTO members in the near future, although there are difficulties, especially in the case of Russia. The Baltic states are not members either, but the situation is likely to change in the near future. These mechanisms are discussed in the paper titled “International Trade and Restrictions of NWFP” in these proceedings.

EU has various policies that are common for all its members. In certain sectors there is no common policy yet. For instance, within the EU there are 15, often very different, national forest policies aiming at different objectives and having different means for the development. Thus there is no common EU forest policy – instead there is an on-going process of creating a common forest strategy, which is likely to be ready for detailed discussions this year. In those fields that have an impact on the development of the forest sectors in third countries, e.g. trade and environment, EU has and applies a common policy.

The actual means that can be used in development projects in the adjacent areas of the
EU are technical programmes, like the TACIS for the Russian federation, Ukraine, Moldovia etc. and the PHARE-programmes for the eastern Europe and the Baltic states. These and other technical programmes will be analysed later in this paper.

3. CO-ORDINATION AND DATABASES

Donor agencies have met with serious co-ordination problems especially in countries that are developing quickly. Good examples of such countries are the Baltic states, where there are on-going projects financed by various EU-funds in the fields of practice, education and research, all tackling similar problems, like forestry education or forest institutions; various international financing organisations like the World Bank, the European Bank for Reconstruction and Development, European Investment Bank and International Financing Corporation; various Nordic multilateral sources: Nordic Council of Ministers (NCM), Nordic Investment Bank (NIB), Nordic Project Fund (Nopelf) and the Nordic Environment Finance Corporation (NEFCO); the United Nations with its relevant bodies and programmes like UNDP, FAO, ECE and UNEP, and Nordic bilateral sources with sectoral ministries from 4-5 countries in addition to the private financing through which privately owned projects are being developed. It is very likely that the projects funded by these sources have very different and often opposite objectives, but they can also overlap to some extent. It would be in the best interest of both the recipient and donor countries to avoid these kind of situations.

A strategy to avoid duplicated work and projects is to collaborate in various phases of the project cycle. Lessons learnt show that the most efficient way to collaborate is to start it during the early phases of the project. If the identification and the (pre)feasibility studies are conducted in co-ordination between interested donors, also co-financing can be used. Co-financing brings about additional resources and demands usually a more comprehensive approach in the preparatory phases. If this is not possible, as often is the case, for instance from the competition or decision power point of view, the activities can be co-ordinated by establishing joint databases about the projects. Usually only activities already planned and being implemented can be recorded. This is done within the Nordic Council of Ministers and its committee for agriculture and forestry concerning activities in the Baltic states. The database shows, for example, that there has been no pure NWFP projects in the Baltic states financed by Nordic countries. However, in the discussion which followed the presentation of this paper, the representative of the Danish government mentioned that there has been several such projects, but that they have usually been connected with other issues, thus having an integrated approach. Such projects could be found among the horticultural ones, as often the problems e.g. with cultured berries and wild berries are similar.

This type of database has been gathered by the ECE at the European level. The report is recent and it shows that there has been no pure NWFP projects in countries in transition in Europe. However, Canada has financed a couple of projects that are predominantly concentrating on recreational services and their development (Csoka 1997).
It is evident that the projects have included an element, especially in the sectoral and strategic development, where NWFP is being tackled. But this has occurred rather recently as in e.g. the Master Plan of the forest sector of Lithuania in 1993 there was no analysis included dealing with NWFP, whereas in the strategic development projects in Estonia and in Belarus financed by Finland, NWFP has been given an important role and status in the analyses.

If one really can use these present data bases as an assistance for better planning, the information should be collected automatically, regularly and continuously from the financing agencies as well from the co-ordination units in the recipient countries. Usually the co-ordination units are located in the ministries of finance or foreign affairs. The most appropriate body to collect and disseminate such information and data would be ECE in Geneva, but for that purpose it would need additional resources.

4. SOME PRINCIPLES APPLIED IN DEVELOPMENT PROGRAMMES AND PROJECTS

Finland is currently applying the so-called project cycle thinking in its programmes and projects. This means that every project starts with the identification phase, which is followed by (pre)feasibility studies. After the studies are appraised and the project documentation prepared we will move through competition towards planning or implementation phases, as appropriate. Special emphasis is given to evaluation. Monitoring is carried out continuously.

More and more often an integrated approach is being used: forestry/environment; forestry/forest industries; practical projects having research and educational elements or components and various types of projects supporting each other; forestry/(bio)energy etc. At the same time a more comprehensive approach is developed: forestry considered as a means for rural development, ownership of land and forests having a crucial role especially in countries in transition, and tackling the problems of conservation and utilisation of forests as a part of the same complexity of problems regarding other renewable natural resources.

These approaches are implemented through using either purely bilateral funds, combining bi- and multilateral funds, seeking for co-financing institutions or through commercial financing. Very little has been done so far in combining the different forms and modes of financing. However, the experiences gained by the co-financing of projects with SIDA in Sweden (two bilateral funds), with the Nordic Council of Ministers (one bi- and one multilateral fund), joint activities towards WB financed projects (two bi- and one multilateral funds), border line activities with EU (one bi- and one multi-fund) though having met some difficulties, have proved to be an effort with more benefits than neglects. The co-financing concept should be encouraged also within the development of NWFP.
5. FINLAND AND VARIOUS FINANCING SOURCES

5.1 Multilateral sources

The financing sources can be divided into multilateral and the bilateral ones. First I will deal with the multilateral ones. Nordic cooperation has been active for decades and in recent years it has also been converted into the form of activities reaching the adjacent areas. Under the Nordic Council of Ministers (NCM) which operates by sectors and by Nordic ministers representing their sectors, the practical preparatory work is being co-ordinated by the committee of agriculture and forestry, and respective sectoral committees in each sector. The committees have joint programmes like the one between committees of agriculture and forestry and the environment, the one between committees of agriculture and forestry and regional development and more often the work is organised oversectorally without established permanent structures like in the case of development of the cultural landscape.

NCM has a general programme for adjacent areas and also the sectoral committees have such activities. This and other joint programme work is co-ordinated and monitored by joint working groups who have an expert role in their work. The projects funded by NCM have a tradition to be research and educationally oriented but more often one can meet projects or other activities with policy or practice oriented approaches or elements. The prioritised areas and countries are Estonia, Latvia, Lithuania and Northwest Russia. More activities are likely to be planned in the Baltic Sea region and the Barents Sea region due to the strong political support these regions are receiving from the Nordic countries and their governments. The financing resources are very limited and they are recommended to be used together with bilateral or other Nordic sources. For NWFP these funds would be of interest, for example, in the field of wild vegetation and its genetic heritage, developing picking and local marketing as well as financing of wild berries or mushrooms (emphasising the gender issues), discussing the problems of recreational activities or entrepreneurship within NWFP in the Nordic and Baltic states in a workshop etc.

NIB, Nopef and NEFCO are the other Nordic multilateral sources but there has not been a direct connection between the NCM financed project or its elements and these sources in the field of agriculture and forestry. This connection should be created and developed as many of the projects logically could co-operate and as additional and more permanent impacts and results could be gained through this connection. This connection could be created most logically in the field of NWFP within the processing and further processing of berries, mushrooms etc. including market research as a part of the feasibility studies needed for the involvement of the financing institutions to such a project, for instance. Also larger projects in which investments are needed, for instance, for recreational areas or national parks could be suitable for the NIB and NEFCO financing.

United Nations has, to a large extent, stayed behind in developing the rural areas and the rural sectors like NWFP in the adjacent areas. The most valuable experience of the UN organisations is from the developing countries. Also the holistic approach that, for example, FAO has gained through its policy and project activities could be a very useful
basis for cooperation. Unfortunately the multi-bi-projects that Finland used to have with FAO seem to be over and the cooperation has to seek for and find new ways for cooperation. The ministry of agriculture and forestry in Finland has collaborated with the Forestry Department of FAO in the field of market oriented approach, having applied similar strategies in the development of marketing of sawnwood products in the countries in transition. Other collaborators have been ECE and the recipient governments in Hungary, Estonia and the Russian federation. The cooperation form has been an expert workshop where the problem area has been tackled from the industries, trade, research and education viewpoints. The workshops implemented have been a start-up of national and regional development activities that have been further developed by experts and consultants in various forms. This type of activities could be, according to the experience gained, an option for the continuation of the development of NWFP multilaterally from the Finnish point of view.

Finland has always appreciated the work of ECE and its role could and should be strengthened in the field of NWFP especially in the statistical fora as it provides by far the best international network on which one could base the development of production and trade statistics of NWFP in the ECE region. This work could be done jointly with the European Forest Institute, EFI. However, the development work cannot occur to any significant degree on voluntary basis; additional resources should be allocated to this purpose. This could and should be done by using several bilateral GOs and NGOs integrating their development work with the larger projects financed by the WB for example in the Russian federation and in Eastern Europe. Also the Asian Development Bank could be an option for cooperation in China and the Asian part of Russia.

UNEP and its European office should be connected to the development work and it could occur, for instance, through its participation in the development activities of the inventory methods and methodology of NWFP. Joint case inventories could be carried out with co-financing (bi- and UN funds or with the EU-funds). UNDP could be connected to the NWFP through practical rural development projects in the countries in transition in Europe and Asia.

Finland has trust funds like many other donors in the international financing institutions. These funds can be used primarily for development activities carried out by institutions and consultants through the projects of these organisations. For instance, Finland has these trust funds in World Bank (WB), European Bank for Reconstruction and Development (EBRD) and International Finance Corporation (IFC). The most appropriate organisation would be the World Bank and its regional and country based programmes. WB has taken seriously into consideration the role of NWFP in its report concerning Russia (World Bank 1997). As the approach for the whole development process occurs through pilot areas and their development, it would be beneficial if the development of NWFP could be taken into account from the very beginning of the projects. Thus NWFP would be considered in all the phases and essential elements of the projects and not added afterwards as additional elements, which has been the case too often in previous years. It is recommended that all the donors planning their activities in Russia would fully take into account the report and plan of the WB in Russia which includes a very holistic approach for the forest sector development including the NWFP.

European Union provides, no doubt, several potential sources that can be used in this
context. The main programmes are PHARE covering the whole eastern Europe and TACIS covering all the CISs and Mongolia. NWFP can and should be developed through using various sources, meant for different customers and users, e.g. Joint Venture Programme (JOP) for enterprises; The PHARE and TACIS Democracy Programme and Link Inter European NGOs (LIEN) for NGOs; PHARE Cross Border Programme for institutes and enterprises and authorities; Ecos-Overture partly financed by the participating towns, regions, PHARE-programme etc. for smaller enterprises, associations etc.; TEMPUS (The Trans-European Cooperation Scheme for Higher Education) and other educational programmes and ACE (The Action for Cooperation in the field of Economics) and other research programmes for educational and research activities; LIFE for larger environmental, like national park programmes; INCO (Cooperation with third countries and international organisations) with its PECO and COPERNICUS for the cooperation between EU, countries in transition and international organisations; as well as the INTAS (International Association for the Promotion of Cooperation with Scientists from the CIS) for the promotion of research and cooperation between researchers in this field. Also the fifth framework research programme of the EU could provide financing for the research activities in this field. TACIS and its small programmes like Bistro can provide actual options for the development of activities in the Russian federation and in other CIS countries. It is recommended that especially the smaller project funding sources would be used in this context as they are much faster and more flexible as the TACIS itself.

5.2 Bilateral sources

Finland started financing the projects as a result of the democracy process in eastern Europe and CIS countries in 1991. Until the end of 1997 the projects were financed by the sectoral ministries though the co-ordination was at the responsibility of the Ministry for Foreign Affairs (MFA). Since the beginning of 1998 both the co-ordination and financing decisions are made in MFA. In my opinion, this change clarifies the situation in all phases of the projects, increases the strategic approach with prioritising sectors regionally and countrywise as well as diminishes the problems of overlapping activities and increases the co-ordination in both sides, donor and recipient countries.

In 1997 the bilateral funds for the adjacent areas totalled 234 mil. FIM of which 80 mil. FIM was allocated to Russia and 36.5 mil. FIM to Estonia. This year the shares of Latvia (14 mil. FIM in 1997) and Lithuania (12 mil. FIM in 1997) are likely to be raised. The main objective of the projects in the Baltic states financed by Finland is to assist in their integration to the EU. In this respect, NWFP are not among the prioritised sectors – neither is forestry, so very limited resources are available for these purposes in the Baltic states from the bilateral sources. However, the results gained in the Estonian forestry strategic plan encourage to continue the work within NWFP in the Baltic states. This could occur in well-defined projects, like those having a connection with the forest certification in these countries, with the development of the forest statistics, and within natural resource inventories, for instance, in their methodologies. In 1997 the share of MAF was less than 10% of the total governmental financing for adjacent areas, the sum
16 Sustainable Development of Non-Wood Goods and Benefits from Boreal and Cold Temperate Forests

totalled in 19.7 mil. FIM, most of which was allocated to the agricultural projects.

Limited sources of financing are available also for the central eastern European
countries, but there the assistance towards the integration to EU is heavily prioritised.
The most natural way of the Finnish cooperation with these countries, who have a long
tradition in many fields of NWFP, would be multilateral. For instance, the cooperation
with FAO and ECE are more obvious options than the bilaterally financed development
projects in this field in these countries.

Finland has a long-term agreement with the Russian federation in the field of forestry.
The prevailing agreement was signed in January 19, 1995 between the MAF and the
Federal Forest Service of Russia. NWFP are mentioned as cooperation issues, though
expressed in the context of inventories. But in practice there are no obstacles to develop
and increase the cooperation within NWFP with Russia. The cooperation includes
practical projects, research and educational projects. It is implemented in practice under
an umbrella of projects, which is called “The Finnish-Russian Programme on Sustainable
Forest Management and Conservation of Biodiversity in Northwest Russia”. So far
NWFP are taken fully into consideration in one project, namely in the Taiga-model
forestry project implemented in the Republic of Karelia. My aim is to use this workshop
for the identification of new ideas and proposals on how, when and where and in which
fields we could increase the development activities within NWFP under this umbrella
described above. The Coordinator of the programme is Mr. Tatu Ollikainen, whose
contact address can be found in the participant list included in these proceedings.

6. DEVELOPMENT OF FINANCING

As mentioned above, certain development needs to be identified and certain tasks have
to be taken. It is evident that the work must be better divided between the various
financing sources and their collaboration should be improved. The financing from
sectoral ministries in Finland is likely to concentrate on the first phases of the project
cycle, namely project identification and (re)feasibility studies. Also the NCM financing
are likely to be used in the same phases, separately and sometimes in the form of co-
financing. Also the small EU-funds within TACIS- and PHARE-programmes are
appropriate for these purposes.

It is useful to involve international and Nordic financing institutions at the feasibility-
phase and try to combine this phase with the previous ones. This connection would also
increase the usage of research work and its results in the project. Planning and
implementation phases are evident to be financed bilaterally by MFA, NIB, Nopef and
NEFCO from the Nordic financing sources, as well as by the WB and EBRD from the
international financing organisations and TACIS-, PHARE- and TEMPUS-programmes
from the EU funds. These connections can be assisted with the active usage of small
EU-project funds and the bilateral trust funds in the international financing institutions.

NWFP should be included in all the strategic and Master Plan-type exercises but also
separate, well-defined NWFP should be planned and implemented. The approaches one
should have within these projects are discussed in the paper entitled "International Trade
and Restrictions of Non-Wood Forest Products" in these proceedings. As a general comment on the approach applied I would like to add that Finland applies increasingly the project planning and evaluation models used in OECD-countries (Organisation for Economic Co-operation and Development) and EU-countries based on logical framework approach and analysing sustainability of the activities from various viewpoints such as poverty, equality, human rights and democracy issues; policy environment; institutional capacity; economic and financial feasibility; socio-cultural aspects; participation and ownership; gender; environment and appropriate technology issues (Ministry of Foreign Affairs 1997).

REFERENCES


OTHER SIMILAR INTERNATIONAL MEETINGS ON NON-WOOD FOREST PRODUCTS

Paul Vantomme
Forest Products Division, FAO, Rome, Italy

ABSTRACT

NWFP related issues have been covered in the past twenty years by an increasing number of international meetings which have been organised by several national and international agencies and NGO’s. Similarities and differences regarding the resources, socio-economic, institutional and policy context for NWFP of boreal and cold temperate regions as compared to other ecological zones are discussed to learn how the boreal region may benefit from ongoing experiences in other regions.

Key words: NWFP, International expert meetings, boreal forests

1. BACKGROUND AND CONTEXT OF THIS MEETING

In the past twenty years, an increasing number of international meetings have been organised by several national and international agencies and NGO’s on issues dealing with the conservation and sustainable development of given ‘non-wood’ forest resources, products and benefits. However, most of these meetings have focused on a specific topic (wildlife, trade, domestication, forest biodiversity conservation, indigenous peoples, institutional capacity building, policies, training etc.); a specific product (pine resin, honey, essential oils, mushrooms, herbs etc.); or a well-defined geographical/ ecological region (e.g. tropical rain forests, mangroves, Africa).

Realising the close botanical interrelationships between the various ‘non-wood’ resources of forest ecosystems, and in order to effectively manage and use these resources, it became evident that there is a need for an integrated and comprehensive approach when promoting their development and for international collaboration. Since about 1990, international agencies, such as UNESCO, ICRAF, ITTO, UNEP, WWF, WRI, and national agencies alike have conducted workshops on the theme of ‘non-wood’ (or ‘non-timber’) forest resources to analyse how these resources can, in a
full range of issues relevant to the resource-, harvesting-, processing-, trade- and policy development of the ‘Non-wood Forest Products’ (NWFP) sector, for:

- Asia and Pacific Region, Bangkok, Thailand, 1991;
- Anglophone African Countries, Arusha, Tanzania, 1993;
- Latin America and the Caribbean, Santiago, Chile, 1994;
- The Near East region, Cairo, Egypt, 1997, and


The outcome and recommendations of these meetings proved to be decisive contributions towards a more holistic and integrated approach for the inclusion of NWFP into sustainable forestry development programmes, policies and projects in each of the regions covered (see Annex 2 for a summary of the recommendations of these meetings, of which the full report is available from FAO upon request).

2. PURPOSE AND IMPORTANCE OF THIS MEETING

The current international workshop “Sustainable Development of Non-wood Goods and Benefits From Boreal and Cold Temperate Forests” is the first of its kind for this region, which is characterised by a vast and unique forest resource and a dynamic forestry sector.

Compared with the other eco-regions the boreal and cold temperate forests are very rich in ‘non-wood’ forest resources from which many products and benefits are (or could be) obtained. In addition, there are many similarities regarding the resources, socio-economic, institutional and policy context among the regions. Therefore this meeting might benefit from the current experiences in other regions and from the outcome and recommendations from their relevant expert meetings.

However, the boreal and cold temperate regions have significant differences compared to the other eco-regions, which are related to climate, resource (mostly conifer forests), population densities and industrial development. Furthermore, boreal and cold temperate regions are also far from homogeneous as a wide variety of different social and economical characteristics are found between (and in) countries in the region.

A major issue for many countries in the boreal and cold temperate regions (and which is rarely found in other eco-regions, apart from northern temperate countries), is the fact that there are (no longer) agricultural activities done in the forests (including expansion
of agriculture land use into forests). On the contrary, subsidies are being paid to farmers to reforest or maintain "forest elements" (tree, hedges, lakes, wetlands,...) in the rural landscapes. This has an important impact for NWFP related policies for example, when (urban) people for recreational motives (will want to) hunt or harvest mushrooms or berries along these hedges.

You, as experts from the region, might wish to discuss issues concerning the promotion and development of non-wood forest products (NWFP) of boreal and cold temperate forests, in order:

- to gain better insight into the resource situation and the present utilisation status of major NWFP (which are gathered from wild or semi-domesticated sources) in the region, including their potential; and the problems and issues involved during their harvesting, processing, trade and marketing;
- to assess (and raise the awareness on) the importance of NWFP for rural development; the environment (biodiversity conservation); for sustainable forestry; and if relevant for cross-sectorial interactions with agriculture, recreation, etc.

You may wish this meeting:

- to identify key constraints (and possible solutions) related to the development of the NWFP sector, i.e. resource management and silviculture (including compatible with timber growing, prospects for domestication/ cultivation, on-going initiatives for criteria and indicators of sustainable forest management etc.); people’s participation in resource management, use and monitoring; forest policies, institutions, finance, research and training; extension; production and trade statistics; people’s participation, access and user rights and conflict resolution with timber growing/ harvesting interests or other competing forest uses (recreation) etc.
- to provide suggestions/recommendations for action at various levels to support national/regional efforts for NWF resource management and conservation; and for the sustainable development of their products.

3. EXAMPLES OF OTHER INTERNATIONAL EXPERT CONSULTATIONS ON NWFP: GOALS AND OUTCOME.

This section contains the two annexes. Annex 1 gives a brief overview of some international meetings on NWFP and Annex 2 presents a summary of the recommendations of the following FAO co-organised meetings, namely:

**Global expert consultations:**
- ‘Interregional Expert Consultation on NWFP’, Yogyakarta, Indonesia, 1995;
- ‘Social, Economic and Cultural Dimensions of NWFP’, Bangkok, Thailand, 1994;

**Regional expert consultations:**
- Anglophone African Countries, Arusha, Tanzania, 1993;
- Latin America and the Caribbean, Santiago, Chile, 1994;
- The Near East region, Cairo, Egypt, 1997.
ANNEX 1. BRIEF OVERVIEW OF SOME INTERNATIONAL MEETINGS ON NWFP

1. 1990. Position et Potentialités des Produits Autres que le bois dans la mise en valeurs durable des forêts tropicales. Actes du séminaire international tenu à Kamakura (Japon). ITTO.

Objectives

- Importance of non-wood forest products for local communities, in the national economy in Southeast Asia.
- Role of the forest as a reservoir for biodiversity and biogenetic resources and the role of local knowledge in the commercialisation of NWFPs.
- Impact of the over exploitation and commercialisation of NWFP on the forest degradation.
- NWFPs versus forest conservation.
- Sustainable ways of harvesting and commercialising of NWFP.
- Role of local communities in projects acting towards sustainable forest management.

Recommendations

- Open and permanent dialogue between local communities, logging companies and other, and government.


Objectives
Cultural Survival has established as a project, a non-profit trading company that will import forest products from the Brazil’s tropical forest and sell them to companies that will, in turn use them in retail products (e.g. foods, cosmetics). The profits from such trading will go back to forest residents in the form of project assistance. All the rain forest products traded by Cultural Survival must be harvested and collected sustainable; the extraction of such products cannot contribute to deforestation or to the loss of biological diversity.

Such an undertaking cannot be approached lightly. It is imperative that many voices be heard along every step of such a project. So the workshop explored:

- Historical and cultural antecedents of non timber products marketing and;
- Sought to identify key issues that need attention at each level of the vertical marketing chain (from forest to industrial nation consumer).

Themes discussed during the workshop
• Conserving ethno-botanical information.
• The potential of non timber forest products.
• Palms and their potential.
• Plants as medicines.
• Reaching international markets.

Recommendations
• Forest dwellers must be assured of land and resource tenure, and their knowledge of forest plants must be accorded the status of intellectual property.
• Trade restrictions and regulatory barriers to the introduction of tropical products in international markets must be eased.
• The ecology of tropical forest plants (seasonal abundance, pollination and dispersal biology, regeneration rates, and so on) must be reflected in strategies for harvesting and marketing new products.
• Indigenous and local communities must be direct participants in the research, planning, and decision making processes involved in the development of non timber forest products.
• The development needs and management capacities of forest communities must be respected and enhanced gradually, to minimise the risk of disruption posed by rapid economic change.
• Businesses in importing countries must subscribe to a code of ethics that includes financial compensation to originating communities, such as payment of royalties.
• Conservationists must increase their efforts to support the self determination of indigenous forest dwellers, to link product development to existing and newly initiated conservation programs in critical rain forest areas, and to raise public awareness of the importance of non timber forest products in both importing and exporting countries.


Objectives
Synthesise available information and to define the future research agenda with special attention to the following themes:
• Product identification, assessment and monitoring;
• Indigenous knowledge and ethno-botany;
• Product development and management (biological options, commercial investment and development opportunities);
• Product domestication and adoption by farmers (user, markets); and
• Policy and institutional aspects.

Expected outputs (outcomes)
• Strategy for monitoring, development and commercialisation of NTFPs.
• A synthesis of information available on products, users and adoption, experiences;
• A mechanism and plan for inter regional exchanges of information; and
• Up-to-date catalogue of institutions involved in non timber forest products, with clear definitions of mandates.


The workshop sought to:
• Provide a pan-tropical review of current understanding and recent advances in respect to potential food production, biological adaptations, socio-cultural background and feeding strategies of human populations in tropical forest environment.
• Identify possible applications of such knowledge to development projects and processes in the humid forested zones of Africa, South and Central America, and Asia.


Objectives
The objective of the workshop was to bring together economists, environmentalists, policy analysts, anthropologist, and market specialists to discuss how answers may be found to such critical questions (listed below) surrounding demand, supply, distribution, and marketing of NTFPs of particular interest to policy makers:
• How much market potential do these products have, in the short- and long term future, for alleviating poverty and preserving the environment?
• How much demand (and where) exists for these products?
• Who (individuals, co-operatives, or other groups of institutions) has the skills/capital needed to market them (in an advertising as well as distribution sense)?
• Who will produce/process the products (and will it be more profitable than alternative resource uses)?
• Are the poor likely to benefit?
• Will products be harvested/extracted from privately owned property, or open access areas, and with what consequences for the environment under each regime?
• Under what circumstances might production shift from forest to farm, and with what consequences for poverty and the environment?
• What production processes, at what levels of production, can preserve the habitat?
• Which products are most likely to meet with success, how quickly, and for how long?


Objectives
• To investigate the extent to which extractivism and the associated concept of extractive reserves can be a major force for the conservation of tropical rain forest in Africa.
• To examine the role of extractivism in providing sustainable benefits to forest dwelling and forest dependent communities in Africa.
• Raise awareness and disseminate information on the potential applications of the extraction of non timber forest products to forest conservation.
•Propose guidelines as well as legal and institutional frameworks for the management of forest reserves in Africa where extraction of non-timber forests products and forest conservation are essential elements of multiple use management
• Develop guidelines addressed mainly to policy and decision makers as well as entrepreneurs.
• Awareness and knowledge among the participants of the potential application of the extractive reserve concept to forest conservation in Africa and the viability of using non-timber forest products as an approach for sustainable development of forest communities in Africa.

Recommendations made during the workshop
Proposal of establishing resource centres on NTFPs that would cater for the following services:
• Building awareness and motivating communities on the use of NTFPs.
• Identifying NTFPs suitable as raw material for craft production and training people in making such items.
• Processing of indigenous foods
• Development of suitable packaging and market networks
• Planning of an integrated multi disciplinary approach to successful utilisation and management of natural resources, particularly NTFPs.
• A need to integrate some of NTFPs into cropping systems e.g. rattan in Cameroon can be incorporated during fallow periods.
• Encouragement of training institutions to emphasise indigenous forest products, NTFPs and domestication of indigenous forest species in order to reduce pressure on natural forests.
• A need to increase understanding of land/tree tenure systems.
• A need to assess and value traditional and current resource use, including mapping, qualitative and quantitative analysis, information on the past and present
management systems, and local management capacity. Furthermore:

- Ecological studies of forest resources should be carried out to determine allowable harvest.
- New categories of reserves should be assessed and appropriate management strategies developed.
- A need to sensitise policy formulators on the importance of including NTFPs in management plans.
- A need to stress internal contacts by meetings at national level to:
  - Inform people within their own agency
  - Encourage participants to exchange information with IUCN and among themselves.
- A need for IUCN social program to undertake/fund case studies in community participation program in Africa, before undertaking any other initiatives. The findings should be shared with all development organisations involved in participatory activities.
- A need for IUCN to ensure sufficient ecological monitoring, in field projects in which it is involved.

NB: On the chapter referring to the collaboration between Funding Agencies and IUCN; A clearly expressed need for information exchange and “networking” resulted for the people and institutions working in the field of community forest management for multiple use in Africa.


The objectives of this conference were to synthesise available information and to define future research agendas with special attention to the following:

- Products identification, assessment, and monitoring.
- Indigenous knowledge and ethno-botany.
- Products development and management (biological options and commercial opportunities).
- Product domestication and adoption by farmers (user, marker).
- Policy and institutional aspects.

Outcomes of the conference

- A strategy for monitoring, developing, and commercialisation of non timber forest products.
- A synthesis of information available on products, users, and adoption.
- A mechanism and plan for inter-regional exchanges of information and experiences.
- An update catalogue of institutions involved in non-timber forest products, with clear definitions their mandates.
ANNEX 2. SUMMARY OF RECOMMENDATIONS OF TWO FAO ORGANISED EXPERT MEETINGS


Recommendations (only those addressed to FAO are listed here)

- Develop and provide guidelines for sustainable management of NWFPs.
- Promote establishment of information networks on NWFPs.
- Compile a directory of available databases, as well as of institutions working on NWFPs.
- Draft a policy framework on NWFPs, suitable to be integrated within overall forest sector policy, to serve as a model to be adapted by countries.
- Collaborate with relevant agencies/institutions in addressing specific trade issues such as of information about chemical and biological diversity of forest.
- Develop a system of classification of NWFPs, harmonised with an existing international system such as International Standard Industrial Classification (ISIC) and the Standard International Trade Classification (SITC), in collaboration with the UN Statistical Office.


Objectives of the consultation

- Review the status of non-wood forest products development throughout the Asia pacific region, with the particular emphasis on the social, economic, and cultural aspects.
- Facilitate the exchange of information and sharing of experiences on non-wood forest products development among participating countries.
- Develop a base of information and specific recommendations for use by Asia-Pacific representatives at the upcoming Global Expert Consultation on non-wood forest products.
- Develop specific proposal and action recommendations for supporting non-wood forest products at regional and national levels.

Recommendations (research)

- Research should emphasise case studies, especially those that identify and analyse the causes of success and failure in non wood forest products development. Case studies are particularly needed in the areas of community management, production of non wood forest products, forest dependency, sustainable utilisation, equity, and benefit sharing in marketing. There is also a need to develop case studies that describe and analyse the marketing channels from collectors/producers to consumers.
Other specific research should be conducted on:

- the supply and demand of non wood forest resources, currently and in the future;
- indigenous systems of local knowledge and resource management;
- the connection between tenurial security and the sustainable development of non-wood forest products;
- the role of gender in resource management, including areas with matrilocal customs and property rights;
- appropriate technologies for non-wood forest products harvest, use, and processing; and
- the existing and effects of professional biases and inaccurate stereotypes, especially those concerning local resource users.
THE NON-WOOD FOREST RESOURCES MYSTERY

H. Gyde Lund
Integrated Resource Inventories and Assessments
Manassas, Virginia, USA

"I only ask a little patience, Mr. Mac, and all will be clear to you." Sherlock Holmes in The Valley of Fear

ABSTRACT

Non-wood forest resources (NWFR) are growing in importance. There are a seemingly infinite number of potential products available from the minerals and various life forms on our forested lands. The interior, exterior, "products", or functions of organisms, such as plants and animals, may provide useful goods or services. We can develop any of these resources as long as there is a market. However, one can develop a resource to the extent that it loses its 'forest' identity. How far to push development depends on the land owner, the decision-maker, and the laws. Regardless, four types of studies are needed to develop NWFR: biodiversity inventories, cultural studies, product, users and market surveys, and resource inventories. What to inventory will depend on the specific needs of the individual decision-maker. However, we do recommend the use of multipurpose resource or ecological inventories to keep data collection costs down and when the ultimate use of the resources is unknown.

Key words: resource inventory, non-wood forest resources, biodiversity
1. THE MYSTERY!

"Come, Watson, Come! The game is afoot!" Sherlock Holmes in The Adventure of Abbey Grange

Developing non-wood forest resources is a bit like detective work. One must ask a lot of questions, make many observations, weigh alternatives, and then come up with a solution that tries to solve the decision-makers' problems. During this presentation, you will be the detectives. Your task is to develop some general solutions for the development and management of non-wood forest resources (NWFR). To help you along the way, I will provide you with some clues.

2. WHAT ARE WE TALKING ABOUT?

"What one man can invent, another can discover." Sherlock Holmes in The Adventure of The Dancing Men

We use many terms often interchangeably to describe the things we get from the forest other than timber. These include, but are not limited to Non-Wood Goods and Services (NWGS), Non-Wood Goods and Benefits (NWGB), Non-Timber Forest Products (NTFP), Non-Wood Forest Products (NWFP), Non-Timber Resources and Values (NTRV), Special Forest Products (SPF), Minor Forest Products and Miscellaneous Forest Products (MFP), etc. I will throw another acronym into the pot - NWFR - Non-Wood Forest Resources. To understand the differences between these terms, some definitions are in order.

- **Resource** – A source of supply or support. An asset or material used to accomplish a goal or task.
  - **Natural resource** – things occurring in nature that can be used as wealth.
  - **Renewable resource** – a resource that will replenish itself over time. This may be in a natural situation or in a plantation.

- **Benefit** – Something that promotes well being.

- **Goods** – Things that are useful, beneficial, and has intrinsic value. Things that have economic utility or satisfy an economic want. Forest goods include all flora and fauna, mineral, and water resources occurring on or originating from the forest. The use of the term goods implies that the resources will be used for economic needs and includes direct consumption, barter, and gift exchanges as well as buying and selling in the market place. The resource will be consumed directly or used for economic needs.

- **A product** is anything produced or obtained as a result of some operation of work, as by generation, growth, labour, study, or skill. One may derive products from animal, vegetation, mineral resources, or a combination. Thus the term forest product is a sub-category of goods and resources. We may use the resources directly or we
may have to do some processing before use. The conversion of plant or animal material into a form suitable for human use constitutes an example of production. Products usually have an economic implication.

- **Non-timber products** are any from forest lands other than those used for building or structural purposes. Non-timber products may include those parts of trees used for fuelwood, roots, limbs, as well as things that are not woody.

- **Non-wood forest products** would exclude timber and all other potential wood products. Researchers have characterised NWFP as being generally small in size, consumed domestically by the collector, accessible to the poor, labour intensive and requiring little capital input. This is not always the case. There are examples of large-scale industrial plantations that supply either primary consumer goods or raw materials for further processing using non-wood forest resources (Leakey et al. 1996).

  - **Service** – A contribution to the welfare of others. *Forest services* include the roles or functions forests play. These may be economical, environmental, ecological or cultural.
    - **Economical services** are the production of goods or products that one consumes directly or sells.
    - **Environmental services** are functions that maintain or protect the general stability of the landscape. They include such things as watershed protection, soil stabilisation, and carbon sequestration. We can maintain environmental functions naturally or through plantations of many kinds of vegetation. These things are vital to human survival.
    - **Ecological functions** – the providing of biodiversity and maintaining of ecosystems. Management requires maintaining a naturalness to the forest.
    - **Cultural services** include recreation, spiritual uplifting, and just peace of mind in knowing that some wild and natural places exist on Earth. These most frequently take place in *natural areas*, but we can find beauty and recreation in human-influenced areas as well.
    - **Political services** – (I threw this one in myself.) These are the roles that natural resources play in helping to get people elected or kept in power. Very often our natural resources are political pawns at times of re-elections. People may take a certain stance on natural resources because it looks good rather than because it is ethically or morally the right thing to do.

- **Value** – The monetary or relative worth, utility or importance of something. It is the quality of an asset which people think as being desirable, useful, and important. In short, value is the worth of direct consumption or the sum of money a buyer is prepared to pay for a product or service.

- **Utility** – The ability of a good or service to satisfy human wants.

In this presentation, I use the term Non-Wood Forest Resources (NWFR). NWFR includes all resources found or originating on forest lands regardless if they are currently recognised as goods, as products, or as providing as service. We may manage for a resource even if it has no immediately recognisable use or function. The spotted-owl (*Strix occidentalis*) of the Pacific Northwest is one example, where millions of hectares
of forest lands have been set aside for its benefit. NWFR excludes timber and any other wood products. If one wishes to include the woody material as well, then the proper term would be simply Forest Resources.

3. WHY ARE WE INTERESTED IN NWFR?

"I am glad of all the details, whether they seem to you to be relevant or not." Sherlock Holmes in The Adventure of the Cooper Beeches

While the use of NWFR is not new, the emphasis on their use and consequent inventory certainly is. There are many reasons why we may be interested in our non-wood forest resources.

- We want to get more use from the forest. This is especially true in countries where forests face the possibility of being converted to other land uses such as agriculture. With increasing populations, there will be more and more pressures on the land. At the same time, there will be an increasing need to preserve our natural resources for environmental, ecological, social and economic needs. If we can find new uses for the resources on our ‘wild’ lands, we may be able to preserve them and maintain the much needed biodiversity.

- We need to keep local people employed to bolster a sagging or non-existent economy. This is true, for example, in the Pacific Northwest of the United States where the federal government has closed down much of the traditional logging for ecological reasons. The production of non-wood products is expected to produce less severe environmental impacts to ecosystems than timber extraction (Viana et al. 1996).

- We want to maintain or improve the well-being of our rural people and preserve their traditions and knowledge about natural resources.

- We want to show how important the forests are. We want to create more interests in the forests in general. We want to put a dollar figure on what forests contribute to the national or global economy, often to justify our programs or a strategy.

- We need to find more and rediscover forgotten products for foodstuffs and medicines to feed growing populations and to help people live longer and healthier.

- We have a need to conserve, yet use. We do not want to see anything wasted.

Land owners may collect NWFR data simply to report on it, to develop management plans for sustained-yield, or for developing commercial enterprises. Unfortunately, non-wood forest resources have not received the attention they deserve. Traditionally Ministries of Forestry have not included them in the economic accounts of their countries (Viana et al. 1996). This is due in most part to a lack of knowledge of how to manage non-wood forest resources, a lack of long-term sustainable resource management policies, and a lack of effective institutional frameworks to improve the
management of these products. I would add to this list the lack of "sensitivity" in recognizing the role of NWFR within the local community and the lack of knowledge of what resources are available for development or use.

As a result of the United Nations Conference on Environment and Development (UNCED) in 1992 and to help gain more recognition of the role forests play, the United Nations Food and Agriculture Organization (FAO) and the Economic Commission for Europe (UN/ECE) is seeking country information about NWFR for the year 2000 Global Forest Resource Assessment (FRA 2000). Information sought beyond timber data includes areas of forest and other wooded lands that serve for soil protection and quantities and value of non-wood forest products (foods, medicines, forage, fodder, etc.) harvested from forests and other wooded lands (UN-ECE/FAO 1997). We hope you will continue to support FRA 2000, not only with your country data, but also with financial and in-kind service support.

In order to understand and manage our forests sustainably, we must have a complete picture as to the full roles forests play nationally and globally. In addition, the land owner or developer must have the capability to make use of the resources. In short, the land owners need an overall strategy to develop NWFR. Local, national, and global assessments will help the decision-makers develop that strategy.

Regardless of our motives, in order to manage these resources we have to have some idea as to what we intend to do with them. Do we wish sustain the NWFR? Develop new economic markets? Domesticate and commercialise them? Do we want to sustain the forest as well? For example, we could develop a very commercial blueberry (Vaccinium sp.) operation in Southeast Alaska perhaps, by clearing out the trees and favouring blueberries. This operation may also be sustainable. In Finland we could promote the production of cloudberries (Rubus chamaemorus) on moors by not draining them for tree growing. How much do we push for non-wood goods development at the expense of other forest resources and values? The answer to many of these questions lies in discovering and understanding what are the potential products from our forests.

4. CLUE 1 — MY GALL BLADDER

"Watson here will tell you that I never can resist a touch of the dramatic." Sherlock Holmes in The Naval Treaty

Shortly after I arrived in Joensuu, I had to go to the local hospital because of some gall bladder problems. The doctors told me I had an infected gall bladder and evidence of gall stones. They would have to operate. The surgery went well without any problems. The next day, the surgeons told me that they had cleared up the infection and removed the stones. While resting at home a couple of days later, I received a notice in English describing what the surgeons did to me. I was surprised to learn that to treat the infection and to remove the stones, the doctors removed my gall bladder. This alarmed me a bit because the organ must serve some purpose and now that I no longer had one! What did this mean?
To find out the answer, I got on the Internet and looked up Gall Bladder. In the very first search I found what I was looking for. Much to my relief, I would survive without it. But also on the same Internet page “Black Bear” (*Ursus americanus*) kept coming up. My initial thought was that black bear gall bladders were being used for human transplants. This aroused my curiosity to see what the link was between Black Bears and my gall bladder. As it turned out, some hunters kill black bears in North America for their gall bladders (and other parts) to sell to Asian markets in the preparation of certain medicines and foods. A black bear gall bladder brings about $20 per gram - more than the price of gold. So here was an example of a non-wood forest product that I had never heard of before.

Black bears, of course, are only one source of non-wood forest products. If one considers the potential products from just the plant and animal species on the Earth alone, the number is nearly countless. There are approximately 7 and 20 million species of life on Earth. Some estimates place the number as high as 100 million species. The real figure probably falls between 13 and 14 million (Heywood and Watson 1995). Of these, some 1.7 million have already been described. Table 1 shows the approximate number of species by life group. Of course, only part of these may be found in forested areas.

<table>
<thead>
<tr>
<th>Group</th>
<th>Number of described species</th>
<th>Estimated total species in group</th>
</tr>
</thead>
<tbody>
<tr>
<td>Viruses</td>
<td>4</td>
<td>400</td>
</tr>
<tr>
<td>Bacteria</td>
<td>4</td>
<td>1000</td>
</tr>
<tr>
<td>Fungi</td>
<td>72</td>
<td>1500</td>
</tr>
<tr>
<td>Protozoa</td>
<td>40</td>
<td>200</td>
</tr>
<tr>
<td>Algae</td>
<td>40</td>
<td>400</td>
</tr>
<tr>
<td>Plants</td>
<td>240</td>
<td>320</td>
</tr>
<tr>
<td>Nematodes</td>
<td>25</td>
<td>400</td>
</tr>
<tr>
<td>Crustaceans</td>
<td>40</td>
<td>150</td>
</tr>
<tr>
<td>Arachnids</td>
<td>75</td>
<td>750</td>
</tr>
<tr>
<td>Insects</td>
<td>980</td>
<td>8000</td>
</tr>
<tr>
<td>Molluscs</td>
<td>70</td>
<td>200</td>
</tr>
<tr>
<td>Vertebrates</td>
<td>45</td>
<td>50</td>
</tr>
<tr>
<td>Others</td>
<td>115</td>
<td>250</td>
</tr>
<tr>
<td><strong>Totals</strong></td>
<td><strong>1750</strong></td>
<td><strong>13620</strong></td>
</tr>
</tbody>
</table>

Scientists believe over half of the 13 million + species to be insects. New species are being identified daily. For vertebrates, there are about 45 000 described out of approximately 50 000. There are 240 000 described vascular plants out of an estimated 320 000. Of the 240 000, scientists believe 25% to be edible. Up to 5000 plants have been used for food, although most of the world relies on less than 200 (Stelljes *et al.*1995). This small number provides about 90% of human food supplies.
There is a potential for any species from any of these life groups to be beneficial to humans. To make the situation more complex, we may use the entire life form or just part of it. From any of the 320,000 plants, for example, we could make use of fruits/nuts/seeds, leaves, stems, bark, saps and resins, roots, chemicals, and genetic material. From any of the 9.5+ million forms of fauna, we could make use the exterior (skin, shells, hides, furs, antlers, horns, hooves), interior - meat, fats, bones, teeth, body liquids (venom, milk, blood, oils, musk), chemicals, body parts and organs (eyes, ears, stomachs, gall bladders, livers, intestines), DNA, and animal products - such as nests, honey, wax, silk and even excrement.

In addition to products, many life forms can provide services that directly or indirectly benefit humans. For example, we use dogs to herd sheep, provide guard services, detect drugs, etc. Some birds are used for fishing. Mushroom hunters use pigs to find truffles. Farmers use some insects, such as the praying mantis (Mantis religiosa) or ladybugs (Hippodamia convergens) commercially to control other insects. Certain fish control algae. We use plants for their beauty, for security (thorn bushes, living fences), and for their environmental functions for soil stabilisation, watershed protection, and carbon sequestration.

To further complicate things, people may harvest some NWFR far removed from the forest itself. A case in point is the pacific coast salmon. The salmon spawn in the rivers and streams in the forests of the Pacific Northwest of the U.S. and Canada but fishermen harvest them thousands of kilometres away in the ocean. How one manages the forest can have a bearing on future salmon populations and success of harvests. The same may apply to other migratory animals such as birds and insects.

Then there are species that people can introduce or reintroduce to a forest to create a market. Beavers (Castor canadensis) were extinct in some parts of the United States. They have now been reintroduced and now provide an income to many people through trapping and selling of their furs. We may also use exotic species. Crayfish (Orconectes sp.) have migrated from central Europe to Finland only in the last 100 years. Now they serve as one form of non-wood forest product collected in Finland. Illicitly introduced and grown marijuana (Cannabis sp.) was one of the largest cash crops from the National Forests in the United States until the federal government initiated a program to eradicate the drug.

Finally, many of our forested lands are sources of water and mineral deposits. These too may be considered potential non-wood forest products. The list could go on and on. The bottom line is that nearly anything can be considered a potential forest product. Needless to say, one cannot inventory all possible forest resources and services. If we are going to have a NWFR inventory program, we have to find a way of narrowing its scope. One way to do that is to find out what people want and what they are currently using.

5. CLUE 2 - A SOW'S EAR

"I can't make bricks without clay." Sherlock Holmes in The Adventure of The Cooper Beeches
There is an old saying that *you cannot make a silk purse out of a sow’s ear.* To put it another way, you cannot sell something unless someone wants to buy it. A lot of potential NWG are currently sow’s ears. At this time there is no market for them. Markets can be created, but they take time and energy. To develop a product for commercial use, it is often necessary to look at what people use on a small time basis and then look at needs and opportunities to expand the market. The resources may be provided through exploitation of the natural environment or by domestication.

*Domestication* is the act or process of converting animals or plants to household use. That often means moving a plant or animal from its natural habitat, introducing it to a modified habitat and providing the means for it to reproduce itself in its new location. An example may be bringing a fruit-producing plant from the wild, planting it near one’s house, harvesting the crop and planting the seeds for a future crop. The domesticated plant or animal may or may not be used commercially.

We domesticate because it is amicable to have that particular life form around, because it is easier to deal with at home, or because it is more economical than to continually go to the wild. The reasons we may not domesticate are: that there may be no need, the individual is plentiful in the wild, or the habitat requirements are too difficult to duplicate locally.

*Commercialisation* is the development of a product or service that is suitable or fits for a wide, public market. In the case of plants or animals, the commercialisation may involve the use of natural settings or human-induced environments such as a farmer’s field. If we do not domesticate the individual, people must leave enough individuals for natural or assisted reproduction and the habitat for doing so.

One difference between domestication and commercialisation is that it is usually one’s intent to profit by commercialisation. This may or may not be true for domestication.

To commercialise, one may have to create a demand. This may require a marketing strategy. Strategies that work are to show that: the product is good for you, makes you feel good, makes you look better, is rare/unique/different, or makes you one of the crowd.

The most successful strategy is when the product fills an actual need. From a forestry perspective, however, there are some shortcomings to the domestication and commercialisation of non-wood forest resources. When used in combination, domestication and commercialisation often lead to monocultures. As such, some of the “forest” aspects may be lost.

6. **CLUE 3 — MY TIE**

"These are much deeper waters than I thought." — Sherlock Holmes in *The Reigate*

Some of you may have noticed my tie. It is difficult not to. My wife made it for me (at my request). The tie is made out of cotton. If you look closely you will see shows pigs, tomatoes, apple trees, bee hives, sheep, mushrooms, chicken, sheep, eggs, etc. If you think about it, all of these plants (even the cotton) and animals were once residents of the forests. Eventually humans learned how to use them and they became Non-Wood
Forest Products. Now they have become so domesticated and commercialised that we think of them as agricultural products rather than forest products. So a question arises-how far do we wish to develop the non-wood resources of our forests? Do we wish to develop them to the point that they lose their identity as forest products? For example, do we consider rubber tree plantations forest or agricultural crops? How about palm oil, maple sugar, nut plantations and plantations of *Acacia senegal* for extraction of gum arabic resins?

If we do domesticate and commercialise certain non-wood forest resources, at what points do they become part of the agriculture sector and leave the forestry sector? When does the inventory of these NWFR fall under the jurisdiction of the Ministry of Forestry or Agriculture? What about areas that we use for agroforestry? Do we include these as sources for NWFR? Who has the responsibility for inventorying and monitoring these lands? While the products may be accounted for by someone, do they account for the services as well?

7. A SOLUTION

"Things must be done decently and in order." Sherlock Holmes in The Adventure of The Retired Colourman

So how do we develop and manage NWFR? A single solution is not possible. Each situation may warrant a different approach. Consequently, we can only make some general statements.

7.1 Questions to ask

First, we have to identify the problems. Some of these we have already identified in the preceding discussions. The problems include - What do we want/need to know? What do we inventory - what plants and animals and what lands? Who is responsible for inventorying and monitoring? How do we measure things like mushrooms and deal with temporal aspects? How do we finance the inventories?

From the resource perspective - What kinds are available and in which forms? How much is available? Where is the resource located and what is its extent? Under what conditions does the resource grow and flourish? For medicinal plants, under what conditions it produces its active ingredients?

When fruit production occurs is another information need. The shea butter tree (*Vitellaria paradoxa*) in West Africa produces a bumper fruit harvest every three years or so, but research has been unable to pinpoint why. This is a major problem for buyers and developers of the product who need a reliable (in terms of quantity as well as quality) source. Compared to timber products, NWFR have been under researched (Viana 1996). To determine how to commercialise a plant or animal, we need to know what are the habitat/environments where it is found, when it is usually found, (season, time of day,
time of year), what are its reproductive requirements, and under what environmental variations it can successfully survive. Such information will be useful in developing the inventory and monitoring systems and management strategies.

From the market perspective — What is the anticipated market and demand? What is the access? Can people reach the resources and move the goods to markets effectively? We need to be able to economically and effectively move goods from producer to markets. This means that to develop a resource, we may also have to inventory and monitor transportation networks.

From the management perspective — Can we meet the demand? How can we extract the resources? Can we manage the resources sustainably?

The answer to many of the questions given above depends on what the decision-maker wants to do with the forest land and its resources. This will vary from country to country and situation to situation. Nevertheless, we can make some statements about the surveys and inventories the decision-maker will need.

7.2 Information sources

We gather information to improve decisions and, thus, to get a better use of our natural resources. The benefit of increased information is the wiser use of the resource base over time. The gathering of resource information is not free - it demands resources (labour, technology, energy, transport, etc.) and therefore implies costs (Päivinen and Solberg 1996). Therefore we need to carefully plan our data gathering activities.

There are four types of studies one should conduct to develop NWR: biodiversity inventories which are aimed at developing lists of species, cultural studies to understand customs, user, market, or product surveys which identify what resources are being used and how; and lastly, resource inventories which determine how much of a given resource or resources exist.

7.2.1 Biodiversity inventories

Inventories of biodiversity are essential when surveying new areas and wanting to seek out new non-wood forest products. They do require the employment of specialists in identifying plants and animals. They are most successful when done in small areas, limited to either plants or animals, and where one does not anticipate a great variety of species. For more information on how to inventory biodiversity, see Boyle and Boontawee (1995) and Heywood and Watson (1995). While biodiversity inventories tell us what species may be available in a given area, they do not tell us what are used and what the abundance and distribution of the resource are.

7.2.2 Cultural studies

Without understanding who the local people are, their histories and customs, and including them in the design and application of management strategies, you may find it impossible to carry out sustainable or ecosystem management programs. You may wish
to involve the local people or harvesters in all the other inventorying and monitoring aspects since they are on the ground nearly every day anyway. Local people may take to training well and generally know the terrain better than anyone. Employment of ethnographers would be a good place to start methodologically with harvester interaction. In seeking harvester knowledge, you may want to consider some forms of compensation as a way of resolving potential intellectual property rights issues.

7.2.3 Survey of users and uses
If we are going to have a product efficient inventory and monitoring program we need to know what and how people will use the plant or animal. User, product or market surveys tell us what people are using. Techniques for gathering information include:
- Direct observation - what are people gathering in the woods and how are they using it.
- Surveys by personal interview/telephone/email/regular mail
- Surveys of local markets - what is being bought and sold, quantities, sources.
- Monitoring the sale or issuance of permits, licences, vouchers, etc.
- Spot road-side checks such as for hunting or fishing
- Literature review
- Consulting of historic and archaeological sites. These sources may reveal past and forgot uses.
- Research and development

Readers may find techniques for conducting such surveys in Carter (1996) and Leakey et al. (1996). As you conduct such surveys, especially through the interviews with people gathering the resource, also seek their knowledge about the ecology of the resource under question and its history. By history I mean people's perspective as to whether the resource was more plentiful in the past, what were the causes for its changes, etc. Keep in mind that perspectives vary among genders. Perspectives about the past also change with growth and age (that is, the snow was deeper, trees taller, and people older (and wiser) when I was a boy than they are now).

We also have to be careful that we do not bias or overlook uses. A pharmacologist for example, looking at ethnobotany may see potential drugs, but overlook new foods, etc. Focus on connected systems of local knowledge informed by an understanding that such knowledge is intrinsically situational and dynamic. The use of an interdisciplinary team may also help overcome potential biases.

As we seek new plants and animals to meet our needs, we need also to remember that similar species may have similar uses. Thus if we find that one species meets some need, a closely related one may also. Finally as we go about investigating potential uses, remember that people may not use some plants or animals because they do not have the necessary technology, the use may have been lost between generations, the animal or plant may be too rare to use, there are more plentiful plants or animals that can be used in its place, or the plant/animal may be too plentiful that its use may be overlooked.

We also need to assess physical processes and social interactions involved in moving a product from the forest to the market. We can divide this process into three conceptual parts by geographic location so that you look at who knows and does what in the forest,
at any intermediate points, and in the market.

In this regard, it is important to look at who does the work, who puts up any money or other capital that may be used, and how the benefits from the activity are distributed among the participants. These points should also be considered in planning for future development, much as transportation networks must be factored in.

While product or market surveys tell us what is being used, they do not tell us what is the extent of the resource and what other resources may be present. A potential gatherer must know where to find the resource and in sufficient quantities to make the energy expended on harvesting and processing worthwhile (Emery 1997).

7.2.4 Resource inventories
An inventory can also help decision-makers determine if the resource has a potential for commercialisation by revealing its apparent abundance, distribution, habitat and condition. Resource surveys are most useful when we know what it is that we want to inventory.

If we conduct a User Survey first, then we will have some idea of what it is that we wish to count in the field. If we know what it is that we are after, then we have a variety of inventory techniques from which we can choose. Some require direct observation in the field, others may be done indirectly by remote sensing, and yet others by a combination (Table 2).

| Table 2. Direct and indirect of gathering field data (Correll et al.1997) |
|---|---|
| **Direct methods include** | **Indirect sampling includes** |
| • Mark-recapture (banding/tagging) | • Visual observation (counts of wildlife) |
| • Dimensional plots (circular, rectangular, etc.) | • Fixed-point/ground based photography |
| • Point sampling (horizontal and vertical) | • Aerial photography and videography |
| • Transect/traverse sampling | • Satellite imagery |
| • Profile/content sampling (soils) | • Laser profiling |
| • Volume/content/flow sampling (air and water) | • Radio telemetry |
| | • Radar/sonar and other remote sensing systems |


The use of remote sensing is especially good for inventorying and monitoring some of the functions and services of the forest, such as watershed protection, soil stabilisation, and carbon sequestration. Many of these are reflected by the amount and extent of vegetation cover which interpreters can generally extract from imagery. Some ecological
functions may also be derived from remote sensing such as biodiversity. This depends on the type, resolution, and scale of the imagery being used. For a good review of how to use imagery for mapping vegetation, see Maus (1995).

A shortcoming of all inventory techniques is that we cannot account for all potential resources and products. For example, in the western United States, we had very good inventories of our timber resources on our National Forests. However, we only collected data on trees that were of a commercial species at that time and on trees that were of a certain minimum size. In the early 1990s, researchers found that Pacific yew (*Taxus brevifolia*) was a good source of Taxol, a drug that has proven effective against ovarian cancer. Almost overnight, interest in and the demand for Pacific yew mushroomed. Because Pacific yew is generally a very small tree and was not considered a commercial species at the time of the forest surveys, the Forest Service did not inventory it. Consequently the inventory records contained little or no information about the abundance and distribution of the species. Because inventory data were lacking, some people assumed that the species was rare. Some moves were made to list the species as “Threatened.” If that were the case, then the species would have to be protected. In other words if listed as Threatened, the plant could not be harvested. So here we have an example of a resource having a definite market, but federal laws restricting its harvest. Fortunately subsequent inventories have shown that the plant is widely distributed and fairly common throughout the Pacific Northwest. The development of its use continues.

When we have a clear picture of the products we intend to produce and the biotic source of those products, then the inventory is somewhat straightforward. If we have domesticated and commercialized the plant or animal as in agriculture, the task is very simple - we just count the number of plants or animals in the ‘farm’. If the source occurs in the wild, then we can narrow down the inventory effort by concentrating on its habitat.

**Multipurpose Resource Inventories.** Where decision-makers cannot identify specific commodities, the use of a *multipurpose resource inventory (MRI)* may be appropriate. *Multipurpose resource inventories* are data collection efforts designed to meet all or part of the information requirements for two or more resources, goods, products, services (such as timber production and watershed protection) and/or sectors (such as agriculture and forestry). The use of MRIs is also a way to deal with the financial problems. By combining data collection efforts and pooling resources, one may be able to collect data on key non-wood forest resources at the same time one is inventorying for timber (Lund 1998).

To further complicate matters, many forest plants are ephemeral, with some plants present in the forest only briefly. So, not only do we need to know where to look for specific NWFR, but also when to look. While we may not be able to collect all the data we may need at a given point in time, we may be able to collect enough data to model the distribution of developing resources. An ecological inventory, which is also a new trend and which I consider a form of multipurpose resource inventories, is one method of developing a data base for modelling. The presence or absence of a species in a given location is a function of the site’s biogeochemical and physical characteristics and past history or treatment (Emery 1997).
In ecological inventories, one collects and combines information about soils, climate, hydrology, topography, existing vegetation and past history into a mapped data base. This may be done through the use of a geographic information system (GIS) or through field surveys. From this information, one may be able to predict the location and likelihood of a certain species being found assuming one knows the ecological requirements of the species. The GIS can also help answer some of the questions about access to resources especially if information on roads and trails are incorporated into the data base. You will find instructions for developing ecological inventories and data bases in Innes (1995) and Meidinger et al. (1996). Table 3 lists a minimum set of data you may wish to have on hand to help model the extent of potential non-wood goods and products.

<table>
<thead>
<tr>
<th>Resource Attribute</th>
<th>Source of Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of vegetation cover (overstory and understory)</td>
<td>Remote sensing, field surveys</td>
</tr>
<tr>
<td>Vegetation height (overstory and understory)</td>
<td>Field surveys</td>
</tr>
<tr>
<td>Percent vegetation cover</td>
<td>Field surveys</td>
</tr>
<tr>
<td>Soil type</td>
<td>Field surveys, existing maps</td>
</tr>
<tr>
<td>Climatic data</td>
<td>Weather Service</td>
</tr>
<tr>
<td>Topography (aspect, slope, elevation)</td>
<td>Digital elevation models, field surveys</td>
</tr>
<tr>
<td>Geographic co-ordinates</td>
<td>Field surveys (global positioning systems)</td>
</tr>
<tr>
<td>Past treatment, uses</td>
<td>Historical records, interviews, field surveys</td>
</tr>
<tr>
<td>Planned treatment, use</td>
<td>Interviews</td>
</tr>
</tbody>
</table>


8. CASE CLOSED?

"Come, friend Watson, the curtain rings up for the last act." Sherlock Holmes in The Adventures of The Second Stain

In the past few minutes I have provided you with several clues for the development and management of NWFR. If one thinks about it, every product that humans have ever developed and any that we will ever develop is, in one way or another, derived from natural resources. My gall bladder example provides a link to the vast amount of resources available that could become forest products. What one selects to become a product depends a great deal on its need and how it is marketed - the sow's ear. The
extent of development depends on the decision-maker. In order to plan resource inventories and subsequent management plans, one has to know the intentions of the land owner or administrator. Conceivably, one may develop a non-wood resource to the extent that is no longer associated with the forest - (my tie).

Regardless of intended use, the decision-maker needs at least four different kinds of surveys and inventories. Biodiversity inventories list what taxa are present. Cultural studies help us understand local customs and needs. Market, product and user surveys show what is being used or could be used, and resource inventories show the abundance and distribution of the resources. Where potential products are not fully known, one may want to use multipurpose resource inventories - especially those that are ecologically based.

Because one should design an inventory to meet a specific need and specific needs vary from country to country and within countries, it is impossible for us to come up with some specific solutions that will fit all needs. I have, however, provided many references where you may go to find additional clues for designing NWFR inventories to meet your own needs. Thank you for your kind attention and detective work. Kiitos paljon!

9. THE WITNESSES (ACKNOWLEDGEMENTS)

"Do not dream of going, Watson, for I very much prefer to having a witness, if only to check my own memory." Sherlock Holmes in The Adventure of The Noble Bachelor

My thanks to Marla Emery, Nora Hunter, Eric Jones, Brita Pajari, Tim Peck, Risto Päivinen, Kate Schreckenberg, and Laura Secco for their helpful reviews of this paper.

FURTHER CLUES (REFERENCES)

"He felt so clever and so sure of himself that he imagined no one could touch him. He could say to any suspicious neighbour, 'Look at the steps I have taken. I have consulted not only the police, but even Sherlock Holmes.'" Sherlock Holmes in The Adventure of The Retired Colourman


ABSTRACT

This paper discusses first the concept of non-wood forest products and identifies the following critical aspects concerning the definitions: whether services and non-biological products are included or not; to what extent woody products are accepted and how the concept of ‘forest’ is understood. Then some characteristic features and common issues of non-wood forest production in boreal context are discussed, such as large variation of crops and in low utilisation rates in many areas, ageing of pickers, low profile of the industry and the scarcity of economic research in the field.

Key words: Non-wood goods, definitions, development issues, boreal forests

1. INTRODUCTION

An ongoing appreciation or rehabilitation of tangible forest items which were called minor forest products is a recent phenomena of the past ten years or so. However, it is still a twinkling of an eye in the longer run of depreciation of these products.

As elsewhere, also in Scandinavia an abundance of animal and plant resources formed the basic means of pre-historic human subsistence in the deciduous and coniferous wildwoods. But ever since the Neolithic Revolution, beginning in the southern Scandinavia some 6000 years ago and gradually spreading towards the north and east, the importance of hunting, picking of wild fruits and berries, and gathering of mushrooms and bark declined (Fritzboeger and Soedergaard 1995).

The history becomes a little closer in Joensuu as it has been reported (op.cit.) that several forest uses which have been abandoned in Denmark, southern Sweden and western Norway during the prehistoric and medieval times still had great importance in the 19th century eastern Finland. The swish of the wings of history were even closer, if we were on the other side of the eastern border. Or should one say that in some sense
at least the future may be closer further in the east, where the interest in non-wood forest products has been maintained better than in the Scandinavian countries.

If we were to go further to the south-east – into the tropics – it is not quite clear what will be the ongoing trend of non-wood forest goods. It may be an increasing one, stabilising or it can follow the western history: for example, Byron and Perez (1996) anticipate that many current ‘traditional’ uses of tropical forests will decline as users’ income rise.

2. CONSIDERING THE CONCEPTS

2.1. The product contents

The non-wood forest products are now “blooming” if not yet “booming”. As this has happened in a short period of time, it is highly understandable that the concepts and terminology are still being discussed and a bit ambiguous. In the recent development one may find a minor paradox: the old concept of “minor forest products” was no doubt little discriminatory, but everybody roughly knew what it meant in practice. The new concept “non-wood forest products” and its derivatives are more equitable and rightly so, but I am not quite sure if everybody knows what these include.

There is an old Finnish saying which literally translates as “the beloved child has many names”. A short review of the names of the “smaller-scale” products of forests shows that they have been called by-products of forests, secondary forest products, special forest products, other forest products, minor forest products, non-wood goods and services, non-wood forest benefits, non-timber forest products (e.g. Saastamoinen 1984, Chandrasekharan 1995) and most recently non-wood forest goods and benefits (as in a title of this workshop) or simply non-wood forest goods.

When planning my paper I was happy that I didn’t have to write it in Finnish. In Finnish we cannot easily use the prefix ‘non’ and the Finnish term mostly used in this context is an awkward one – “other forest products than wood”. I am not that happy anymore – as at least some of the problems are also related to the English language – or its usage – in different disciplines. I do not want to exaggerate the problems as they still might be minor ones.

There are some problem areas, which Chandrasekharan (1995) has identified; the paper includes a careful overview of the terminology. The paper was related to a FAO consultation, which agreed on the following definition for general use (FAO 1995, 57):

“Non-wood forest products consists of goods of biological origin other than wood, as well as services, derived from forests and allied land uses”.

The problems of demarcation related to the contents of “non-wood forest products” includes the following:

(i) whether services (such as grazing lands, viewing and hunting wildlife, camping facilities – where there is a human input) and/or (service-type) favourable influences of forests (such as watershed values and amenity values – where there
is no apparent human input) should be included or not. The above FAO (1995) consultation suggested to include the first type of "real" services but exclude the forest influences. On the other hand, FAO (1991) definition has excluded them all as it only included tangible products.

It is finally a matter of agreement whether services are included or not into the non-wood forest products. The term product may refer either to goods or services although an everyday connotation may be more towards tangible items. In Finland the common approach has been to exclude all services and forest influences from non-wood forest products (e.g. Saastamoinen 1984). If they were to be included, then all types of services should be logically included as well, and that would make the definition in many cases too wide to be operational. However, it should be noted that the concept of "non-wood goods and services of forests" is clear, does not cause any confusion and is operational in its proper contexts.

(ii) whether products of non-biological origin (such as water, soil, sand, etc.) should be included or not. The above definition excluded those as forest products in concordance with the earlier FAO definition (1991). However, Chandrasekharan (1995) proves that the former authorised definition of Minor Forest Products included water, sand, etc. – perhaps a fact not well known.

(iii) to what extent – if any – woody materials can be included into non-wood forest products. This paradoxical question cannot be avoided. The concept of non-timber forest product allows firewood at least. The FAO definition (1995) excludes wood in all its forms covering timber, poles, small wood, small dimension wood materials, and wood fuel (Chandrasekharan 1995). It includes rattan and bamboo, which are woody materials (Mather 1990) and tree leaves and other non-woody parts of woody plants, but excludes roots and branches, even smaller ones.

So, apparently the small-scale use of twig brooms, conifer twigs and willow twigs for decoration common in boreal forests were not included into non-wood forest products. As this groups includes some of the most important non-wood forest product in Finland – bath whisks – and small Juniperus branches which are popular in handicrafts – it may not be that easy to agree. The FAO definition (1991) seems to have a more practical approach as it lists which timber and wood assortments are excluded.

(iv) The last question is how 'forest' is defined. Chandrasekharan (1995) states that many forest products other than wood are also produced in non-forest land. Considering them as forest products will be anomalous. Forest products cover only products originating from forests or obtained from a system of land use which can be included under the general heading of forestry (op.cit.). However, the problem is complicated as we have large mixed areas between proper forest lands and clearly defined agricultural lands and concepts such as agroforestry and even urban forestry. So, the more "liberal" concept of forest might also be justifiable although a demarcation line towards agriculture and horticulture should be found as Chandrasekharan (1995) rightfully points out.

The problem which products – for example rowan berries from the trees in farm yards or urban forest groups – should be included into agricultural or horticultural
production then appears. A solution might be that at least natural trees (such as rowan) could be included into the sphere of forestry.

The purpose here has not been to present any official definition of the contents of non-wood forest products (or goods) in Finland as it is not developed, neither to suggest on that. However, common products or goods usually included can be mentioned: they include wild forest and peatland berries, forest mushrooms, herbs and other plants, decorative lichen, reindeer forage and reindeer husbandry (occasionally forage for other domestic animals), game and hunting, and supply of minor woody parts of trees for domestic use or handicrafts as well as such micro-scale products as birch sap and tar.

A conclusion is that the practice in Finland is closer to the 1991 FAO definition than to the 1995 one. According to FAO definition (1991), "non-wood forest products implies all renewable and tangible products, other than timber, firewood and charcoal, derived from forests or any land under similar use as well as woody plants...”

2.2. Some key terms may have mixed meanings

It might be logical to prefer the concept “non-wood forest goods” when a Finnish type of contents of “non-wood forest products” is concerned. However, there is no exact translation for goods in Finland better than ‘products’ and to some extent it seems that even the English terms may sometimes have several meanings.

Goods has two meanings in economics (Black 1997). First they refer to “things people prefer more of rather than less: income, leisure and security are good while pollution and risks are bad”. Second, they are “economic assets taking a tangible physical form, such as houses or clothes. These are contrasted with services, such as transport, which cannot be stored, or insurance, which has no physical embodiment”.

Thus – although the latter distinction between goods and services clearly recommends to prefer term ‘goods’ when talking about material “minor” products – the first general meaning of ‘goods’ as an opposite for ‘bads’ makes the concept not entirely unambiguous. This is also illustrated in two important concepts in non-wood goods forestry: private and public goods.

Private goods are any goods or services used by one individual or firm and which are not available to others. Public goods, on the contrary, are (mostly) services with such characteristics that one person’s use does not decrease the amount available for others. The borderline between private and public goods is not always clear: a recreation forest may be close to a private good when there are few people but becomes closer to the characteristics of public goods under heavy congestion.

The determinants of private and public goods are many and refer not only to consumption aspect but sometimes also to the degree of exclusion (access and property rights) in production (see e.g. Randall 1989). For example, forest flowers are public goods for all wanderers but become private when picked for home delight.

Could one call non-wood forest products commodities? Commodities sometimes refer to any kind of goods and services. More specifically, however, commodities refer to the output of primary sectors, as NWFGs certainly are, but commodities in this sense
are standardised goods, which are traded in bulk and whose units can be traded interchangeably. So, the answer to the question in the latter sense is negative.

The borderline between goods and services in real life is not always clear as some economic goods such as dinner in a restaurant – or a picnic in a forest – are combinations of goods and services (cf. Black 1997).

Goods can be consumer goods (durable or non-durable, used by final consumers), intermediate goods (mostly non-durable used as an input in production) and capital goods (mostly durable used for production). NWFGs can be either consumer goods or intermediate goods, often the same products may have both roles.

The term "product" refers to the usefulness of biological items as well as to the implied use of input of human resources such as labour to make a biological thing available. However, the product may refer not only to goods but also to services resulting from the input of factors of production (see Chandeasekhran 1995).

To conclude, although the concept of "goods" in all its connotations may not always be unambiguous, it nevertheless seems to be more straightforward term than "products" if one wishes refer to strictly tangible non-wood forest items. "Products", however, are more familiar expression especially for the public, and has often perceived to refer especially tangible items.

3. ISSUES AND CHARACTERISTICS OF NON-WOOD FOREST GOODS IN BOREAL CONTEXT

3.1. Mixed property and harvesting rights

There are large variation in the property rights of NWFGs. In most Nordic countries, Russia and the Baltic countries forest berries and mushrooms are open access resources – part of what is called the everyman's rights. Some NWFGs unanimously belong only to forest owners like any parts of growing trees or decorative reindeer lichens. However, in reindeer management the same lichens are part of forage resources of reindeer, the grazing rights of which are considered being part of everyman's rights. In Finland, the northern municipalities had the right based on a law to ask a permission from state to prohibit cloudberry picking by people not living in the municipality. Hunting rights usually belong to the land owner but there are also a range of collective or local rights in hunting. There are also differences between what is legally binding and what is practically being implemented or implementable.

3.2. Large variation of biological crops

A typical feature of the annual crops of berries and mushrooms in the boreal forests are their large variation. For a single species and for certain localities or larger areas the range of annual variation may be from a complete failure to profuse yields.
There seems to be less variation nation-wide than locally. Sometimes the good and bad crops occur very differently in different parts of one country, but sometimes it also may happen that good or bad years occur almost uniformly in the whole Fennoscandia and the Baltic states.

The variation of course is true for all kind of biological crops including the agricultural ones, but nevertheless this variation at least to some extent is a problem for market development and processing industries and of course has due impacts on the prices of products.

3.3. Utilisation rates depend on population pressures and preferences but are generally low

In Finland and the other Nordic countries, the utilisation rates for forest berries and mushrooms compared to biological resources are relatively low.

In Sweden, in 1977 it was estimated that roughly 10% of the total crop of bilberries, cowberries and raspberries were collected and 5% of that of mushrooms (Kardell 1980).

Utilisation rates vary by species, by geographical regions (e.g. Saastamoinen and Lohiniva 1989), and also annually. Most of the utilisation rates are expert estimates or calculations at the national level although some regional or local studies have at the same time investigated both amounts picked and biological crops. For example in Finland, it is usually assumed that only 3-10% of the estimated crop of most common wild berries are picked (Salo 1995). It is certainly higher for most appreciated cloudberries but, on the other hand, hardly more than 0.1-0.5% for least appreciated species such as crowberry. Only 1-3% of edible mushrooms are annually collected.

3.4. No general tragedy of commons

What is called "the tragedy of commons" (Hardin 1968), or as e.g. Klemperer (1995) interprets it more correctly, that of "open access resources" such as fisheries and grazing lands, seems not to be a problem in picking of open access wild berries and mushrooms in the most regions of boreal forests. Explanations include the low population pressures, the decreasing labour productivity when picking the last berries (marginal costs higher than marginal benefits) and biological aspects of gathering (when picking fruits and mushrooms one mainly harvests the annual growth). In this sense, the situation seems to be quite different compared to that of tropical and perhaps even many temperate areas.

3.5. Only part-time employment and additional income

In the boreal zone the winter is long and the summer is short. Even shorter is the season of many NWFGs. The effective period of collecting the crop of a single berry species
may last only one month and is not more than two-three months for the most popular berries. For mushrooms as a whole group the picking period is longer, as some species as *Gyromitra esculenta* is available already in late spring/early summer. Nevertheless, the biological rhythm of NWFGs in boreal zone determines that their collection and supply activities necessarily are seasonal and often part-time. This implies that those activities predominantly produce only additional income, which nevertheless can be very significant. In Finland, their importance has increased as for a long time the income from picking and selling wild berries and mushrooms has been tax-exempt for the gatherers. If that incentive were to be removed — as the Ministry of Finance from time to time has been suggesting — that will cause drastic reductions in the supply available for markets. Last year in Finland when the biological crop was abundant for most species and regions the pickers complained in the media of the low market prices. No doubt, besides labour picking also requires other costs such as transportation.

Besides additional income, non-wood forest goods play a significant role in complementing the household diet. For example, in Russian Karelia during the economic crisis of the ongoing transition period in order to survive households have to rely on subsistence farming and forest products: berries and mushrooms are regular ingredients in nutrition and wild herbs are used as a replacement of industrial medicines (Klementev et al. 1996).

### 3.6. Are the pickers disappearing?

Piirainen (1986) made one of the first studies on socio-economic aspects of berry picking in Finland. He found that the berry pickers were often elderly persons and expressed concern, that in future there will be less people willing to go to forest for picking non-wood forest products. Also the study of Elo (1993) confirmed that the active berry pickers in general are about 50 years old. The same concern was shared a couple of years ago as the official working group prepared their report on means to strengthen the nature product sector development (Työryhmämietintö 1995). They noticed that very few new pickers were entering commercial picking. The same may hold true — at least to some extent — in household picking, as public discussion is worrying why young people are not interested in picking. One of the problems identified has been the earlier start of the school year in mid-August (instead of the beginning of September). It has been suggested that the schools should organise joint picking activities as they did in the past and some plans to do this have already been initiated.

### 3.7. Low profile of the "industry"

Related to the lack of interest by the younger generation, berry and mushroom picking has been seen as having a low and outmoded profile. This certainly holds true for many countries in the boreal zone. However, for example, in Finland the trade and processing industries and the public authorities have already for some time tried to improve the image of the sector. This has happened in the form of increased public information in the
schools and among the population, training and extension has increased, and regional and national picking contests have been organised. The strong health related business and retail-trade of processed natural products, based however largely on imported products, and the “greening” attitudes of consumers may have positive impacts on the image of the NWFGs in general.

The last year’s new development in the Finnish Forest Research Institute to monitor and forecast the development of crops of berry and mushrooms got an excellent reception among the mass media, and increased the public information about and the interest in the availability of products (Salo 1998).

3.8. Development of processing, products and marketing

The recent reports and studies on NWFGs in Finland (e.g. Työryhmänmietintö 1995, Vanhatalo 1996) have clearly demonstrated that regardless of the multitude of traditional and even newer quality products based on nature products, much development in further processing and product improvement and innovations are needed. Especially the marketing activities should be intensified and the entrepreneurs themselves regard that presently as the most important single challenge. Also improved networking is needed between the firms and micro-firms in the natural product sector (Vanhatalo 1996). Recently, many regional projects have been initiated to improve the situation in this aspect.

3.9. Impacts of forestry, modelling and the resource inventories

Non-wood forest goods are a part of forest ecosystems, and whenever the major components of the ecosystems, trees, are removed or forest managed otherwise it will affect NWFGs. In many countries in the boreal zone there are a multitude of studies about the impacts of cuttings and silvicultural operations on the state and production of NWFGs. Those impacts can be negative, neutral or positive, with varying degree and time dimensions (short-term impacts may be different from long-term ones) and differing largely also according to biological and geographical conditions (e.g. Belonogova 1993, Budruiniene 1993, Belonoga and Zaitseva 1996).

As the number of NWFGs is very large, and conditions vary greatly, there are urgent needs to intensify research in this area to achieve joint production functions for wood and non-wood components of forest ecosystems. Nevertheless, the existent studies, and perhaps even more the practical observations, give reasons to conclude that the peaceful coexistence of NWFGs with wood production is highly possible for most NWFPs. It seems probable, that in boreal zone the situation for joint production of wood and non-wood products is decisively better than in the tropics.

In the Nordic countries, Sweden has been so far the only country which has implemented an nation-wide inventory of forest major forest berries and mushroom. The inventory was done in 1974-77 and was integrated into the National Forest Inventory (e.g. Kardell 1980). Smaller scale inventories has been made in several countries.
Inventories are needed, but due to extensive variation in crops they should be replicated during several years. There is an apparent need to survey also lesser known but potential resources.

3.10. Profitability of product chains, functioning of markets and state intervention

Little – if any – research has been done on the profitability of commercial picking and the subsequent product chain from the forest to the world markets. The market prices of berries and mushrooms depend on supply conditions (biological crops, consequent productivity of picking including the requirements of travelling time, and costs) and demand factors (export outlook, domestic consumer and industrial demand, import competition, existing stocks, substitutes etc.). In Finland the conditions of competitive markets are assumed to prevail (Saastamoinen 1996). In the recent years the impacts of competitive imports from the neighbouring countries have reduced the price level. Many active pickers have regarded too low and unstable level of picker prices being the major hindrance for development of commercial gathering (Elo 1993).

As elsewhere, there is a need to study and analyse the existing and optimal forms of public intervention in the non-wood forest product sector. This should include direct and indirect subsidies, taxation and tariff policies as well as any other means which are used or needed to promote the sound development of the sector.

4. CONCLUSIONS

Non-wood forest goods have numerous dimensions of economic and social significance: commercial (including domestic consumer markets, industrial uses, export), household uses (direct collection and consumption by households, providing sometimes very essential components into nutrition) and recreational (related to collection by households but may relate also to a part of commercial picking as well).

The social dimension get more strength as NWFGs are available for all people regardless of forest ownership, and often they are best available for those communities and regions which otherwise have less opportunities. NWFGs also have an important role in maintaining or strengthening the importance of forests among rural and urban citizens.

In addition, the utilisation of many non-wood forest goods is a direct continuation of the oldest livelihood of the human kind and a bridge between the past and present generations: cultural values are no doubt involved. As the multitude of NWFGs also represent a non-negligible sample of the biodiversity of forests, their proper management also support related conservation values. Indeed, the contribution of non-wood forest goods towards economic, ecological and social sustainability of forestry can not be regarded as a minor one.
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Non-Wood Forest Products from Boreal and Cold Temperate Forests

Paul Vantomme
Forest Products Division, FAO
Rome, Italy

Abstract

This paper deals with Non-wood Goods and Benefits (NWGB) which are obtained from boreal and cold temperate forest ecosystems. Information on specific boreal non-wood forest products (NWFP) and examples of their use are given in order to assist in identifying opportunities for management and production of NWGB as an integral part of sustainable economic development. Where possible, issues associated with the sustainable management of these products and compatibility or conflicts with timber production and/or other land uses are briefly touched upon.

Key words: NWFP, boreal forests, sustainable forest management, NWFP classification

1. Purpose and Scope of this Paper

This paper deals with Non-Wood Goods and Benefits (NWGB) which are (or can be) obtained from boreal and cold temperate forest ecosystems. It discusses both traditional and contemporary uses and provides some examples from both developed and developing countries.

Boreal and cold temperate forests represent a large part of the world’s total forest resources. They are situated mostly in the boreal and temperate regions of the northern hemisphere, but with significant large areas of cold temperate forests also occurring on higher elevations in many tropical and sub-tropical countries. Conifers are the most frequent tree species in these ecosystems, with many NWGB derived from conifer trees and their associated flora and fauna.

This paper provides a global view on non-wood uses and benefits from boreal and cold temperate forests and it is based on excerpts taken from: "Non-Wood Forest Products from Conifers", Non-Wood Forest Products Series 12, FAO (1998, in press). The material is presented with the aim to facilitate the discussions at this meeting and
does not imply an endorsement by the author or by FAO of any definition or statement given. Information is given in order to assist in identifying opportunities for management and production of NWGB as an integral part of sustainable economic development and poverty alleviation initiatives in economically depressed regions. Where possible, issues associated with the sustainable management of these products and compatibility or conflicts with timber production and/or other land uses are briefly touched upon.

2. GENERAL OVERVIEW OF NON-WOOD GOODS AND BENEFITS FROM BOREAL AND COLD TEMPERATE FORESTS

This section is a concise overview of the many types of NWGB. Annex 1 presents a shortened version of a more comprehensive classification scheme for Non-Wood Forest Products, which was discussed at the International Expert Consultation on NWFP, Yogyakarta, Indonesia 17-27 January 1995, and of which the full report is available on request.

2.1 Benefits

Human culture
Human culture, art, folklore and mythology, political and religious symbols have been (and are) deeply influenced by "trees" (as a whole, or parts of) and "forests." For example, the Buriats, a Mongolian people living in the vicinity of the southern end of Lake Baikal in eastern Siberia, often viewed groves of Pinus sylvestris as sacred. These "shaman" forests were scattered over dry grassland. Before 1917, it was a tradition to approach and ride through the groves in silence to avoid offending the gods and spirits of the woods. Solitary trees near the Buriat villages were always sacred and adorned with talismans, ribbons or sacrificial sheep skins.

Landscape, ornamental and recreational values
Landscapes and ornamental trees/plants are an important part of daily human life. Trees provide shade and beauty around homes, schools, markets and shopping areas, places of work, along streets and highways, in city parks and other areas; and their maintenance is a significant provider of employment and income (directly and indirectly, such as for example: municipal park employees, or indirectly, the case of paying 'agriculture subsidies' to farmers to maintain and take care of trees/hedges in 'agriculture landscapes').

Environmental functions
The direct and indirect contributions of forests and trees to an "improved" environment are manifold, and include: conservation of energy (shade, wind protection, etc.) and the
quality of air, water and soil; direct and indirect protection to agricultural and urban lands; torrent control in mountain regions, climate related issues, etc.

### 2.2 Goods

**Ornamental products**
Decorative floral greenery is a non-wood forest product with a rapidly expanding market. A wide variety of plants (or parts of) are harvested to provide a green backdrop for floral arrangements, bouquets and other household floral products. Examples include: Christmas trees, foliage (from trees, shrubs, herbs, fungi, etc.), evergreen boughs, bark, roots, mulch, lichen, moss, etc. Annex 2 is the summary of a study on bough harvesting in western Washington, USA indicating complementarity with timber production.

**Food products (human and animal; direct or indirect; processed or unprocessed)**
Seeds, fruits, herbs, spices, berries, bushmeat, eggs, honey, edible insects, lichens and fungi are just a few examples of the enormous variety of food products gathered from wild sources (fauna and flora) in (or outside) forests. Wherever they occur, they have become important foods or food additives, most locally but some are important in international trade as well.

**Fibre materials for construction/utensils/clothing/packaging**
For example, the inner bark of the western red cedar, *Thuja plicata*, and Alaska yellow cedar, *Chamaecyparis nootkatensis*, were used for a variety of items by the indigenous tribes of the Pacific Northwest region of North America. During the transition from spring to summer, women went into the forest and sought out young cedar trees. After saying a prayer for the tree’s soul, they notched the bark near the base, loosened it carefully and tried to tear a long strip of bark free, tearing upward. The inner, lighter bark was separated from the rough outer bark and brought home to be used in various ways. Raw bark was often transformed into a water ladle or a small canoe. Of greater importance however, was the prepared bark which was beaten until it became a soft fibre. It was then separated into strips and bands of varying width. This fibre was one of the raw materials used for coarser woven products such as mats, baskets and shawls, cord for hanging fish in the smokehouse and lashings for shelters.

**As raw materials for further processing (at artisan or industrial level)**
Plant or animal parts for further processing, including for chemical extraction of: tannins, phytopharmacological active components, dyes, resins, essential oils, wax, etc.
3. SOME GENERAL CONSIDERATIONS AS “FOOD FOR THOUGHT” FOR THIS MEETING

Boreal and cold temperate forests are, in addition to their huge wood production at the global level, also important sources of a wide range of non-wood products and benefits (as compared with tropical forests for example). In the region, forests, wild fauna, trees and shrubs play a key role in human society. They have been revered by many cultures and have become an integral part of human folklore, mythology, religion and art.

NWGB are derived from a wide variety of species of wild fauna and flora in and outside forests. Even the non-wood tree products come from virtually every part of the tree; the foliage, bark, roots, resin, seeds, fruits and cones. The wood, foliage and resin of a number of trees and conifers yield essential oils which are important ingredients in perfumes, disinfectants, and cleaning products. Whole trees are important as landscape and ornamental materials, Christmas trees and speciality products such as bonsai or topiary.

Many non-wood products have been used for thousands of years. For example, tapping of pines and other conifers for resin has been practised at least since biblical times. The edible nuts of several pines have been important food sources in many parts of the world, probably since pre-historic times. Traditional uses of bark and roots by indigenous forest dwelling societies living along the boreal regions of North America and Europe for food, medicine, construction, clothing and basketry is still another example of a long-term use of non-wood product of which many are still in use today.

It is interesting to note the similarity of some traditional uses of non-wood products in different parts of the world. The Fijians used resin from an indigenous conifer as an ingredient of a glue to build their ocean going canoes. The indigenous people of some North American cultures also used conifer resins to caulk their canoes. Similarly, the diuretic properties of the berries of *Juniperus communis* were known to Europeans, the peoples living on the Himalayan highlands of the Indian subcontinent and the indigenous people of North America.

Some food items from conifers or conifer forests, which were once considered traditional staple foods of forest dwelling people, have become delicacies in today’s society. Pine nuts are now an ingredient in a number of “gourmet” dishes in the cuisine’s of Asia, southern Europe and the south-western USA. The same is true of the nuts of *Araucaria araucana* in Chile, *A. angustifolia* in southern Brazil and *Tóreya nucifera* in Japan. Juniper berries flavour a number of traditional European dishes, especially those which include wild game. They are also a key ingredient of the alcoholic spirit, gin. Edible mushrooms harvested from conifer forests have become an important item in international trade and the Japanese matsutake mushroom, which grows in forests of *Pinus densiflora* in Japan, is presently regarded as the world’s most expensive food.

Several non-wood products are of a more recent origin. A classic example is the recent discovery of the anti-cancer agent, taxol, in the bark of *Taxus brevifolia*. Other examples include the use of forest gathered organic foods and foliage for floral arrangements, of pine straw and bark chips as mulches and soil amendments. In addition, some long-term uses of a non-wood product in one culture have recently become appreciated by other cultures. A case in point is the recent interest in the
medicinal properties of extracts from the fruits of *Ginkgo biloba* in Germany and other European countries, something which has been used in Asia for thousands of years.

Some non-wood products are presently major items in international trade. These include Christmas trees, evergreen boughs, essential oils, resins, certain species of pine nuts, edible mushrooms, berries, honey, maple syrup and decorative lichens. These products provide additional sources of income for people in many countries including a number of developing countries. On the other hand, the development of alternative sources of a non-wood product by a developing country could reduce the need for that country to import that product. This has the advantage of reducing the need for foreign exchange required to import that commodity plus providing additional jobs. The development of a local cedarwood oil industry in northern India based on *Cedrus deodara*, which provides an acceptable substitute for imported cedarwood oils from the USA is a good example of such an initiative.

While there has been an expansion in the development of some non-wood products, production levels of others have declined. In many cases, these declines have been regional in nature and are based on global, regional or local factors. For example, the decline in production of gum naval stores in the Baltic countries and the USA is directly related to the high labour costs associated with industrial economies which reduces the profitability of harvesting gum resins, a labour intensive process. Consequently other alternatives, such as the production of tall oil as a by-product of the kraft pulping process or the extraction of resin from saturated pine stumps have become more economically viable resin sources. Tapping of live trees for resin is still a viable alternative in developing countries, however, where labour costs are low. There are opportunities to further develop the resin tapping industry in places like China, and several other countries which have a significant pine resource. Decline of the tannin industry in the eastern USA during the early part of this century was directly due to the decimation of *Tsuga canadensis* forests resulting in a shortage of bark from which to produce tannin. This forced the industry to seek alternative sources of tannin.

Enterprises based on non-wood forest products are and can provide many opportunities for employment for disadvantaged people (physically and socially) and can therefore play a very important social role in society. Collection of pine resin, nuts, berries, mushrooms, sorting and grading of conifer boughs, harvesting and processing of edible mushrooms, decorative cones and lichens, production of Christmas wreaths and related items, are examples of such enterprises. Particularly, but not exclusively, in developing countries women are directly involved in the use of non-wood products for traditional uses, such as harvesting of herbs, roots, or bark for food, medicinal or artistic purposes, processing and storage of berries, fruits or pine nuts and production of curious and artistic products (e.g. baskets and other items from roots, bark or pine needles).

Non-wood products which have enjoyed an increased demand in recent years are evergreen boughs, certain medicinal products, decorative cones, edible mushrooms, berries and lichens. Increased demand for these products has created new job opportunities in many areas. In the Pacific Northwest region of the USA, employment opportunities created by increased demand for evergreen boughs, edible mushrooms and decorative cones has partially offset unemployment caused by a decline in the wood
products industry due to the reduced availability of timber from public forest lands. The
increased demand for certain non-wood products, such as evergreen conifer boughs and
edible mushrooms, is driven largely by a few, select industrialised countries such as
Germany and Japan. As other countries develop economically and the quality of life of
their people improves, there could be additional demands for these and other non-wood
products from conifers. A recent example of this trend is the sudden increase in demand
for Christmas trees by the people of Mexico.

There is evidence that the harvesting of some non-wood forest products is
compatible, perhaps even beneficial, to other forest management objectives. There are
indications, for example, that harvesting of decorative lichens in the Nordic countries can
increase success of pine regeneration and result in increased growth of pines on dry,
exposed sites, thus making lichen gathering and wood fibre production compatible
resource management objectives. The compatibility of harvesting evergreen boughs and
Christmas trees from forests managed for wood production has been demonstrated both
in Germany and the USA. The harvesting of pine straw in the eastern USA can provide
an income from pine plantations long before they are ready to harvest for pulpwood or
timber. An other interesting example is the harvesting of non-wood forest products from
materials which were formerly considered to be waste products. The extraction of cedar
wood oils from sawdust and other residues from the cedar wood products industry or
from trees which have been felled to create pasture for livestock grazing are good
examples. Another example is the initiatives of governments and the wood products
industry to develop viable products to utilise huge volumes of waste bark, much of
which was formerly disposed of by burning in tepee burners, often resulting in
widespread air pollution.

Unfortunately, in other cases, unsustainable and damaging practices have been
associated with the harvesting of certain non-wood forest products. The harvesting of
the bark of *Tsuga canadensis* in the eastern USA for production of tannin is an
outstanding example. This practice resulted in the virtual decimation of the old growth
*Tsuga canadensis* forests which once covered extensive areas of this region. Other
eamples of a non-sustainable harvesting practices include: over-hunting of given fauna
species and the intensive gathering of medicinal plants, such as wild ginseng.

Harvesting of certain non-wood forest products has also resulted in land use conflicts.
A case in point being the conflict between commercial pickers of edible mushrooms and
indigenous people harvesting mushrooms in traditional sites in western North America.
Illegal entry into pine plantations for harvesting of pine straw is another example of a
conflict associated with the harvesting of a non-wood product.

Factors other than the harvesting of non-wood forest products could affect their
sustainability. There is evidence from Europe, for example, that a decline in production
of fruiting bodies of ectomycorrhizal fungi, some of which are harvested as edible
mushrooms, may be the result of soil acidification and nitrogen eutrophication. Not only
could this affect future harvests of edible mushrooms but, because of their symbiotic
relationship with forest trees, could adversely affect overall forest health and
productivity.

More recently, programs leading toward the expansion of existing non-wood products
or the development of new products have attempted to identify and address potential
problems in the long-term sustainability of these products. The potential impact of the increased demand for the bark of *Taxus brevifolia*, a small tree which occurs in limited quantities in the Pacific Northwest region of the USA and British Columbia, Canada, for extraction of the anti-cancer ingredient taxol was recognised early. This resulted in an immediate search for alternative sources of this material. The search for alternative sources of taxol has been successful to the point that there is now a reduced demand for yew bark and the pressure on a limited resource has been eased. Concern about the potential impact of increased harvesting of edible mushrooms from conifer forests on the sustainability of this increasingly important resource has been raised in several countries and research is already underway in the USA to look into this question. In addition, some concerns have been raised about the long-term effects of regular harvesting of pine straw on the soil nutrients in pine plantations and should be investigated.

There are many opportunities to develop or expand profitable, sustainable and environmentally sound non-wood products enterprises in conjunction with economic development projects. Obviously, the development of an enterprise which involves use of non-wood products must be based on the availability of an existing forest resource (natural or planted). An appreciation by local people is also an important factor to consider when planning such enterprises. In addition to the potential economic benefits to be derived from the harvesting of non-wood products, other factors to consider are that the management and harvesting practices used will ensure the sustainability of the non-wood resource and that its harvest is compatible with other existing or planned uses of the forest.

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ANNEX 1

A Tentative Classification scheme for Non-Wood Forest Products. (C. Chandrasekharan 1995)

Live plants and parts of plants
- Live plants,
- Parts of plants (fresh, cut, dried or crushed) collected for specific uses,
- Specific parts of plants with multiple uses, not included under the previous group,
- Vegetable material not elsewhere classified,
- Raw exudates and similar natural products.

Animal and animal products
- Live animals,
- Animal products.

Prepared/manufactured products
- Prepared (provisionally preserved) edible products,
- Prepared beverages,
- Prepared animal feed/fodder,
- Vegetables oils/fats,
- Animal fats/oils,
- Prepared waxes of animal or vegetable origin,
- Dyeing and colouring extracts of plant or animal origin,
- Phytopharmaceutical/medicinal extracts, galenicals, medicaments,
- Essential oils and their concentrates,
- Rosin and rosin derivatives,
- Processed gums and latex,
- Other basic organic/phytochemicals,
- Prepared bark products,
- Plaited products,
- Products of natural fibre,
- Tanned leather, fur and products of taxidermy,
- Miscellaneous products manufactured from non-wood forest raw materials,
- Other non-wood plant and animal products n.e.c.

Services
- Forest based services.
ANNEX 2

A study in western Washington, USA indicates that timber production and bough harvesting in *Abies procera* plantations can be compatible management objectives. Bough harvests can begin when the plantation is eight years old and can be sustained for up to 25 years. Open grown, sapling size trees have the best quality and greatest quantity of foliage. Stand mortality can be prevented by intermediate Christmas tree harvests but in general harvesting for boughs is more profitable than selling Christmas trees. In the study presented, bough harvesting began at age 13 and the annual harvest over a 10 year period was 1930 kg/ha/yr or about 2 kg/tree/yr. Approximately 55% of the trees had boughs harvested at least once. A pre-commercial thinning in this plantation at stand age 24 provided a final opportunity for bough harvesting providing an estimated yield of 12260 kg/ha of boughs. Based on a 1980 market value of $US 0.20/kg, the boughs resulting from the thinning were worth $US 2452/ha. A three stage thinning procedure is suggested when combining a bough harvest with stocking control. First stage is the selection of crop trees for ultimate timber harvesting and marking trees to be removed. Secondly, bough cutters strip any marked tree of saleable boughs. In the final stage, a thinning crew can cut all marked and/or stripped trees. This paper also reports results of a similar study in Denmark where a 21 year old stand of *A. procera*, harvested for 13 years for boughs, gave annual yields of 1.8 kg/tree (Murray and Crawford 1982).

NON-WOOD GOODS AND BENEFITS IN THE UN-ECE/FAO TEMPERATE AND BOREAL RESOURCES ASSESSMENT 2000

Linda L. Langner
USDA Forest Service, Washington, DC, USA

ABSTRACT

The UN-ECE/FAO Temperate and Boreal Forest Resource Assessment 2000 (TBFRA) will be a key source of information for evaluating international forest resources. Section V of TBFRA focuses on the protective and socio-economic functions of the forest. Quantitative and qualitative data are being collected on forest use by indigenous and tribal peoples, public access to forests, and non-wood goods and services of forests.

Key words: Assessment, non-wood goods and services

1. INTRODUCTION

Forestry has become highly visible in the international political agenda, particularly since the UN Conference on Environment and Development in 1992. The UN Commission for Sustainable Development and its Intergovernmental Panel on Forests have been particularly important in identifying forest information gaps which international organisations are being called upon to fill. The Temperate and Boreal Forest Resource Assessment 2000 (TBFRA) will be a key source of information for evaluating international forest resources.

Forest managers are now addressing a much wider range of issues than simply managing forests for wood production. Environmental concerns and public demands for other uses of the forest have resulted in increased public interest in forest management. Because of the increasing demands for many non-wood uses of the forest, managers have to deal with multiple objectives on forest land. In some cases, these multiple demands can lead to conflicts between user groups. Managing for multiple objectives requires better data about the variety of goods and services that area provided by forests. National needs for better information may also improve international reporting on these goods and services.

International efforts to collect data on non-wood goods and benefits have been hindered by several factors. The incredible variety of non-wood goods and services that could be considered is overwhelming. Most countries do not collect national-level data on these goods and services. At best, data are collected on a small number of products. Where data do exist, comparability among countries is often limited. This paper briefly describes two previous efforts by the ECE/FAO to collect such data, followed by a more detailed discussion of the content of the TBFRA.

2. PREVIOUS ECE/FAO ASSESSMENT EFFORTS

The most recent ECE/FAO Forest Resource Assessments (FRA) have been conducted on a 10-year cycle. The first questions about non-wood goods and services were included in the 1980 FRA, with a separate query included in the 1990 assessment. Since the 1990 FRA, a Team of Specialists was commissioned to evaluate the prospects for further reporting on non-wood goods and services.

2.1 The 1990 FRA

The enquiry for the 1990 FRA included a separate section (Part II) on non-wood goods and services. Part II emphasised a descriptive approach to allow correspondents to provide information that did not fit a more structured quantitative format. Seven functions of forests were considered: wood production, water supply and protection, grazing, hunting, nature conservation, and hunting. The enquiry requested information on four topics:

- the importance of forests for each of the seven functions;
- the number and area of national parks and nature reserves, their forest area, and primary functions;
- a list of non-wood products with estimates of quantity and value where available;
- an evaluation of the change in emphasis in policy and planning activities towards the various functions over time.

A separate volume (Volume II) was published with a synthesis of the results from Part II, the individual country responses, and a commentary on the results. As expected, data varied widely between countries. In most countries, comparable national inventories were not available. Because of data variations, it was difficult to compare results across countries. Despite these limitations, the results clearly indicated the importance of these goods and services.

Forest area was rated as of high, medium, or low importance for each of the seven functions. These ratings were provided by ownership categories where possible. Wood production tended to be rated highly important on more acres than other functions. Ratings for other functions varied greatly between countries. In evaluating the change in emphasis for the forest functions, a general trend was seen of an increasing emphasis in the majority of countries on protection, water, nature conservation, and recreation.
The respondents provided great variety in the list of non-wood goods. The most commonly reported products were berries, mushrooms, game meat, honey, nuts, Christmas trees, aromatic and medicinal plants, foliage, needles and cones, resin, and fodder and hay. These are not necessarily the most economically important goods. Several non-wood goods are already traded in economic markets, including Christmas trees, decorative greens, cork, resins, gums, and edible products. However, in many cases non-wood goods collected for personal consumption or traded outside traditional markets may be more important in terms of quantity and/or value.

The results of Part II were considered sufficient to continue efforts to improve the ability to report on non-wood goods and services. To further the study of this issue, a Team of Specialists was convened in 1994 under the direction of the FAO/ECE Joint Working Party on Economics and Statistics.

2.2 The Team of Specialists on non-wood goods and services

The team of specialists was commissioned to prepare a report that would present the situation and trends at a national level. The approach taken was for team members to prepare individual country reports, following a standard outline and list of goods and services to consider. Seven country reports were prepared and a summary of the reports is currently undergoing final revisions.

The team report concluded that data problems that were identified in the 1990 FRA persisted: lack of national data and lack of common methodology. The goods and services considered in the study covered a wide range of disciplines. Much of the relevant information may reside outside traditional forestry sources, which increases the cost of data collection. In addition, interpretation of information becomes more complex. In many cases, data are not available for the “forest component.” For example, hunting data are not usually presented for forests or forest species.

Despite these difficulties, there were several areas where common measures were fairly standard across countries, primarily in the area of environmental services. The most obvious were information on carbon storage in forest ecosystems, species diversity (either number of species, forest types, or other grouping), protected areas, and lists of endangered species. The latter two categories can generally be reported by IUCN categories, although the “forest” component is not always available.

Recurring, statistically designed inventories of non-wood goods were fairly limited. However, some countries do keep annual reports of outputs. Where the data are maintained, quantities are usually in a common weight measure. Goods with high potential for reporting included game meat, mushrooms, berries, Christmas trees, and decorative materials. The value component tends to be more problematic.

Data on hunting and fishing activities were available from all countries, often including both harvest numbers and number of participants. Data on other types of leisure pursuits were limited. Most recreation use data were from public recreation areas only. For all recreation activities, it is often difficult to estimate the portion that occurs in forests.
The team focused on physical quantification of non-wood goods and services. Most of the values provided were for the non-wood goods. There was not sufficient documentation to determine at what stage of production most goods were being valued. Since many of these goods are not marketed, the values provided are likely to greatly underestimate the total value. For many of the services, particularly for recreation, data were available for fees collected for access or other services. A few examples were also provided of valuing environmental services, such as avalanche protection.

The results of the country reports indicated that it is possible to report on non-wood goods and services in a manner useful for policy making. However, improving the existing situation will require a commitment of resources, and better co-ordination to discover data from outside traditional sources.

3. THE TBFRA

The TBFRA continues a five decade tradition of international forest resource assessments. The enquiry for data collection was the result of numerous consultations over the past several years, led by a Team of Specialists. The results of this assessment will be part of the Global Forest Resource Assessment 2000, led by the FAO in Rome. The TBFRA will play an important role in providing data on many of the quantitative indicators of sustainable forest management drawn up by the Pan-European process.

The enquiry has been sent to the national correspondents in all member countries. Responses are due on January 31, 1998. (For the name of a specific national correspondent, contact Alex Korotkov at UN/ECE: alexander.korotkov@unece.org) The preliminary results will be presented to the Pan-European Ministerial Conference on the Protection of Forests, to be held in Lisbon in June 1998.

The TBFRA has five main sections:
I) general forest resource information
II) biodiversity and protection status
III) wood supply and carbon sequestration
IV) forest condition
V) protective and socio-economic functions

Section V of the enquiry contains the information on non-wood goods. Non-wood social and cultural benefits or services are also addressed in this section, while environmental benefits are covered in several other sections.

3.1 Section V in the TBFRA

Section V consists of five tables, Tables 21-25. Table 21 focuses on protection, requesting data on forest area managed primarily for soil protection. Two points in time are requested to develop a trend in soil protection.

Table 22 requests information specifically on use of forests by indigenous and tribal peoples. Information on total population, forest area used for non-wood goods and
services, and list of the main uses of the forest is requested. Quantitative information on the uses is to be provided where available.

Forest land is also used extensively by the general population for collection of non-wood goods and for various recreational activities. Table 23 focuses on public access to forest land, by ownership categories. Correspondents are asked to estimate the area of forest land not available for public access by ownership category, as well as the long-term trend in access by ownership. Patterns of visitation are requested, using any type of quantitative information available. Descriptive information on access regimes that vary from general access policies can also be provided.

Table 24 requests primarily descriptive data on the range of non-wood goods that are important in the responding country. Since quantitative data is likely to be limited for many goods, this descriptive approach will allow countries to highlight those goods that are important for reporting at the national level. Correspondents are also asked to assess whether demand for the listed goods is either increasing, stable, or decreasing.

Available quantitative data on non-wood goods will be presented in Table 25, which requests a list of the quantity and value of non-wood goods. To the extent that countries use similar measures of quantity and value, aggregated values across the ECE regions may be possible.

3.2. Other non-wood services in the TBFRA

In addition to the information in Section V, a number of environmental services are addressed in other sections of the enquiry. Section III includes information on carbon storage, which can be used to show the importance of forests in global carbon cycles. Section II contains information on biological diversity. Data on the occurrence of endangered species provides information on the importance of forest ecosystems for harbouring rare species. Other tables request data that address the diversity of tree species, age class distribution, and genetic origin.

3.3. Reporting on the non-wood goods and services from TBFRA

It is too early to determine to what extent it will be possible to summarise data on these topics across countries. At a minimum, the results should clearly identify the non-wood goods and services with the greatest potential for international reporting. Previous efforts have provided some ideas of the likely candidates. The TBFRA results could either confirm or contradict some of those results.

A major emphasis in the enquiry is a requirement to document the source and reliability of the data presented. This information will be critical to assessing the ability to aggregate across goods and services. Numerous questions have been raised about the appropriate values to use for non-wood goods and services. At this point, it is most important to assess whether any values are available, with appropriate documentation.

The report of the TBFRA will be a summary of the results of the five sections of the enquiry. A series of more in-depth technical documents will provide additional detail. One of those documents will a more detailed report on the results of Section V.
4. CONCLUSIONS

The TBFRA is the next step in improving our ability to provide useful data on non-wood goods and services. It would be easy to get discouraged by the enormity of the task. However, a consistent reporting format for wood products did not occur over one assessment period. In this case, we are dealing with a variety of goods and services that all have unique properties and for which traditional data collection and analysis techniques may not work.

The results of the TBFRA should also help narrow down the range of non-wood goods and services that are important for international reporting. The enquiry results will determine which goods and services can be reported by a significant number of countries, and whether the potential exists for common reporting measures. Other important factors to consider are the importance of the forest in supplying the good or service, as opposed to non-forest supply; the economic or social importance of the good or service; and whether international reporting requirements exist.

Finally, success in this area is dependent on a commitment of time and resources from the highest levels. Most countries have devoted considerable resources to collecting data on forest resources. Additional or complementary efforts will be required if international reports hope to achieve the comparability and quality of reports on wood products.
NON-WOOD FOREST PRODUCTS IN THE COLD TEMPERATE AREA OF CHINA: THE CASE OF VACCINIUM SPP

Jiang Chunqian
International Farm Training Centre, The Chinese Academy of Forestry, Beijing, China

Chen Binghao and Zhu Zhaohua
The Chinese Academy of Forestry
Beijing, China

ABSTRACT

The resources of NWFPs are very rich in the cold temperate area of China and they have become more and more important in the local development, especially *Vaccinium uliginosum* and *V. vitis-idaea*. Some problems and recommendations on the NWFPs development for this area in China are given.

Key words: NWFPs, *Vaccinium uliginosum*, *V. vitis-idaea*, cold temperate area

1. BACKGROUND

The area north of Daxing Anling Mountain, with latitude and longitude between 46°18' and 53°34', 119°19' and 127°15', respectively, belongs to the cold temperate area. Its area is about 27.55 million ha which includes the north of Heilongjiang Province and the north of Inner Mongonia Autonomous Region. It is also the largest state-owned forest area and one of main centres of timber and non-timber production in the boreal and cold temperate areas of China.

The climate in this forest area is cold and humid with the yearly average temperature of -2 to -6 °C. The average temperature in the coldest and warmest month is -30 °C and 16 °C respectively. There are a permanent frozen layer (the thickness of the layer is about 20-30 cm), higher underground water level and large areas of marsh and wetland forming the dominant *Larix darhurica* vegetation. The forested area is 106 thousand km² with stand volume 692 million m³. The berry resources are very rich with the characteristic of broad and relative concentration distribution, high storage and easy collection.
2. THE BERRY RESOURCES AND THEIR DEVELOPMENT

According to the primary statistics, there are 18 species of berry plants in the north of Daxing Anling Mountain forest area, e.g. *Vaccinium uliginosum*, *V. vitis-idaea*, *Lonicera caerulea* L. Var. *Edulis*, *Rubus davidii*, *Rosa palmatus*, *Fragaria orientalis* and *Ribes procumbens*. The total natural production of berries is about 1.8 million tons. The yearly average purchasing of natural berries was 1000 tons, but it has peaked at 5000 tons. For example, the natural production of *Vaccinium uliginosum*, and *V. vitis-idaea* L. is about 1.3 million tons. If the collection proportion reached 1-5%, the yearly collection would be from 13 to 65 thousand tons. In 1994, the purchasing of *Vaccinium vitis-idaea* was 800 tons (excluding the collection for collectors' own needs) with only 0.1% - 0.2% of the natural production collected. So the berry resources in this forest area have a great potential to be developed.

The following berries can be found in cold temperate area of China:

- *Arctos japonicus* Nakai.
- *Hippophae rhamnoides* L.
- *J. sibirica* Burgsd.
- *Prunus padus* L.
- *Ribes lioanum* kitag.
- *R. palczewskii* (jancz) Pojark.
- *R. spicatum* Robs.
- *Rosa acicularis* lindl.
- *Rubus arcticus* L.
- *Sorbus pohaushanensis* (Hance) Hedl.
- *V. alpinum* E. Busch.
- *V. uliginosum* L.
- *Vitis amurensis* Rupr.
- *Juniperus davurica* Pall.
- *Lonicera caerulea* L. var. *edulis* L.
- *P. sibirica* L.
- *R. nignum* L.
- *R. procumbens* pall.
- *R. triste* Pall.
- *R. davurica* Pall.
- *R. chamaecmorus* L.
- *R. saxatilis* L.
- *Vaccinium microcarpum* (Turcz.) Schm.
- *V. oxycoccus* L.
- *V. vitis-idaea* L.

3. INTRODUCTION OF *VACCINUM* SPP.

*Vaccinium uliginosum* belongs to family of *Vacciniaceae* with its flowering time in June and fruiting time in August. They mainly grow in the subalpine forest, Betula spp-shrub forest and wetlands in the north of Daxing Anling mountain and north of Xiaoxing Anling mountain, Changbai mountain and Ertai mountain. About 100 000 ha *Vaccinium* trees, which were called the pearls of the forest sea, were growing concentrated in the Er Gula left County belonging to Daxing Anling forest area of Inner Mogonia Autonomous Region. The main products made from *Vaccinium* are juice, wine, vinegar, and sauce etc.

*V. vitis-idaea* grows in the coniferous forest, shrubs and in cutting-blank land and is the indicator plant of *Larix decidua* forest and *Syvestris* Var. *Mongolica* forest. The fruit of *Vaccinium vitis-idaea* are rich in nutrition and can also be used for producing medicine. The leaves of this species have been used traditionally as medicine. The main products are a series of fruit wines that have good markets in China.
4. THE DEVELOPMENT OF NWFPS AND SUSTAINABLE DEVELOPMENT IN THE DAXING ANLING FOREST AREA

4.1 Status

Before 1978, the economic system and single ownership system with the characteristic of timber-oriented production prevailed in the Daxing Anling forest area. In recent years, two “crisis” have appeared in this area (the crisis of forest resource and forestry enterprises economic). In 1994, the local people and decision-makers began to take the production of NWFPS as the priority in the development. They have established four kinds of centers such as the production and processing of aquaculture (the domesticating and breeding of wild animals), beverage (from natural plants) and medicinal plants, wild vegetation, and mushroom. Since 1994, the annual increasing rate of the NWFPS value reached 16.5%. In 1996, the output value was 738 million yuan RMB (1 $ equals to 8.3 yuan RMB). But only few species were commercially developed such as *Vaccinium uliginosum*, *V. vitis-idaea* etc. with preliminary products and small scale. Most berry resources were collected only for collectors’ own food and subsistence. The research on the berry resources has mainly focused on the biological and ecological traits.

4.2 Evaluation and Recommendations

4.2.1 Evaluation

- Forest is a nutrition pool that not only provides timber and ecological protection but also diversified food, medicine and other benefits for the people. The developments of NWFPS in the cold temperate area have a great potential. There are about 1290 species of plants and animals could be utilised.
- Irrational property rights: single ownership by the people (State ownership), instruction production planning, single timber production, and equalitarianism were implemented in the forest industrial enterprises.
- The processing techniques and equipment are old in the existing NWFPS enterprises with small scale capacity.
- The processing of berry resources are primary products processing and lower value-added approach.
- Shortage of market information.
- Lack of effective statistic methods.
- It is difficult to collect the money for the development of NWFPS enterprises.

4.2.2 Recommendations

- Establishing a special institution to co-ordinate the management, development, technical guides, and to market the berry resources and NWFPS.
- Developing an integrated plan with short, medium, and long term plans, determining the scope, time, methods and optimum yearly harvesting level of berry collection.
• Breeding and domesticating the species with the high quality and production.
• Research on the collection, cold-storage, fresh-preserved, transportation, and integrated processing of berry fruits.
• Establishment of berry plantation in the peatland.

5. SUGGESTION TO REGIONAL PROGRAM ON THE NWFPS IN COLD TEMPERATE AREA

• In order to protect the resources, the relevant policy, law and regulations need to be established and the process of examination and approval need be implemented.
• The monitoring system and statistic methods for the sustainable development of rare and valuable berry resources need to be built, which could be used as evaluation of harvest techniques.
• On the basis of inventory and evaluation numeric indicators and management system should be created.
• Dissemination of the NWFPs information and encouragement of the participation of local people and women because women are the main force of NWFPs collection.
• Research on the regeneration, recycle, and sustainable use of NWFPs and on the high and new techniques.
• Promoting the cooperation among developed and developing countries.
• Implementing the quota system and establishing pre-warning system.
• The knowledge property rights in the development of NWFPs.
• Making up comprehensive value evaluation methods and property rights system of NWFPs resources.
• Establishment of compensation system for the development of NWFPs.
• Domesticating the species of NWFPs in agroforestry system.
• Cultivation of some selected species.
IMPORTANCE OF MAIN NON-WOOD FOREST PRODUCTS IN THE CZECH REPUBLIC

Ludek Sisak
Faculty of Forestry of the Czech University of Agriculture Prague, Czech Republic

ABSTRACT

Non-wood forest products (NWFPs) – edible mushrooms, forest berries and medicinal plants – are of great importance as externalities of both recreational and market activities in the Czech Republic (CZR). NWFPs can be collected freely and free of charge by forest visitors for their own use in all accessible forests irrespective of forest ownership. Recent investigations based on sociological surveys show that 2/3 of the inhabitants and 4/5 of households collect NWFPs: an average of more than 12 kg of main NWFPs were collected by each household in 1994-1996, which amounts to 46.6 mil. kg, and 2700 mil. Czech Crowns (CZK). The value corresponds to 1/4 - 1/3 of the timber harvest value in an average year. NWFPs are collected also in forests affected by emissions. The data obtained could help to improve the quality of forestry policy, and of decision making by different parts of the forestry sector. Significant data should be incorporated into periodical statistical surveys and reports.

Key words: Non-wood forest products, socio-economic importance, Czech Republic

1. INTRODUCTION

Non-wood forest products (NWFPs) are products not closely related to timber. Particularly edible mushrooms, forest berries and medicinal plants have been well known products for centuries. Forest products have been collected, mostly without any payment, since the medieval times. Also access and entrance to forests in all kinds of ownership has been generally unrestricted and free of charge (with only some exceptions).

In spite of the fact that the collection of NWFPs is a very popular public activity, there was no objective information about the importance of NWFPs for Czech people before a large investigation on the socio-economic importance of main NWFPs.
collection was launched in 1994. The research project was funded by the Grant Agency of the CZR (Research Project No. 504/94/0291) in 1994-1996 and by the Czech Ministry of Agriculture (Forestry Branch). The quantity and quality of data collected and processed depended to a great extent on the funding of the project. In 1997, the research had to be considerably reduced due to lack of finance, and funding for 1998 is unfortunately still uncertain. However, pilot figures demonstrating the NWFPs importance in the CZR are now available.

2. USER'S RIGHTS AND THE SOCIO-ECONOMIC NATURE OF NWFPS

According to the Article 19 of the latest Forest Act No. 289 from 1995, individuals are entitled to enter the forest at their own risk, and to collect any forest berries and dry wastewood lying on the ground for their own needs. While doing so, they shall be obliged not to damage the forest, not to interfere with the forest environment and to follow the instructions of the owner or tenant of the forest and their staff. All forest stands are accessible to people, and people can pick non-wood forest products freely, and free of charge, basically irrespective of kind of forest ownership.

Unfortunately, the Forest Act does not mention mushrooms and medicinal plants explicitly, which can cause certain confusion and misunderstandings. But 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 that NWFPs collected free of charge by forest visitors cannot be sold. However, in practice, NWFPs are sold freely (with exception of licensed sales of mushrooms).

If collected freely and without charge by forest visitors, the NWFPs and their collection can be ranked among the externalities of the Czech forests and forestry. The collection of NWFPs, as a forest and forestry externally, is of a double socio-economic nature (market and non-market). On one hand, NWFPs are part of physical production (tangible goods), while on the other hand, they can be ranked among intangible outputs as a part of the recreational function of forests (Gregory 1972).

Many non-timber forest products collected by forest visitors are a substitute for similar agricultural products. Only a comparatively small part of NWFPs picked free of charge is marketed in the CZR. The greater part is collected by forest visitors and consumed in their own households, which influences the market because NWFPs are consumed instead of other similar products of an agricultural origin bought at market prices. The importance of NWFPs externally should be expressed both in the frame of the non-market (recreational) function and in the frame of the market or “shadow market” (production) function.

NWFPs can be also produced commercially and then marketed by forest owners, tenants and businessmen. But this is extremely rare under the current socio-economic conditions in the CZR. Nevertheless, the NWFPs can be considered potentially important internally. A great part of the NWFPs (forest fruits, mushrooms, medicinal plants) can be considered as alternative production to agricultural production, and produced to a great extent without any chemicals. Forest management not only for timber production
but also for the production of non-timber products could be taken as a kind of "symbiosis" between forest management for classical forest goals (timber, environment) and for forest production of an agricultural type. Essentially, it can be a parallel with what we know from tropical and subtropical zones as "agroforestry" even under conditions of temperate zone developed forestry.

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 CZR. But the present Forest Act still does not address the possibility of planned production and harvest of the NWFPs by forest owners and tenants. The Forest Act does not protect such forest producers against pickers 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 health and safety of the public. But random public collection of commercially intended NWFPs is not restricted.

3. IMPORTANCE OF NWFPs COLLECTION

Basic data about forest visiting and NWFPs collection were obtained from sociological surveys representative samples of inhabitants of the CZR structured according to main demographic features of the total population (sex, age distribution, level of education, profession, size of residence and number of inhabitants in individual districts and regions).

Four surveys have been performed already (in 1994-1997) but the investigation from 1997 is still being analysed. The surveys were based on interviews with respondents aged above 15 and on filling in questionnaires. In 1994, 856 households of 1200 planned took part in the survey; while in 1995, 991; and in 1996, 1451 of 1500 households participated.

The following main questions were asked: number of forest visits per year; main purpose of forest visits; visiting costs (mainly transport); amount of collection of main NWFPs in kg with regard to the following commodities: mushrooms (without species specification), bilberry - *Vaccinium myrtillus* L., raspberry - *Rubus idaeus* L., blackberry - *Rubus fruticosus* L., elderberry - *Sambucus nigra* L., and cranberry - *Vaccinium vitis-idaea* L.; costs of NWFPs collection; market prices of NWFPs; willingness-to-pay for a forest visit (equivalent measure).

The collection of NWFPs took was the second important among the main reasons for visiting forests, with app. 29% (short term relaxation took the first place with 42.5%). But NWFPs are picked also during short term relaxation and forest visits for other main purposes. According to data from 1994-1995, 2/3 of inhabitants and 4/5 of households collected NWFPs. Mushrooms were picked by more than 70% of households, bilberries by almost 50%, raspberries by almost 30%, blackberries by more than 20%, elderberries by 15% and cranberries by 8% of households in the CZR. The years 1994 and 1995 can be taken as extraordinary favourable for the NWFPs harvest.
On average, almost 12.2 kg of the above mentioned commodities were picked per year by an average household in the CZR, of which one half was mushrooms by fresh weight. About 4.6 kg of the commodities per inhabitant, and 18.8 kg per ha of forest land accessible to people, were picked on average yearly in the period 1994-1996 (Sisak 1997; Sisak et al. 1997).

But relatively great differences occur between individual regions of the CZR. According to data from 1994-1995, 8.5 kg/household were collected yearly in the South Moravian Region (13.5 thousand km², 0.4 mil. ha of forest land, 2 mil. inhabitants) but 18.9 kg/household in the South Bohemian Region (11 thousand km², 0.4 mil. ha of forest land, 0.7 mil. inhabitants). An extremely high quantity – on average 42 kg/ha of forest land – was collected per year in forests of the Central Bohemian Region (11 thousand km², 0.28 mil. ha of forest land, 2.4 mil. inhabitants including the capital Prague) in 1994-1995, while only 13.8 kg/ha in the South Bohemian Region (11 thousand km², 0.4 mil. ha of forest land, 0.7 mil. inhabitants). Volumes of NWFPs collected by inhabitants of the CZR are shown on the Table 1.

Table 1. Amount of collected NWFPs (mil. kg)

<table>
<thead>
<tr>
<th>Products</th>
<th>1994</th>
<th>1995</th>
<th>1996</th>
<th>Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mushrooms</td>
<td>23.6</td>
<td>29.7</td>
<td>18.4</td>
<td>23.9</td>
</tr>
<tr>
<td>Bilberries</td>
<td>11.3</td>
<td>15.0</td>
<td>9.4</td>
<td>11.9</td>
</tr>
<tr>
<td>Raspberries</td>
<td>4.2</td>
<td>5.8</td>
<td>3.1</td>
<td>4.4</td>
</tr>
<tr>
<td>Blackberries</td>
<td>2.7</td>
<td>2.8</td>
<td>1.8</td>
<td>2.4</td>
</tr>
<tr>
<td>Cranberries</td>
<td>0.7</td>
<td>1.3</td>
<td>0.7</td>
<td>0.9</td>
</tr>
<tr>
<td>Elderberries</td>
<td>3.9</td>
<td>3.9</td>
<td>1.5</td>
<td>3.1</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>46.4</strong></td>
<td><strong>58.5</strong></td>
<td><strong>34.9</strong></td>
<td><strong>46.6</strong></td>
</tr>
</tbody>
</table>

The importance of the NWFPs collection was also expressed in economic terms based on market prices, on costs spent for NWFPs collection, on shadow labour costs of NWFPs picking and by damage caused by visitors to forests. The total average yearly value of the collected NWFPs reached about 2700 mil. CZK (1 USD = 32 CZK) in 1994-1996 (see Table 2). This is a surprisingly high value equivalent to 1/4 - 1/3 of a year’s timber sold in the CZR markets in last years (it varied yearly from 9000 mil. CZK to 12 000 mil. CZK from almost 2.6 mil. ha of forests – 1/3 of the CZR area).

The value of products picked from one ha of forest land reached on average 1100 CZK yearly. The value of bilberries picked from 1ha of a bilberry cover reached more than 4000 CZK, which is a similar level to the value of timber extracted from 1 average ha in an average year (from 4 to 5 thousand CZK). Bilberries cover almost 10% of total forest land in the CZR.
Table 2. Amount of collected NWFPs (mil. CZK)

<table>
<thead>
<tr>
<th>Products</th>
<th>1994</th>
<th>1995</th>
<th>1996</th>
<th>Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mushrooms</td>
<td>1314</td>
<td>1658</td>
<td>1082</td>
<td>1351</td>
</tr>
<tr>
<td>Bilberries</td>
<td>881</td>
<td>1164</td>
<td>456</td>
<td>834</td>
</tr>
<tr>
<td>Raspberries</td>
<td>180</td>
<td>248</td>
<td>173</td>
<td>200</td>
</tr>
<tr>
<td>Blackberries</td>
<td>161</td>
<td>169</td>
<td>129</td>
<td>153</td>
</tr>
<tr>
<td>Cranberries</td>
<td>22</td>
<td>43</td>
<td>42</td>
<td>36</td>
</tr>
<tr>
<td>Elderberries</td>
<td>140</td>
<td>137</td>
<td>113</td>
<td>130</td>
</tr>
<tr>
<td>Total</td>
<td>2698</td>
<td>3419</td>
<td>1995</td>
<td>2704</td>
</tr>
</tbody>
</table>

According to data from 1995, pickers spent almost 100 mil. hours on NWFPs collection, more than 650 mil. CZK (travel costs) and caused almost 615 mil. CZK damage in forests. The last figure seems to be extraordinarily high. It is true that a lot of forest visitors respect nature and only a small proportion of them cause much damage but the number of forest visits is relatively high (about 100 visits/ha, but in forests with bilberry cover, an additional 170 seasonal visits).

The shadow net income for the population (based on the difference between market value and expenses) reached almost 2500 mil. CZK per year. Then the forest land value varies around 33 thousand CZK/ha (at 3% interest rate), which is a bit higher than the mean official price of forest land for timber production. Shadow profits (net of the cost of “working“ time in picking and forest damage caused) amounted to 211 CZK/ha. By comparison, the profits from timber production were 290 CZK/ha before taxes in 1995.

Figures mentioned above do not overestimate the comprehensive importance of forests and forestry as producers of NWFPs in any case. Apart from the products discussed, people collect and use free of charge other commodities on a large scale. For example, according to respondents’ answers in 1994, 2.8 mil. kg of medicinal plants in dry state were collected – an important part of them in forests.

4. INFLUENCE OF AIR POLLUTION

Part of the Czech forests are burdened to a great extent with emissions, mostly sulphur dioxide, from the last decades. For the purposes of investigation of NWFPs collected in forests afflicted with air pollution, 20 of the total 75 administrative districts of the CZR were identified as districts with forests considerably affected by emissions. Surprisingly, it was ascertained that 27.5% of NWFPs were collected in those 20 administrative districts representing 25% of total forest area in the CZR (according to data from 1995-1996). Surprisingly, such forests can have better conditions for growing and collecting NWFPs in comparison with forests not affected by emissions. The results show that people collect NWFPs irrespective of forests and forest soils being polluted by acid rains.
The results from investigations on heavy metals contained in NWFPs by Cibulka et al. (1997) show that the quantity of heavy metals in NWFPs is influenced rather by natural background and natural composition of chemical compounds and elements in forest soils than by the level of pollution from emissions. The influence of emissions in heavy metal contents in NWFPs is statistically unimportant.

5. CONCLUSIONS

NWFPs can be ranked high among the externalities in relation to forests and forestry under conditions in the CZR. The collection of NWFPs as a forest and forestry externally has a double nature and importance. As an intangible, recreational activity, it can be valued in the framework of non-market social goods. But as a market production, it can be valued at the same time relative to market and common economic values.

NWFPs still are not commercially produced, harvested and marketed by forest owners and tenants, apart from some negligible exceptions, in the CZR. Nevertheless, the prospects for planned cultivation of some NWFPs are promising, mainly as regards the cultivation of some berries and, especially, medicinal plants. But it requires the clarification of forest legislation, and especially the Forest Act; and the amending or the adding of articles dealing with the problems.

Many data about the importance of NWFPs for inhabitants of the CZR, resulting from the recent research, are quite new in the frame of the CZR. The data prove the surprisingly high economic importance of NWFPs collection for the public; for public attitudes to forests, forestry, forest enterprises, forest owners and users. The value of the main NWFPs collected varies between 1/4 and 1/3 of value of an average year's timber harvest.

Further information and knowledge could help to improve the quality of forestry policy making; decision making by state administration at different levels; and decision making by forest owners, tenants and foresters in questions about forest values; land fund delimitation between forestry and agriculture; the effectiveness and level of economic tools; and purposes and methods for multiple and sustainable forest management. Significant data should be incorporated into periodical statistical surveys and reports about the importance, state and development of forests and forestry. The information should contribute to a more comprehensive concept of forests and forestry, than previous.

Depending on the financial means, the investigations of NWFPs importance should continue mainly as to quantities of produced and collected products, including medicinal (drug) plants; as to ways of their consumption; proportions sold on the market; levels of forest damage by visitors; legislation and the solution of discrepancies between public and forestry interests, including financial compensation.
REFERENCES


NON-WOOD FOREST PRODUCTS IN POLAND

Michal Kalinowski
Forest Research Institute, Warsaw, Poland

ABSTRACT

This paper presents the current status and changes in the utilisation of non-wood forest products (NWFP) since 1989 in Poland. It is based on the most recent publications by the leading specialists in the field. Since 1989 the status of NWFP has changed as many state enterprises have become private or they have been liquidated. Nowadays, the NWFP are utilised by private firms. The information on the NWFP resources is based on estimates only. At present, the most important NWFP in Poland are: forest berries (e.g. bilberry Vaccinium myrtillus L.), mushrooms (chantarelle Cantharellus cibarius, edible boletus Boletus edulis) and medicinal plants. The resin is also an important product, but in 1993 the State Forest Enterprise stopped collecting it.

This paper presents the legislation and some statistics concerning NWFP harvesting and marketing. The valuation of NWFP and collecting for home use has not yet been studied in Poland.

Key words: Non-wood forest products (NWFP), NWFP resources, NWFP harvesting

1. UTILIZATION OF NWFP BEFORE AND AFTER 1989

1.1 General information on the Polish forests

In Poland forests occupy 8.779 mil. ha or 28.1% of the country area. Conifer species dominate with Scots pine – 69.2 % and Norway spruce – 5.8 % . Among the most important deciduous species are: downy birch and verrucose birch – 6.0 % , English oak and sessile oak – 6.1 % , European beech – 4.1 % . The age class structure is: I class (1-20) – 14.3 %, II (21-40) – 25.1 %, III (41-60) – 21.5 %, IV (61-80) – 17.4 %, V and older – 16.8 %. Most forests are owned by the state as the State Forests
Enterprise manages 71% of the total forest area. The average size of privately owned forest is about 1 ha; currently there are 1.4 million private owners (Paschalis 1997).

1.2 Organisation

Until 1989 NWFP were commercially used by the state – State Forests Enterprise harvested resin and the state enterprises processed it. The whole harvest of berries, mushrooms and medicinal plants was organised by “Las” (Forest) Enterprises, which dealt also with their processing.

The year 1989 was crucial for the use of NWFP. The harvesting and processing of berries, mushrooms and medicinal plants was taken over by private firms. Since then, NWFP harvest has not been registered in the statistics.

Forest Research Institute is the most important scientific centre dealing with NWFP. The main areas of the Institute’s research work were technical, technological and environmental bases of resin harvesting, NWFP resources inventory – area and yield of berries and medicinal plants.

2. NWFP RESOURCES

2.1 Berries

Bilberry (*Vaccinium myrtillus*) is the most important forest berry in Poland. Other berries have no commercial importance at present. In the 1960s, Forest Research Institute carried out an inventory of bilberries and cowberries (*Vaccinium vitis-idaea*). The mean yield available for commercial (organised) use was estimated to be 30 000 tons, at average harvest (Grochowski 1990). The results of the inventory are shown in Table 1.

Table 1. Bilberry (*Vaccinium myrtillus*) in the state owned forests in Poland (ha).

<table>
<thead>
<tr>
<th>Ground cover class (%)*</th>
<th>Resources available for commercial use</th>
</tr>
</thead>
<tbody>
<tr>
<td>- 20</td>
<td>21-40 41-60 above 60 Total</td>
</tr>
<tr>
<td>26097 79906 82827 56390</td>
<td>679 080</td>
</tr>
</tbody>
</table>

* Cover class means percent of covering by bilberry on a unit area used during inventory.
2.2 Mushrooms

The mushroom resources are not sufficiently recognised in Poland. The average annual yield of mushrooms, harvested for sale, without the share of own use by the collectors, amounts to 18,000 tons, i.e. only 0.5 kg mushrooms per "statistical inhabitant" and 2 kg per average hectare of forest (the estimation was made very carefully). Estimates show that the commercial use takes only 15-20% of the collected yield (Grzywacz 1997).

2.3 Medicinal and technical forest plants

These resources are not recognised. In 1960, Forest Research Institute inventoried alder buckthorn (Frangula alnus) resources, which covered 71,470 ha (cover class above 5%), i.e. 10,3 thousand ton of medicinal raw material (Grochowski 1990). The inventory of deadly nightshade (Atropa belladonna) made in the beginning of 1960 shows that the resources of this plant were very small and its harvest cannot be allowed.

Cultivation of medicinal plants is an effective method of preservation. In Poland above 20,000 farms grow medicinal plants (all kinds, not only forest), the average size of the plantation being 0.5 ha. Some medical plants need a specific forest environment (Glowacki 1997).

3. LEGISLATION

The most important legal act for the users of NFWP is the regulation of the Minister of Environmental Protection, Natural Resources and Forestry concerning conservation of plants and mushrooms. The regulation divides plants and mushrooms into two groups – subjected to complete and partial conservation. The first group includes endangered medicinal plants and mushrooms such as lycopods (Lycopodiaceae), deadly nightshade (Atropa belladonna), purple foxglove (Digitalis purpurea), garden angelica (Archangelica officinalis), and morels (Morchella). The second group includes alder buckthorn (Frangula alnus), common bearberry (Arctostaphylos uva-ursi), wild ginger (Asarum europaeum), lily of the valley (Convallaria maialis) and other. These species can be harvested for commercial purposes only by local firms and to a quantity agreed with the Minister of Environmental Protection, Natural Resources and Forestry.

Since 1992, in accordance with Forest Act, collectors of forest floor plants and mushrooms for commercial purposes have to sign contracts with the administration of forest districts. This rule is, however, not fully not observed (Ostalski 1997). After the Forest Act amendment of 1997, the forest services were given the authority to control the origin of forest products (not only wood products). The Minister of Environmental Protection, Natural Resources and Forestry is obliged to issue regulation concerning the rules of and collecting plant and mushrooms preservation and harvest.
4. MARKETS

It is impossible to give any information about the markets of berries and mushrooms in Poland because of the lack of statistics and research projects.

The Polish demand for medicinal forest raw materials obtained from non-protected plants amounts to about 1200 tons (Glowacki 1997). The most important raw materials are inflorescence of small-leaved lime (*Tilia cordata*) – demand for more than 100 tons, fruits of dog rose (*Rosa canina*) – more than 100 tons (now less, because of import), bark of sessile oak (*Quercus petraea*) – up to 100 tons, flowers of elder (*Sambucus nigra*) up to 100 tons, fruit of elder (*Sambucus nigra*) – up to 100 tons, flowers of whitethorn (*Crataegus monogyna*) – up to 100 tons, herb of mistletoe (*Viscum album*) – up to 100 tons, and many others (Glowacki 1997 after Kozlowski 1996). Among partially protected species, the largest demand is for alder buckthorn (*Frangula alnus*), and lily of the valley (*Convallaria majalis*).

Poland is a country rich in resin resources, but since 1994 this product has not been harvested. There are many reasons for this. In 1997, one of regional directorates of State Forests first signed the contract for selling 200 tons of resin.

The valuation of NWFP and collecting for home use has not been subject to any research works in Poland.

5. HARVESTING STATISTICS

Table 2. Some Non Wood-Forest Products harvested in Poland (tons and thousand of items) Source: Paschalis 1997.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Resin(^a)</td>
<td>9200</td>
<td>8403</td>
<td>6400</td>
<td>2940</td>
<td>806</td>
<td>34</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Christmas trees(^a)</td>
<td>920</td>
<td>564</td>
<td>336</td>
<td>339</td>
<td>330</td>
<td>303</td>
<td>272</td>
<td>317</td>
</tr>
<tr>
<td>Berries(^b)</td>
<td>2824</td>
<td>8010</td>
<td>3006</td>
<td>1974</td>
<td>1258</td>
<td>606</td>
<td>252</td>
<td>292</td>
</tr>
<tr>
<td>Mushrooms(^b)</td>
<td>6078</td>
<td>5151</td>
<td>2792</td>
<td>841</td>
<td>618</td>
<td>657</td>
<td>87</td>
<td>243</td>
</tr>
</tbody>
</table>

\(^a\) harvesting in the forests managed by State Forests Enterprise

\(^b\) harvesting (products purchased from collectors); since 1993 without made by enterprises producing food and drink
### Table 3. Mean yield of berries harvested* by enterprises “Las” (“Forest”) Enterprise in 1952-88 (Cybulko 1997)

<table>
<thead>
<tr>
<th>Species</th>
<th>Harvesting</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>min. tons</td>
<td>max. tons</td>
<td>Mean tons</td>
<td>%</td>
</tr>
<tr>
<td>Bilberry (<em>Vaccinium myrtillus</em>)</td>
<td>452</td>
<td>25950</td>
<td>8020</td>
<td>63.5</td>
</tr>
<tr>
<td>Blackberry (<em>Rubus spp.</em>)</td>
<td>66</td>
<td>3700</td>
<td>1100</td>
<td>8.7</td>
</tr>
<tr>
<td>Elder (<em>Sambucus nigra</em>)</td>
<td>200</td>
<td>2200</td>
<td>880</td>
<td>7.0</td>
</tr>
<tr>
<td>Mountain ash (<em>Sorbus aucuparia</em>)</td>
<td>31</td>
<td>2600</td>
<td>670</td>
<td>5.3</td>
</tr>
<tr>
<td>Dog rose (<em>Rosa canina</em>)</td>
<td>313</td>
<td>2600</td>
<td>700</td>
<td>5.5</td>
</tr>
<tr>
<td>Blackthorn (<em>Prunus spinosa</em>)</td>
<td>3</td>
<td>2240</td>
<td>510</td>
<td>4.0</td>
</tr>
<tr>
<td>Wild raspberry (<em>Rubus idaeus</em>)</td>
<td>12</td>
<td>1580</td>
<td>420</td>
<td>3.3</td>
</tr>
<tr>
<td>Red bilberry, cowberry (<em>Vaccinium vitis-idaea</em>)</td>
<td>4</td>
<td>450</td>
<td>190</td>
<td>1.5</td>
</tr>
<tr>
<td>Cranberry (<em>Vaccinium oxyccocus</em>)</td>
<td>1</td>
<td>216</td>
<td>70</td>
<td>0.6</td>
</tr>
<tr>
<td>Bog bilberry (<em>Vaccinium uliginosum</em>)</td>
<td>0</td>
<td>300</td>
<td>37</td>
<td>0.3</td>
</tr>
<tr>
<td>Common sea buckthorn (<em>Hippophae rhamnoides</em>)</td>
<td>0</td>
<td>84</td>
<td>24</td>
<td>0.2</td>
</tr>
<tr>
<td>Wild strawberry (<em>Fragaria vesca</em>)</td>
<td>0</td>
<td>66</td>
<td>11</td>
<td>0.1</td>
</tr>
<tr>
<td>Total</td>
<td>-</td>
<td>-</td>
<td>12632</td>
<td>100.0</td>
</tr>
</tbody>
</table>

*Harvesting means purchasing berries from collectors

### Table 4. Total yield of mushrooms *harvested by enterprises “Las” (“Forest”) Enterprise in 1976-88 (Grzywacz 1997).

<table>
<thead>
<tr>
<th>Species</th>
<th>Tons</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chantarelle (<em>Cantharellus cibarius</em>)</td>
<td>22899</td>
<td>50.6</td>
</tr>
<tr>
<td>Bay boletus and other (<em>Xrocomus spp.</em>)</td>
<td>11515</td>
<td>25.4</td>
</tr>
<tr>
<td>Honey fungus and other (<em>Armillaria spp.</em>)</td>
<td>2702</td>
<td>6.0</td>
</tr>
<tr>
<td>Butter boletus and other (<em>Suillus spp.</em>)</td>
<td>2571</td>
<td>5.7</td>
</tr>
<tr>
<td>Edible boletus (<em>Boletus edulis</em>)</td>
<td>2551</td>
<td>5.6</td>
</tr>
<tr>
<td>Equestrian tricholoma (<em>Tricholoma equestre</em>)</td>
<td>1869</td>
<td>4.1</td>
</tr>
<tr>
<td>Edible gyromitra (<em>Gyromitra esculenta</em>)</td>
<td>984</td>
<td>2.2</td>
</tr>
<tr>
<td>Rough-stalked boletus and other (<em>Leccinium spp.</em>)</td>
<td>122</td>
<td>0.3</td>
</tr>
<tr>
<td>Other species</td>
<td>76</td>
<td>0.1</td>
</tr>
<tr>
<td>Total</td>
<td>45289</td>
<td>100.0</td>
</tr>
</tbody>
</table>

*Harvesting means purchasing mushrooms from collectors
REFERENCES


NON-WOOD RESOURCES AND THEIR UTILISATION IN LITHUANIA

Algirdas Rutkauskas
State Forest Inventory and Management Institute
Kaunas, Lithuania

ABSTRACT

The principles of multiple forest use prevail in Lithuanian forestry. According to functional destination and economic regime, forest areas are divided into 4 forest groups covering up to 20 categories. Management planning controls the use of forest resources of defined priorities. The basis of forest resources is stand-wise forest inventory. Resources of non-wood products and their use, recreational activities and hunting are analysed in the paper.

Key words: non-wood products, recreation, hunting, management.

1. INTRODUCTION

Lithuanian Forest Act (1994) is the legislative basis for multiple forest use. All Lithuanian forests are considered to be equally important from economic, ecological and social viewpoints.

Forest is not only the source of timber and non-wood products, but also one of the most important components of natural environment, landscape formation and protection, as well as the subject to recreation and hunting. Forests are assessed according to 5 main functions, the value ratio of which is as follows: timber – 55%, protective function – 28%, recreational function – 11%, berries, mushrooms, herbs – 9%, game and fauna – 4% (Malisauskas et al. 1990).

At present the number of forest functions is increasing and their value ratio is changing. This is revealed by the project “Multiple use of forest in Dubrava Forest Experimental Enterprise” (1995). This project was a part of the Danish Government’s support program to East European countries. The project elevates current situation in multiple use of forests, evaluates and compares forest functions (10 of them were singled out) and possibilities to use every forest plot for different purposes. This paper...
presents the situation in Lithuania concerning non-wood forest resources and benefits from their utilisation.

2. LEGISLATIVE BASIS

According to the Lithuanian Forest Act (1994) forest resources include wood, forest plants and animals, minor non-wood products, such as resin, stumps, bark, birch sap, Christmas trees, greenery, foliage, mushrooms, nuts, berries, fruits, herbs, forest litter, and dropped antlers.

Forest administration and private forest owners may, according to the established order, lease forest areas to make use of minor non-wood products for hunting, recreation and scientific investigations. The Environmental Protection Ministry issues permissions for industrial utilisation. Limits for export of non-wood products are provided according to the order established by the Government.


According to the documents mentioned above, Lithuanian citizens have free access and may use minor non-wood resources in all Lithuanian forests, except:

• in reserves (at all times) and ornithological reserves (from 1 April to 1 September)
• forests, where public access or gathering of non-wood products is temporarily forbidden or restricted by community decisions.

Utilisation of forest resources on protected territories is regulated by general or individual regulations. Game hunting activities are controlled by the Government’s regulations (1993). Hunting law is being elaborated.

Forest and non-wood resources are regulated in accordance with the Protected Territory Act (1993). To preserve plant and mushrooms species as well their biotopes, 128 botanical and zoological reserves were established, natural forests resources were regenerated, enlarged and extended, sites of resources under conservation (tree, berry stands, forest tracts rich on mushrooms and herbs, wildlife habitats, marshlands) were singled out.

Utilisation of forest resources on these areas is controlled by the Act of protected areas (1993). The Lithuanian Red Book (1992) is a regulatory document upon which the protection of rare and endangered species of plants, fungi and animals is based in the Republic of Lithuania.

3. FOREST RESOURCES

Lithuanian forest resources (wood and non-wood) are assessed by compartments during
stand-wise inventory process. In 1988, the fifth post-war stand-wise inventory was
started. Forest inventories and management planning are performed by State Forest
Inventory and Management Institute (Kaunas). Forest inventory is obligatory to all
ownership forms. The inventory cycle is 10 years.

For each compartment the following parameters are estimated: land use category,
landowner, forest group (protected status), dominant tree species (forest type), tree
species composition, age, stocking level, growing stock, site type, vegetation type,
undergrowth, shrub and plant density, etc. Data on non-wood resources are obtained
from stand-wise inventory or defined indirectly by using standards (e.g. biology and
exploitation yield, forage classes, etc.).

Central database “Lithuanian forest” comprises descriptions on 1.1 mil compartments
(average size of a compartment 2.3 ha). In 1997 National Forest Inventory by sampling
method started. Among principal issues is the assessment of some non-wood resources.
Forest management plans are prepared by forest enterprises, state parks, recreational and
protected areas. Since 1995 individual management plans have been prepared for private
holdings. In 1995, a graphical database according to GIS was established. Until 1990
maps of berries and medical plants (1:20 000) were made for purchasing organisations.

There is a specialised game management group at the Institute. Complex forest and
game plans are worked out by forest enterprises, national parks and specialised state
hunting husbandries. Since 1995, detailed game management plans for commercial
hunting areas have been prepared.

Forest land in Lithuania occupies 1 978 000 ha, which corresponds to 30.3% of the
total land area. Forested area makes up 1 871 000 ha, including 435 000 ha plantations.
Coniferous forests prevail – 62% of the total (pine – 38%, spruce – 24.0%). Among the
broadleaves the birch stands predominate – 19.5%, followed by – black alder (5.6%),
grey alder (5.6%), aspen (2.6%), ash (2.7%), oak (1.8%). Mean annual growth is 348
mil. m³ or 186 m³/ha.

4. NON-WOOD RESOURCES AND THEIR USE

Table 1 presents information on the main products harvested in Lithuanian forests in
1996. Data represents the official statistics and expert assessment (i.e. amounts of plants
consumed for personal needs of residents). Income from 1 ha of the whole forest area
comprised 240 Lt. (60 USD). Income for non-wood products made up 13% from the
total amount received from forest. Especially significant was the harvest of mushrooms.
Their export has increased considerably. However, kinds and extent of non-wood
production have differed from time to time.
Table 1. Main products collected or harvested from Lithuanian forests in 1996

<table>
<thead>
<tr>
<th>Goods (products)</th>
<th>Unit</th>
<th>Total</th>
<th>Value in national currency (1 Lt = 0.25 USD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wood</td>
<td>1000 m³</td>
<td>5537</td>
<td>404 201</td>
</tr>
<tr>
<td>Mushrooms</td>
<td>t</td>
<td>3026</td>
<td>39 558</td>
</tr>
<tr>
<td>Berries</td>
<td>t</td>
<td>4328</td>
<td>9886</td>
</tr>
<tr>
<td>Medicinal herbs</td>
<td>t</td>
<td>44</td>
<td>379</td>
</tr>
<tr>
<td>Christmas trees</td>
<td>1000 un.</td>
<td>280</td>
<td>2100</td>
</tr>
<tr>
<td>Game meat</td>
<td>t</td>
<td>781</td>
<td>4840</td>
</tr>
<tr>
<td>Furs</td>
<td>units</td>
<td>8040</td>
<td>777</td>
</tr>
<tr>
<td>Antlers</td>
<td>t</td>
<td>18</td>
<td>358</td>
</tr>
<tr>
<td>Hunting trophies</td>
<td>units</td>
<td>101</td>
<td>286</td>
</tr>
</tbody>
</table>

4.1. Medicinal herbs and plants for food

The first inventory of these plants was carried out in 1962 and since 1978 has been conducted regularly. In every compartment, berry and fruit plants as well as herbs and the area they cover in % are registered. Later the data are converted to 100% coverage. The stocking level of a stand is the most important factor limiting productivity of the non-wood resources. According to this, productive and reserve areas are defined. Forest plants area covers 282 000 ha or 15% of the total forest area. Entirely covered area (100% coverage) makes up 68 500 ha or 3.5% of the total forest area (Table 2).

The largest the areas covered by bilberry, raspberry and cowberry. Bilberry harvest is not collected completely when cowberry and cranberry demand exceeds supply. Meanwhile, resources of medicinal herbs are insufficient to meet the demand.

Exploitable harvest is calculated according to productivity standards of these plants depending on site index, forest type, taking into account harvest periodicity and biological part of the harvest used for purchasing (Budriumiene 1990). Mean annual exploitable harvest in Lithuanian forests comprises about 5000 t berries, 215 t nuts, 260 t buckhorn bark, 680 t heather, 390 t ledum and 1700 t nettle. Currently mushrooms and berries are collected both to satisfy personal needs (70-80%) and for sell (20-30%).

The greatest demand on home and foreign markets is for cowberries, cranberries, bilberries and ash-berries. Wild strawberries and raspberries are in demand only on home market, while hazel nuts and bog whortleberries are collected only to satisfy personal needs. In 1970-79 on average 1700 t of forest berries, mostly cranberries, bilberries and ash-berries, were sold for processing. In 1980-1989, their exports were about 1000 t per year.

20-30 herb species are collected in Lithuanian forests. In 1961-1965 about 190 t of herb material were prepared in the forest annually, in 1970-1979 about 80 t and in 1980-1990 about 40 t. The greatest amount of raw material is processed in Shventchionys herb pharmaceutical factory. The greatest demand is for juniper berries, bearberry leaves, ash-berries, black alder bark, etc. As the resources of most of the herbs are limited, the
Table 2. Resources of forest berries, fruit and medical herbs in Lithuanian forests (1988-1995)

<table>
<thead>
<tr>
<th>Species</th>
<th>Entirely overgrown area (100% coverage)</th>
<th>Of which productive area in percent</th>
<th>Annual exploitable harvest kg/ha</th>
<th>total, t</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vaccinium myrtillus</td>
<td>19400</td>
<td>94</td>
<td>180</td>
<td>3260</td>
</tr>
<tr>
<td>Vaccinium vitis-idea</td>
<td>5250</td>
<td>10</td>
<td>16</td>
<td>84</td>
</tr>
<tr>
<td>Rubus idaeus</td>
<td>5050</td>
<td>35</td>
<td>280</td>
<td>495</td>
</tr>
<tr>
<td>Fragaria vesca</td>
<td>170</td>
<td>30</td>
<td>150</td>
<td>8</td>
</tr>
<tr>
<td>Vaccinium oxyccoccus</td>
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Supply does not meet the demand (bearberries, lilies of the valley, juniper berries, Saint-John’s-wort, thyme, etc.).

About 100 mushroom species grow in Lithuanian forests, however only 15 to 25 are collected. In 1970-79 approximately 450 t of mushrooms were sold for export and processing, in 1980-89 the amount was 288 t. About a half of this amount is sold in the market places. The greatest demand is for boletus, chanterelle, etc. 20-25% of collected berries and mushrooms are sold for processing. Annual exploitable mushroom harvest comprises 15-30 kg per ha. It is thought that inhabitants collect not less than 30-40% of the exploitable harvest. Potential mushroom production in Lithuanian forests makes up about 24 000 t and the industrial about 8000 t. Since 1993 mushroom production has been greatly increasing with growing private sector.

### 4.2 Resin production

Resin tapping in pine stands started in 1935 and was constantly increasing from 200 t to 1830 t in 1965. Then it started decreasing, reaching 146 t in 1994. In 1995 resin tapping was stopped due to economic reasons. Resin tapping in pine stands continued for about
10 years with an average annual production 180 kg of resin per ha. The value of resin production over 10 years significantly exceeds the value of timber.

Potential resin supply could reach 1500 t per year. Lithuanian joint stock company "Alytaus Chemija" (Alytus Chemistry) can process 2000 t of resin and obtain 1472-1512 t of colophony and 326-346 t of turpentine. At present only 1 t of colophony and 30 t of turpentine are consumed in Lithuania. Further demand on colophony depends on the development of the paper industry.

In 1930-1992, pine stumps turpentine, tar and charcoal were produced. In recent decades every year up to 100-150 t of turpentine and tar as well as 1000 t of charcoal were obtained. In 1993 this production was stopped.

4.3 Christmas trees and greenery production

Christmas trees are produced while thinning undergrowth, whereas greenery is obtained while delimbing spruce trees felled by intermediate and final cuttings. In the recent years forest enterprises have sold the following amounts: in 1995 about 107 000 Christmas trees and 25 000 of ornamental branches, in 1996 about 115 000 and 28 000 respectively. In the future the supply tends to increase as both Christmas trees and greenery are produced in specialised plantations.

4.4 Needle meal production

In 1962-1990 needle meal production was used as an admixture to cattle fodder as well as in chemistry. Smaller pine and spruce branches were used as raw material. This production was conducted mostly by forest enterprises. Every year 15-20 000 t of branches were processed.

4.5 Sap production

Birch and maple sap production on an industrial scale is not widespread. Local people use sap from individual trees for their own purposes. Birch stands are suitable for sap production 3-5 years before final cutting. In the future this production will be overtaken by the private sector.

4.6 Game

In Lithuania 15 animal and 7 bird species are the object of hunting. In 1997 there were 3750 moose, 15 000 red-deer, 36 000 roe-deer, 20 000 wild boars, 600 wolves, 86 000 hares, 16 500 foxes, 7500 raccoon dogs, 11 000 martens, and 20 000 beavers in Lithuania. Since 1993 the number of moose has significantly decreased, while that of red deer is increasing. The number of roes and wild boars remains stable. Meanwhile, fine fauna is growing, especially hares and foxes.
Ungulate animals (moose, red deer, roe deer, wild boars) and fine fauna (hare, wild-duck, gallinaceae birds) are hunted for meat. In 1994-1996 an average of 545 000 kg of wild animal meat was produced per year: of that 505 000 kg of ungulate animal and 40 000 of fine fauna animal meat. In 1996 about 62 000 kg or 12% of ungulate animal meat was exported.

In 1996, beavers (1800), foxes (7300), raccoon dogs (800), martens (400), musk-rats (300), and hares (15 000) were hunted for furs. As there is no demand, the supply will be stable. Currently no furs are exported, while earlier the export made up 90%.

The following trophies are acquired: antlers (moose, red deer, roe), fangs (wild boar), skulls (wolf, foxes, raccoon dog, badger), furs (wolf). 3-5 moose antlers, 200-250 deer antlers, 80-100 roe-deer antlers, 150-200 wild boar fangs are on average medal worthy according to CIC scale. 98% of medal worthy trophies stay in Lithuania. The demand during the last five-year period has been stable.

5. PROTECTIVE AND SOCIO-ECONOMIC FUNCTIONS

5.1 Recreation

Recreational forests cover 73 000 ha or 5% of all Lithuanian forests. About 800 picnic sites that could welcome 200 000 visitors in one day were established. In 1985 recreation volume made up about 14 mil visitor-days. At present recreational loading in forests has decreased almost twice, due to economic reasons. However, recreational forest areas have changed a little. Forest attendance growth is expected and around 2005 it will reach the level of 1990.

There are 5 National Parks, 30 Regional Parks, 4 Strict Nature Reserves, 290 Protected landscape areas and 724 Nature Monuments in Lithuania. All of them are of scientific, spiritual and cultural significance.

Management planning for protected and recreational areas is based on special tasks and rules. The objectives of the policy on recreation and nature-based tourism are to improve the opportunities for vacationing and spending leisure time. Recreational forestry has formed as a new branch of the forest science (Riepsas 1997).

5.2 Hunting

Game areas in Lithuania cover 1 800 000 ha. A total of 1 650 000 ha are rented for game clubs, 145 000 ha are state owned game areas (run by forest enterprises). In 1997 there were 29 000 sportsmen (0.9% of all Lithuanian citizens) in the country. The number of sportsmen during the five-year period increased by 8000 or 45%. The recreational game significance increases with increasing number of sportsmen that was earlier limited. Since 1990 foreign hunters have shown interest in Lithuania. In 1994-1996 about 600 of foreign sportsmen haunted game in Lithuania for on an average 1500 days. Income from game in 1993-1996 made on an average 1.8 mil Lt. per year. There are possibilities to
develop game tourism. The aim of hunting policy is to regulate wildlife population, increasing the productivity of hunting and preventing damage to forestry.

5.3 Protective function

Lithuania has developed a system of protected areas. Total protected areas according to IUCN I-VI categories in Lithuania make up 720,000 ha or 11% of territory, among them forest area occupies 296,000 ha or 15% of the total forest area. The IUCN plan “Parks for life” was launched in Lithuania in 1994. As an important step in the complex process of overall environmental management, the Ministry of Environmental Protection has drafted a National Environmental Strategy and the National Action Plan for Conservation of Biological Diversity (1996).

Within the context of this program, steps have been taken to identify and prioritise areas for conservation. The PHARE Program has initiated activities for establishing a coherent administrative and technical basis for system of protected areas in Lithuania, strengthening of protected areas management, including drafting of plans for state parks, database/cadastre development, etc. Lithuanian forests are very important in regulating microclimate, preserving soils and water, and creating favourable conditions for growing agricultural plants. Territorial distribution of forests is significant for the formation of natural framework, stability system of European environment. Based on scientific investigations, a plan of territorial forest distribution and standards for optimising the share of forest area were prepared. It is estimated that the share of forest area in Lithuania will increase from 30% to 35% (Pauliukevicius et al. 1995).

Protective forests in Lithuania make up 13% (water shelter woods, field shelter woods, road shelter woods, etc.). Management of these areas will focus on stand species composition improvement, greater resistance and biodiversity.

6. CONCLUSIONS

In Lithuania non-wood products on an industrial scale were mostly needed in Soviet times, especially in 1970-1990. Forests were widely used for recreational purposes as well. After the Declaration of Independence, non-wood production greatly decreased or even ceased due to economic reasons. Recreational loading on forests decreased significantly due to lesser flow of tourists from Soviet Republics.

In 1992-1997 legislative and standard basis for the use and conservation of forest resources was laid on a new foundation. A system of protected and protective forests (natural framework) has been worked out; regionalisation and distribution of forests by functional destination and management regime were carried out. 97% of all Lithuanian forests were inventoried, forest management plans and maps were elaborated. Preconditions for sustainable, multiple forest use were created.

With the improving economic situation in Lithuania, forest resources are utilised more intensively. Non-wood production is organised by private business structures.
Production of mushrooms and berries is increasing, especially great demand is on export of mushrooms. Private farmers grow small plantations of some berries (cranberries in particular) and herbs.

Perspectives on resin production are uncertain, especially as public is against damages of trees. The significance of social forest functions is rising. Under improving welfare of people forests are more and more used for recreation, mushroom gathering, hunting. Tourism and hunting are going to expand.

In order to improve utilisation and conservation of forest resources, it is planned to update account of these resources and production statistics. Forest management aims to prepare detailed management plans by functional destination of forests, to work out different forest maps, to elaborate forest information system on GIS basis.

REFERENCES


NWFP RESOURCES AND THEIR FUTURE UTILISATION IN LATVIA

Lelde Vilkriste
Forest Economic Group, Latvia Forest Research Institute “Silava”
Salaspils, Latvia

ABSTRACT

The transformation process in Latvia brings a lot of changes not only in the ownership structure, but also in social, political and economic life. The aim of this paper is to show the interaction between the transition process and forestry sector development and to forecast future uses of different forest resources. The objective is to turn attention to the problems coming with formatting Latvian private forestry sector and future management of non-wood forest products.

Key words: Private forest, forest management plan, non-wood products.

1. INTRODUCTION

Forests cover more than 44% of the total area of Latvia. This percentage has increased from 1923 when the share of forest was only 24%. One of the dominant sectors in economic and social life in Latvia is forestry and forest related activities. The export value for products from forests corresponds roughly to 30% of the total Latvian export value.

On-going land reform is changing forest ownership patterns and will create a large group of new forest owners in Latvia. The privatisation process is very slow and the area of private forest grows only by a few percent per year. During this process about 250 000 applications will be submitted, covering over 3 million hectares of land, including about 1.2 million hectares of forest land. This is about 40% of the total forest land in Latvia.
2. FOREST POLICY

General Forest Policy goals in Latvia are sustainability and efficiency. Today one of the important questions in the forestry sector is the multiple-use of forests. Forests in Latvia are not only a source of employment, economic development and export income, but also an important component of the environment. We have old traditions of nature conservation and it is possible to maintain Latvian forests while simultaneously using principles of sustainability to turn out only economic principles of product utility.

The main principle of forest policy in Latvia is that government (state-owned) and private forests are the most valuable national resources, which should be managed sustainably, using social, economic and environmental principles and techniques. The main goal of the Latvian forest policy is to increase the environmental quality and the level of the welfare of inhabitants.

3. ENVIRONMENTAL PROTECTION

Latvia has long traditions in forest management. The first Forest Act dates to the 16th century, but the first law on environmental protection was passed in 1923. The system of protected natural areas in Latvia was founded in 1957, and forest reserves with special management programs were established four years later.

Forests in Latvia are divided into three forest categories, according to their function and importance in terms of ecological, economic or some special functions (Figure 1). The categories are as follows:

- **Class I: Protected forests.** The aim of these forests is to preserve the diversity of nature.
- **Class II: Restricted management forests** which are significant environment protection.
- **Class III: Exploitable forests.**

![Figure 1. Forest categories (according to statistical data).](image-url)
A large part of Latvian forests are managed with higher cutting age or strict restrictions for clear-cut areas. Most restrictions on non-timber management are found in the Law on Forest Management and Utilisation. Latvia’s forests have high environmental value. The rich flora and fauna need to be conserved for future generations. The forest policy aim from the environmental viewpoint is to preserve biodiversity.

4. FOREST MANAGEMENT PLANNING

One of the first steps in multiple-use forestry is to prepare a forest management plan (FMP). Forest inventory and FMP are basic tools to implement forest policy in the Baltic countries. The decisions in FMP have to be calculated by maximising the sum of the “price” of all benefits (Nilson 1996).

Forest owners have to manage forests according to FMP that are made for forest ownership every ten year. This is not a problem for state forests, but it gives a lot of problems for private forest owners.

The FMP defines harvesting and special restrictions in protected areas, but does not include non-timber uses. Management plans in Latvia are not connected with the economic situation in the timber market. FMP in many cases are based on environmental goals more than economic decisions. Problems with forest valuation in such situations exist in state and private forests.

5. FOREST VALUE

The process of forest planning and management must be connected with the value of the forest. The planning of production and services is impossible without knowing the value of environmental and other non-wood production aspects. It is possible to identify these values, but hard to quantify and value them in monetary terms.

The value of forests consists of the value of timber resources and different non-market benefits. The importance of non-timber benefits varies widely and in some forest types is higher than the timber value. There is a problem with measuring non-priced forest values not only from a technical standpoint, but also because of insufficient information and statistical dates in Latvia. Research about the use of non-wood products and their valuation is only at its beginning point.

6. USE OF NWFP

The forest is not only a source of commercial products, but also of non-commercial benefits. It provides employment, economic development and export income, as well as
recreation, hunting, berry and mushroom picking, tourism and other non-wood uses.

Collecting berries, fruits, nuts, mushrooms, medicinal herbs and other raw forest materials are popular recreation activities in Latvia. It is possible to harvest these products for personal use without a permit (license) but it must be done without causing damage to the forest (Silamikele 1996) The situation is more complicated in real life. There is no real capacity to control the use of forest resources after harvesting. In many cases they are sold. This level of harvest will result in a decrease of future availability for use and decreases the value of forests.

The forest also is a place for sport, recreation and hunting. The demand for forest products is growing rapidly not only in the production sector (food, chemical industry), but also in the recreational and environmental sectors. We have no statistical information about “monetary” non-timber product uses and prices.

At the same time there are a lot of forest benefits which are impossible to buy and sell. For example, oxygen production, beauty, open space, water, pollution filtering and erosion protection are non-market benefits.

7. DEVELOPMENT OF FOREST SECTOR

It is possible to declare that forestry development in the state and private forestry sector will be different. The motivation of such statement comes from analysing and comparing forest activities (cutting and reforestation) and quality of forest resources in both forest sectors.

A forest is like a certificate of deposit or stock that will return more money than is paid for it (Klemperer 1996). This means that successful forest management needs inputs (land, labour and capital). Not all owners will invest money in forest because the production circle is too long. Many people have bad experiences under the Soviet regime and do not believe it will be possible to get back their investments.

Forests do not produce only timber but also non-timber products and services. Forest resources are renewable resources, but scarcity governs the production of different outputs. As we see in Figure 2, it is possible to maximise timber production (T) or non-timber products (N). As demand for non-wood products from society grows (S), the private owner is interested in getting money from forest management (M). The optimum point for both groups of users should be at point (O). New policy mechanisms are necessary to secure the growing demand for non-wood products for society.

8. CONCLUSIONS

Sustainable development of forest resources include use and utilisation of NWFP and benefits. Demand for these products and services grows. Non-wood forest products are important source for food industry and development of rural areas. Their role in the medical, cosmetic and other sectors will increase.
We need more information and research on the actual and potential uses of NWFP to plan the management and to forecast future marketing of non-timber use in Latvia. At this moment it is very important to increase use of NWFP in the domestic level. It is necessary to pay attention to the above mentioned questions. New forest policy in Latvia must the find the best ways to make owners interested in managing their forests according to the interests of the whole society.

The government has to solve the above described problems and make the right decisions which can help private owners manage their forests in the best possible way. It should help save forest resources for the next generation. If we want to predict sustainable management we have to pay attention not only to forest, but also to the forest owner. It is very important to favour co-operation among forest owners and different users of NWFP to improve sustainable management and utilisation of forest resources.

REFERENCES


NON-WOOD PLANT PRODUCTS IN ESTONIAN FORESTS

Taimi Paal
Estonian Agricultural University, Faculty of Forestry
Tartu, Estonia

Olli Saastamoinen
University of Joensuu, Faculty of Forestry
Joensuu, Finland

ABSTRACT

Berries, mushrooms, medicinal plants and other products comprise the major groups of non-wood forest products of plant origin in Estonia. All animal products are excluded from this review. The paper focuses on the estimates of the amounts and the values of the products worked out in the context of Estonian forestry development project. In good crop year of 1994 the “forest edge” value of non-wood forest products was 138 mil. EEK, which was 16.8% of the value of wood production.

Key words: Berries, mushrooms, utilisation, production value

1. INTRODUCTION

Tangible non-wood forest products have always been an essential part of Estonian forestry. Also currently their role is regarded important which, among other things, can be seen in the way they are recognised in Forest Act of 1993. Similarly, they have been given due consideration in the general reviews of Estonian forestry (e.g. Estonian Forest Department 1995).

The current paper deals only with tangible non-wood products of plant origin. All non-wood products of animal origin are excluded here. It is only mentioned that especially game and hunting are considered increasingly important, especially from the recreational and tourism development point of views (Estonian Forest Department 1995).
2. MAJOR GROUPS OF NON-WOOD FOREST PRODUCTS (NWFP)

2.1 Berries

The most important berries are bilberry (*Vaccinium myrtillus*), cranberry (*Vaccinium oxycoccos*) and cowberry (*Vaccinium vitis-idaea*). Besides these major species, large amounts of rowanberries (*Sorbus* sp.) and varying amounts of wild raspberries (*Rubus idaeus*), wild strawberries (*Fragaria* spp.), cloudberries (*Rubus chamaemorus*) and bog whortleberries (*Vaccinium uliginosum*) and some other minor species are collected. These berries are collected in the wild but the cultivation of cranberry has been experimented. Quite recently, an initiative to study cultivation of cowberry was done and first proveniences are already under investigation.

2.2 Mushrooms

Total number of edible mushrooms is estimated to be about 300, of which 100 are regarded tasteful and some 30 species better known by the people. Traditions for household use are long but only some species groups such as cantharelles, milk mushrooms, russulas and boletus have common household or commercial use.

The use of mushroom resources for commercial purposes is more difficult than that of berries as the quality of mushrooms very rapidly deteriorates and in warm weather already newly born mushrooms may be spoilt. Cantharelles are the major export product. Fresh and salted mushrooms have some importance in the domestic markets.

2.3 Medicinal plants

Herbs and other plants can be used for medicinal purposes, as additional food or for spicing as well as for some technical purposes like colouring. Most of medicinal herbs are home-made and mainly used in the households. Bearberry (*Arctostaphylos uva-ursi*) has received most scientific interest. Only few products are available as pharmaceutical products. At Tarto University (Agricultural academy, department of pharmacy) Ulve Pihlik manages medicinal herbs garden and investigates their cultivation possibilities. Earlier forest inventories included data collection on medicinal herbs. The use for herbs as spices and for food is mainly a past tradition which gradually seems to attract people again.

Juniper (*Juniperus communis* or kadakas in Estonian) is said to be a well honoured tree in the whole country but especially in Saarenmaa, where it is called the tree of life. It has been thought to give people more vitality and health than any other tree (Relve 1995). Berries of juniper are collected and they are commercial products for medicinal purposes (according to an old saying, one berry includes nine doctors and works against ninety-nine diseases).
2.4 Other products

Beekeeping and honey production were earlier practised by all forest districts but have recently been largely privatised. The most important honey plants are heather, willows, wild raspberry and rowan trees, which earlier were always left in clear cutting areas. Intensive agriculture has kept beekeeping in forests but currently agricultural fallow fields are available as well. In some places bee mite has been a problem.

Fresh flowers have always been collected and used for every-day decorations and delight as well as for local trade (e.g. Hepatica triloba, Convallaria majalis, Trollius europaeus etc.). Dry flowers are also increasingly popular and among them Calamagrostis is one of the commonly used species.

Forests provide numerous minor raw materials for making handicrafts and household items. Tough and aromatic wood of juniper is widely used for many purposes. Earlier forest districts were obliged to reserve areas for bath whisks and besoms. Willow is largely cultivated for basket works and can grow even 2 meters in a year. Spruce cones have been exported to Germany.

Birch sap was formerly produced in large amounts and there were even some factories producing it. Occasionally also Black chokeberry (Aronia melanocarpa) sap was produced. Estonian factories are not producing sap anymore but households make birch sap to some extent.

Lichens have traditionally been used only in small amounts as window decorations and moisture removers. Earlier mosses were used as fillings. The leaves or needles of trees are very seldom used for any other than decorative purposes in the households. Occasionally birch leaves have been used e.g. for making tea.

Ant nests are often protected in forests for pest protection but ant eggs are not collected. Resin production has practically not been done during the past years and the products have been substituted by others.

3. AVAILABLE YIELD ESTIMATES

Most forest berries are found throughout Estonia in those forest site types they commonly occur in. Wild berry resources are located mainly in the border areas. The central areas of Estonia are dominated by agriculture and mires and therefore are less important from the point of view of berries and other non-timber forest products.

The Estonian Forest Research Institute and Zoological and Botanical Institute have made long-term investigations concerning the biological characteristics, crops and yields of the most important berries (e.g. Kask 1972, Männi 1980, Pihlik 1987, Paal 1986 and 1997). Also medicinal plants (bearberry and cowberry vegetative parts) and mushrooms have received some attention while there is no data available for other products concerning their crops and yields. However, the more systematic data can be compiled here only for most important berries.

Long-term (1984-1991) studies of bilberry and cowberry yields on the most productive site types (on areas where the species coverage is > 40%) have been done in
different geographical areas (Paal 1997). Most collecting occurs in these productive areas, which only cover a small share of all forest land area. According to data presented by Paal (1986), the most productive bilberry areas covered only 0.4 % of all forest land area and other productive areas (species coverage 10-30 %) additionally 1.5 %. For cowberry the most productive areas made only 0.1 % of total forest areas and other productive areas (coverage 10-30%) an additional 1 %.

**Table 1.** The average (1984-1991) biological crops of bilberry and cowberry on most productive (vegetation cover >40 %) site types in different parts of Estonia (Paal 1997).

<table>
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<th>North East</th>
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<td>138</td>
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<td>263</td>
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<td>Bilberry</td>
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<td>94</td>
<td>240</td>
<td>153</td>
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<tr>
<td><strong>Site-type</strong></td>
<td><strong>COWBERRY Pohla kg/hectare</strong></td>
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<td>Bilberry</td>
<td>104</td>
<td>116</td>
<td>40</td>
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</table>

*Note: If a figure is missing, it indicates that the productive berry areas have been too small to be included into study.*

Similar systematic experimental data does not exist for other site types. However, to calculate the possible magnitudes of biological crops the above figures have been amended with expert estimates. In total, resulting tentative estimates suggest that the average biological crop of bilberry is 14 million kg annually and for cowberry 7 million kg annually (Saastamoinen et al 1997). Kask (1972) has estimated that the biological crop of cranberry is 5.7 million kg annually and the productive area is 21 000 hectares.

Pihlik (1987) has estimated that the biological stock of vegetative parts of the bearberry (*Arctostaphylos uva-ursi*) growing stock in Estonia is 0.252 million kg (air-dry weight), exploitable stock 0.013 million kg and possible stock to be collected 0.02 million kg.
Only few estimates on economically harvestable amounts are available in Estonia. For example, Paal (1986) estimated that in the years of medium level yields it is possible to gather 2154 tons bilberries and 120 towns cowberries. In good years 3500 tons bilberries and 250 tons cowberries can be collected. Kask (1972) stated that in the case of cranberries as much as 70% of biological crop is actually collected. Probably, the estimate of biological crop consisted only productive sites.

In fact, the concept of economically harvestable crop is somewhat theoretical which can only be used indicatively for planning purposes. In the real world the actual use of biological crop measures also the efficiency of crop utilisation that people regard appropriate given their incomes, preferences, available time and other resources.

4. THE COMPONENTS AND VALUE OF UTILIZATION

4.1 Household consumption

In many countries the direct consumption by rural and urban households of many non-wood products is the major form of utilisation. Household consumption includes own collection or free products given by neighbours or relatives. In addition, households buy some of the products from local markets and retail shops.

The Household Survey of Estonia (Emor 1995) provides data on the collection and consumption quantities by two broad product groups: berries and mushrooms. The bulk of berries collected consists of bilberries, cowberries and cranberries.

The self-picking of berries for household own use has been about 2 kg per person but has shown a downward trend between 1992-1995 (Table 2). It is not known whether this is just a random phenomena due to annual crop variation, or a reflection of lesser interest on these products due to rising standard of living. A contrasting explanation is that more products are sold for export markets and therefore less used for own consumption. The latter reason may be the probable cause.

Picking mushrooms for own consumption has also been about 2 kg per person although it has been on the average little more than the use of berries. Purchased products represent 7% of berries and only 1% of mushrooms consumed in the households.

In 1994 the price received by a picker when selling the products was on the average EEK 10/kg for lingonberry, bilberry and cranberry. The same price was adopted for household’s direct use of mushrooms. In 1994 the value of household consumption of berries and mushrooms was 67.2 mil. EEK (Table 3).

4.2 Domestic market use

The domestic market use can be divided to industrial and non-industrial uses. The latter consists of those products purchased by families (Table 2) and “large-scale household”-uses such as schools, hospitals and restaurants. The latter is not known but is assumed to be roughly the same level as the purchased products of households.

<table>
<thead>
<tr>
<th></th>
<th>Per capita (kg)</th>
<th>All population (tons)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Self-picked</td>
<td>Purchased</td>
</tr>
<tr>
<td>BERRIES</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1992</td>
<td>2.32</td>
<td>0.18</td>
</tr>
<tr>
<td>1993</td>
<td>2.19</td>
<td>0.14</td>
</tr>
<tr>
<td>1994</td>
<td>1.81</td>
<td>0.12</td>
</tr>
<tr>
<td>1995</td>
<td>1.08</td>
<td>0.12</td>
</tr>
<tr>
<td>Average</td>
<td>1.85</td>
<td>0.14</td>
</tr>
<tr>
<td>MUSHROOMS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1992</td>
<td>1.83</td>
<td>0.02</td>
</tr>
<tr>
<td>1993</td>
<td>2.73</td>
<td>0.03</td>
</tr>
<tr>
<td>1994</td>
<td>2.68</td>
<td>0.05</td>
</tr>
<tr>
<td>1995</td>
<td>2.19</td>
<td>0.02</td>
</tr>
<tr>
<td>Average</td>
<td>2.36</td>
<td>0.03</td>
</tr>
</tbody>
</table>

There are six major factories buying forest berries, most of them locating in Southern Estonia. Some of the factories may also participate in the export of raw materials.

The value of domestic market use of berries and mushrooms was calculated to be 11.6 mil. EEK in 1994 (Table 3).

4.3 Export

The major non-timber forest product exported from Estonia is bilberry. Other important export products are cowberries, cranberries and mushrooms. Only little value added products such as jams and liqueurs are exported directly, but in fact indirect export of those products by tourists (mostly from Finland) is more important.

According to the statistics of the Estonian foreign trade, the major export countries were Finland (52 % of the total amount of exported fresh berries and fruits in 1994), Sweden (29%) and Germany (16%). Austria, France, the Netherlands and Norway make the most of the rest 4% of export (Foreign Trade, Statistical Office of Estonia 1995).

According to the import statistics of Finland, Sweden and Germany, these countries bought 4.9 million kg berries from Estonia in 1994. The export value based on import statistics was roughly calculated to correspond domestic income and was 77.2 mil. EEK in 1994 (Table 3). It is worth mentioning that in 1994 pickers received 21 million crowns mainly from bilberry in three southern provinces alone.
4.4 The value of non-wood products

The data presented in the preceding sections on non-wood forest products gives possibilities to assess their aggregated economic value at the national level tentatively (Table 3). The basis of the calculations are given above or explained in the footnotes of Table 3 (for more detail see Saastamoinen et al. 1997). However, some points need to be emphasised here.

First, the quantitative data concerning other non-wood products than berries and mushrooms was not available. Here it is conservatively – based on an estimate made in Finland – assumed that all other products make 5% of the value of berries and mushrooms (Salo 1994).

One should notice that the year 1994, for which most data is available, was a year of good crops. The export amount was 58% larger than in 1993. In 1995 when the crop level was very low, the export quantity dropped sharply.

The total value of non-wood forest products can be seen from two different viewpoints. First, if calculated using border prices for exported products, the ‘domestic’ value of non-wood products in 1994 was about EEK 165 million (Table 3). Of that figure, the share of export income is 47% and the value of households’ self-picked and self-consumed products (only berries and mushrooms) 40%. The other non-export market uses make up the rest 13% and this figure also includes an estimate of the poorly known other products.

The second estimate for the 1994 value of non-wood products is obtained when domestic picker prices are also used for exported berries and mushrooms and “other products” are included. The result is 138 mil. EEK. This is the proper figure to be compared to the estimated delivery value of wood production (which according to the Forestry Development Project’s estimate was 909 mil. EEK). In 1994 the relative share of non-wood production was 15.2% of the value of wood production. Although it represents the above average value of good year, it clearly demonstrates that non-wood forest products do play a significant role in Estonian forestry.

In the past, their importance was also well reflected in the activities of the research organisations. Estonia has rich experience on non-wood forest products research. Unfortunately, the recent budget cuts and reorganisation of forest research has greatly reduced the research input available for the study of these treasures of nature.
Table 3. A tentative estimate of economic values of non-wood products in Estonia in 1994

<table>
<thead>
<tr>
<th></th>
<th>Direct household use</th>
<th>Domestic market use</th>
<th>Export</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Retail &amp; other direct</td>
<td>Industrial uses</td>
<td></td>
</tr>
<tr>
<td>Million tons</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Berries</td>
<td>2718</td>
<td>180</td>
<td>600</td>
<td>5145</td>
</tr>
<tr>
<td>Mushrooms</td>
<td>4014</td>
<td>72</td>
<td>120</td>
<td>44</td>
</tr>
<tr>
<td>Other products</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1) Includes only products purchased by households (Statistics Estonia, Household surveys). Other direct use (schools, restaurants etc. see text) excluded. Other direct use may be about the level of household use.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2) Industrial use is an estimate based on scattered data of the 1995 utilisation, known capacities of the firms and assumed export of non-processed products.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>3) It is conservatively assumed that all other products make 5 % of the value of berries and mushrooms (pickers' market income and household consumption EEK 131 million) - based on similar assumption made in Finland (Salo 1994). Only the total is thus estimated and no disaggregation between uses is done.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>4) To make the export unit values more comparable to domestic income the unit import prices of importing countries have been reduced by 25 % (e.g. in the case of berries from EEK 20 /kg to EEK 15/kg). However, if the value of exported products were to be measured at the forest edge, then the actual picker prices should be adopted (i.e. EEK 10/kg). The total export value of berries and mushrooms in importing countries is thus 25 % larger and in total EEK 99 millions. Some of export products have been imported from Latvia.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>5) Other products are included only into grand total, see note 3) above.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
REFERENCES


UTILISATION AND RESEARCH OF NON-WOOD PRODUCTS IN THE FORMER SOVIET UNION

Taimi Paal
Estonian Agricultural University, Faculty of Forestry
Tartu, Estonia

ABSTRACT

A short survey is given of how the utilisation of non-wood products was organised on the territory of the former Soviet Union. Scientific research of wild berries is characterised with a special emphasis on the activities of the Committee of Wild Berries Research.

Key words: wild berries, mushrooms, herbs, honey, resources.

1. UTILISATION

The vast territory of the northern part of the former Soviet Union is covered with coniferous forests rich in wild berries and mushrooms. Utilisation of the natural crop from the woods is an old tradition of the people in these regions and is in many parts alive even today. In hard times – such as wars, failing crops, and abrupt political changes – non-wood products have often been of vital importance.

Wild berries, mushrooms, and nuts have also been important export articles. First information about the export of wild berries from the Russian Empire is from 1817 (Rahilin 1972). Exports were most extensive before World War I: in 1911 at least 1392 tons of berries were exported. The exports of wild berries and mushrooms played an important role in the exports from the FSU as well. In the Baltic region they have intensifi ed during the recent years as the economy has been reorganised.

In addition to berries and mushrooms, resin was also collected in great quantities to produce turpentine and other chemical products. Collecting birch sap, medicinal plants and honey have also been important. In some regions, a vitamin paste was prepared from the needles of the coniferous trees.

In the Soviet Union a wide network of enterprises was active in organising the gathering and buying of the non-wood products. The organisation of the Cooperated
Customers played the leading role in the process buying depending on the yearly crop 50-70% of the berries, nuts and mushrooms used in the local production and for export (Agaphonov 1972).

Since 1966 when the Ministry of Forestry of Russian S.S.R. was founded, the subdivisions of the ministry – forestry enterprises and forest districts – also became active in the process (Sotnik 1972). As the income from the non-wood products reaching millions of rubles was not centralised but was left to be used by the enterprises active in collecting, those institutions were greatly interested in organising the collecting process. Special brigades were formed at the forestry enterprises, supplied with transport as well as the necessary equipment. Those brigades were taken in the second half of the summer to places rich in berries and were sometimes left there for several months. In these far-off places camps were founded, and quite often the processing of the collected material was also arranged on the spot.

Forestry enterprises also collected a great part of honey produced in the Soviet Union. The customers developed certain preferences for honey originating from different parts of the country, honey from fireweed (Charmaenerion angustifolium) and lime (Tilia cordata) being especially appreciated.

Many forestry departments also had their own processing plants where jam, alcoholic drinks, herb tea mixtures, natural oils and extracts were produced in small quantities according to local traditional recipes.

In addition, the forestry department’s big organisations such as Lekrasprom, Tsentrosojuz, and the Bureau of Drugstores were also active in organising the gathering of medicinal plants. In the rural areas, school-children had an obligation to gather a certain amount, usually a couple of hundreds grams, of a medicinal plants, too.

Campaigns were a feature characterising the economy of the FSU to a greater or smaller extent and this was concerned collecting the non-wood products, too. During some recent campaigns new organisations and enterprises were created that became active in the business. The last great campaign that also included utilisation of non-wood products was the so-called Nutritional Programme (Prodovolstvennaya Programma).

To plan the gathering of non-wood products better, it was necessary to know the geographical location of the resources and their quantities. To solve these problems various research teams and institutions were formed. For the publication of the research results in the field of plant resources a special journal Rastitelnye resursy (Plant Resources) was founded in 1967 by the Academy of Science of the Soviet Union.

2. RESEARCH

The systematic study of non-wood products in the Soviet Union began after World War II, although a number of profound investigations concerning these problems had been published before. One of the most important studies is M. A. Rozanova’s research on the Vacciniaceae family in the 1920s and 1930s (Rozanova 1934). In 1928 E. Sinskaya and M. Shchenkova published a comprehensive study on the mutability of the Vaccinium genus. In 1935, J. Branke’s monograph on the biochemistry of wild berries was
published, just to give a few examples. Most of the investigations published before World War II dealt with the biochemistry of wild berries but also with their export, storage and processing.

While after the World War II the aspects of development biology and autoecology prevailed, from beginning from the 1960s the quantity of research work into the plant resources started to increase quickly. A remarkable event in the problematics connected to the utilisation of non-wood products was a conference in 1972 in Kirov, the result of which was the founding of a Committee of Wild Berries Research, subordinated to the All-Union Botanical Society. The purpose of the Committee was to co-ordinate research all over the Soviet Union, as well as to create and develop contacts between scientists from different regions and republics. The foundation of the Committee was in fact the result of work that had lasted many years.

In the next conference in 1974 in Darwin, the statute project of the Committee was polished and its leaders were elected. The Committee was officially formed on October 15, 1975 according to the decision of the All-Union Society of Botany (Tyulin 1986) with A. Ph. Cherkasov as the chairman and S. Ya. Tyulin as the secretary. By the time the Committee officially started its activities, several research teams had been formed in different parts of the Soviet Union that extended and intensified their work even more.

During a meeting of the leading body of the Committee, an extensive programme was drafted for research of wild berries (Cherkasov 1976). A solution of the following problems was projected in it:

- Finding and specifying the geographic locations of wild berry populations;
- Elaborating methods for mapping their resources;
- Prognosing the crops and finding methods for prognosing the potential yield of berry plants connected with a systematic inventory of the forests;
- Investigation of the environmental factors determining the wild berry crop in different geographic and climatic regions;
- Investigation of the influence of anthropogenic factors on the berry populations and problems of berry population protection;
- Research of developing, phenology and other aspects of berry-plant populations;
- Elaboration of economic reasons for creating special enterprises for managing the areas of berry growth.

The leading body of the Committee included scientists from different republics and regions and that made the exchange of information easy. To get a better survey of the work being done, it was decided to organise an annual conference in the region of the stronger research teams. During the following ten years 7 conferences were held.

An important task of the Committee was to support young scientists in their academic progress, especially to offer them help in approaching methodological problems. All doctoral dissertations related to the field were critically reviewed by the Committee. In 1982-1985 scientists related to the Committee defended 6 doctoral theses concerning the different problems of non-wood products (Tyulin 1986).

Since 1975 the Committee started creating its own library to gather literature concerning non-wood products from the Soviet Union but also from western countries in one place and make it available for all researchers. The library was located at the
Laboratory of Plant Resources by the Institute of Botany in St. Petersburg where the Committee's secretary S. Ya. Tyulin was employed. The obligation of all Committee members was to send a copy their publications to that library. Literature was also obtained through donations. Literature from the western countries reached the library with the help of the scientists of the Baltic republics who had contacts with the western colleagues. In ten years about 900 articles and books were collected in the library.

Equally important was writing common monographs and seeking publication opportunities for them. In Russian such monographs were published as Annotated Bibliography of Publications on Wild Berries, vol. I (1981), Cranberry (1981), Cloudberry and Arctic Bramble (1982), Plant Resources of USSR, vols. I (1984), and II (1985), Cowberry in Forests of Siberia (1987), Cowberry (1990), etc. An Annotated Bibliography of Publications on Wild Berries, vol. II is expected to be published soon in Novosibirsk. The publication of the bibliography has been delayed by the economical difficulties caused by the collapse of the Soviet Union. In Petrozavodsk an essential handbook for all researchers into the field of plant resources Dictionary of Terms on Non-wood Research is being prepared for publication. The manuscript has been ready for years.

In 1975-1985 the members of the Committee published 25 monographs and 413 papers, participated in 181 projects of non-wood products and 52 exhibitions (Tyulin 1986).

In the 5 years after the foundation of the Committee, centres of resource research were formed in several places all over the Soviet Union. One of the more successful teams worked at the Forest Institute and at the Institute of Biology Institute of the Karelian Academy of Science in Petrozavodsk. The team has investigated the productivity of wild berries, their phenology, inventory of the berry resources parallel with forest taxation, impact of human activity on berry crop, biological peculiarities of cranberry and its biochemistry. The resources of several important medicinal plants were also appreciated, also the regime of their exploitation and their protection as well as biochemical properties of berries and herbs (Gorbunov 1987). Mushroom resources were also profoundly investigated (Shubin 1988 and 1993).

The work of the Kostroma Experimental Forest Station centred around the methodological problems of wild berry resources, crop prognoses and crop potential. In the 1980s the researchers also started to investigate the genetic variability of the berry plants. A few years later, the team started experimenting with the cultivation of wild berries and the work is currently continued.

The St Petersburg Laboratory of Plant Resources was more interested in the berry plant ecology and biology. At present the research team is occupied in investigating the influence of the atmosphere pollution on the berry resources of the Kola Peninsula.

Investigation performed at the Forest Institute of Belarus in the field of non-wood products varies: included are topics related to the inventory of resources, investigation of the problems of ecology and biology of berry plants, the influence of human impact on berry and mushroom resources, and the prognoses of crop potential. Cultivation of wild berries has also been in the centre of attention. After the 1986 Chernobyl nuclear catastrophe the influence of radiation on the natural berry and mushroom populations has been investigated.
Strong centres of wild berry research were also at the Lithuanian Forest Institute, Lithuanian Institute of Botany, Latvian Botanical Garden, Botanical Garden at the Academy of Sciences of the Soviet Union in Novosibirsk, at the Forest and Wood Institute in Krasnoyarsk.

An essential role in the research into the berry resources was performed by the nature reserves. Numerous long-time experiments have been realised in these areas, also comparative research into different methods and collecting of material about the population structure of the economical plants. The initiative for carrying out the research often came from scientists working independently, who later generalised their results either into monographs or doctoral theses (e.g. Reier 1982, Paal and Paal 1989).

In 1980 another institution investigating the problems of non-wood product was founded at the Scientific Council of the Forest Management by the Academy of Sciences of the Soviet Union. Its assumed range of interest was wider in comparison to that of the Committee of Wild Berries Research. The institution saw its purpose in co-ordinating all possible research in the field of non-wood product. However, the new institution did not get very good results. A few conferences with numerous participants were organised but no essential change was brought about either in the methods or the generalisation of relevant problems.

The past seven or eight years have been devastating for many scientific institutions in the former Soviet Union. Due to inadequate funds the staff has diminished and several researchers have left for various reasons. Contacts between the researchers of different regions have become only occasional or have been interrupted altogether, especially in the case of the researchers from the Baltic states. However, as the non-wood products are still important in the whole boreal forest zone, we can expect that with the process of economical stabilisation we will succeed, with the help of international projects, to reach the previous level of research.

The present article has omitted all research performed in the field of berry plant cultivation as a survey of that aspect has been given in English before (Paal 1992).

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DENMARK: NON-WOOD FORESTRY IN A DENSELY POPULATED TEMPERATE COUNTRY

Peter Munk Plum
Division of Forest Management Planning, National Forest and Nature Agency
Denmark

ABSTRACT

Main purposes of forestry in a densely populated country like Denmark are mainly non-wood: recreation, wildlife, biodiversity, protection of ground water, landscape issues, historical and cultural values are probably more important forest products to the ‘average Dane’ than wood. The legislation, management planning and administrative systems are build up to support these non-wood goods at least to the same level as the wood goods. The financial revenue of non-wood goods have in general figures at the same level as wood goods. Products such as mushrooms, berries, nuts, etc. play a very delimited role in the Danish use of the forests, and the economical value of these products have no private or national economical importance. This article gives a number of examples on how forest policy, administration and management is undertaken in a densely populated temperate country.

1. BACKGROUND: DANISH FOREST HISTORY

To understand the present situation in Danish forestry it is very important look at the situation about 200 years ago (Plum 1988).

Originally 80-90 percent of the Danish land area was covered with forest. During the different climatic periods after the last Ice Age different tree-species have been predominant but the most important species are beech (*Fagus silvatica*), oak (*Quercus robur* and *Q. borealis*), ash (*Fraxinus excelsior*), birch (*Betula pendula* and *B. pubescens*), alder (*Alnus glutinosa*), hornbeam (*Carpinus betulus*), scotch pine (*Pinus silvestris*) and yew (*Taxus baccata*).

When the country was inhabited in the Younger Stone age about 4500 years ago, deforestation began. It was carried out to give room for habitation and agriculture and to provide the population with firewood and material for houses, handicrafts etc. This
development continued until about the year 1800 when forests only covered few percent of the country's area — and these forests were in bad condition.

The lack of wood products became a major national-economical problem for the country and made the country politically dependent on neighbouring countries with wood. Also soil-drift and other ecological complications had severe impact on the lack of forest vegetation. To stop the vast deforestation of the country and to rebuild the forests and to afforestate marginal agricultural areas, a number of activities were introduced in 1800-1820: enclosure of existing forests and cadastral registration of forest obligation, establishment of a state forest department (currently part of the National Forest and Nature Agency), grants for afforestation, and public purchasing of land for afforestation, establishment of graduate level forest education, and implementation of forest statistics.

2. OUTLINE OF DANISH FORESTRY IN THE 1990S

Of a total land area of 4 309 441 ha, forest covers 445 391 ha (10.3 %) and other wooded land about 93 000 ha. Only about 200 ha can be considered as undisturbed by human activities, and 34 800 ha as semi-natural forest. The total area of plantations of 410 391 ha reflects the afforestation-policy of the past two centuries. With a population of about 5.1 million people, there is about 0.08 ha of forests per inhabitant.

This is the main result of the building up of Danish forestry since the year 1800: Danish forestry is a very young one — almost all the stands are first, second or maybe third generation of stands. Nature forests as in, for instance, Scandinavia do not exist in Denmark. Every stand is well-delimited and well-described by tree species (normally only one per stand), age, productivity etc.

The total forest area of 445 391 ha is divided into 168 280 ha of coniferous forests, 111 480 ha broad-leaved forests and 165 631 ha mixed forests. Only 5000-6000 ha of forest are not considered available for wood-supply, mainly for nature-conservation reasons.

139 856 ha are in public ownership — predominately state-owned — and 305 538 ha privately owned by about 20 000 owners. More than half of the privately owned forest area consists of holdings larger than 50 ha. Almost all the forest area are silviculturally managed.

An adjustment in accordance with the international IUCN-categories shows that 5086 ha can be considered as being protected as strict nature reserves (like IUCN-category I and II), and 420 414 ha either as habitat or species management area, protected landscape area or managed resource protection area (like IUCN-category III-VI), while 19 891 ha are not protected. Important is the very large amount of Danish forests which are protected by legal forest obligations according to the forest law which states that these areas must be managed following sustainable principles.

The standing volume is about 55 200 000 m³ over bark equivalent to about 25 665 000 ton biomass oven-dry. The net annual increment is about 3 520 000 m³. The yearly fellings are about 2 200 000 m³. Annually the standing volume increases with about 1 200 000 m³.
About 50 000 ha of the forest have protection functions, of those 15 000 ha against development of dunes, 15 000 ha for ground water protection and 20 000 ha against soil-drift.

The net value of forests (not sawmills, wood industries, etc.) is about 350 mill. DKK from wood, 253 mill. DKK from Christmas trees and greenery, 143 mill. DKK from hunting, totally 700-850 mill. DKK annually. The net value is calculated as the surplus from the activities after all costs have been paid.

3. PRESENT FOREST POLICY IN DENMARK

3.1. Strategy for sustainable forest management

The Danish Strategy for Sustainable Forest Management of April 1994 (Ministry of the Environment 1994) constitutes the main forest policy in Denmark. It serves partly as a follow-up to UNCED and to the Helsinki Conference, partly as the Danish policy on how to substantiate and bring into operation the international efforts on the implementation of Sustainable Forest Management. The strategy presents a number of objectives and measures and a process of evaluation, which together are to ensure the sustainable management of Danish forests in general.

3.2. Conservation of the genetic resources of trees and bushes

The Strategy for the Conservation of the Genetic Resources of Trees and Bushes in Denmark was launched in 1994. This national strategy is intended to ensure the genetic variation of the trees and bushes that are used as cultivated plants in Danish forests and landscapes. Before year 2004 a network of tree and bush stands will be established in order to conserve genetic resources in the 80 most imported species.

3.3. Natural forests and other forest types of high conservation value

In 1992 a national Strategy for Natural Forests and Other Forest Types of High Conservation Value in Denmark was adopted. The overall objective of this strategy is to conserve the biodiversity of Danish forests, including the gene resources present in these areas. In the state forests, 5000 hectares of non-intervention forest reserve and an area of about 4000 hectares under traditional management systems, have been designated for protection.
4. GENERAL MEASURES TO PROMOTE SUSTAINABLE FOREST MANAGEMENT

4.1. Legal/Regulatory framework

The Forest Act (1989 with amendments 1996) ensures that forest reserves (forest obligations) remain under forest cover and are managed in accordance with the rules of good and multiple-use forest management. The Forest Act is based on the principle of integrating production and conservation on all forest areas, and the Act defines good and multiple-use forestry as management with due regard to increasing and improving wood production as well as nature conservation, landscape, historical values, environmental protection and recreational interests. There is a demand on the forest owner to take into account multiple-use considerations on each individual forest area in accordance with a comprehensive view.

The Nature Conservation Act (1992) protects bigger lakes, streams, bogs, etc. This act also ensures access – with a slight differentiation between private and state owned forests – for the general public to all forests.

4.2. Institutional framework

The central governmental responsibility for forestry is concentrated in one ministry, The Ministry of Environment and Energy which, through the National Forest and Nature Agency, carries out the administration and policy making on forestry, nature raw material, leisure and conservation of historical sites and buildings.

The National Forest and Nature Agency also manages state forest areas covering approximately 1/3 of the Danish forest areas on which the state can adjust forest management to meet public wishes. According to the Forest Act, the state forestry must pay special regard to recreational use, nature, environment and cultural heritage in forests.

4.3. Public involvement in forest management

A forest ranger scheme has been established, where rangers based on extension centres provide information on forest and nature to the public. In 1997, about 70 such centres had been established.

The National Forest and Nature Agency has since 1990 been funding and running a Forest Info-programme, consisting of a continuing professional information campaign targeted at forest owners, with the aim to improve forest management principles.

Since 1994 a “Day of the forest” (app. one each year) has been held regularly nationwide, with the intention to raise the general awareness concerning forests and their sustainable management. A variety of activities has been offered to the public in both private and state forests. Such activities are very popular.

In 1994 User Councils were established for all state forest districts. The aim is to
strengthen the local users involvement in the managing and utilisation of the state forests, and to increase the users influence on this. Active in the User Councils are NGO's, local and regional authorities, associations and citizens.

5. THE RECREATIONAL USE OF THE FORESTS

In 1993-1994 an investigation on the populations use of the nature for recreational purposes have been carried out (Jensen and Koch 1997). The investigation was based on questionnaires to a representative part of the male Danish population (15-77 years). The questionnaires was of tree types which aimed at count the use of forest for recreation, the preferences for different types etc. of forests and a combination of those two items respectively.

Figures shown in Table 1 cover 90% of the Danish population which visits the forest at least once a year. The so-called 'common Dane' – the median in the questioned population – was in the forest 10 times a year and the median of the duration of each visit was about 1 hour and 10 minutes. 2/3 of all visits were carried out in the forest which are nearest to visitors address. One fifth of the forest visits takes place in less than 2% of the forest area – nearest the big cities.

Assessments like this are widely used in the Danish forestry administration, planning and management to be in accordance with the recommendations of Rio, Helsinki and other agreements on sustainable forest development.

Table 1. Visits to forest by the activities.

<table>
<thead>
<tr>
<th>Activity (a visitor can have more than one purpose)</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Only 'had a walk'</td>
<td>63</td>
</tr>
<tr>
<td>Enjoyed the nature</td>
<td>55</td>
</tr>
<tr>
<td>Studied the nature</td>
<td>19</td>
</tr>
<tr>
<td>Had a drive</td>
<td>13</td>
</tr>
<tr>
<td>Enjoyed the calmness</td>
<td>14</td>
</tr>
<tr>
<td>Other</td>
<td>14</td>
</tr>
<tr>
<td>Motioned</td>
<td>13</td>
</tr>
<tr>
<td>Took out the dog for a walk</td>
<td>13</td>
</tr>
<tr>
<td>Worked</td>
<td>2</td>
</tr>
<tr>
<td>Went fishing</td>
<td>2</td>
</tr>
<tr>
<td>Went riding</td>
<td>2</td>
</tr>
<tr>
<td>Went hunting</td>
<td>1</td>
</tr>
</tbody>
</table>

Content of the group “other” Percent
- Eating                                          6.3
- Painting, photographing                          4.1

Used the products of forest Percent
- Game management                                 5.4
- Joined a party                                   5.4
- Looking at historical monuments                  1.9
- Sport etc.                                       16.5
- Special activities                              14.0
- Not specified                                    21.6

List of forest products used Percent
- Branches etc.                                    3.5
- Moss, lichen etc.                                2.9
- Nuts                                             1.0
- Berries                                         0.0
- Mushrooms                                       1.9
- Christmas-trees                                 2.5
- Collected plats                                 4.8
- Cones etc.                                      1.9
- Other matters                                    6.3
REFERENCES


NON-WOOD FOREST PRODUCTS IN FINLAND: STATISTICS, EXPERT ESTIMATES AND RECENT DEVELOPMENT

Olli Saastamoinen
University of Joensuu, Finland

Jyrki Kangas*, Arto Naskali** and Kauko Salo***
Finnish Forest Research Institute
*Kannus, ** Rovaniemi, ***Joensuu Research Stations, Finland

ABSTRACT

This paper reviews the current situation concerning tangible non-wood forest products in Finland. Basic non-wood product groups are the forest and peatland berries, edible mushrooms, decorative lichen, herbs, reindeer, game and other products. Information on each group is given concerning the value of the production based either on statistics or expert estimates. Available statistical sources are identified and the planning, policy and development issues are concisely discussed.

Key words: Non-wood goods, statistics, expert estimates, production values, Finland

1. INTRODUCTION

About 86% of total land area in Finland falls into the category of forestry land, comprising altogether 26.3 million hectares. Forestry land refers here not only to forest land (20.9 mil. ha) but also to scrub land (open woodland with scattered trees, bogs – 3.0 mil. ha) and treeless tundra or open peatland (3.1 mil. ha) as well as roads and other minor areas forestry requires.

According to a slightly discriminatory and outdated terminology, the treeless forestry lands (treeless tundra, open peatland) are called waste land: a term that could be seen appropriate from the point of view of wood production but not from that of non-wood production or other environmental amenities.

The forestry land makes more than five hectares per every citizen in Finland (population about five million and forestry land about 26.3 million hectares). Not surprisingly, for most Finns forests are a part of the every-day life.

The majority of forestry land (54 %) is owned by private non-industrial land-owners; the state owns one-third and forest companies 8 %. The rest is owned by municipalities, church and other minor owner groups. Most state-owned forests are located in northern
and eastern Finland. For that reason, among others, average growth of trees is greater in privately owned forests than in State-owned forests (Naskali 1996).

Total volume of the growing stock in Finnish forests is about 1.9 million m³, and the annual increment of the growing stock is about 77 million m³. For the past few decades, annual increment has exceeded the annual removal. This development has given more possibilities for taking also non-wood goods and benefits as well as other dimensions of multiple-use forestry into account both in forest policy and forest management practices.

In recent years, forest management and utilisation directives have changed a lot. The past decades’ intensive forestry has been discarded and a more environmental-friendly, or nature-oriented, practice has been embraced. This change is in line with both the public opinion on forests and their use, and the international pressures.

According to recent studies, Finns set several concurrent goals for the forest utilisation and management. People feel that the country’s forests should be healthy, beautiful to the eye and rich in diversity, and at the same time they should offer good recreational possibilities and opportunities to collect wild berries and mushrooms (Kangas and Niemeläinen 1996). No doubt, ordinary Finns seem to prefer multiple-use forestry. The non-wood forest products traditionally play an important, although in some respects inadequately recorded, part of that.

### 2. RESOURCE GROUPS OF NON-WOOD FOREST PRODUCTS

This paper will be limited to the following tangible non-wood forest products used presently either for direct consumption by households or collected for sale:

a) Forest and peatland berries  
b) Edible mushrooms  
c) Decorative lichen  
d) Herbs and other plants  
e) Reindeer and reindeer husbandry  
f) Game management and hunting  
g) Other products

All the services of forests such as everyman’s recreation, nature based tourism, carbon sequestration, other environmental benefits of forests (water and soil conservation, settlement and infrastructure protection including urban forestry benefits, etc.), landscape values, and biodiversity conservation are excluded from this survey.

It should to be mentioned here that the silvicultural site classification in Finland is based on a forest site type theory. According to that approach, forest and peatland type sites are classified on the basis of ground vegetation, especially on those called indicator species. Although the real purpose was to predict soil fertility and wood production capacity, the typology of Finnish forest site classification also might suggest that non-wood forest products were the major topics of interest: site types are named according to dominant ground and field floor plants, many of which have commercial value.
Examples are lichen (*Cladina* sp.) site type, cowberry (*Vaccinium vitis-idaea*) site type and bilberry (*Vaccinium myrtillus*) site type. Indeed, this biological site type classification gives good possibilities to adopt and take into account the new needs of NWFP and biodiversity conservation.

### 3. NATIONAL STATISTICAL FRAMEWORK FOR NON-WOOD FOREST PRODUCTS

Following statistics are annually or periodically available concerning tangible non-wood forest products in Finland:

- **a)** Forest resource statistics: the national forest inventory (NFI) by the Finnish Forest Research Institute (METLA) is a well-established monitoring system, which reports the areas of forestry land and site types as well as characteristics of the growing stock. Development towards multi-resource inventory is going on and some smaller scale inventories have been experimented.
- **b)** Household surveys (Statistics Finland) were earlier done every 5 years, now annually but with smaller sample. It gives some data on berries and mushrooms picked by households.
- **c)** Commercial picking (Food & Farm Facts Ltd – Elintarviketieto Oy): annual quantities and values of berries and mushrooms bought by organised trade and industry.
- **d)** Industrial statistics (Statistics Finland) show the use of raw materials by major branches of industries offers some data on berries and mushrooms also.
- **e)** Exports and imports statistics (Foreign trade, Statistics Finland) give detailed data on concerned products.
- **f)** National accounting (Statistics Finland) compiles annual (but unpublished, published only at more aggregate level); estimates of GDP values of berries, mushrooms, reindeer husbandry, hunting based on all available other statistics. Estimates have also been used as a part of “green accounting” (e.g. Hoffrén 1997).
- **g)** Game and hunting statistics show the annual catch and game resources by the Finnish Game and Fisheries Research Institute.
- **h)** Reindeer management statistics: An Association of Reindeer Herders’ Organisations.

Some of the above statistics are reported in the Finnish Statistical Yearbook of Forestry published by the Finnish Forest Research Institute.

### 4. EVERYMAN’S RIGHTS AS A BASE OF NWFP UTILISATION

The traditional rights of public access allow everybody to use nature for some restricted purposes irrespective of the owner of the forest estate free of charge and without any permission. The principle is that everything is allowed which is not forbidden by law or
based on a law. However, performed activities should be harmless – no damage or
disturbance is not allowed to produce (Naskali 1996).
Rights of public access allows a citizen to:
• move by foot, skis or a bicycle anywhere except in areas which may be damaged
  by this (including gardens, yards, conservation areas, and agricultural land under
cultivation during growing seasons);
• camp temporarily;
• collect wild berries and mushrooms, and non-protected flowers and herbs;
• use waterways for moving, swimming and washing

On the other hand, rights of public access do not allow a citizen, for example, to (except
in a emergency situation):
• fell, injure or remove trees (neither growing nor dead), shrubs, mosses etc. without
  a permission given by the landowner;
• make open fires or litter without a permission given by the landowner;
• drive a motorised vehicle without a permission given by the landowner;
• fish and hunt (as a main rule, fishing by angling – also ice-fishing – is allowed
  except waterways with a noticeable current) without licenses required

As seen, many of the non-timber forest products are privately owned and exploitation of
them only can happen by the owner or with a permission of the owner.

5. BERRIES AND MUSHROOMS

5.1. Forest and peatland berries

The Finns are like the wild forest berries. For example, according to Kangas and
Niemeläinen (1996), 87% of citizens (of ages 15 to 75 years) collect berries or
mushrooms sometimes or often.

There are about 60 species of wild berries in Finland. 37 of these are edible but only
16 are picked for food. The economically most significant and most popular berries are
cowberry – lingonberry – \(Vaccinium\ vitis-idaea\), bilberry \(V.\ myrtillus\) and cloudberry
\(Rubus\ chamaemorus\). Cowberry is the most important household berry in Finland and
it also provides the most abundant crop (Table 1). Bilberry – also called blueberry – takes
the second place (Salo 1995). Cloudberry is Finland’s most valuable wild berry, and in
recent years its price has been FIM 40/kg (USD 9/kg). This ‘orange of the North’, as
it is rightly known, has for centuries been an important source of vitamin C for the
inhabitants and helped to keep them free of scurvy. The berries are eaten as such or as
a dessert e.g. with ice-cream. The aromatic flavour of the berries is at its best in juices
or liquors (Salo 1997).

Crowberries \(Empetrum\ nigrum\) and \(E.\ hermaphroditum\) are a common field layer
species in dry and dryish upland pine forests and in the fells of the coniferous zone.
Moist and grove-like upland sites are typically populated by raspberry \(Rubus\ idaeus\),
rowan (*Sorbus aucuparia*) and stone bramble (*Rubus saxatilis*). Along with crowberries, the latter two have not been very popular in Finland in the recent past. There are years when some tens of tons of rowan berries and cowberries are bought for industrial consumption. Juniper (*Juniperus communis*) is common in moist and grove-like upland forests and along the coast. Juniper berries are mainly used to spice foods and beverages (Salo 1995).

**Table 1.** Expert estimates on yearly berry crops in poor and good crop year (Salo 1994)

<table>
<thead>
<tr>
<th>Berry</th>
<th>Poor year mil. kg</th>
<th>Good year mil. kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lingonberry</td>
<td>200</td>
<td>500</td>
</tr>
<tr>
<td>Crowberry</td>
<td>150</td>
<td>250</td>
</tr>
<tr>
<td>Blueberry</td>
<td>150</td>
<td>200</td>
</tr>
<tr>
<td>Bog whortleberry</td>
<td>20</td>
<td>50</td>
</tr>
<tr>
<td>Rowanberry</td>
<td>10</td>
<td>50</td>
</tr>
<tr>
<td>Cloudberry</td>
<td>20</td>
<td>30</td>
</tr>
<tr>
<td>Cranberry</td>
<td>10</td>
<td>20</td>
</tr>
<tr>
<td>Raspberry</td>
<td>5</td>
<td>10</td>
</tr>
<tr>
<td>Juniper</td>
<td>0.1</td>
<td>0.2</td>
</tr>
<tr>
<td>Wild strawberry</td>
<td>0.1</td>
<td>0.3</td>
</tr>
<tr>
<td>Buckthorn</td>
<td>0.1</td>
<td>0.3</td>
</tr>
<tr>
<td>Arctic bramble</td>
<td>0.1</td>
<td>0.1</td>
</tr>
<tr>
<td>Black bearberry</td>
<td></td>
<td>0.1</td>
</tr>
<tr>
<td>Stone bramble</td>
<td></td>
<td>&lt;0.1</td>
</tr>
<tr>
<td>Bearberry</td>
<td></td>
<td>&lt;0.1</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>565.3</strong></td>
<td><strong>1111.2</strong></td>
</tr>
</tbody>
</table>

The two wild berry species typical to virgin pine mires and bogs are the above mentioned cloudberry and bog bilberry – bog blueberry – (*Vaccinium uliginosum*): both of these also grow well on spruce mires. Crowberries and small cranberry (*Vaccinium microcarpum*) are typical on pine bogs. Cranberry (*V. oxycoccos*) grows on treeless bogs. Cowberry and bilberry are typical forest berries, but they also grow and produce good yields on transitional drained peatlands and in old peat-based forests. A peat substrate is also suitable for berry-producing individuals of raspberry (*Rubus idaeus*) on logged spruce mire sites and for arctic bramble (*R. arcticus*), an increasing rare species, on meadows and in spruce bogs that are regularly flooded (Salo 1997).

In a good crop year, biological yield of wild berries in forests and peatlands in Finland is about 1000 mil. kg. In a poor crop year the yield of berries might be about 500 mil.
kg (Salo 1994). Collectable yield can be estimated to be about 30% of the biological yield. In recent years, about 5-10% of the biological yields of wild berries have been collected. Most berries and mushrooms are collected for own use, but there is no annual statistics available. In many parts of the country picking for sale is also very important, and since 1977 there has been annual records on wild berries and mushrooms as well as garden berries bought by organised trade and industries (Table 2). There are large variations in annual values of sold berries. In most years, the value of wild berries has been greater than that of garden berries.

5.2. Edible mushrooms

Finland has 2000 mushroom species, microfungi excluded. Two hundred of these are edible mushrooms, but only some 30 species are used as food. There are 23 very poisonous mushroom species and about 30 other mushrooms suspected to be poisonous. In 1994, 22 mushrooms and mushroom groups were accepted as commercial edible mushrooms. A commercial edible mushroom means a mushroom species that is of value for the mushroom trade and is normally easy to recognise. They must be species not to be confused with poisonous or inedible species. Another criteria set is that they must be common species with high yields which are found growing on mineral soils and favoured by Finns on autumn mushroom picking trips (Salo 1995).

Most of the edible mushrooms are mycorrhizal species that accompany Scots pine (Pinus sylvestris), Norway spruce (Picea abies) and silver and downy birches (Betula pendula, B. pubescens). Many are capable of having a mycorrhizal relationship with two or three species and are therefore to be found commonly on several kinds of site types.

The most common and most popular edible mushrooms are to be found among ceps (Boletus edulis, B. pinophilus, Suillus variegatus, S. luteus, Leccinum versipelle, L. vulpinum), milk caps (Lactarius trivialis, L. utilis, L. rufus, L.torminosus), Russula species (R. paludosa, R. decolorans, R. vinosa, R. claroflava), Rozites caperatus and Cantharellus cibarius. There are only a few saprophytic species included in the list of edible mushrooms: Scutiger ovinus, Gyromitra esculenta; these may also happen to be mycorrhizal species. Purely saprophytic species are Craterellus cornucopioides, Morchella spp. and Armillaria mellea coll. (Salo 1995).

In a good crop year, biological yield of mushrooms in Finland is about 2000 mil. kg but in a very poor crop year about 400 mill kg. (Salo 1994). The amount of wild mushrooms collected in Finland in recent years has been 5-10 mil.kg (Salo 1994). The commercial utilisation of forest mushrooms is much smaller than that of berries (Table 2).
6. OTHER NON-WOOD PRODUCTS

6.1. Herbs

In addition to berries and mushrooms, products gathered in forests and peatlands include wild herbs. Although they were almost neglected some decades ago, recently there is an increasing interest in them. According to a guide for commercial pickers, there are 24 natural plant species, which can be used as an ingredient to meals and drinks. In addition, there are three herbs that can be used for medicinal purposes. There is a specific legislation for medicinal herbs. Among the most common species used as herbs there are birch leaves, shoots and berries of Juniperus, flowers of Calluna and Cetraria islandica-lichen.

Table 2. Incomes from picking wild berries, edible mushrooms and garden berries in 1977-1996 and percentages (Food and Farm Facts 1997)

<table>
<thead>
<tr>
<th>Year</th>
<th>Wild berries</th>
<th>Edible mushrooms</th>
<th>Garden berries</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1000 FIM</td>
<td>% 1000 FIM</td>
<td>% 1000 FIM</td>
<td>% 1000 FIM</td>
</tr>
<tr>
<td>1977</td>
<td>72,295</td>
<td>87</td>
<td>719</td>
<td>1</td>
</tr>
<tr>
<td>1978</td>
<td>45,805</td>
<td>76</td>
<td>2,593</td>
<td>4</td>
</tr>
<tr>
<td>1979</td>
<td>50,071</td>
<td>72</td>
<td>1,720</td>
<td>3</td>
</tr>
<tr>
<td>1980</td>
<td>35,755</td>
<td>76</td>
<td>1,915</td>
<td>3</td>
</tr>
<tr>
<td>1981</td>
<td>35,277</td>
<td>51</td>
<td>3,955</td>
<td>6</td>
</tr>
<tr>
<td>1982</td>
<td>53,235</td>
<td>50</td>
<td>2,454</td>
<td>2</td>
</tr>
<tr>
<td>1983</td>
<td>89,447</td>
<td>60</td>
<td>3,811</td>
<td>3</td>
</tr>
<tr>
<td>1984</td>
<td>31,601</td>
<td>36</td>
<td>3,340</td>
<td>4</td>
</tr>
<tr>
<td>1985</td>
<td>54,907</td>
<td>42</td>
<td>8,588</td>
<td>7</td>
</tr>
<tr>
<td>1986</td>
<td>44,669</td>
<td>41</td>
<td>4,396</td>
<td>4</td>
</tr>
<tr>
<td>1987</td>
<td>41,982</td>
<td>47</td>
<td>6,504</td>
<td>7</td>
</tr>
<tr>
<td>1988</td>
<td>85,304</td>
<td>62</td>
<td>11,646</td>
<td>8</td>
</tr>
<tr>
<td>1989</td>
<td>56,786</td>
<td>51</td>
<td>3,727</td>
<td>3</td>
</tr>
<tr>
<td>1990</td>
<td>52,073</td>
<td>48</td>
<td>6,801</td>
<td>6</td>
</tr>
<tr>
<td>1991</td>
<td>73,554</td>
<td>60</td>
<td>10,266</td>
<td>8</td>
</tr>
<tr>
<td>1992</td>
<td>45,667</td>
<td>49</td>
<td>6,001</td>
<td>7</td>
</tr>
<tr>
<td>1993</td>
<td>27,220</td>
<td>39</td>
<td>3,086</td>
<td>4</td>
</tr>
<tr>
<td>1994</td>
<td>136,276</td>
<td>80</td>
<td>5,919</td>
<td>4</td>
</tr>
<tr>
<td>1995</td>
<td>58,725</td>
<td>70</td>
<td>4,253</td>
<td>5</td>
</tr>
<tr>
<td>1996</td>
<td>52,158</td>
<td>63</td>
<td>4,090</td>
<td>5</td>
</tr>
</tbody>
</table>
In the early eighties it was estimated that the annual value of collecting herbs was FIM 1-3 mil. (Saastamoinen 1984). Ten years later an estimate of FIM 20 mil. was given for the commercial collection and household use of domestic herbs (Salo 1994).

6.2. Decorative lichens

Collecting decorative reindeer lichens do not belong to the everyman's rights but to the landowner. It is a traditional economic activity practised in a geographically restricted area near to Oulu in northern Finland just southwards from reindeer management area.

Usually the dry lichen heaths are rented to the lichen entrepreneur by forest owners. The entrepreneur hires the labour force, organises gathering and transportation and sells the products to exporting companies. Sometimes the forest owners may collect lichen themselves. Wooden crates are used in storage and transportation. Almost all best quality lichens are exported, but in recent years the amounts have been in decline.

It has been estimated that in 1988, when the crops in general were quite good, the total value of berries, mushroom, herbs and decorative lichen collected for household use or for sale were 593 mil. FIM (Table 3). As the household uses of berries and mushrooms, which comprise the bulk of the value, as well as the use of herbs are not known, these figures should be regarded as expert estimates. Nevertheless, the significant value of these non-wood forest products is well demonstrated.

Table 3. An expert estimate value of picking wild berries, edible mushrooms, wild herbs and reindeer lichen (Cladonia alpestris) in 1988, which was a good crop year (Salo 1994).

<table>
<thead>
<tr>
<th>Resource</th>
<th>Value, mil. FIM</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Wild berries</strong></td>
<td></td>
</tr>
<tr>
<td>Professional sale</td>
<td>85.3</td>
</tr>
<tr>
<td>Direct sale and market sale</td>
<td>20.0</td>
</tr>
<tr>
<td>Domestic use</td>
<td>340</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>445.3</td>
</tr>
<tr>
<td><strong>Edible mushrooms</strong></td>
<td></td>
</tr>
<tr>
<td>Professional sale</td>
<td>11.6</td>
</tr>
<tr>
<td>Direct sale and market sale</td>
<td>3.0</td>
</tr>
<tr>
<td>Domestic use</td>
<td>104.0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>118.6</td>
</tr>
<tr>
<td><strong>Wild herbs</strong></td>
<td></td>
</tr>
<tr>
<td>Commercial herb gardens</td>
<td>10.0</td>
</tr>
<tr>
<td>Domestic use</td>
<td>10.0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>20.0</td>
</tr>
<tr>
<td><strong>Reindeer lichen</strong></td>
<td></td>
</tr>
<tr>
<td>(Cladonia alpestris)</td>
<td>8.5</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>592.4</td>
</tr>
</tbody>
</table>
6.3. Other products

There are numerous other non-wood forest products which are even more "minor" than those mentioned earlier. The traditional birch sap was totally neglected for a long time but since the 1980s there has been some increase in interest. Beekeeping has grown considerably and part of that occurs in forest lands. Tar burning – one of the oldest forest products – is done continuously in a small scale but resin tapping has ceased entirely. Ants’ eggs were used for a specific export product but now they are collected only in a very small scale.

A large group of non-wood forest products include small parts of trees such as conifer twigs for decoration, twigs of deciduous trees used as brooms or bath whisks, barks of willow, birch and conifers as well as roots and knars of trees. By so far, there is no recorded data available concerning the quantities or values of these products. Some of these products have been traditionally used as a part of everyday life and are still common.

7. REINDEER AND WILDLIFE

7.1 Reindeer husbandry

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 of reindeer husbandry is smaller than that of hunted moose.

Most of the reindeer herders in the northernmost part of Finland are Sami people (Helle 1995), and therefore reindeer husbandry maintains the original cultural values in Lapland.

Reindeer husbandry is the only important form of forest grazing in Finland. In recent years, the amount of meat production has varied between 2.7-3.5 mil. kg annually and value of production between FIM 70-100 mil. annually. The Association of Reindeer Herding Units has estimated that the total regional-economic importance of reindeer husbandry is annually FIM 200 mil. and the employment in total about 1400 person-years. All reindeer are privately owned although the mode of management is mainly collective.

In 1995/96 there were 333 500 reindeer counted in Finland. The total number of slaughtered reindeers was 120 700, of which 86 800 were calves younger than one year. The venison production was 2.7 mil. kg. The winter herd, i.e. the number of reindeers after harvesting, was 212 800 reindeers (Helle 1997).

The reindeer population is now much smaller than in the beginning of this decade. Main reason for this is that the carrying capacity of winter ranges has been reduced due to many reasons, including pressures from other land uses, but mostly, however, due to apparent overgrazing.
### 7.2. Game management and hunting

Game resources in the boreal forests mainly represent scarce resources. Many species, especially capercaillie, are keenly utilised and demand for them is greater than maintained by the scant biological production of northern forests.

Hunting rights are based on landownership or landholding in Finland. The owner can lease hunting rights to others. In northern Finland, the so-called free hunting right for local inhabitants traditionally prevails, allowing them to hunt in state-owned forests within the municipality of their permanent residence.

Hunting rights in privately owned forests are most often leased to local hunting associations. However, contrary to the practice in most countries, private forest owners are often not paid in cash for the hunting rights. This is due to traditions and local social pressures. Bigger landowners, such as forest companies, may charge rents for hunting but in many cases prices are much lower than what markets would allow, varying roughly around the level of FIM 1-2 per ha/a, although sometimes more has been paid (Ripatti and Ermala 1995).

For hunting activities, both a national game license (from Hunters' Central Organisation, requiring a 'hunter's examination') and a local hunting permission are required. In Finland, there are about 300 000 hunters with the national game license.

Finnish hunting legislation was renewed in 1993. According to the new law, hunting should be limited according to the principles of sustainable use and carried out in a manner which ensures that game stocks are not in danger and nature is not damaged. A prohibition against hunting of some game species can be given at the national, county or local level, if needed. Yearly hunting seasons are prescribed for each species.

Game management efforts are regularly done by hunters, although intensive game management is technically difficult because part of management system (weather, natural population dynamics) is uncontrolled and part of it is insufficiently known (e.g. detailed relationships between forest management and development of game stocks). The most severe problem, from forestry point of view, has been the damage caused by moose on young pine sapling stands (Saastamoinen 1996).

**Table 5. Bag of game and its value in hunting year 1995/96 (Finnish Statistical Yearbook of Forestry 1997).**

<table>
<thead>
<tr>
<th>Game species</th>
<th>1000 individuals</th>
<th>1000 kg</th>
<th>mil. FIM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deer animals</td>
<td>52</td>
<td>6226</td>
<td>181.6</td>
</tr>
<tr>
<td>Waterfowl</td>
<td>919</td>
<td>469</td>
<td>40.4</td>
</tr>
<tr>
<td>Gallinaceous birds</td>
<td>456</td>
<td>284</td>
<td>24.7</td>
</tr>
<tr>
<td>Farmland game birds</td>
<td>201</td>
<td>65</td>
<td>6.8</td>
</tr>
<tr>
<td>Hare</td>
<td>432</td>
<td>819</td>
<td>23.7</td>
</tr>
<tr>
<td>Fur-bearing animals</td>
<td>276</td>
<td>29</td>
<td>17.6</td>
</tr>
<tr>
<td>Wild boar</td>
<td>0</td>
<td>2</td>
<td>0.3</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>7894</strong></td>
<td><strong>293.9</strong></td>
<td></td>
</tr>
</tbody>
</table>
The most valuable game species in Finland, measured in yearly bag, is moose (*Alces alces*). However, hunters themselves appreciate mostly the gallinaceous birds.

The costs of all hunting in Finland were estimated to be FIM 805 mil. in 1993 (Ermala 1995). The value of catch during the hunting year 1993/94 was FIM 262 mil.. As the hunters do behave rationally, one can conclude that the minimum recreational value of all hunting is the difference between the two figures (FIM 543 mil.) or twice the material value of the catch. Contingent valuation studies done in Sweden, Norway and Finland have already earlier recognised the great share of recreational value in hunting (e.g. Johansson *et al.* 1995). In hunting year 1995/96, the value of the catch was FIM 294 mil. (Table 5).

8. RELATIVE IMPORTANCE OF NON-TIMBER PRODUCTS IN FINLAND

Numerous values are related to non-wood forest products: household consumption values, commercial sales values, recreational values and possibly even option and existence values (e.g. Saastamoinen 1995). Household consumption values and sales value of commercial picking as well as the industrial use and export values of the products are the most concrete and there are also statistics available (as given earlier, although not adequately and not covering the lesser used or sometimes not even many common non-wood products). Only the available concrete values are usually presented in multiple-use statistics – as also in this paper.

Concerning other values, recreational aspects and collection of non-wood goods may often be closely connected. The recreational values, e.g. are related to the satisfaction of the pickers (or hunters) to walk in a healthy and nice environment. Additional satisfaction may be derived from the simple ability to supply one’s own products.

However, the comparative conclusions about the national and regional economic importance of non-wood forest products in Finland must be based only on the conventional data on tangible values.

The economic importance of “minor” (as they were earlier called) forest products (berries, mushrooms, wildlife, decorative lichens, reindeer husbandry, other small products) has been estimated to be about 8% in the 1970s and early 1980s compared to the delivery value of timber harvested (Saastamoinen 1984). It was nearly 9% in 1994 but on the average about 7% in 1990-94 (Saastamoinen 1996). These estimates, as well as the earlier ones, include some uncertainties concerning e.g. how much households collect berries and mushrooms for their own consumption annually or what is the value of less-known products such as herbs. The annual relative values in percent also vary not only due to large variation of the crops of non-wood products but also due to changes in annual cutting volumes and stumpage prices of wood.

Regional and local differences in the relative importance of non-timber products are wide. They are most important in the Finnish Lapland, where material non-timber products (reindeer husbandry, berries and mushrooms, value of catch) comprised 16% of the value of wood production in 1980 (Saastamoinen 1986) and 28% in 1994 according to the data of the new forest strategy of Lapland (Kajala 1996). This
comparison – as the figures above – is done roughly at forest edge level and does not include tourism income of Lapland, which by size is superior to any tangible non-wood forest products. However, also in wood production chain the major bulk of economic importance is related to forest industries (pulp and paper, saw-milling, etc.).

From the employment point of view, the comparisons concerning relative importance are not straightforward because the utilisation of non-wood forest products in some cases is a mix of economic and recreational activities. Nevertheless, it can be concluded both from the estimated national data (Työryhmämistö 1995) and from the data produced in Lapland (Kajala 1996) that non-wood forest utilisation is much more labour intensive than the wood production and processing, which emphasises the NWFPs role in the regional and local economies.

9. PLANNING, DEVELOPMENT AND POLICY ISSUES

9.1 Planning

Forest plans with stand-wise treatment schedules have been prepared practically for all forests in Finland, the planning horizon typically covering 5 to 20 years. Planning approaches and methods applied in forestry practice changed in the recent years. Multi-objective forest planning has made its breakthrough, while planning practices in the past having been strongly wood-production-oriented.

Research regarding the integration of non-timber products and values into forest planning has been vigorous recently in Finland, and co-operation between research and forestry practice has been good. Especially the planning of State forests has been in the forefront in applying new planning principles, approaches and methods. Also some private forest landowners have made good advances in developing forest planning practices. For example, UPM Kymmene Ltd. at Kainuu region, some Forestry Centres, and Kuusamo Jointly Owned Forest (in northeastern Finland) have tested new multiple-use planning techniques and tools as well as those developed for landscape ecological examinations.

Due to the increase in the general public’s consciousness of the use and management of forests, public participation in forest planning and policy making is often required. This holds true, in particular, for forests owned by the state and other public stakeholders, and strategic choices at the national and regional levels. For example, it has been decided to work out participatory, landscape ecological plans for all state-owned forests governed by the Forest and Park Service (about one third of all forestry land in Finland). In addition, there are currently efforts to apply participatory planning in private forestry sector. On the basis of experiences obtained in case studies and practical applications, non-wood goods and benefits are strongly emphasised by both interest groups and citizens involved in participatory processes.

Advances in the integration of non-wood goods and values into planning calculations together with the progress in the landscape ecological and participative planning
approaches provide a sound basis and encouraging perspectives for promoting multiple-use forest planning in Finland.

9.2. Development issues

In 1995 a working group established by the Ministry of Agriculture and Forestry prepared a program to develop natural products sector (wild berries, mushrooms, herbs etc.). The target of the program is to increase the present rates of utilisation by 30%, to increase the industrial use of the products by 10%, to raise the quality of products by adopting quality control systems in processing enterprises, and to increase value added of the products and product development as well as marketing (Työryhmämuistio 1995).

The implementation of the programme was divided into nation-wide activities (e.g. national co-ordination, picking campaigns, developing quality standards for products, etc.) and regional activities (developing regional natural product support units, training, product development and participating into promotion campaigns). The program period covers the years 1995-1999.

9.3. Forecast system and inventory of wild berry and edible mushroom yields

In 1997 the Joensuu Research Station of the Finnish Forest Research Institute started a national research project concerning the yields of economically most important natural berries and mushrooms. Berries included cowberry, bilberry and cloudberry. The most common mushrooms with commercial value were included such as ceps and russulas. The project at the same time provided basis for a new forecasting system to inform berry and mushroom pickers.

The yields of berries and mushrooms were observed in 1997 at 1110 permanent experimental plots situating in 57 municipalities in different parts of Finland.

The observations were done by the personnel from the research stations, research areas and national parks of the Finnish Forest Research Institute, together with the universities of Joensuu and Oulu, and some schools of agriculture and forestry. In Kainuu, enterprises Jansa, Kainuun Tuote and Kiantama participated in the inventory of the yields of berries and mushrooms. In North-Karelia the observations were carried out by qualified natural product advisers (Salo 1998).

There were five marked experimental plots of 1 m$^2$ at each forest and peatland compartment. In each plot, the flowers and raw and ripe berries were calculated. The experimental plots were established at forest sites where bilberry and cowberry would potentially grow, and at peatlands, where berries of cloudberry were earlier observed or dwarf shrubs could be clearly observed. The yields of mushrooms (species and the number of individuals) were determined from the whole area of the forest compartment. At the permanent plots of each forest or peatland compartment, the annual variation of yield, the factors affecting the yields, the timing of flowering and the ripening of berries, and the annual differences of yields were recorded. In addition to the yield information,
also the type of the growing site, the proportions of tree species and the developmental class of trees were recorded in the observation forms. The models describing the yields of the most important berries will be finished in a few years, after years with good, medium and poor yields can be included.

The information of berries and mushrooms was sent in electrical form via the Internet, phone or fax to the Joensuu research station, where the material was processed with the information system MASI (= Berry and Mushroom System). The core of MASI consists of database and geographical information system programs. The results were presented in the form of theme maps, in order to inform, with the help of the media, the berry pickers about the timing of flowering and the development of raw and ripe cowberries at each zone of Finland. The maps and notes described the kind of sites the main yields were to occur, and the level of yield of each berry species during 1997.

The yield forecast maps with related comments were expected to increase the picking activities of people and encourage them to use clean, flavour rich natural berries and forest mushrooms. This was also assumed to bring benefits for the trading of berries and mushrooms, processing enterprises and rural tourism. During the crop period of 1997, five situation reports were given to media. The reports were cited widely by press and local radio stations. The yield maps were also shown on TV in connection with evening news and morning broadcasts.

9.4. Policy issues

The new Finnish Forest Act, substituting the former Private Forest Act and parts of some other legislation, promotes economically, ecologically and socially sustainable management of forests so that forests give sustainably good yield while, at the same time, maintaining their biological diversity. The new Act allows, and encourages, more versatile management and silvicultural practices than the previous Act — a change that benefits multiple use of forests, including non-wood forest products. The new Act concerns also the State forests, which previously had been under a separate State forest legislation.

Similarly, the new Act on the Financing of Sustainable Forestry allows possibilities to develop also other forest uses than wood production — unlike the previous Forest Improvement Act. However, the financial resources in all have been dramatically reduced in the years of economic depression of first half of the 1990s.

A national statement on new forest policy in Finland is being prepared and probably will be leading to a formulation of a new National Forest Policy in 1998. It provides possibilities to officially recognise and promote non-wood forest products as a part of general forestry development in a more authoritative and concrete manner than has been — despite all progress — the case in official forest policy so far.

Furthermore, according to the new Forest Act and the corresponding Forest Decree, a regional forestry target programme should be worked out by each Forestry Centre for its area of operation. The target programme functions as an advice of forestry promotion and supervision. It also serves guidelines for the practical execution of the Act on the Financing of Sustainable Forestry. The target programmes will contain also non-wood
considerations of forestry, although the principal focus being wood production oriented. Participatory approach is required in the process of preparing the programme. A regional target programme does not contain information identifiable at forest holding level. The target programme shall be reviewed at intervals of no more than five years.

REFERENCES


NON-WOOD FOREST PRODUCTS AND THEIR RESEARCH IN ARKHANGELSK, RUSSIA

Genrikh Chibisov and Natalia Demidova
Northern Research Institute of Forestry
Arkhangelsk, Russia

ABSTRACT

The review of the results on the research on non-wood forest production of the Northern Research Institute of Forestry is presented in this paper. The berry and mushroom resources and their production data are presented. The reasons why NWFP are not being utilised are described and the measures for increasing the level of raw material harvest is suggested.

Keywords: Forest, production, berries, mushrooms

1. INTRODUCTION

The economic and social development of the Russian European North largely depends on the degree of the use of natural resources, in particular, non-wood forest products (NWFP) which have medicinal, food and forage significance, as well as gum products of wood. The gum production is the most widespread use of living wood.

Throughout history, mushrooms and berries have been considered valuable food raw material, which have been widely utilised in the north. The NWFP, in particular, wild berries, have just recently become important as form of income from the forest, because of the increasing interest in the food products available.

To maintain the rational use of shrubbery thickets it is necessary to ensure that they are managed in a manner that promotes their health and productivity. Hence, there is a need to develop special measures and management programs.

Since it is almost impossible to forecast the NWFP crops, the berry and mushroom production has been having difficulties in the preparation of the raw material and the planning of the production. Predicting NWFP crops differs from the ones predicting agricultural crops and forest stocks of wood production as a NWFP crop depends on weather conditions during the vegetation period, preparation for wintering, “type” of the

winter, and on buds flushing. The accuracy of the weather forecasts cannot currently satisfy the requirements of economic bodies connected with use of non-wood raw material, the resources of which are characterised by temporary and territorial instability.

As the result of the silvicultural methods practised during the past 60 years, the vegetation on the cutting areas has been completely destroyed (Chertovskoi 1987, Lukin 1983, 1991). Forestry science was developed following the rule: the forest is the main source for timber and has no other role. In fact, there are no current practical recommendations concerning shrubbery preservation.

Researchers have studied efficient shrubbery formation in great detail (Lukin et al. 1990). Investigations show that forest management is effective when it pays special attention to the biological-ecological features of shrubberies, thus saving, stabilising and strengthening their productivity.

2. RESOURCES OF NWFP

Approximately 70% of the territory of the northern frontier areas of the Russian Plain is covered by low productive coniferous stands and their derivatives. Increased swamping of the territory is stipulated by e.g. low evaporation.

The unstable cold weather conditions limit the opportunity of growing fruit-berries for production, therefore the rationalisation of using the wild shrubbery is of special interest as well as the creation of specialised plantations of local berries.

The northern forests can be called the “pantry of nature” as large amounts of forest berries are gathered there. A group of scientists in our institute, under the leadership of I.N. Lukin, have been involved in NWFP research.

The stocks of berries and mushrooms have been determined by this group of researchers taking into consideration the method of objective valuation of NWFP efficiency, development of a road network, concentration of fruiting places, crop of production types, natural forage losses and losses at the harvest (Table 1).

When the crops are low, the general stocks of bilberry and cowberry in the area exceed 30 thousand tons.

As one of the aims of forest management is to save the areas where cranberry and cowberry grow, they are to be harvested third in the group of four berry types.

The main methodological rules developed in our institute for the forest berries crop account containing integrated parameters of mean values for several years on limited types of forest (Lukin and Chertovskoi 1975, 1977, 1988). These recommendations have been later on specified and finalised. They are useful in arranging the stand inventory for the evaluation of NWFP, for the special organisation of forest holdings to harvest forest berries, as well as for estimating future forest profits.

Young stands of 15-35 years have the most mushroom production on the northern taiga zone, where the top layers of soil are sufficiently warm and humid. As a rule, these are in leafy and liffy-coniferous forests.

90% of edible mushrooms which are used by the local population could be collected in the bilberry type of forests. Cowberry type of forests have less diversity of mushrooms.
Table 1. Efficiency of main NWFP in Arkhangelsk region

<table>
<thead>
<tr>
<th>Kind of production</th>
<th>Crop (kg/ha)</th>
<th>Production area (1000 ha)</th>
<th>Available for harvest (1000 tons)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cowberry</td>
<td>160-400</td>
<td>407</td>
<td>7.5</td>
</tr>
<tr>
<td>Cranberry</td>
<td>50-180</td>
<td>376</td>
<td>5.6</td>
</tr>
<tr>
<td>Bilberry</td>
<td>100-230</td>
<td>912</td>
<td>24.7</td>
</tr>
<tr>
<td>Cloudberry</td>
<td>70-180</td>
<td>148</td>
<td>1.5</td>
</tr>
<tr>
<td>Sub total</td>
<td></td>
<td></td>
<td>39.3</td>
</tr>
<tr>
<td>Sharp garlic (Lactarius torminosus)</td>
<td>2-14</td>
<td></td>
<td>5.0</td>
</tr>
<tr>
<td>Red-headed mushroom</td>
<td>9</td>
<td>548</td>
<td>4.9</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td>49.2</td>
</tr>
</tbody>
</table>

3. MAIN CUTTINGS' INFLUENCE ON BILBERRY AND COWBERRY

As a result of intensive forest cuttings, the viability of shrubbery populations reduces, their environmental function as dominant and as co-dominant vegetation is lost, and shrubbery's ability of self-restoration is weakened. The degree of the cuttings' negative impact on plants is determined by the biogenic opportunities of shrubbery phytocenosis and the technological pressure put on them (Lukin 1993).

The application of compact concentrated cuttings, use of heavy multi-modular engineering, as well as the disregard of forest regeneration and non-wood vegetation have resulted in the total degradation and disappearance of shrubbery areas on vast areas.

Our investigations on cutting areas have shown that the hydrothermic parameters of micro-climate increase greatly. This is seen as an increase of average day temperatures of air and soil in a shrubbery zone by 5 °C or more. It also affects the growing environment of bilberry and cowberry as the humidity of air and soil is reduced to 5-7%. Also air movement at the level of shrubbery heights has considerably changed: thus the plants are under more stress and damages are occurring more often.

The use of heavy equipment on cutting areas has resulted in damage and destruction of shrubbery in 80-90% of the area.

The growing area of bilberry and cowberry was significantly reduced as a result of cutting. The remaining part of the population, located in the non-cut areas, however, produced increased crops. Other shrubbery (cloudberry, cranberry, bog bilberry) and mountain ash reacted to changes of ecological conditions caused by cuttings, too. There have been some increase in their area and crops.

It is easier to promote the production of shrubbery in natural forests, where stands with natural populations grow on limited areas. Preliminary results show that this would mean a 15-20% decrease of the production area.
Our institute has developed forestry requirements to main cuttings with special focus on the saving of shrubberies. These are based on the results of the main cuttings' influence on bilberry and cowberry.

4. NWFP DISTRIBUTION ON THE TERRITORY

The territorial distribution of NWFP resources is connected with forest conditions. The sub-zone of the northern taiga, the northern part of our region has a cold unstable climate. But in spite of these facts we have significant berry and mushroom resources.

The main cowberry areas are concentrated in the Pinegsky, Onegsky, Holmogorsky and Leshuconsky regions, cranberry in the Onegsky and seaside regions, cloudberry in the seaside, Mezensky regions, bilberry in the Onegsky, Plesezhky, Seaside, Pinegsky and Holmogorsky regions. Some parts of the northern taiga are swampy and promote the growth of bog bilberry and crowberry (*Empetrum*). Currant (*Ribes*), mountain ash (*Sorbus*), bird cherry (*Padus*), raspberry (*Rubus*) areas are distributed in the river regions of the Dvina, Onega, Mezen, Kuloi and their tributaries.

The conditions are more favourable for shrubbery fruitage in the middle taiga zone. Cowberry areas are found in the Velsky, Krasnoborsky, Kotlassky, Vinogradovsky, and Shenkursky regions, cranberry in the Kargopolsky, Shenkursky, Njandomsky, Plesezhky, Konoshsky regions, bilberry in the Njandomsky, Konoshsky, Shenkursky, Ustjansky, Lensky, Plesezhky, Verhne-Toemsky, and Krasnoborsky regions. A well developed network of streams, small rivers etc. of the rivers Northern Dvina and Onega provide availability of *Rubus, Ribes, Sorbus, rose hips, Padus* and other kinds of berries.

The most mushroom stocks are concentrated around the railway regions of the Plesezhky, Njandomsky, Konoshsky, Velsky, Ustjansky, and Kotlassky, as well as Shenkursky, Krasnoborsky, Kargopolsky and Pinezhsky regions.

5. POSSIBLE MAINTENANCE OF THE POPULATION BY NWFP PRODUCTS

It is possible to provide the local population with berries and mushrooms in sufficient quantities (Table 1). The potential consumption is about 27 kg of cranberry, lingonberry, bilberry and cloudberry per capita (Table 2).

In addition, the average possible per-capita consumption of bog bilberry is 0.4 and of Sorbus 3.5 kg. The possible consumption of mushrooms is 3.4 kg of *Lactarius torminosus* and 3.3 kg of *Boletus*. For other mushrooms the following estimates of the per-capita consumption are acceptable: *russula* - 3.5, *Lactarius piperatus* - 0.2, *Boletus edulis* - 0.1, and other edible mushrooms - 2.4 kgs.

In total, the population in our region annually can consume about 13 kg of mushrooms per capita.
To sum this up, we can say that our forests provide mushrooms and berries for the 44-kg per-capita consumption, and in the case of *Rubus*, rose hips, *Padus*, *Ribes*, *Fragaria*, *Empetrum*, *Rubus arcticus*, and *Viburnum* the amount can be up to 50 kg.

Table 2. Average berry crop and possible berry harvest by kinds of berries.

<table>
<thead>
<tr>
<th>Kinds of berries</th>
<th>Average berry crop for region (1000 ton)</th>
<th>Possible berry harvest (kg/person)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Urban</td>
<td>Rural</td>
</tr>
<tr>
<td>Cowberry</td>
<td>7.5</td>
<td>3.5</td>
</tr>
<tr>
<td>Cranberry</td>
<td>5.6</td>
<td>2.7</td>
</tr>
<tr>
<td>Bilberry</td>
<td>24.7</td>
<td>11.8</td>
</tr>
<tr>
<td>Cloudberry</td>
<td>1.5</td>
<td>0.7</td>
</tr>
<tr>
<td>Total</td>
<td>39.3</td>
<td>18.7</td>
</tr>
</tbody>
</table>

6. USE OF RESOURCES

Mushroom and berry resources are currently not fully utilised. In Russia, people gather an average of 30-100 kg of wild berries per hectare of forest land. However, the amounts do not exceed 2 kg per capita in the Arkhangelsk region.

In the 1930s, the mushrooms and berries were more widely utilised. The local population gathered on average 1.83 thousand tons of berries and 2.04 thousand tons of mushrooms in a year. At the end of the 1960s, the local consumption was more than 200 tons of mushrooms and about 250 tons of berries.

The co-operatives had the highest volumes of purchases. Currently, the commercial companies have the highest volume of purchases (joint-stock companies, interstate enterprises, local trade associations). The level of purchases is slightly increasing. The demand of forest berries is high and their utilisation should be further developed.

If berries and mushrooms are not gathered, the total efficiency of each hectare of the forest area is reduced. Thus also the forest’s profitability is reduced. The use of all accessible berry and mushroom stocks can raise a total price of a hectare of forest land by 2.5 to 3 times. Harvesting berries and mushroom does not cause damage to phytocenoses and is characterised by long-term constancy while maintaining the forest using rules.
7. REASONS FOR THE LACK OF USING NWFP

The volumes of NWFPs harvested vary. This is explained by natural and socio-economic reasons. Seasonal and territorial inconstant fruitage of berries and mushroom production lead to the following:

- Low level of financial interest in the NWFP harvest and delivery;
- Difficulties of gathering berries and mushrooms manually;
- Low purchase prices on wild berries and mushrooms;
- Concentration of the population in a few large populated areas and reduction of its density in rural territories;
- Absence of effective protective measures of berries and mushrooms;
- Little resource studies of berries and mushrooms at a modern level of forestry management in the region;
- Insufficient weather forecasts – weather is a factor, which has a significant influence on harvest of wild mushrooms and berries;
- Lack of inventories on NWFPs;
- Protection of high productive areas is not organised.

There are also other reasons why the NWFPs have been given greatly ignored: detailed studies and analyses are needed to promote their use in the future.

8. MEASURES FOR INCREASING A LEVEL OF RAW MATERIAL HARVEST

The following measures should be carried out to rationalise the utilisation of NWFP:

- Reception of the more exact information about size, distribution, terms of use, quality of berries and mushroom resources;
- Improvement of non-wood products purchases;
- Protection and reproduction of berries and mushrooms: introduction of wild plants into culture as a way of significant stable increase of plants productivity.

It is necessary to create a system for determining and forecasting berry stocks on scientific basis. The information on a crop should be collected periodically, at various stages of production formation through the observers, who can test the productivity of the areas.

9. CONCLUSIONS

The NWFP resources increasingly affected by man-induced factors, in particular, economic activities (cuttings, forest melioration, using chemicals in forests, etc.) and thus require special attention.
We need further studies directed on the perfection of NWFP use. A question of perfection of shrubbery resources valuation, deformed by man-induced activities, requires research. The development of prognosis models of shrubberies efficiency is of great interest. It is necessary to:

- monitor the productivity of different types of NWFPs;
- work out possibilities of plantation NWFP reproduction; and
- take into account the costs of NWFP and their utilisation while leasing forest areas for short-term or long-term utilisation.

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CURRENT DEVELOPMENTS RELATED TO NON-WOOD FOREST PRODUCTS IN RUSSIA

Jenne de Beer
ProFound
The Netherlands

ABSTRACT

Many aspects of society have changed in the Russian Federation. The current situation has brought along a set of new perspectives and constraints. This paper discusses some of these developments, using the situation in the Sikhote Alin mountain range as an example.

Key words: Russian Federation, Udege people, Sikhote Alin mountains, recent developments

1. INTRODUCTION

When discussing the subject of non-wood or non-timber forest products in boreal forest, it makes sense to pay special attention to the situation in the Russian Federation. Not only because of the vastness of its varied forest resources, but also because traditionally NWFP collecting has been, and continues to be, extremely important in the country.

To get an impression of the importance of non-timber forest products in Russia we may go back to an earlier conference, the first Finnish-Soviet symposium on non-timber forest resources, held in Jyväskylä in 1986. From the contribution of Mr. Cherkasov on the classification of non-timber resources, we learn for instance, that the former USSR:

- produced over 100 000 tons of wild berries and nuts per annum;
- used more than 600 species of medicinal plants in pharmaceutical and chemical factories. Most of these plants were harvested in forest areas. The annual industrial demand for plant raw material gathered from wild thickets and forests was estimated at 30 000 tons;
- produced about 100 000 tons (in dead weight) of moose meat and 20 000 tons of wild boar meat every year, as well as about 900 000 tons of fish caught from lakes.
and streams in forest areas. Hunting and fishing thus contributed significantly to the local economies.

Mr. Cherkasov further mentions huge quantities of edible mushrooms, mosses, resins, edible herbs and honey. He concluded that while in the commercial forests the non-timber resources (including intangible benefits) made up about 50% of the total economic value, in protected forests it was estimated at about 93%.

Since 1986 much has changed in the Russian Federation. The current situation has brought along a set of new perspectives and constraints, some of which will be discussed in this paper, using the situation in the Sikhote Alin mountain range as an example.

2. THE UDEGE OF THE SIKHOTE-ALIN MOUNTAIN RANGE

In terms of biodiversity, the richest forests of the Russian Far East are found in the Ussuri taiga, along the Sikhote-Alin mountain range. The mountains stretch from southwest to north-east in Primorsky krai, well into Khabarovsk krai, parallel to the coastline. The area still has a number of relatively intact watersheds along the Bikin, Samarga, Khor and Katen rivers.

The mixed coniferous-deciduous forests are the habitat for an unique fauna, among which the Amur tiger, and other rare species, such as the Chinese merganser, Blakiston’s fish owl and several endangered species of crane. The Udege are one of the indigenous peoples who have lived in this forest area since ancient times. Today, the Udege number about 1600 people. The Udege live in the North of Primorski Krai and in the south of Khabarovsk Krai.

The livelihood of the Udege depends almost entirely on the forest. Their economy revolves around hunting, fishing and the collection of forest products. Only in this century have the Udege taken up agriculture, although this still remains a very marginal activity. In the past, fish (in particular trout and salmon) formed a very important part of the Udege diet. Fish stocks have decreased rapidly over the last decades. This decrease has been exacerbated by pollution, logging down river and over-fishing. Meanwhile, over the years, the Udege diet has shifted more and more from the traditional towards the ‘modern’, processed food, which reportedly has negatively affected the general health conditions.

In the traditional culture of the Udege, respect for nature was an essential value (see Arsenjew 1924). While the Soviet period administration brought them various improvements, such as better health care and education, it had a very negative impact on the indigenous culture. As a consequence, much of the Udege culture, including traditional knowledge relating to the management of forest resources, has been lost. Nevertheless, the core of the culture and way of life still persists, as expressed in their continuing orientation on the forest and deep respect for the tiger. The Udege are currently attempting to revitalise the core elements in their culture.

While opposed to opening up their forests to large scale logging operations, the Udege people wish to develop their economic activities based on the forest. These activities
Current Developments Related to Non-Wood Forest Products in Russia

Focus on the rich NTFP resources of the area. Major products are: mushrooms and ferns, pine nuts, Siberian ginseng (*Eleutherococcus senticosus*) and berries, among which the excellent limonik (*Schisandra sinensis*). Additionally, a very fine quality of honey is produced in the area. The bees feed on rich forest nectar sources in a pollution-free region.

Before the collapse of the Soviet Union, the GosPromKhoz, the state forest product company, organized the trade in non-timber forest products from the region. After 1989, a new situation appeared, characterised by the following elements:

- A tax regime that discourages legal productive activities.
- In the past, forest products were delivered according to a pre-set plan at fixed prices, and the quantity of products was more important than the quality. Now, primary producers need to go out to explore markets for its products, find new customers on the home market, and link up with trade networks for organizing the export of products.
- Some locally produced items were driven out of the home market and replaced by imported goods. Many factories, e.g. for processing berries and medicinal plants, closed down. Prices of raw materials came under pressure and due to inflation and a fluctuating market, it became very difficult to arrange long term delivery contracts with customers.

The state company turned out to be ill-equipped to deal with the new situation. As a result, the income of those dependent of the enterprise fell dramatically.

### 3. CURRENT EFFORTS TO IMPROVE THE ECONOMIC SITUATION

In the early 1990s, it became clear that action had to be taken. Several Udege villages in Primorsky and Khabarovsk Krai became involved in efforts to develop forest-related economic activities on their own. The programme they started focused on the marketing of NTFPs and honey, as well as on the development of eco-tourism. Now, this effort takes place both at a community and at a regional level.

At the community level, activities are directed at building an organizational infrastructure that can handle the collecting, packaging and transport of NTFPs and honey from the collecting sites. The same organizational structure will deal with tourism-related activities.

On the regional level, the Russian Far East Association for the use of non-timber forest products has been established. The association, based in the town of Khabarovsk, has as its primary task, to ensure sustainable development in remote forest villages and to support the traditional economies of the region’s indigenous peoples through the promotion of NTFP activities. It is the aim of the association to link different actors in the region that are involved in NTFP trade. These range from village organizations to traders, processing plants and scientific institutes. The association further advises and supports village organizations with establishing primary processing units, adequate storage facilities and the like. Jointly, the organizations can build strength to promote their products, both on the home market and abroad.
REFERENCES


ABSTRACT

The background of the Belarus Forestry Strategic Plan is briefly described. The role of NWFP in Belarus is discussed and information on the production and trade is provided. The paper concludes by giving the objectives and strategies recommended for the Belarus NWFP sector.

Key words: Strategic planning, policy objectives, production, trade

1. THE STRATEGIC PLAN

During 1996-97, the Ministry of Forestry of the Republic of Belarus drew up a Forestry Strategic Plan as a part of the ongoing Forestry Development Project. It was a tripartite exercise in which both national experts and international expertise provided from Finland and Sweden joined their forces in an intensive collaborative effort. The main objectives of the Strategic Plan were to make an in-depth analysis of and a framework for the necessary policy and strategy adjustments in the forestry sector, particularly in view of the gradual movement towards market economy in the country. The planning horizon was set at the year 2015 and the work was carried out under five sub-headings:

1. Forest Policy and Legislation
2. Forest Ecology and Environment
3. Forest Management and Operations
4. Forest Economics, Trade and Processing
5. Human Resources Development and Forest Research
2. NWFP IN BELARUS

Non-wood forest products are important in Belarus and were therefore discussed in the Strategic Plan as a part of the multi-purpose forest management. The aim was to study the resources of NWFP, the present harvesting systems and possibilities of increasing their efficiency in the new more market-oriented conditions.

All forests of Belarus are owned by the state and the basic forest management unit is the leskhoz which have an average area of about 80 000 hectares each. A leskhoz is in charge of also all NWFP production within its territory and in some cases the collecting and processing of these products plays an important role in the economy of a leskhoz.

All citizens have a free access to the forests and may pick mushrooms and berries for their own use and for sale. For industrial production purposes, however, it will be necessary to lease the land area designated for that purpose.

The research concerning NWFP in Belarus is carried out by the Forest Institute of the Academy of Sciences. The following report is based upon the information provided by this institute for the purposes of the above mentioned Strategic Plan (Burak et al. 1997).

The forests of Belarus have the following economically important berries: bilberry, cranberry, bog whortleberry, cowberry and mountain ash. Their biological resources make 32 945, 11 180, 1310, 3280 and 1092 tons, respectively. The total biological stock is thus 49 807 tons of which 41% or 20 457 tons is considered the ecologically safely harvestable amount.

According to the official statistics in 1995, altogether 4600 tons of wild growing fruits and berries were harvested, of which 923 tons within the Ministry of Forestry system, for example, through the leskhozes. 1374 tons were exported. In 1996 the MoF enterprises collected 1481 tons of which 221 tons were exported.

Currently it is possible to procure slightly more than 25 000 tons of mushrooms in the country. According to the data of the Ministry of Natural Resources and Environmental Protection, 3072 tons of mushrooms were procured in 1995, of which 2367 tons were exported. In 1996 only 272 tons were picked of which 215 tons were exported to Germany, the main species being chanterelle and bull.

A reduction in the natural resources of some berries and mushrooms is evident as a result of the human influence on the forest ecosystem. There is an urgent need to develop methods of rational utilisation and regeneration of non-wood forest products.

The national demand for nuts is about 200 tons annually, of which only 10% is met by local production. Although the biological stock of hazel nuts in MoF forests is 809 tons, only 24 tons were harvested in 1996.

In 1996, 2583 tons of birch sap was tapped which is only 0.6% of the possible resource of 369 000 tons. The commercial utilisation of sap is directly depending on the birch felling areas and their accessibility.

About 70 species of medical plants are procured in Belarus. The leskhozes also collect the so-called technical plants for pharmaceutical industry and tanneries (oak bark, willow, Rhamnus alaternus). In 1995 the total national harvest of medical and technical plants was 297 tons.

It is estimated that there are 180 000 bee swarms in the MoF forests which means in average about 8000 swarms in one leskhoz. The amount of commercial honey per
Swarm in 1995 was 5.8 kg, and 3.5 kg in 1996. The profitability has been good and the production of honey in leskhozes is planned to be doubled by the year 2015.

Other non-wood forest products having economic value include pine resin, stump resin, birch bark, and spruce scrape.

The leskhozes have currently about 250 procurement and 80 boiling and salting units for the handling of berries and mushrooms. The most widely spread form of procurement is to buy from the private citizens although specialised collecting teams are also used and considered more effective. The leskhozes are mainly dealing with raw materials and semi-finished products. It is proposed that in the future some of the leskhozes would specialise in the procurement and processing of NWFP to get more value added and better profitability.

### 3. Recommendations

The Strategic Plan made some recommendations concerning the future development of the NWFP sector. At the policy level the following objectives and strategies were proposed:

1. Belarussian population's respect for and personal relationship (recreation, food and game acquisition etc.) with the forest land and resources will be acknowledged in forest policy and management.
   - Legal provisions for the free access of citizens to the forest will be maintained.
   - Forest management regulations will take into account the multi-purpose utilisation of forests, including recreational aspects.
   - The Ministry of Forestry will ensure that the general public is well informed of the conditions of recreational possibilities in the forests.

2. Security of access to mushroom and berry collection and maintenance of conditions suitable to the production of all non-wood forest products.
   - Forest management rules will pay attention to securing the growing and collection of non-wood forest produce.
   - Information material will be developed to inform the population of the conditions of berry picking, collection of mushrooms and other circumstances.

3. Concerning the forest management, the recommended objective and strategies included:
   - Organised collection and processing of non-wood forest products on sustainable basis supports local economies and provides earnings for local people and processing plants.
   - Development of infrastructure and staff training to support collection and utilisation of non-wood forest products.
   - Improving legislation and tax system to provide incentives for increased collection of produce and to better serve local people.
   - Forbidding pasture in the forest.
• Developing and implementing the system of the integrated utilisation of timber and non-wood products in the forest.
• Organising specialised farms for growing and processing berries, herbs, nuts and other produce.
• Launching public campaign to notify the difference between healthy and contaminated forest produce.

REFERENCES

NON-WOOD FOREST PRODUCTS IN ARMENIA

Gayane Ter-Ghazaryan
Institute of Botany, Armenian National Academy of Sciences
Yerevan, Armenia

Karen Ter-Ghazaryan
Division of Forestry Research and International Relations
Armenian State Forest Service, Yerevan, Armenia

ABSTRACT

NWFPs constitute an important source of income and employment in Armenia. These activities are a part of the Armenian State Forest Service’s management and give permanent employment to 26% of its staff. Three major reasons have been identified for the NWFPs relative importance compared to the wood products: the comparatively free pricing system, the possibility to retain income and the lower degree of central planning. Presently, the resources are under-utilised (except pears, hazel nuts and walnuts), but reliable and up-dated information on the resources is lacking. There is no proper monitoring of the utilisation of NWFPs and, therefore, the risk of non-sustainable utilisation with negative effects on the gene resources increases.

Key words: Non-wood, forest, resources

1. COUNTRY DATA

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Area</td>
<td>2 947 000 ha</td>
</tr>
<tr>
<td>Land Area</td>
<td>2 845 000 ha</td>
</tr>
<tr>
<td>Location</td>
<td>Transcaucasus</td>
</tr>
<tr>
<td>Borders</td>
<td>Turkey, Iran, Georgia, Azerbaijan</td>
</tr>
<tr>
<td>Population</td>
<td>3.7 mil., of which 67% urban</td>
</tr>
<tr>
<td>Climate</td>
<td>Dry continental type</td>
</tr>
<tr>
<td>Forest Area</td>
<td>335 000 ha</td>
</tr>
<tr>
<td>Dominant Species</td>
<td>Oak, Beech, Hornbeam</td>
</tr>
<tr>
<td>Total Flora</td>
<td>3500 species of which 260 arborescent</td>
</tr>
<tr>
<td>Total Medicinal Plants</td>
<td>2000 species</td>
</tr>
<tr>
<td>Widely Collected</td>
<td>40 species</td>
</tr>
</tbody>
</table>

H. Gyde Lund, Brita Pajari and Miina Korhonen (eds.)
Sustainable Development of Non-Wood Goods and Benefits from Boreal and Cold Temperate Forests
EFI Proceedings No. 23, 1998
Wild Fruits, Berries and Nuts  50 species; possible annual harvest 12 000 tons
Mushrooms  150 edible species, of which only 3 are widely collected
Other products  Honey, fragant gum, silk

2. NWFP RESOURCES AND UTILIZATION

The gross income from NWFPs represented some 20% of the total revenue to Armenian State Forest Service “Hayantar” in 1995-1996. Even if this percentage was distorted because of artificially low stumpage revenues, it indicates the importance of the NWFPs. The main income was from hay making, livestock farming, forest fruits, Christmas trees, honey, medicinal plants and hunting in order of generated income.

NWFPs constitute an important source of income and employment. These activities are part of Hayantar’s management and give permanent employment to 26% of its permanent staff.

In some Forest Enterprises (FEs) the NWFPs represent more than 50% of the total income. Each FE is allowed to organise its own sale of these products on conditions set by the central administration concerning minimum prices and allowed quantities.

Experiences in the NWFP sector suggests that also for the forestry sector could liberalisation of pricing and decentralisation of decision making have a positive influence. Three major reasons have been identified for the NWFPs relative importance compared to the wood products: the comparatively free pricing system, the possibility to retain income and the lower degree of central planning. Table 1 shows a breakdown of the earnings from NWFPs in 1996. Meat and fruit production, Christmas tree selling and hay collection together account for 2/3 of the sub-sector’s income.

<table>
<thead>
<tr>
<th>Product</th>
<th>Unit</th>
<th>Quantity</th>
<th>Income (th. Dram)</th>
<th>% of income</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grain</td>
<td>ton</td>
<td>681</td>
<td>13 951</td>
<td>13.5</td>
</tr>
<tr>
<td>Hay</td>
<td>ton</td>
<td>3170</td>
<td>19 883</td>
<td>19.1</td>
</tr>
<tr>
<td>Forest fruits and berries</td>
<td>ton</td>
<td>490</td>
<td>10 739</td>
<td>10.4</td>
</tr>
<tr>
<td>Honey</td>
<td>kg</td>
<td>2015</td>
<td>6280</td>
<td>6.1</td>
</tr>
<tr>
<td>Meat</td>
<td>kg</td>
<td>31 800</td>
<td>18 883</td>
<td>18.2</td>
</tr>
<tr>
<td>Milk</td>
<td>kg</td>
<td>146 800</td>
<td>11 158</td>
<td>10.8</td>
</tr>
<tr>
<td>Eggs</td>
<td>un</td>
<td>2000</td>
<td>90</td>
<td>0.1</td>
</tr>
<tr>
<td>Christmas trees</td>
<td>un</td>
<td>20 000</td>
<td>20 000</td>
<td>19.2</td>
</tr>
<tr>
<td>Wool</td>
<td>kg</td>
<td>2200</td>
<td>65</td>
<td>0.1</td>
</tr>
<tr>
<td>Vegetables</td>
<td>kg</td>
<td>28 000</td>
<td>2545</td>
<td>2.5</td>
</tr>
</tbody>
</table>

(Source: Hayantar)
Forest fruits and nuts are produced in the forests on an estimated area of 15,000 ha, and are therefore considered the property of Hayantar. They accounted for 1/10 of all non-wood incomes in 1996. Paid at a fixed price to the workers collecting them, they are transported to collection centres where they are sorted (quality, size) and sold. Some forest fruits are processed to juices or concentrates for the domestic market as well as for export. High value fruits include various kinds of berries (raspberries, blackberries, etc.). Where fruit production is important, particular attention is given to the management of the forest to ensure good growth of the understory fruit bushes. Some of the berries are also grown by Hayantar as plantation crops. Presently, the resources are under-utilised (except pears, hazel nuts and walnuts), but reliable and up-dated information on the resources is lacking. There is no proper monitoring of the utilisation of NWFPs and therefore, the risk of non-sustainable utilisation with negative effects on the gene resources increases.

The following wild fruit and nut species are of substantial interest both for market production and for conservation of the gene resources:

<table>
<thead>
<tr>
<th>English Name</th>
<th>Scientific Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Apple</td>
<td><em>Malus orientalis</em></td>
</tr>
<tr>
<td>2. Pear</td>
<td><em>Pyrus caucasica</em></td>
</tr>
<tr>
<td>3. Mountain ash</td>
<td><em>Sorbus aucuparia</em></td>
</tr>
<tr>
<td>4. Hawthorn</td>
<td><em>Crataegus caucasica</em></td>
</tr>
<tr>
<td>5. Plum</td>
<td><em>Prunus divaricata</em></td>
</tr>
<tr>
<td>6. Apricot</td>
<td><em>Armeniaca vulgaris</em></td>
</tr>
<tr>
<td>7. Almond</td>
<td><em>Amygdalus fenzliana</em></td>
</tr>
<tr>
<td>8. Cherry</td>
<td><em>Cerasus avium</em></td>
</tr>
<tr>
<td>9. Hazel</td>
<td><em>Corylus avellana</em></td>
</tr>
<tr>
<td>10. Walnut</td>
<td><em>Juglans regia</em></td>
</tr>
<tr>
<td>11. Cornelian cherry</td>
<td><em>Cornus mas</em></td>
</tr>
<tr>
<td>12. Seabuckthorn</td>
<td><em>Hippophae rhamnoides</em></td>
</tr>
<tr>
<td>13. Rose</td>
<td><em>Rosa sp.</em></td>
</tr>
<tr>
<td>14. Medlar</td>
<td><em>Mespilus germanica</em></td>
</tr>
</tbody>
</table>

3. CONCLUSION

The identified priority problems include: 1. The potential of fruit and nut trees is underutilised, and 2. Scarce budget resources do not permit an appropriate research programme on gene resources of the wild fruits, berries and nuts.

The NWFP sector is interesting as Armenia has a comparative advantage for most of these products as compared to western European countries. The gradual transition to a market economy is likely to support these opportunities.
THE GLOBAL MUSHROOM TRADE AND OTHER TALES FROM NON-TIMBER FOREST PRODUCTS’ RISE TO INTERNATIONAL FAME

Sarah Lloyd
Rock Island, Illinois, USA

ABSTRACT

Non-timber forest products (NTFPs) provide opportunities for bringing much needed income to forest-based communities in the boreal region. Examples of effects on communities and individuals from the globalization of NTFP markets are given and discussed in this paper. NTFPs are experiencing expanded international markets fuelled by both the market and by concerted efforts to development these markets. Communities and individuals can be adversely affected by this new exposure to the international market. Community needs and issues must be taken into account in development of “sustainable” NTFP economies. Value-added production and local consumption of products are essential in the effective development of community-based, multiple-use forest economies including NTFPs.

Key words: Non-timber forest products, globalization, community development, berry, mushroom

1. A GLOBAL CONTEXT

Non-Timber Forest Products (NTFPs) from around the world, including the boreal regions, must be seen in an increasingly global context. In this paper, NTFP refers primarily to consumable medicinal plants, edible and potable products, decoratives and crafts, not of recreational values or the forest’s potential as a carbon sink. Uses and tastes for medicinal plants and mushrooms, for example, are reaching beyond traditional boundaries into new world markets. A growing consumer demand for “natural” and “ecological” products in more sophisticated consumer markets in the North and the West has helped expand NTFP potential in international markets. NTFP production, marketing, and sales have, in some geographic regions, also been assisted by financial and technical assistance from foreign aid programs, multilateral funding, domestic
government assistance and private foundation support to communities and/or local and international Non-Governmental Organizations (NGOs) working on alternative forest use and economic development.

Whether NTFP expansion into the global arena is fuelled by demand in economic markets or programs for alternative forest use and community-based economic development, forest communities are being affected. The global reach of these products in some cases causes results which may not be foreseen. NTFP development holds the potential to be an integral part of a healthy, both ecologically and economically, community-based multiple-use forest economy. As increased attention is paid to NTFP use and development both by the market and through international seminars and programs it becomes increasingly important that considerations for the health of local economies and communities in this global context be given top priority.

Following are several examples of effects on communities and individuals by the internationalisation of NTFP markets and products; these anecdotes come from informal interviews of people active in the field:

- NGOs active in north-western Russia report of the increased interest from Finnish berry companies in cloudberrries (Rubus chamaemorus). It has been reported that Finnish buyers are able to obtain cloudberrries from harvesters at a lower price in Russia than in Finland. This has effected small Finnish communities' and individuals', located in north-eastern Finland, ability to obtain income from cloudberry picking.

- Every summer Sweden experiences a wave of migrant berry harvesters primarily from Poland. Polish pickers began showing up in Sweden about 10 years ago and were able to make good money, by their standards, during the berry picking season. In the early 1990s, a Polish doctor could reportedly make the equivalent of his annual salary in one berry picking season. Soon wholesale Swedish buyers realised that they could offer to buy at a much lower price and the migrant harvesters, having already invested in a trip to Sweden with the promise of good money, after initial hesitation, would still pick large quantities and sell at this reduced price. This trend caused prices paid to harvester to be dumped, reducing incomes earned by all harvesters and further distancing native Swedish pickers from activity in the commercial berry markets. Swedish harvesters had begun to decline even before the dumping of the price because by Swedish standards the prices paid were low.

- Boletus edulis is a mushroom found in many places around the world, prized for its high culinary value. In an interview in the summer of 1996 one small-scale harvester in the US Pacific Northwest said he, and most harvesters he knew, had stopped harvesting commercially because of the low price offered apparently due to the arrival of Boletus edulis products imported into the US from Africa and other places. Development of export products of Boletus edulis, as well as, other mushroom species, has also begun in the Russian Far East as part of a USAID sponsored initiative.
2. ANECDOTES

These three anecdotes exemplify the effects on individuals and communities from the development of more global markets for NTFPs. The example of mushroom markets shows that a "good idea" of developing international NTFP markets for the benefit of a region or specific community may end up diminishing possibilities for other communities on the other side of the world. The other examples demonstrate that the mobility and market actions of wholesalers can often leave harvesters with reduced incomes and opportunities.

One more case can highlight the complexities of the expanding NTFP marketplace and challenges to enterprises:

A small, one person, enterprise in northern inland Sweden specialises in value-added wild fish and berry products. The company sells packaged fish filets to Southern Sweden and has spent considerable resources to establish contacts and create a market on the European Continent. Children in the local schools eat farm fed fish sticks from Southern Sweden. Also, the company ships its packaged filets in bulk to a wholesaler on the coast, almost 200 kilometres away where they are often bought by establishments in the village of origin, sending the products back the same 200 km road. The company also makes high quality berry jam products. You do not often find these products in the two local grocery stores, which represent national chains. In the national chains you find berry products from the two largest berry processing companies in Sweden, the nearest located more than 350 kilometres away.

NTFP development can provide a means to bring much needed income into forest-based communities. The examples given above are cautionary and should not be seen as isolationist or denouncing the opportunities of global markets. Finding international markets for NTFPs and creating export products can bring higher returns and in the case of Russia, vital hard currency income into enterprises and communities. However, the needs of communities and harvesters must be considered in the global context. Harvesters in a region may need to create some sort of more formal entity, even across existing political borders, in order to protect themselves from price dumping. Keeping the exchange of goods and money within the community can reduce enterprises' and individuals' vulnerability to the whims and complexities of a global market. Developing value-added production of NTFPs is the first step. However, to complete the cycle, local communities and individuals must buy locally. Effective plans for economic and socially, as well as, ecologically "sustainable" development of NTFPs must include the whole community, suppliers and consumers.
INTERNATIONAL TRADE AND RESTRICTIONS OF NON-WOOD FOREST PRODUCTS

Pekka Alhojärvi
Ministry of Agriculture and Forestry, International Affairs Group
Helsinki, Finland

ABSTRACT

The paper discusses the importance of international trade and its relation to development of the non-wood forest products sector as a whole, the pattern and scale of trade, its restrictions caused by tariffs and non-tariff barriers and the world markets. It is pointed out that the development of the sector discussed is strongly dependent on the development of systematic trade and market research supporting the activities and parts in the chain from the forests to the final markets and consumers. Also the importance of market oriented approach is being emphasised.

Key words: International trade, world markets, tariffs and non-tariff trade barriers, trade and development, non-wood forest products

1. INTRODUCTION

Globally the importance of trade is of vital significance in relation with the development impacts the utilisation of NWFP can achieve in a certain area. The most common type of trade within NWFP is the local trade which is primarily based on the cultural heritage and experience in the area discussed. The local trade with its pattern and modes has developed in the pace of history and it is seldom that external advisers can in practice develop the local trade. Local people manage it most appropriately without external assistance. The most common feature in the local trade is that most of the products are sold or exchanged in their original character, without processing or other value-adding functions (Lintu 1995).

In the boreal zone, the local markets of berries and mushrooms represent an original market place where several producers (usually merchants of retail character) or gatherers themselves sell the products. The market price of products is based on the competition of the sellers and the real selection alternatives of the buyers and consumers.
In certain countries and markets like in remote rural areas the influence of the competition is not the decisive factor, and the market is usually dominated by the buyers. This is partly avoided by the producers by the establishment of the unofficial exchange market where products and services of NWFP are being transmitted by exchanging them without using money. The typical NWFP of such character are fodder, food items, plant- and animal-based medicines and construction materials.

Quantification of the local trade is extremely difficult due to its sporadic nature and because only a part of it is monetary-based. Some local markets can, however, be considered as industrial markets. They include, for instance, fruit processing such as syrup and concentrate manufacturers, fruit juice makers, jam and preserve manufacturers etc. (Lintu 1995).

National markets are very important also for the NWFPs. Products entering national trade include fruits, nuts, spices, raw materials for flavours and fragrances, medicinal plants etc. These markets are based on the customary food habits which usually are very culturally orientated and thus create a market for spices and flavours, for instance. The internal trade for instance with medicinal plants are considered in many countries more important than international trade – this is the case e.g. in the US markets (Lintu 1995).

The problem in analysing the local and national markets lays mainly in the statistics. It is very difficult to have a comprehensive and concise picture of the NWFP as a whole as usually even the statistics concerning a product group or a segment has problems in its reliability. The consumption of various NWFP in a certain market is always at least partly based on an estimation as both the internal trade statistics and the ones describing collecting/gathering, production and processing are imperfect.

As international trade is a vital element in the development of any nation and as the development problems of the rural areas and less developed economies can be tackled more precisely than in external trade analyses, this paper concentrates almost entirely on the problems of international trade. In addition, according to the author, WTO and the development of international trade have at least as remarkable impact on the development of the forest sector of a nation than the international environmental processes coordinated by the UN. This is also the case within NWFPs.

2. INTERNATIONAL TRADE BY PRODUCT GROUPS

The international trade of NWFP can be tackled only by product group basis as there are no comprehensive trade statistics. It is composed of imports and exports of many products at different stages of processing. Some of these are unprocessed goods from the forest while others have undergone processing to a lesser or larger degree. A distinctive character of the trade is that many of the products, like oils, are traded in rather small quantities compared with other commodities. However there are NWFPs, like gums and nuts, that are traded in very large quantities. At least 150 NWFPs, including 26 essential oils are of major significance in international trade. In addition, a large number of botanicals (ranging between 4000 to 6000), enter the international markets (Iqbal 1995).
International Trade and Restrictions of Non-Wood Forest Products

FAO has listed NWFPs of their commercial significance (Iqbal 1993). The list is as follows (with examples):

1. Food products (nuts, fruits, edible fungi, vegetables, oils)
2. Spices, condiments and culinary herbs
3. Industrial plant oils and waxes
4. Plant gums (gums for food uses, technological grade gums)
5. Natural pigments
6. Oleoresins (pine oleoresin)
7. Fibres and flosses
8. Vegetable tanning materials
9. Latex (natural rubber)
10. Insect products (natural honey, beeswax)
11. Incense woods
12. Essential oils
13. Plant insecticides
14. Medicinal plants
15. Wild plants
16. Animals and animal products
17. Miscellaneous products.

Most of these items are mainly interesting from the development countries' point of view, but in this context the main focus is given to products that are of importance from the temperate and boreal forests.

Pine nuts are an important NWFP with a growing and high-value market, particularly in countries with a health food awareness. China is the world’s largest producer and exporter of *Pinus koreansis* seeds and seeds of *Pinus cambra* which is the Siberian equivalent to the edible European nut species (*Pinus pinea*). These nuts are mainly consumed in Middle Eastern countries. Walnuts, China being the largest producer, are consumed in the EU, Japan, Canada and Switzerland (Iqbal 1995).

Black mushrooms or morels are also globally considered to be of economic and commercial significance. They are used for culinary purposes and they grow naturally mainly in the temperate forests for example in Europe, North America, China, Nepal and Bhutan. The main markets are in Europe, namely France, Switzerland and Germany. The value of the international trade of morels has been at the level of US$ 50-60 mil. annually in recent years. Truffles are also highly favoured by gourmets in various European countries and USA – France and Italy being the main producers. Truffles are exported fresh as well as in preserved (usually chilled). The value of the world trade of truffles has been approximately US$ 5 mil. per annum.

Wild berries are usually traded locally and increasingly nationally. However, the international trade of wild berries is growing to some extent in the boarder lines where there are considerable price differences in the market, such as between the Baltic and Nordic countries. Globally, the international trade of wild berries or edible mushrooms besides the above mentioned, has not had any significant meaning or role.

World trade of natural honey is of the order of 300 000 tonnes and valued at US$ 300 mil. per annum. Russia, China, USA are the main producers and Germany, USA, UK and
Within these figures and statistics all kinds of honey is included; not only the wild honey. Total value of international trade in insect waxes ranges between US$ 23-26 mil. annually. The bulk is beeswax, which like natural honey, originates from wild and cultured sources. In the zones discussed China, Germany, Canada and USA are the main producers. These products are mainly consumed in the EU (Iqbal 1995).

Liquorice and ginseng roots are produced for instance in China, Japan and Russia and consumed mainly in USA, Japan, Republic of Korea, EU, Canada and China.

World trade in essential oils is of the order of US$ 1 bill., including both the wild as well as cultivated sources. China is the only major producer of these products in the region discussed, and the EU, USA and Japan are the main world markets accounting for more than 70% of the world imports. China is also among the main producers of natural rubber the major markets being in the EU, USA and Japan (Iqbal 1995).

Within medicinal plants China is the largest producer in the world accounting more than 30% of the world trade. Other major exports include also USA and Republic of Korea and the main world markets are Japan, USA, Germany, France, Italy, Malaysia, Spain and the UK. The world centre of trade is Hamburg in Germany. The trade is very important also for Poland, Czech Republic, former Yugoslavia, Hungary, etc.

3. MARKETS AND INTERNATIONAL TRADE

When analysing the markets and trade for these products it is essential to recognise how diversified and complicated structures we have to deal with. If we, for instance, analyse the markets for medicinal plants, we have to take into consideration a variety of its potential industrial uses that include phyto-pharmaceuticals, intermediates for drug manufacture, herbal teas, traditional medicines, new drugs, industrial/pharmaceutical ancillary products, health foods and galenicals. For each market segment one has to have specialised, thorough experience and expertise: general analyses do not bring about concrete and practical solutions for the trade and marketing problems.

When analysing the industrial markets for essential oils, the structures are even more complicated. They can be used for example as adhesives, dental preparations, cosmetics and toiletries, by paper and printing industries, motor industries, petroleum industries, for rubber and plastics, foods and beverages, in textile industries, for insecticide preparations, in paints industries and as pharmaceuticals in medicinal and veterinary preparations.

There are many difficulties in analyses concerning the markets; for example in estimating the consumption of various products as usually there are very little or unreliable information or data concerning the production. Usually the trade figures, especially the international ones, are statistically better recorded. It would be easier to integrate these analyses to institutions and consulting companies who are specialised in trade and market analyses with sophisticated methods and skilful personnel rather than to try to develop these analyses on a voluntary and NGO basis.
The crucial point would be how the activities promoted by the NGOs and the systematic (market)research could meet each other, which is essential if these issues are to be seriously developed. In my opinion, this could happen through GO financed (pilot)projects in which this type of combination could be tested and further developed. The work could start from certain statistically well developed production chains like bilberry or cowberries or certain edible mushrooms like cantarelles in which the whole chain from the forest to the final consumer in the EU, for instance, could be analysed using well-known market research methods in statistically reliable ways.

The studies should have the approach starting from the final consumer, the end-user of the product and taking his/her wishes and needs as the starting point. Most often the approach is production oriented which has been the long tradition both in forest and in non-wood forest products. This approach is applicable in local markets within most products and with raw materials, but the more processed and differentiated markets one analyses, the more consumer oriented approach the production chain and its phases should have. In fact also with the marketing of raw material, one can get a preferential marketing situation, if the product is marketed to meet the requirements of the potential buyer and not only the ones of the seller. These chains have been illustrated by Mr. Lintu (1986) in Figure 1.

4. CHARACTERISTICS AND BARRIERS IN THE WORLD TRADE

The international trade and markets of NWFP should always be analysed in the context of the global framework and the general international trade policies. These issues are coordinated and controlled as well as developed by the World Trade Organisation (WTO). The main aim of WTO is to liberalise the world trade with all the products and services through international negotiation processes and in a varying time schedule per product and service. There are a large number of existing trade agreements and trade restrictions (tariffs and non-tariff measures) that give preference for certain regions or countries in world trade. These measures have been used in the pace of the history also as a means to control the trade, protect your own production and industries and to support certain for or prevent them from development. In 1960s and 1970s one could distinguish also political dimensions in the restrictions.

For the countries in transition in Europe the main agreements in the field of trade are designed with the EU. Also the ones with EFTA have been of great importance. From the EU point of view, there is a preferential trade system where the least restrictions deal with the present EFTA countries, Switzerland and the countries with Europe Agreement with the EU. In recent years the Baltic States and Slovenia have become closer to the EU and the enlargement of the EU will diminish all the main trade barriers between these countries when creating a single market concept. An example of a similar agreement aiming at a larger single market is the agreement between Czech Republic, Hungary, Poland and Slovak Republic called the Central European Free Trade Area. EU has also applied a GSP (Generalized System of Preferences) for some countries in transition, though it has been predominantly been used in the trade with developing countries.
The aim of the WTO and EU is to diminish the tariffs strongly from the 1995 level to the year 2000. For instance, within essential oils the tariffs are aimed at to be reduced from the 5% level to 2% during that period in the EU market. With rubber and products the tariffs would be reduced from 3 to 2% and within wood products from 5 to 2%.

Another typical characteristics in the trade has been the tariff escalation which means that the tariffs vary according to the degree of processing or value-adding. Usually the tariffs have been lower with raw materials than with processed or further processed products made of that raw material. As an example of tariff escalation, one can present the case with rubber products where the tariff has been at the level 3.7% within the form of raw material, at the level of 7.5% within primary processed rubber products and at the level of 5.8% within the secondary processed rubber products. Figures are average ones from 1995. By the year 2000, the tariffs should be lowered from the above mentioned levels to 1.9%, 5.3% and 5.2% respectively. If compared with the respective figures of wood products for 1995 they are: 1.6%, 4.1% and 4.9% and the aims for the year 2000: 0%, 1.7% and 2.0%.

In the main markets: the EU, USA and Japan, over two thirds of the NWFP tariff lines are under 5% tariff, less than one third in the tariffs between 6 to 10% and only a few lines exceed 11%. In the EU market the highest tariffs are for natural honey, 1.3%, for mushrooms and truffles 12.8% and other truffles 14.4%. The highest duties within NWFP in the US market are for some tropical products (bamboo shoots, rattan and also natural cork) and in Japan for natural honey, 25.0%, maple syrup 17.5%, shellac and other refined lacs 17.0% etc. (UNCTAD 1994).

While the tendency has been to lower the tariffs in the world trade, the use of non-tariff barriers have become more common in the international trade and markets. UNCTAD has classified and listed for decades different types of barriers in order to especially assist the developing countries in their efforts to develop their trade. The most common types of non-tariff measures in international trade are: tariff quotas and other import restrictions (quotas, prohibitions, import licences, "voluntary" export restrictions); export restrictions: quotas, prohibitions and licences; measures influencing the prices; health and sanitary standards; customs and administrative entry procedures; trade agreements; ocean freights and other measures such as production grants, preferential loans and subsidies, tax concessions, preferential exchange rates, government funded marketing and promotional activities as well as restrictions caused by environmental concern.

All the above mentioned ones have been used in the world markets also with forest and non-wood forest products. The main reason has been and is to protect the own production and its market share and industrial competitiveness in the domestic market. However, the objectives for example to support through these types of measures the reforestation or the cleaning of processes, have become more common in conjunction with these measures, especially within the environmental and health and sanitary ones. It is a necessity for any producer or trader in international markets to understand these measures as to be able to forecast their usage and to be able to react in advance. This type of knowledge is very accurate and special skills and expertise are needed within these issues. Very seldom any company within NWFP can invest itself to this type of trade and market research; it should be one function of the promotional (trade or industrial) association or federation or other relevant body. But if the international markets are to be penetrated, this is a must.
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DEVELOPMENT ISSUES RELATED TO THE MARKETING OF NON-WOOD FOREST PRODUCTS

Leo Lintu
Forest Products Division, FAO
Rome, Italy

ABSTRACT

This paper deals with the efforts to increase the economic and social contribution of the forestry sector to sustainable development and starts by presenting the special features of the non-wood forest products sector. Prerequisites for efficient marketing of non-wood forest products are reviewed, including adequate recognition of marketing functions, access to appropriate information, correct marketing practices, sufficiently trained human resources, and strong policy, institutional and infrastructural support, including competent producer and industry organizations.

Key words: NWFP, marketing, training, policy, institutional support, industry associations

1. INTRODUCTION

The efforts to increase the economic and social contribution of the forestry sector to sustainable development includes the maximisation of the value of resource utilisation in harmony with the environment. This means increasing the number and variety of products and services from the forests beyond wood products. Non-wood forest products have traditionally been important in local economies both in developing but also, to a certain extent, in developed countries. Their role in forestry has, however, largely remained unrecognised. There is, therefore, a pressure from the supply side to introduce more non-wood forest products to the markets and properly market them in order to channel the increased value to the forestry sector at the local level.

On the demand side, many of the non-wood forest products continue finding markets in various well-established end uses although the development of synthetic substitutes has reduced the demand of many of them and even made numerous non-wood forest products totally obsolete.
There are, however, two major developments which are particularly influencing the demand side and drawing growing attention to non-wood forest products and their marketing especially in developed countries. One is the already high and still increasing urbanisation, and the other is the strong emergence of “green” and “nostalgia” markets as part of the general public’s concern of the environment.

The urbanisation is moving many of the traditional uses of non-wood forest products to cities and forcing towards the development of efficient commercial supply structures in order to satisfy the more sophisticated customer base there. Urban population is also demanding continuously improved services from the forestry sector for recreational purposes, such as in the form of eco-tourism.

In developed countries, people are ready to buy products which they can perceive originating from nature, for example being “green” or “natural” as compared to products made of synthetic raw materials. Many of the health and cosmetic products based on non-wood forest product raw materials serve these markets. The “nostalgia” markets are closely related to the valuation of traditions among the city people: e.g. many traditional decorative and food items consumed in rural areas in the past tend to survive in cities due to their sentimental values, especially during the major festive periods.

Utilisation of forest resources has traditionally concentrated on timber harvesting which is an industrial operation offering employment and income to people. The general public, people from outside the forestry sector, has only occasional direct exposure to forests. Non-wood forest products provide a link between the general public and forests. These products contribute to the formation of a positive image of forestry on the part of the general public. They therefore serve as a means to create goodwill and understanding towards forests.

The interest of governments and industries appears to be increasing and becoming more favourable and supportive towards the development of the non-wood forest product sector. These products can provide significant additional income to people in rural areas and thus contribute to the alleviation of employment problems.

It appears, however, that for a better exploitation of the opportunities offered by these products, additional attention to their marketing would be needed.

There are markets for both the physical products and services. The final consumer markets are mainly for value-added products, marketed through commercial channels. As the opportunities for city people to have direct access to forests decrease, many of the products become a symbol of good recollections of nature and “good old times”. These markets are accustomed to highly processed products which are sold through channels perceived by consumers to be reliable and secure, especially in the case of health, cosmetic and food products. As the non-wood forest products start as basic raw materials from the forests and are converted by various processors and industries into final consumer products, the marketing takes place several times within this chain. The services, like eco-tourism, are also highly commercial and need to be efficiently marketed to consumers.

In sustainable forest utilisation, marketing provides not only a means of knowing and satisfying the needs and wants of consumers but also of maximising the values and distributing them among the participants in forestry activities. It is closely linked to resource management and processing which create and convert the resource into marketable products.
By describing some of the special features of the non-wood forest products sector and prerequisites for efficient marketing, this paper will identify some of the basic development issues which need to be addressed in making conditions conducive to efficient marketing of non-wood forest products.

2. SPECIAL FEATURES OF THE NON-WOOD FOREST PRODUCTS SECTOR

It is not an exaggeration to say that the non-wood forest products represent one of the most challenging product groups from the marketing point of view because of their number, versatility, end-use variation, dissimilarities of producer base and resource richness. Non-wood forest products comprise unprocessed raw materials and consumer products as well as further processed consumer and industrial goods. Many of the products are seasonal and with fairly small overall markets, which means that individual producers seldom rely and specialise on one product only to make a living on it. Similarly, the users recognise the seasonality of the supply and adjust their demand accordingly. The resource base also varies greatly, some of it being natural and even wilderness while other resources are plantation-based.

Producers of these products are individual gatherers living mostly in rural areas, or in some cases, large-scale industrial plantations supplying either primary consumer goods or raw materials for further processing industries. They also include farm-level processors, small-scale industries and huge multinational industries which deal with processed goods based on non-wood forest products.

Markets range from local consumer markets to most sophisticated industrial niche markets in numerous end-use sectors both in domestic and export markets.

Competitors of non-wood forest products come from the sector itself or from other sectors with natural or synthetic products.

Furthermore, the non-wood forest product markets have been and continue to be in the middle of a drastic evolution. Traditional markets for many products have been lost to competing synthetic materials while new markets are emerging, especially with the interest in natural products. All this would require from the producers a full understanding of the changes and the ability to quickly identify threats and opportunities in the markets and swiftly adjust to them not only in marketing but also in resource management and processing in an harmonious manner. A further complication arises from the fact that many of these products serve several different local, national and international markets simultaneously, each requiring different marketing approaches.

A serious problem arises from the fact that many of the gatherers, primary processors and middlemen, who would need marketing capabilities, are exposed to the products only seasonally as a side-line activity. They are therefore reluctant to make any major long-term investments in the improvement of efficiency. This makes their position much weaker than that of the suppliers of competing substitute materials. It also weakens the position of the gatherers, primary processors and middlemen compared to the more committed members of the marketing and processing chain further up.
What do the gatherers, primary processors and middlemen need to know in terms of marketing? The basic questions when starting any activity in marketing of non-wood forest products are:

- What are the potential marketable products available?
- What and where are the markets for those products?
- Who are the competitors in supplying the markets?
- What are the specific strengths of the producer/gatherer in supplying the markets in relation to the competitors?
- What are the means to get to the markets in competition with other suppliers?

Efficient marketing will assist in finding information and answers to the questions posed and in taking full advantage of the emerging opportunities.

3. PREREQUISITES FOR EFFICIENT MARKETING OF NON-WOOD FOREST PRODUCTS

Marketing, processing, raw material procurement, human resource, and finance are the basic functional areas of any forest-based enterprise. All these functions are equally important to the success of an enterprise and have to be operated in harmony. It can, however, be noted that marketing is often left to a "Cinderella" position in relation to other functions.

In order to improve the situation, certain basic conditions need to be met. The prerequisites for efficient marketing include adequate recognition of marketing function, access to appropriate information, correct marketing practices, sufficiently trained human resource, and strong policy, institutional and infrastructural support, including competent producer and industry organisations. Each of these basic prerequisites will be discussed below with the aim of identifying relevant issues to be addressed.

3.1 Recognition of importance of marketing

There are several interest groups who need to be aware of the importance of marketing: the gatherers of non-wood forest products for sale; commercial middlemen; processing industries; the providers of recreational services in forest areas; the authorities responsible for policy development and control measures; and the forest owners. Only in some instances there are industrial scale operators with plantations like those for Christmas trees.

Producers of non-wood forest products, at the primary level, are mostly individual gatherers living in rural areas. They collect the products, like berries, mushrooms, decorative materials, medicinal plants, etc., both for home consumption and for sale. They are often part-time operators whose main activity is somewhere else. They work mostly as individuals or by families. They do not necessarily have any long-term commitment to the activity. Whenever they are collecting for sale they will need to be
connected to an appropriate marketing organisation which in most cases is provided by middlemen. Due to the sporadic nature of the activities, the gatherers tend to ignore many of the vital aspects which are important for efficient marketing. These include the product knowledge, grading, quality, packaging, storage and timely delivery which all are important in maximising the benefits. It is important to remember that many of the non-wood forest products are highly-valued specialities, like many food items (venison, forest mushrooms, berries, nuts, etc.), which need to be handled and marketed as such from the very beginning in order to maintain their real value to the consumer. Many of the non-wood forest products are also serving very small and specialised markets, like some of the raw materials for fragrance and flavour industries and some decorative materials used especially during the festive periods. There are therefore opportunities only for a few specialised suppliers even if the resource would be abundant to allow large supply.

As the supply of many of the non-wood forest products varies from year to year depending on the climatic conditions, the willingness of the sporadic gatherers and the commercial middlemen to invest in basic structures to provide facilities for handling the harvest of non-wood forest products efficiently is limited. Especially during the good years, when the harvested quantities of products like berries and mushrooms are abundant, shortages in handling capacity may prevent taking full advantage of the supply.

All the above factors make the interest of the gatherers rather short-term oriented and even not motivated to know more about markets and marketing of the gathered products than just finding out the minimum requirements set by the middleman buying the products and how much he/she is ready to pay. The key role is therefore played by the middlemen in channelling the needs and wants of the customer in the market to the gatherers.

The seasonal character, relative smallness of the markets of individual products, great number of products requiring specialisation emphasise the short-term orientation of the middlemen involved in the trade and minimises their interest in acquiring adequate knowledge and having sufficient commitment to these activities.

Industries processing non-wood forest products are mostly dealing with the commodity type products which need to be available in predictable quantities, qualities, cost and time.

### 3.2 Improving the access to appropriate information

Marketing can be called an information-based “soft” technology. It is operated on the basis of information about markets, means of accessing the markets, competition and business environment. Efficient marketing relies on a well-functioning marketing information service that provides necessary quantitative and qualitative information regularly, reliably, timely and at the lowest possible cost.

Information is needed on the markets (demand, end uses, supply, producers), marketing factors (products, distribution channels, promotion and prices), competition, marketing environment (comprising social, economic, political, technological, regulatory, legal, cultural, infrastructural, ecological, etc. environments), and institutions related to marketing.
Marketing information on non-wood forest products which is systematically collected, analysed and disseminated is seldom available with the exception of some products. Furthermore, the information on these products is collected from the resource side or at the processing level. However, there seems to be increased attention on collecting information from markets and end uses to which gatherers and primary processing industry are selling their products. Similarly, collection of information on marketing factors would need to be improved.

There are some basic things which need to be taken into account when developing marketing information to back up non-wood forest products. Non-wood forest products are a very wide and varied category of products. It is therefore not possible to set up any generalised information system but the system has to be specific either as regards the market (i.e. end use) or the raw material available from the forest. For instance, an essential oil available from the forest could be used in several end uses which are totally different from each other. It could be used in the fragrance industry for perfumes, flavour industry for foods, pharmaceutical industry for medicines, or even for some other industries for other consumer or industrial products. This will mean that all these markets (end uses) need to be followed for one single forest raw material. The same forest area, used by the same people, may, however, have a number of different essential oils which can all be found in the same markets.

Non-wood forest products which are harvested from the forest usually undergo a number of processing stages before they reach the final consumer in a consumer product. In these cases, the non-wood forest products are marketed as raw materials for further processing. For the raw material supplier it will be vital to be aware of the whole chain of processing and marketing which will take place before the final consumer product reaches the consumer in order to be able to satisfy the market in the best and most efficient way and to be able to claim a fair share of the economic benefit created. A good marketing information system will be able to provide the information for backing up the activities of the raw material supplier of non-wood forest products.

In developing marketing information systems for specific non-wood forest products and their markets, one of the first shortcomings is encountered in the lack of appropriate internationally approved harmonised classification and definition of non-wood forest products. Although some initial work has been done in this regard, additional efforts will be needed in setting up the basic criteria for systematic information collection by national and international product, trade, industry and professional organisations concerned with each of the non-wood forest products and their end uses.

Specific market and marketing studies are needed to better understand the opportunities offered by small niche markets for specific non-wood forest products. The problem with these studies is that they cannot be carried out by gatherers and traders individually because the studies require specialised expertise and are rather expensive.

### 3.3 Improved knowledge of marketing practices

Practices in marketing of non-wood forest products vary greatly depending on the market, product and its degree of processing. The marketing of non-wood forest products takes place in three main stages:
• the marketing of raw material, i.e. from the gathering stage until the product reaches the industrial user which converts it further;
• the marketing of the semi-finished or finished industrial product to other processing industries; and
• the marketing of non-wood forest products (either in their original form or as processed products) to final consumers.

It is vital to know the practices in all of these cases to have a solid basis for further development. Gatherers are directly involved in marketing the product which they have gathered from the forest in the first and the third case while in the second case the marketing is done by the industries concerned, but it is vital for the gatherer to be aware also of this stage.

One of the efficient means to improve the knowledge and understanding of current marketing practices is to have case studies prepared. Descriptions of current marketing practices efficiently reveal the current strengths and weaknesses and provide a solid basis for taking action on improving them.

The case studies are of particular assistance to local-level operators as they identify the parties involved, describe their respective roles and highlight major marketing issues efficiently to them. They also help involved parties to better understand the importance of market-orientation in activities related to non-wood forest products.

Many of the currently available descriptions of activities on non-wood forest products are heavily product- and production-oriented. The product- and production-oriented approaches concentrate on describing the efficiencies in raw material procurement, product development, capital inputs and technology as the main means for achieving better performance in producing increasing volumes of higher-quality products at a lower cost. This is all very well, assuming that the product and quantity will meet the specific requirements of the market and the customers there. A marketing-oriented description of practices emphasises the identification of specific needs and wants of the markets and customers and clearly illustrates the means by which the customer needs and wants can be satisfied most efficiently taking into account the basic elements of marketing (product with its various features like quality, distributions channels, promotion and price as an appropriate mix).

Many of these studies, which are of general interest to all concerned with the development of activities related to non-wood forest products, could be done by appropriate academic research and educational institutions.

### 3.4 Availability of sufficiently trained human resource

Capabilities in marketing include the basic knowledge of marketing, skills to apply the knowledge in practice, and appropriate attitudes to recognise and appreciate the value of marketing as one of the basic functions of the activities of non-wood forest products.

Marketing capabilities are needed at all levels, starting from the gatherers and farmers of non-wood forest products through traders and operators of primary processing industries to further processing industries. The members of the distribution channels specifically involved in marketing need capabilities for their every-day operations. The
government officials at the policy-making level, as well as in regulatory activities, need to have a basic understanding and appreciation of marketing. People in various governmental and private organisations who are involved in promoting trade in non-wood forest products also need to have basic capabilities in marketing. It is therefore evident that in addition to formal, comprehensive education and training in marketing of non-wood forest products, there is a need for short seminar-type training events mainly for sensitising, e.g. the authorities to the main issues in marketing of non-wood forest products.

It appears that marketing of non-wood forest products is either not present in the curriculum of forestry training institutions, or it is there only marginally. Extension workers are faced with similar shortcomings.

3.5 Policy, institutional and infrastructural support

There are several ministries and institutions involved in activities related to non-wood forest products. Close coordination among these is vital for a success in creating a conducive and harmonious policy environment for marketing of non-wood forest products. For example, it is not enough to guarantee a success with policies on the resource management side supporting improved production of non-wood forest products if at the same time there are serious policy obstacles to efficient processing and marketing.

Competent producer and industry organisations are vital for promoting the local-level interests to policy-makers and to improve access to information. They are also important in some cases to provide a sufficiently large supplier of products to the markets to be able to compete with other suppliers.

The most obvious shortcomings in the institutional support to marketing of non-wood forest products relate to the weaknesses or even total absences of local-level producers' organisations, institutions for providing improved access to marketing information, extension services and educational institutions.

Infrastructural support varies depending on specific situations. In some instances only the basic infrastructural services of transportation, communication, banking, etc. will be sufficient, while in other cases there is a need for specialised pre-processing, storage, packaging and transportation means, etc.

4. ISSUES TO BE ADDRESS IN DEVELOPING THE MARKETING OF NON-WOOD FOREST PRODUCTS

Some of the issues emerging from the previous discussion include:

Parties concerned:
- Identification of relevant parties involved in marketing of each of the potential non-wood forest products.
• Harmonisation of the cooperation among ministries, institutions and other concerned parties.

Recognition of marketing:
• Increasing recognition of marketing of non-wood forest products among the parties concerned.

Marketing opportunities:
• Identification of market opportunities, carrying out marketing studies by individual markets and products.
• Taking advantages of the market opportunities, especially in view of the great number of markets and products involved and competition posed by other materials.
• Improvement of the knowledge of current marketing practices including preparation of case studies.

Access to marketing information:
• Improvement of the access to the marketing information on non-wood forest products with emphasis on information on end-uses and marketing factors, including the establishment of relevant marketing information systems.
• Development of commonly agreed, harmonised classification and definitions of non-wood forest products and strengthening the collection of statistical information on the use, production and resources of non-wood forest products.
• Identification of specialists for marketing studies of non-wood forest products.

Human resource development:
• Improvement in marketing of non-wood forest products education, training and extension.

Policies, institutions and infrastructures:
• Development of harmonised resource, industry, trade and other policies to create a conducive environment for efficient marketing of non-wood forest products;
• Identification of the needs for and development of institutional and infrastructural support to marketing of non-wood forest products.

A thorough discussion to find solutions to these issues will be needed at local, national and international level.
PARTICIPATORY NON-WOOD FOREST PRODUCTS MANAGEMENT: EXPERIENCES FROM THE PACIFIC NORTHWEST, USA

R. J. McLain
University of Washington
Seattle, Washington, USA

E. T. Jones
University of Massachusetts
Amherst, Massachusetts, USA

ABSTRACT

This paper draws upon experiences in the Pacific Northwest region of the United States to examine key issues associated with expanding user group participation in NWFP management. It summarises major strengths and weaknesses of user group participation in resource management decision-making. Key policy venues where expanded participation is needed are identified and the importance of the structure of participation processes is discussed. Policy recommendations aimed at supporting participatory NWFP management are provided.

Key words: Forest policy, non-wood forest products, participatory management

1. ECOSYSTEM MANAGEMENT AND NWFPS

Under increasing public pressure to manage forests in a more holistic fashion, state and federal agencies in the Pacific Northwest region of the United States, the area covered by the states of Washington, Oregon, and northern California, have recently adopted ecosystem or landscape management approaches. These approaches shift the emphasis of public forest management from a timber production orientation to maintenance of long-term integrity of whole ecosystems or large-scale landscapes. As forest management agencies struggle to fulfil their new mandates, the question of how to manage NWFPs on public forests has emerged on local and regional forest policy agendas.

A wide variety of products, including wild mushrooms, floral greens, berries, and medicinal plants, are harvested from the region’s cold temperate forests for home consumption and sale in domestic and international markets. NWFP harvesters, buyers and processors come from a wide range of class backgrounds, ethnicities, and residential settings. In the past fifteen years, harvester demographics have shifted...
dramatically with the entry of large numbers of Southeast Asian and Hispanic harvesters into the NWFP work force. Conflicts over access to NWFP gathering grounds, as well as growing concern about the negative ecological consequences of unregulated harvesting, has fuelled a demand for NWFP regulation. However, recent studies of NWFP harvesters and buyers in the Pacific Northwest indicate that they have had little voice in recent government decisions affecting NWFP distribution patterns, productivity, and access conditions (Brown 1998; Love and Jones in review; McLain and Jones 1997; Robinson 1994).

In this paper we examine some key issues associated with expanding user group participation in NWFP management in the Pacific Northwest. Our analysis draws upon our joint experiences as participant observers of the wild mushroom industry and of NWFP policy making venues during the past five years. We begin with a summary of major strengths and weaknesses of user group participation in resource management decision-making. We then discuss the policy making venues in which participation is needed, as well as how the structure of public participation structures affects NWFP user group participation. We end with policy recommendations for supporting the development of more participatory NWFP management.

2. RATIONALE FOR PARTICIPATORY NWFP MANAGEMENT OF PUBLIC FORESTS

2.1 Critique of state management regimes

Historically, most NWFPs on public forest lands in the Pacific Northwest region of the United States have fallen under what common property theorists describe as a *de facto* open access regime (Bromley 1992). In brief, state and federal governments in this region have the statutory authority to regulate the harvesting of NWFPs in forests under their care, but they have failed to make or enforce such rules. Empirical evidence suggests that under conditions of increasing resource demand, *de facto* open access regimes foster unsustainable levels of harvest and resource system collapse (McEvoy 1986; Bromley 1992). Strengthening nation-state control is often problematic, particularly when resource systems are characterised by scientific uncertainty and high temporal and spatial variability in productivity, as is the case for certain NWFPs, such as wild mushrooms, berries, and forage. In such cases, the difficulties of implementing centralised monitoring and enforcement systems can lead to the persistence of *de facto* open access conditions and eventual system failure (McEvoy 1986).

Widespread resistance to state management regimes, as well as their failure to stop widespread environmental degradation has prompted a world wide trend toward broader based user group participation in resource management decision-making (Western and Wright 1994). These opportunities range from the transferral of management authority from state to local authorities or user group associations, to resource co-management arrangements, to the development of more inclusive public participation processes within state management regime contexts.

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1 A number of Native American nations, including the Quinault, the Yakima, the Karuk, and numerous others, also exercise treaty rights over many NWFPs on federally and state-managed lands.
2.2 Strengths and weaknesses of user group participation

2.2.1 Strengths

Resource tenure studies suggest that strong user group participation in natural resource management is justifiable on at least four grounds. As noted below under section 2.2.2, these arguments are context-specific and do not necessarily apply to all situations.

**Resource systems knowledge:** Resource users often have extensive and detailed site-specific knowledge of resource and ecological conditions. This is particularly true when users have been harvesting or extracting resources from a specific area over many years or generations (Acheson 1975). Recent studies of NWFP harvesters in the Pacific Northwest document the considerable knowledge – both scientific and folk knowledge – that exists among NWFP users concerning the resources they harvest and the ecological conditions that foster greater productivity (Richards 1997; Love and Jones, in review). Wild mushroom researchers in Oregon have also found partnerships with commercial harvesters and amateur mycologists helpful for designing and implementing research and inventory and monitoring projects (Amaranthus and Pitz 1996).

**Stewardship incentives:** Under certain socio-economic conditions, resource users whose livelihoods depend on the presence of certain resources may have incentives to ensure that those resources are managed for long-term sustainability. For example, Love and Jones’ (in review) study of wild mushroom gatherers on the Olympic Peninsula documents the use of practices designed to maintain and improve wild mushroom productivity. Moreover, the fact that harvesters are willing to implement stewardship practices even within the context of a de facto open access regime suggests that strong motivations exist for some commercial harvesters to adopt resource conserving strategies.

**Rule Compliance:** Resource users are likely to resist rules whose legitimacy they do not recognise, particularly when the rules are inappropriate for local conditions (Smith and Jepson 1993; Acheson 1975). Harvesters and buyers interviewed as part of one study in western Washington (Robinson 1994), where NWFP compliance rates appear to be quite low, indicated that they had no input into the rules, and that many of the rules created economic hardships without addressing ecological concerns. Similarly, many wild mushroom harvesters in central Oregon stress that they are not opposed to the idea of regulation per se, but object to regulations which they feel are unnecessarily restrictive or counter-productive to forest sustainability.

**Social justice:** A fourth justification for expanding user group participation in NWFP management in the United States is that U. S. public land management agencies are legally required to involve the public in decisions that have significant environmental impacts. However, our observations suggest that the very structure of those processes mediates against wide-spread involvement of the diverse groups that harvest NWFPs on public lands, thus effectively disenfranchising these populations from decisions affecting how the resources they depend upon are used.
2.2.2 Weaknesses

Resource management systems with strong user group participation in decision-making also have some potential weaknesses. First, if such systems have social and economic incentive structures that favour short-term economic considerations over long-term benefits, users will be unlikely to make decisions that favour long-term sustainability over short-term gain. Second, economic and political inequities within user groups may favour the participation of some and the exclusion of others. Third, user groups may lack a view of where their system fits within larger systems, and thus may let local or resource-specific concerns override concerns at larger spatial or multiple-resource scales.

2.3 Hybrid systems

Most resource management regimes are actually hybrids of nation-state and local systems, with varying degrees of participation by resource users. In the Pacific Northwest, access to and management of NWFP resources on public forests is shaped by a complex patchwork of local, state, federal, and Native American tenure regimes. During the past decade, however, there has been a trend toward strengthening federal and state regulatory elements without adequately taking into account the capacity of NWFP harvesters and buyers to participate in regulatory processes.

3. CRITICAL DECISION-MAKING VENUES AND FORMS OF PARTICIPATION

In thinking about how to expand user group participation in NWFP policy making, two issues need to be examined. First, key venues in which decisions are shaped or made, and in which, therefore, users ought to be involved, need to be identified. Second, reasons for low NWFP user group participation in existing participatory processes need to be identified, and more appropriate processes need to be developed.

3.1 Important policy venues

Policy and management decisions are made in a variety of venues, ranging from formal legal processes to informal meetings between key stakeholders. Also important, though sometimes overlooked, are pre-decision venues, such as scientific experiments, workshops, and media debates, where policy problems are defined and policy agendas are shaped. In the Pacific Northwest NWFP policy arena, policy venues where participation of NWFP users is critical can be divided into three broad categories.
3.1.1 NWFP-specific legislative, regulatory, and management processes
Obvious venues for policy participation are the legislative, regulatory, and management processes aimed specifically at regulating access to and the use and management of NWFPs. For example, the state of Washington recently passed legislation requiring buyers to record data about harvesting permits, volumes, and values of products from people who sell NWFPs. Two groups of NWFP resource users - amateur mycologists and a segment of the floral greens processing industry - played strong roles in developing those laws. Other NWFP user groups, including most commercial wild mushroom harvesters and buyers, had no voice in the process. In a meeting held in 1995 by the Washington Department of Natural Resources to explain the changes in the law, wild mushroom buyers voiced their intention to resist the law on the grounds that it had been pushed through without their knowledge and that they felt the provisions were inappropriate and unrealistic. Enforcement of the provision has proved costly and compliance rates are low. Involvement of a greater range of wild commercial mushroom harvesters and buyers in earlier stages of the process might have resulted in legislation with which people might have been more willing to comply.

3.1.2 Broader legislative, regulatory, and management processes
Often overlooked, but equally critical, is participation in legislative, regulatory and management processes that do not specifically target NWFPs, but which nonetheless affect NWFP distribution patterns, productivity, and user access. Some examples at the federal level include recent decisions on many national forests to close large numbers of logging roads and to implement new tree harvesting and burning practices to reproduce the forests that existed in these areas a hundred years ago. Such actions will substantially affect NWFP harvesters and buyers (some negatively, some positively); yet our research suggests that few harvesters and buyers were involved in the public meetings in which the merits of these actions were debated. Processes seemingly unrelated to forest management, such as the development of international trade agreements, tax laws affecting small businesses, and labour laws can also affect NWFP harvesters and buyers; and also need to be considered as important venues for expanding NWFP user group participation.

3.1.3 Problem definition venues
Venues where policy problems are defined and policy agendas established are a third place where participation opportunities for NWFP user groups need to be expanded. Examples include federally mandated late successional reserve analyses for forests within the range of the northern spotted owl, an endangered species inhabiting old growth forests; scientific research projects aimed at producing guidelines for NWFP management; and inventory and monitoring projects. Late successional reserve analyses, for example, are the primary setting where federal agency scientists and managers decide what kinds of activities are likely to have a negative effect on spotted owls and which thus should be prohibited in late successional reserves falling within the spotted owl’s range. The agencies maintain that these analyses are information gathering
processes rather than management actions and thus are not subject to the public review process. Expertise within the federal agencies on NWFPs is, by their own admission, extremely limited. It is in these fora, where harvesters are not present, that agencies decide whether or not NWFP gathering activities will be permitted in spotted owl habitat. Through the late successional reserve analysis process, vast areas of central Oregon have been declared off-limits to commercial wild mushroom harvesting since 1994. Yet no scientific evidence exists as to whether such activities are damaging or not. Enforcement of the area closures has been extremely costly in terms of agency staff time and funding. Moreover, the closures may potentially have a negative effect on wild mushroom grounds outside the closed areas since the same number of harvesters are now harvesting in a smaller area.

3.2 Weaknesses of existing participation processes

Though public involvement in state and federal environmental management is legally mandated in the United States, studies of these public involvement processes indicate that they are often only nominally participatory (Blahna and Yonts-Shepard 1989; Culhane 1990). Agencies can meet the letter of the law by advertising proposed actions, holding hearings to inform the public of proposed actions, and allowing the public to comment on those actions. How and where they choose to advertise proposed actions, what venues they select for defining and discussing options, where and when they choose to schedule discussion fora, and whether citizens think their comments will be taken into account, however, all affect who can and does participate in these processes. In the Pacific Northwest, existing forest planning participation processes appear to favour groups who are politically well-organised or economically powerful (i.e. the timber industry, recreationalists, and mainstream environmentalists), or groups who reside near the forests where management actions are being considered. Left out of these processes are resource users who are politically unorganised, people who cannot afford to take time off or pay for travel to meetings, mobile NWFP harvesters who spend only a part of the year in the forests they work in, the many harvesters who do not speak or read English, and people from cultures where the public hearing format is not used.

4. RECOMMENDATIONS FOR POLICY ACTION

Sustainable development of NWFPs in the cold temperate and boreal forests of North America and elsewhere will require the encouragement of policy making and management environments that are inclusive of a wide array of NWFP user groups. The following policy actions can help support participatory NWFP management:

 Expansion of social science expertise within forest management agencies: Our work with two federal and two state forest management agencies in the north-western United States indicates that the number of staff with training in social science and participatory management or research methods is extremely small. Enhancement of agency capacity
to carry out participatory forms of management will require a concerted effort on the part of forest management agencies to hire anthropologists, sociologists, political scientists, and cultural geographers as part of core field and management staff. They will also need to provide such staff with adequate funding and support staff to undertake outreach efforts.

**Support for research conducted in collaboration with NWFP user groups:** In societies in which science provides much of the basis for forest management decisions, NWFP user group participation in setting scientific research agendas, and in designing and carrying out experiments is critical to the success of a participatory management approach. Support for such research partnerships, as well as support for studies that critique existing collaborative research models, are crucial to the development of effective participatory structures.

**Supporting user group initiatives to organise politically and economically:** Historically many NWFP user groups have not been politically organised in ways that allow them to have a voice in existing decision-making processes, nor have they had the economic clout that would make resource agencies pay attention to their concerns. In the Pacific Northwest, however, we are beginning to see efforts by harvesters and buyers to empower themselves through the creation of industry associations, forest worker associations, and producer and marketing co-operatives. Identification and support for such initiatives are a key step in the development of enabling environments for more inclusive user group participation in NWFP management.

Developing more participatory NWFP management processes is a difficult and long-term undertaking, as it requires fundamental re-thinking and re-structuring of many institutional arrangements within resource management agencies, industry, and academia. However, we need not begin the process from ground zero, as a wealth of material on participatory research and decision-making exists in the fields of agriculture, social forestry, fisheries, and water quality management. Examining the lessons learned from such experiences, and reflecting on how those lessons could be applied to the NWFP arena is one imminently practical way to begin the process of broadening participation in NWFP policy making and management.

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THE PROBLEM OF NWFP OWNERSHIP: PROPERTY RIGHT ANALYSIS

Mika Rekola
Dept. of Forest Economics, University of Helsinki
Finland

ABSTRACT

Management systems of all non-wood forest products (NWFPs) have been classified in four property regimes: private, common, state and open access regime. Rights, duties, and privileges regarding to NWFPs are determined within these regimes. The ownership of specific NWFP is frequently ambiguous. For that reason, property rights should be carefully analysed when conducting economic assessment of NWFPs. Property regimes are also an important tool in NWFP policy.

Key words: Property rights, property regimes, economic assessment

1. INTRODUCTION

Environmental conflicts in forestry have revealed various conflicting goals with respect to forest management. The problem has to some extent been solved with new forest management practices and legislation in the US, Canada, Sweden, and Finland. New rights and duties have been defined. For example, forest owners now have the legal duty to maintain and preserve biodiversity in special habitats. Biodiversity used to be an open access resource but according to the Rio conventions, states are now entitled to manage biodiversity. Management systems of all non-wood forest products (NWFPs) can be classified under four property regimes: private, common, state and open access.

The purpose of this paper is to show that property regimes can be important tools in NWFP policy. In particular, NWFP right regimes should be analyzed when any cost-benefit analysis (CBA) is carried out. It is only under the private property regime that right holders are well-defined. Many NWFPs are, however, utilized on the basis of open access, where resources have no owner.

The structure of this paper is as follows: first the concepts of rights are defined and
2. PROPERTY REGIMES AND THE ECONOMIC ASSESSMENT OF NWFPs

2.1 Classification of property regimes

Rights can be classified as 1) claim rights and 2) privileges (Feinberg 1973; Hohfeld 1913). The claim right implies an ability to receive benefits; the fact that a group or a person has a right also goes hand in hand with the understanding that other groups or persons do not have that right, and they have a duty not to encroach on it. For example, forest owner have right to cut trees but other people may not do that. Privilege simply means that a person has no duty. For example, Finns are free to pick berries from private forests, no one has the obligation to refrain from doing that. Berries are not owned by anyone – unlike timber. We see that privileges are not as strong as claim rights. It is worth noting that some privileges are set forth by law but many other are not. For example, the ‘right’ to recreation in private forests is not a strictly defined legal right or privilege. It is merely a common practice.

Rights and privileges that concern natural resources have been said to function within four property regimes – namely 1) private, 2) common, 3) state, and 4) non-property regime (Bromley 1991; Eggertsson 1990). These regimes define the rules under which natural resources are managed. In the following, the regimes are described and examples of NWFPs given.

Private property is the simplest case. Most typical market goods, such as timber, are under this regime, which consists of non-attenuated rights, i.e. rights that are transferable (Randall 1987). To establish private property rights to NWFP it should be possible to exclude other users. A Finnish example may be seen in hunting rights which belong to the landowners.

The second property regime is common property. My understanding of common property should be not confused with the term “commons” as described in Hardin’s 1968 article “the tragedy of the commons”. His case can be classified in the open-access regime. A real common property is a private estate managed by a group of people, like a neighborhood or a tribe. The group as a whole decides how to use a resource, e.g. a communal park. The community may grant use rights to its members. These usufruct rights do not permit transfer of ownership (Bromley 1991). In Finland usufruct rights are, for instance, related to right to use facilities in communal recreational areas. It could be said that common property is an infrequently encountered way of NWFP management in Western countries, unlike in many developing countries.

According to the state property regime, individuals have a duty to observe rules concerning the use of resource (Bromley 1991). These rules are set by agencies. For
example, forest services in all countries decide how visitors may use national parks and which recreational activities are allowed. An individual who may obtain benefit from rules has a usufruct right. As in the case of common property he or she is allowed to use the resource, but does not have “full” rights to the resource. For instance, some indigenous Sami in Northern Finland have the right to use household timber from state forests, but they may not transfer that right.

The fourth property regime is the open-access. Individuals have both privilege and no claim right with respect to the use of the resource (Bromley 1991). Many NWFPs are under open access in Nordic countries. Non-landowners’ “rights” to forest NWFPs, so called everyman’s rights, are only to some extent written in law. For example, all berries and mushrooms may be collected from private forests. There are only minor restrictions. Cloudberry (*Rubus chamaemorus*) is valuable and economically important to local people in Northern Finland, and in some areas picking “right” has been withdrawn from non-residents.

### 2.2 Economic assessment of NWFP use

The profitability or efficiency of NWFP use depends heavily on the way the costs and benefits are identified. The cost-benefit analysis (CBA) of NWFP is sometimes hampered by the fact that many NWFP are non-market goods without market prices. Non-market attributes may play a crucial role for some goods that are traded in markets. For example, extensive recreational benefits are connected to berry-picking – not to mention hunting. Some techniques are used widely to value non-market benefits, such as contingent valuation (CV). In any case, valuation and CBA require the recognition of property rights so that correct economic welfare measures can be applied (Mitchell and Carson 1989). Economic welfare measures take the form of willingness-to-pay (WTP) or willingness-to-accept compensation (WTA). Too often only WTP is considered (Bromley 1995; Gregersen and Contreras 1992). It is important to note that WTA is frequently much higher than WTP for the same good (Hanemann 1991). That is why it matters which measure is applied.

With many NWFPs the choice between WTP and WTA is not without problems. For example, peatland drainage to increase timber production will reduce the cloudberry crop and decrease bird populations. Should the CBA of this project be done so that berry pickers and bird watchers have right to use the land (they are compensated for the loss of usufruct right) or do the forest owners have the right to drainage? In the latter case berry pickers and bird watchers should pay to forest owners for not draining the peatland. The allocation of rights is, no doubt, essential to welfare distribution, and it also has strong effect on the actual use of NWFPs. In other words, when people have right to pick berries without compensating the land owner they do that much more compared to the situation when they have to pay for the right. The allocation of rights is a difficult issue in all countries, but it is particularly unsettled in countries where legislation and rules are under revision, as in Russia, for example.

Many NWFP rights can be classified as usufruct rights. It is questionable whether people enjoying those NWFPs should be compensated if the right is withdrawn. In many
cases such benefits are practically impossible to compensate because of the large number of people involved. Also the loss to an individual is typically small. For example, if the right to stay overnight in national park is revoked and recreationists have to pay for the service, the costs to one person will be reasonable. In some special cases distributional issues are so important that compensations are paid. For instance, a large amount of old-growth state forest in Northern Finland was conserved and left out of timber production in 1995. There was a considerable loss of income in local forestry and the forest industry, which is why compensations were paid from the state budget to local communities.

In the open-access regime the problem of choosing between WTA and WTP is more controversial than in the other regimes. It should be clear that neither the WTA nor the WTP approach is clearly advisable from the legislative perspective simply because by definition law does not say anything about the resource owner. The dependence of economic welfare measures on property regimes is summarized in the Annex 1 with a few simple examples. The idea of this Annex is to show that choice between WTA and WTP is unclear in common, state as well as under open-access regime. Ultimately, it is a political decision that determines the choice between WTA or WTP measures, and the rights to NWFPs, respectively.

2.3 Choice of property regime to manage NWFPs

The question of the proper property regime for any particular NWFP management is multi-dimensional, and only a couple of specific cases can be mentioned here. The prevailing wisdom is that private property is the best regime for most "normal" goods. The simple lesson of economists and social scientists has been that open-access resources are not used in a sustainable manner, but exploited. However, this is not necessarily true: there are many cases where a traditional community management (i.e. common property regime) has worked reasonably well (Bromley 1991; Arnold 1995).

Even open-access can be a successful system. For example, everyman's rights are based on the fact that the forests are abundant and the intensity of NWFP utilization is low. Under these conditions it is not easy to set strict property rights. For instance, it could be extremely difficult and costly for recreationists before entering the forests to contact the forest owner and negotiate of a permission to entry. On the other hand, it is costly for forests owners to fence their land or control access in any other way.

It seems that this situation will basically remain unchanged in Finland in the future. However, some revisions might be needed. Eco-tourism is testing the limits of the current system and stricter rules for recreationists are probably sometimes necessary. Buckthorn (Hippophae rhamnoides) is becoming so valuable that open-access, which causes conflicts between potential collectors and landowners, is not feasible anymore.

The other NWFP system that is under pressure to be changed is reindeer farming in Northern Finland. Reindeer farming is an exceptional right granted to people living in this area, whereby they may keep reindeer on all private and public lands. The most important natural fodder for reindeer is lichen. The sustainability of reindeer farming is in crisis because of over-grazing.
3. CONCLUSIONS

Laws and rules concerning rights and privileges have implications for the efficiency and sustainability of NWFPs. The property regimes provide the framework within resources are managed. The private property regime appears here to be the most powerful in general. The other regimes are relevant for NWFPs, and most can work reasonably well. Even the open access regime, which has a bad reputation, could be a socially reasonable system.

Because only few NWFPs are managed under the private property regime many non-wood goods and services are without a legal owner. Consequently, an economic cost-benefit analysis is difficult to apply. To some extent, the traditional neoclassical economic analysis of NWFPs has ignored the significance of different property right regimes. It is recommended that property rights should be studied especially, in countries whose laws in this area are being amended.

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<table>
<thead>
<tr>
<th>Property regime</th>
<th>Example of NWFP project</th>
<th>Demanders (Gainers)</th>
<th>Suppliers (Losers)</th>
<th>Welfare measure for demanders</th>
<th>Welfare measure to suppliers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Private property</td>
<td>hunting is organized in private forests</td>
<td>recreationists</td>
<td>forest owners</td>
<td>WTP for hunting right to the area</td>
<td>WTA for selling the hunting right</td>
</tr>
<tr>
<td>property rights</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Common property /</td>
<td>More recreational areas in communal parks or state forests are provided and</td>
<td>Recreationists in a</td>
<td>forest workers</td>
<td>WTP for new areas</td>
<td>WTA for new areas</td>
</tr>
<tr>
<td>State property usufruct rights</td>
<td>timber production is reduced.</td>
<td>community</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Open access privileges</td>
<td>Cuttings in private forests where recreation is performed</td>
<td>recreationists</td>
<td>forest owners</td>
<td>WTP for abatement of cuttings</td>
<td>WTA for abatement of cuttings (compensation received)</td>
</tr>
<tr>
<td></td>
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<td>WTA for cuttings (compensation received)</td>
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</tr>
</tbody>
</table>
NON-WOOD FOREST GOODS AND BENEFITS AND THE CHOICE OF FOREST MANAGEMENT PRACTICES

Jyrki Kangas
Finnish Forest Research Institute, Kannus Research Station
Finland

ABSTRACT

In this paper, some fundamental principles and problems of forest planning are discussed from the viewpoint of integrating non-wood goods and benefits into the comparison of alternative forest management practices and management plans. A problem arising due to the dearth of production and value functions applicable for planning calculations is emphasised. The possibility of applying expert knowledge on non-wood forest products is considered as a temporary solution to this problem. In addition, some on-going Finnish studies on utilising game management expertise in forest planning are briefly presented.

Keywords: Ecological modelling, expert judgements, multiple-use forestry, multi-objective planning, non-wood forest products

1. INTRODUCTION

According to both empirical and theoretical investigations, objectives other than those based solely on wood production are carrying more and more weight in forestry decision-making. Nowadays, not only the public, but also private forest landowners, both industrial and non-industrial ones, value the multiple-use aspects of forests. Recently, especially the dimensions of biological diversity and taking them into account in forestry and forest management planning has received much attention.

At least in the Nordic Countries, there are very few – if any – forest areas with only one mode of use. Thanks to the rights of public access, also privately owned forests are widely used for recreation and for utilising non-wood goods. For example, picking berries and mushrooms, moving by foot or on skis, and simply enjoying the forest landscape, are permitted to all irrespective of land ownership. Also, most nature conservation areas offer multiple use opportunities, although the conservation aims are the most important ones. In most commercially managed forests, wood production...
considerations are still the main reasons for conducting management options—but usually they are not the only ones.

Where the stand in question is a part of a conservation, commercially managed or other special area, each alternative forest management practice has its impacts on the production of each category of forest goods and benefits. In choosing forestry practices, the best possible treatment schedule is searched for, taking all the relevant considerations and objectives into account. Because the choice of production programme for a single forest stand affects the achievement of forest holding aims, or, more widely, landscape level aims, and because practices within the surroundings influence the consequences of stand-wise management, the final meaning of alternative choices often appears only after analysis within the landscape context. This is the case especially with amenity and conservational values.

Forestry is often called multiple-use of forest resources when several goods and services are produced and utilised. Making decisions about forest management practices is a more difficult task in multiple-use forestry than in single-use forestry. Perhaps this is why the choices of practices, and planning them, have often been made as if there were only one forestry objective—or at most a couple of them. It may be that the reasons for oversimplifying decision situations include lack of proper information and decision support tools, and the human trait of avoiding complicated problems. We cannot do much about the latter reason, but the former can perhaps be alleviated to some extent by forest research. Plenty of studies about the effects of stand-wise management practices on non-wood goods and benefits have been published. The results of these studies give valuable basic information, but they alone do not solve practical multi-objective choice problems.

Written and formal regulations given by some authority are generally applied as answers to the need for guidance in forest management. Typically, these regulations provide advice on the basis of the stand characteristics as to the “correct” treatments in each forest stand. Recently, these kinds of directives have been reformed in Finland in order to better meet the requirements of nature conservation and multiple-use forestry. However, the main problem of any directive remains: they are too rigid for real-life choices. The criteria vary a lot from one decision situation to the next, as well as do the potentials of target areas from the viewpoint of different forest uses. Furthermore, forestry directives are often too limited to stand-wise view.

No collection of regulations is able to adjust properly to case-wise needs. However, some advice is needed. The tools of forest planning serve as means of dealing with multiple-use, multi-objective choice problems. Combination of modern planning methods and techniques, a skilled planner as a consultant, and a decision-maker interested in forestry, having also directives as one source of information among others, provides a sound basis for comprehensive decision support; and for making good and justifiable management practice choices.

By applying planning calculations, it is possible to deal with single stands as parts of a forest area and to analyse, for example, how the scenic impacts of clear cutting a stand are dependent on the management practices in the neighbouring stands. Of course, the results of computerised and other planning calculations are not the whole truth, and they contain much uncertainty. The main advantage of analytical tools is that they help
planners and decision-makers to better understand the decision situation as a whole. It is informative to analyse, among other things, what the trade-offs are between different goods and benefits; such as between net income from cuttings and yields of edible mushrooms.

Planning of multiple-use forestry is, by its very nature, multi-objective. In addition to timber management, comparable parts of multi-objective forest planning include, for example, design of forest landscape, wildlife management planning, recreation management planning, and consideration of picking forest products and of biological diversity. In the multiple-use planning of forest resources, all parts are integrated into one planning process. That is why multiple-use planning has also been called integrated forest management planning (Kreutzwiser and Wright 1990).

2. PHASES AND NEEDS OF MULTIPLE-USE FOREST PLANNING

The aim of forest planning, as of any planning process, is to lend support to decision-making so that the best possible production programme leading to an efficient mix of outputs can be chosen in the decision-making process. The product of forest planning is usually a forest plan: a recommendation of treatment schedules for forest stands located in the area in question, and some alternative plans, with information on the impacts of implementing the plans.

For choosing the best plan, perfect knowledge is required of both the decision alternatives available, and information of the consequences associated with these alternatives, as well as of the objectives and preferences of the decision-maker(s). Furthermore, decision alternatives have to be evaluated with respect to each objective, and also with respect to overall utility. Because the preferences of decision-makers vary from one person to another, and from one decision situation to another, the components of utility, and their weightings, have to be determined case by case.

A planning process includes, at least, the following phases:
• structuring the decision problem;
• describing the decision alternatives;
• determining the objectives and preferences of decision-makers;
• assessing the possible impacts of each decision alternative;
• evaluating the decision alternatives with respect to each objective;
• evaluating and comparing the decision alternatives with respect to overall utility;
• compiling the plan.

The part of planning process, which precedes the compilation of the plan, is often called decision analysis (Keeney 1982). Its aim is to provide support to decision-making in decision problems, which are too complex for the intuitive use of common sense.

Forestry decision analysis can be decomposed into six main phases from the point of view of practical applications:
1. identification and structuring the decision problem;
2. analysis of interests, including the preferences of the decision-maker(s) as well as those of the interest groups or citizens concerned;
3. detailed description of the forest (including forest inventory);
4. generation of the decision alternatives by applying (for example) simulation calculations;
5. examination of the production possibilities and trade-offs; and
6. evaluation and comparison of the decision alternatives.

If a decision support reliable and versatile enough has been obtained in the decision analysis, a forest plan can be compiled; otherwise one or some of the phases should be deepened in order to obtain a more solid decision basis.

In multiple-use forestry, different outputs – goods, services, and other benefits – are consciously produced in the same production process. The choice of a forest plan in a multi-objective case is sensitive to changes in the importance given to outputs and objectives. It is only seldom that the best production programme can be found without clarifying the objectives and their weights, and taking them carefully into account in planning.

Different goods and values are usually not measurable or otherwise expressible, accurately enough, in the same units. However, all relevant factors, which have an effect on utility, have to be somehow made commensurable – at least in the decision-maker’s head. Otherwise, the comparison of decision alternatives with respect to overall priority is difficult, if not impossible. Every choice inherently means some adapted trade-offs between competing decision variables. In decision analyses, information on trade-offs is produced so that final decisions can be made while being aware of their consequences.

Unfortunately, planning is rarely as easy and straightforward as presented in the simplified schemas above. This is the case especially with multiple-use planning of forest resources. In order to gain sound decision support in complex planning situations, an iterative and interactive approach is often called for. In fact, interactivity can usually be taken as a precondition for an effective planning process, especially when talking about participatory or customer-oriented planning. There is not much probability of finding optimal plans with only one attempt, because of, for example, difficulties in clarifying preferences and objectives.

Also, continuity and adaptivity are typical characteristics of today’s forest planning. New plans should be possible to work out if the factors having influence on the choices change, or assumptions made or forecasts produced prove to be unrealistic or false. In adaptive planning, in addition to being of continuous nature, uncertainty in forecasts and calculations is analysed and the endeavour is to take these into account in the evaluation of alternative forest plans.

Interactivity, iterativity, continuity, and adaptivity are important principles particularly concerning planning of multiple-use forestry. For example, most plans compiled five years ago do not meet the objectives and preferences set currently by the decision-makers. As stated earlier, non-wood goods and benefits are receiving more and more weight in forestry choices. That is why plans made in the past are often based on under-weighting of non-wood aspects, and the treatment recommendations proposed in them are not optimal with respect to today’s priorities. Interactivity and adaptivity, in turn, are needed in multiple-use planning due to the great uncertainty involved in evaluations of alternative treatment schedules and alternative forest plans with respect to objectives other than those concerning wood production, and in related forecasts. For example,
predicting the average yields of picking products as consequences of different treatment schedules of a forest stand is fairly uncertain so far.

Because of the complexity of multiple-use planning problems, decision support models, methods, and tools are needed. Of course, the intuitive use of common sense is also always a necessity, but it alone does not solve complicated tasks. Plenty of computerised approaches, methods, and techniques for forest management planning have been presented and applied.

Geographical information systems, simulation models, and decision support systems also serve as tools for multiple-use planning of forest resources. However, the fact that there is a shortage of applicable production and value functions describing non-wood forest products and benefits, produced by empirical research, makes the use of these tools more uncertain in multiple-use planning than in pure timber management planning. Expert knowledge can be utilised in planning, when applicable models based on empirical research are not available.

3. EXAMPLES OF STUDIES ON THE INCORPORATION OF NON-WOOD BENEFITS INTO FOREST PLANNING: CASE OF UTILISING GAME MANAGEMENT EXPERTISE

The main problem in incorporating game management considerations into calculations of tactical forest planning is the shortage of production functions or other evaluation models that could be used to estimate the priorities of alternative management practices with respect to game populations. This is the case, unfortunately, although much research has been carried out both on the habitats of game species and on the economic evaluation of game.

When models based on objective information are not available, the needs of game populations – shelter, reproduction, food and water, and movement – can be dealt with in planning using expert knowledge. Much expertise has been gathered over the years, both in research and in practical game management. This knowledge is available in the comparison of alternative forestry choices, and as a basis in modelling habitat suitability functions. In order to be applicable in planning calculations, such functions should produce priorities of decision alternatives from the information available on the alternatives in the planning process.

In the following, the steps of a method for elaborating a habitat suitability function on the basis of ecological expertise are presented. After that, some other on-going studies concerning the incorporation of expert knowledge into forest planning are briefly introduced.

The main steps of the process of estimating a habitat suitability functions are as follows:

- a set of experts is chosen;
- material consisting of a set of different forest areas or forest plans is produced;
- the forest areas or forest plans are evaluated by the experts with respect to the game species concerned;
• the relative priority of each area or plan is estimated on the basis of the evaluations; and
• a priority function predicting the relative priority is worked out using the characteristics of the forest areas or forest plans as predictors.

The resulting priority function is a habitat suitability function of the game species in question. It gives the relative habitat suitability indices for alternative forest areas, or the states of a forest area. The use of the function in planning calculations is as simple as using growth models of tree stands.

In step (ii), pair-wise comparisons of the forest areas or forest plans included in the material are carried out. In a comparison situation, the question is which of the two areas or plans compared is better with respect to the habitat needs of the game species, and how much better? The comparisons are then transformed into numerical values. Measurement scales based on verbal comparisons can also be applied. In step (v), priority functions are estimated using regression analysis.

Prior to the comparison process, information is gathered on the needs of the species dealt with. Both theoretical and empirical research are examined, and the chosen experts are subjected to a preliminary interview. This prior information is needed to produce proper material with reasonable variability with respect to the expected priority, and to choose the information to be presented to the experts during the process. Prior information also helps to decide the predictors of the habitat suitability function.

A case study involved working out the habitat suitability function for black grouse (*Tetrao tetrix*) (Kangas et al. 1993). Fifteen experts made the required comparisons separately and independently. The final functions were derived on the basis of average comparison values. The best 2- and 3-predictor models were the following equations:

\[
\ln(\text{HSI}) = -5.832 + 1.038 \ln(\text{Birch}) + 0.041 \ln(\text{Pine})
\]

where HSI is the habitat suitability index; Birch is the proportion of birch in the whole forest area (% of the standing volume); and Pine is the proportion (%) of such stands where the share of pine is at least 40% of the standing volume.

\[
\ln(\text{HSI}) = -9.991 + 0.946 \ln(\text{Birch}) + 1.439 \ln(\text{Height5-15}) + 0.023 \ln(\text{Pine})
\]

where Height5-15 is the proportion (%) of stands in which the mean height of trees (weighted by the basal area) is between 5 and 15 metres; others as in the previous equation.

According to the same basic principles, also functions describing the production potentials of the forest stands with regard to the yields of two wild berries (cowberry and bilberry) were estimated.

In the estimation process, problems can arise due to the great differences in the experts' judgements. This being the case, final evaluation values could be calculated, for example, as weighted means by weighting each expert's judgements with the level of expertise he/she represents (for example, according to the opinions of other experts). Perhaps a more justified way, although not without its disadvantages, is to apply some negotiating and compromise searching methods in order to seek out the convergence of
experts’ views and to eventually achieve consensus (Kangas et al. 1996). For example, the so-called Delphi-technique has been used as a framework in an iterative and interactive process of eliciting expert knowledge.

It can be assumed that models based on expertise are not as reliable as those based on information produced by empirical research. For this reason, expert-knowledge-based functions are only used temporarily until more reliable empirical-studies-based models become available.

Because of the many possible sources of uncertainty that expert judgements and corresponding models contain, it is important to analyse the reliability of the resulting indices and priorities. Studies on this rather complicated task have recently been carried out (Alho et al. 1996). Alho and Kangas (1997) applied techniques of Bayesian statistics in the analysis of uncertainties in experts’ judgements in a multi-objective planning situation. In their case study, the habitat requirements of moose (Alces alces), capercaillie (Tetrao urogallus), and black grouse (Tetrao tetrix) were considered among other objective measures, the priorities with respect to the requirements being estimated on the basis of expert judgements. On the basis of Bayesian analysis, it was possible to calculate, for example, how likely it is for a given forest plan to be better than any other plan being compared.

In the above, examination of non-wood goods and benefits is mainly considered from the point of view of tactical planning of a forest area. Because of the great number of possible combinations of stand-wise treatment schedules, evaluation of choice alternatives should be much automated and routine-like. When applying the methods of strategic planning, such as the widely-used Analytic Hierarchy Process, with a limited number of alternative strategies to be compared, no evaluation models are necessarily required. Instead, experts’ judgements can be made regarding the priorities of choice alternatives (Alho and Kangas 1997).

4. SOME CONCLUDING REMARKS

Research on the issue of integrating non-timber products and values into forest planning has recently been rather vigorous. One of the principal reasons for this has been the acute need for information, methods, models and, techniques required in forestry practice. At least partly due to the same reason, co-operation between researchers and forestry practitioners has often been close. Breakthroughs in non-wood goods and services, landscape ecology, public participation, and multi-objectivity in planning have taken place in today’s forestry.

Fortunately (from the viewpoint of researchers), there remains plenty of research tasks to address concerning the incorporation of non-wood aspects into the comparison of forest management practices, and new ones are still emerging. These tasks include, among others, studying the effects of forest management practices on the yields and values of non-wood goods and benefits, elaborating production and value functions for non-wood products and services, developing methods and techniques for different phases and different kinds of multiple-use planning processes, as well as for controlling
the process as a whole, and making the results of studies applicable in forestry practice.

Public pressure on the multiple-use of forests has increased around the world. Due to the general consciousness of the use and management of forests, public participation in forest planning is often required. This holds true, in particular, concerning forests owned by the State and other public stakeholders. On the basis of experiences obtained in case studies and practical applications of participatory planning, non-wood goods and benefits are strongly emphasised by both interest groups and citizens involved in planning processes. It can be seen that public participation in planning and decision-making will be demanded more and more around the world. Also this feature calls for the development of decision support models, methods, and tools for the integration of non-wood aspects into forest planning.

REFERENCES


CREATING NEW RURAL LIVELIHOODS IN FINLAND: THE ACTION PLAN TO PROMOTE SMALL-SCALE NATURE-BASED BUSINESS

Marjatta Hytönen
Finnish Forest Research Institute
Helsinki, Finland

ABSTRACT

This article gives a short overview of the Action plan to promote small-scale nature-based business in Finland, published in January 1998. The Action plan contains information on 1) collecting, retailing and processing of non-wood forest products, 2) small-scale wood processing, and 3) nature tourism. The emphasis of this article is in presenting the problems found in product development, quality management, marketing and networking. Also problems in taxation and other regulations are discussed. Finally, the information provided by the Action plan is related to other development efforts aiming to support rural livelihoods in Finland.

Key words: Rural policy, non-wood forest products, small-scale wood processing, nature tourism, private entrepreneurs.

1. INTRODUCTION

The Ministry of Agriculture and Forestry of Finland established a committee in 1995 to prepare a development plan for rural areas (Toimiva maaseutu... 1996). One of the decisions made by the committee was to call together a working group to create a more detailed action plan to develop small-scale nature-based private business in Finland. This working group published its report in January 1998 (Luontoyrittämisen toimintaohjelma 1998).

The objective of the working group was to give recommendations:
• to facilitate the creation of new income earning and employment opportunities;
• to improve the preconditions of nature-based business; and
• to remove factors which impede the business.
The working group consisted of 12 representatives of public administration, national-scale interest groups and research organisations. Along the work, the group interviewed 10 experts. In addition, the group received answers to questionnaire interviews from 23 private entrepreneurs or extension workers and from 93 different types of official rural extension organisations. The group elaborated 56 recommendations concerning the above-mentioned issues.

The report contains relevant information from the point of view of the utilisation of non-wood forest products and services. It opens new economic and cultural perspectives in Finland, raises a lot of questions and highlights problems in the field. This article gives a short overview of the contents of the report, a few conclusions, and references to other activities aiming to support rural livelihoods. The emphasis is in describing the factors which impede the business currently.

Most of the information in chapters 2-7 is directly taken from the action plan. If additional information is included, the sources are mentioned in brackets.

2. SCOPE OF THE ACTION PLAN

According to the working group, nature-based business refers to small-scale business which utilises products and enjoyable experiences provided by nature. Typical enterprise forms are the picking and processing of berries, mushrooms, herbs, etc. and the provision of nature tourism activities and programs. “A nature enterprise” is usually a one family firm, which has only one or few workers part-time or full-time.

The working group analyses the present state and problems of the following branches:

1. Collecting, retailing and processing of non-wood forest products: wild berries, wild mushrooms, herbs and other wild grass-like plants, lichen, moss and twigs, peat, forest honey, fish, game and reindeer,
2. Small-scale wood-processing; i.e. firms with less than 10 workers.
3. Nature tourism; especially hunting and fishing services.

Table 1. The estimated monetary value and employment of the main branches of nature-based business (1 USD = about 5.4 FIM in 1998)

<table>
<thead>
<tr>
<th>Branch</th>
<th>Value (mil. FIM/year)</th>
<th>Employment/year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Collected products</td>
<td>1800</td>
<td>9000</td>
</tr>
<tr>
<td>Small-scale wood processing (&lt;10 workers)</td>
<td>2200</td>
<td>4000</td>
</tr>
<tr>
<td>Nature tourism</td>
<td>1100</td>
<td>1700 full time</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1450 part time</td>
</tr>
</tbody>
</table>
3. THE SUSTAINABILITY ASPECT

The working group does not deliberately aim to promote sustainable development, but its approach is based on certain principles which are commonly referred to in present sustainability discussions.

According to the group, nature-based business uses natural resources in a sustained manner and takes care that the environmental impacts of the activities are not harmful. The activities pay attention to the enterprise’s social and cultural surroundings and to the carrying capacity of nature. Nature-oriented business increases people’s knowledge of nature and increases the interaction between people and nature. It strengthens the positive attitudes towards nature and thus increases people’s interest in nature-based opportunities, such as, for example, healthy and safe products.

4. SWOT-ANALYSIS

The working group analyses the strengths, weaknesses, opportunities and threats in nature business. The main strengths and opportunities in Finland include clean, abundant and diverse nature, safe society with good infrastructure and the traditional Public Right of Access. The main weaknesses and threats lie in the undeveloped products, lack of cooperation and social infrastructure favouring big enterprises.

5. PROBLEMS IN PRODUCTION AND MARKETING

The Action plan contains an analysis concerning four key components of nature business: product development, quality management, marketing and networking.

Main problems in product development are
- low level of value-adding,
- lack of financial resources and time,
  - lack of knowledge of customers’ needs, and
  - lack of suitable machines for small-scale production.

Main problems in quality management are
- lack of quality norms and quality assessment criteria for berries, mushrooms and herbs, and
- uneven quality of products.

Main problems in marketing are
- inadequate possibilities to analyse and monitor markets,
- difficulties in finding the right target groups,
- wrong pricing,
- long distances to markets,
- uneven quality of information material,
- lack of financial resources,
lack of cooperation, and
• scattered information: customers do not get all the information they need from one source.

Main problems in networking are
• occasional enviousness, prejudices, negative attitudes and lack of social skills;
• suitable partners may not be found or they are too far away;
• lack of rules of game;
• lack of long-term commitment;
• expert services are too scattered and it may be difficult for the entrepreneur to find the right adviser;
• official development projects may proceed too fast: not enough time to develop mutual trust, too often changing personnel;
• official development projects are not always based on entrepreneurs' needs;
• the cooperation between development workers (e.g. public administrators, educators, extension workers and other developers) aiming to help the entrepreneurs does not always work well;
• the cooperation between the developers may be hindered because of competition to get financing; and
• uncoordinated and overlapping research and development efforts
  • on national level, different ministries carry out unintegrated development projects; and
  • on regional level, various governmental and non-governmental organisations provide uncoordinated services for private enterprises.

The above mentioned problems have been recognised also earlier and various measures have already been taken to solve them. Concrete activities include the work of the Rural Tourism Working Group within the Ministry of Agriculture and Forestry (Rural tourism... 1998) and the Arctic Flavours Association (Welcome to Arctic Flavours... 1998). However, altogether 20 out of the 56 recommendations of the working group concentrate in solving these problems.

6. PROBLEMS IN TAXATION AND LEGISLATION

The working group analyses the present state and problems of the following measures with the help of which society can help private entrepreneurs in
• maintaining basic infrastructure and good living conditions in rural areas;
• providing clear land-use rules;
• taking care of extension services and education;
• producing information, research and development services;
• creating reasonable and simple taxation and juridical systems; and
• providing financial aid to help small-scale enterprises to get started.

The present taxation and juridical systems of Finland have turned out to be very troublesome from the point of view of small enterprises engaged in various different and
seasonal activities. Attempts to improve taxation were also made by an earlier rural policy working group (Rural Policy... 1992). Oksa and Rannikko (1996) state that "...only a few concrete proposals made in the earlier programme have materialised... Proposals regarding taxation and other suggestions to change budget flows were never carried to fruition. In some cases the situation has actually got worse".

The working group on nature-based business defines the following problems in taxation:

- nature-based tourism enterprises often practise many forms of activities which make them subject to various different taxation regulations;
- the products made of wild berries, mushrooms and herbs are more heavily taxed than many corresponding imported products; and
- undefined taxation rules for some natural raw materials.

Problems in other regulations include:

- large amount of permission requirements and announcement obligations;
- changing interpretations of same regulations;
- undeveloped and unclear pension, insurance and social security systems of small entrepreneurs (compared to wage-earning workers); and
- inflexible labour policy rules which are not suitable for seasonal work.

The working group makes proposals to the Ministry of Finance to solve the above mentioned problems. Also the Ministry of Labour, the Ministry of Social Affairs and Health and the Ministry of Agriculture and Forestry are key actors in changing the regulatory systems affecting private entrepreneurs.

7. FOLLOW-UP

The follow-up of the recommendations made by the working group will start by asking comments concerning the action plan from various interest and stakeholder groups (Personal communication with Eeva Karjalainen). Later a task force will be established to develop further the recommendations and to follow their realisation.

8. CONCLUSIONS

The realisation of most of the recommendations of the working group require measures to be taken by the ministries and the local administrations under them. Also research organisations, municipalities and non-governmental organisations as well as the entrepreneurs themselves need to take measures to make the small-scale nature-based livelihoods flourish.

New actors in the rural livelihood administration are the Employment and Economic Development Centres established in 1997 by combining the local organisations of the

The tasks of the Employment and Economic Development Centres include

- providing support and advice to small and medium-sized enterprises in the different phases of their life cycle;
- promoting technological development of companies;
- assisting enterprises with export and internationalisation issues; and
- planning and organising training and education for adults.

The 15 Employment and Economic Development Centres cover many municipalities, and so far it is unclear how much support the small-scale nature-based entrepreneurs will get from them. It is likely that also municipality level services should be developed to help the demand and supply of nature products to meet.

The creation of a relevant and efficient social infrastructure for the practical promotion of nature-based livelihoods in rural areas requires input from various sectors. Recently many positive activities supporting the achievement of the rural development goals outlined in various political contexts have taken place in Finland. These include the various association and networks created by the entrepreneurs (e.g. Welcome to Arctic Flavours... 1998), the increasing social awareness of environmental activist groups (e.g. Depending on trees... 1997), the contributions by forestry research (e.g. Salo 1995), the foundation of the Finnish Journal of Rural Research and Policy by rural sociologists in 1993 (New Rural Policy 1996) and the establishment of the Finnish University Network for Tourism Studies (Finnish University... 1998). Furthermore, the quick spreading of Internet access will increasingly open new opportunities for private enterprises and other organisations in future.

Finally, the various committee reports and action plans produced by the ministries have often been criticised as being impractical and far from real life issues. The recommendations presented in them are often very abstract and on general level. However, they form a valuable part of the discussion on values and objectives of the society. They provide political and administrative legitimisation and recognition for real life activities and can thus serve as encouragement for the actual entrepreneurs and other professionals making their living, for example, in the small-scale nature-based livelihood field.

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COLLECTION OF BERRIES AND MUSHROOMS
BY FINNISH HOUSEHOLDS IN 1997

Olli Saastamoinen, Hanna Aho and Kari Kangas
University of Joensuu, Faculty of Forestry
Joensuu, Finland

ABSTRACT

This paper describes the approach and scope of the first nation-wide study on the collection and use of wild berries, edible mushrooms, herbs and other non-wood resources by the Finnish population.

The study was carried out as a national mail questionnaire during the last quarter of 1997. The sample size was 6849 households. The questionnaire form was divided into four categories according to the major product groups concerned: wild berries, wild mushrooms, wild herbs and the other non-wood forest products. The sample results given here concern only the collection of berries and mushrooms by households living in two forestry districts.

The sample results indicate that the amounts of wild berries collected in North Karelia (Eastern Finland) are significantly higher than in south-west Finland. The total average for all berries was 66.7 litres per household in North Karelia and 19.8 litres in south-west Finland. The amounts of mushrooms collected for household use were slightly higher in south-west Finland but the commercial collecting was remarkably more abundant in North Karelia. The total average for mushrooms collected was 10.8 litres in North Karelia and 9.9 litres in south-west Finland.

Key words: Non-wood forest products, national mail questionnaire, North Karelia, south-west Finland

1. INTRODUCTION

The new strategy for the sustainable use of renewable natural resources in Finland (Ministry of Agriculture and Forestry 1997) lists some of the nature and natural
resources related strengths of the country, which include “diversified game and fish resources as well as wild berries and mushrooms”.

The traditional importance of wild berries and mushrooms is well recognised in Finnish society. There are also statistics, data and expert calculations available about many important aspects of the utilisation of wild berries and mushrooms, so that their overall economic significance can be assessed. It is also well-known that the sustainability of wild berries and mushrooms is nothing but threatened – on the contrary the continuous concern unanimously shared by the public, media, authorities and the researchers has been a heavy underutilisation – e.g. only 10% of common berries and 5% of edible mushrooms is calculated being harvested.

Nevertheless, the fact is that there has not yet been reliable nation-wide inventory of wild berry and mushroom resources. Furthermore, the annual estimates on the utilisation of the resources have mainly been based on interpolation and interpretation of Household Surveys earlier done in five-year intervals. Although the previous household surveys have given valuable information, they have not covered all berry species. In addition, the new annual survey, unfortunately, has a smaller sample size than its predecessors.

Concerning the assumingly increased use of herbs, medicinal and other plants, the situation is even weaker. Nationally, there is only one expert estimate available for one year (Salo 1994). Numerous common household utensils and handicraft materials, etc., obtained from forests, lack even that.

One should also notice that besides national needs, an increasing number of development programmes and strategies are being formulated and implemented at regional or even at municipality levels. Although some earlier regional and local studies have provided scattered base-line data, in general the existing database has been inadequate to meet, for example, the needs of new regional forest strategies being in process in all regional forestry centres.

Obviously, there has existed a need to survey thoroughly the use of berries, mushrooms and other collectable non-wood forest products by Finnish population. This paper briefly describes the approach and scope of first such a study in Finland, carried out as a national mail questionnaire during the last quarter of 1997. The data is currently being stored, but as the research group is trying to get some preliminary data for the use of the regional forest strategies, some preliminary regional results are already available on berries and mushrooms.

The basic aim of this study is to investigate the quantities of berries, mushrooms and other non-wood forest products the Finnish households collected nationally and regionally (and also in a few municipalities) in 1997.

The study is a joint part-project of two ongoing research projects funded by the Academy of Finland. The first project is focusing on the total economic value of forests in Finland. The other is a part of the Finnish Biodiversity Research Programme and has a title “Between subsistence and global markets: grassroot economies, social structures and national policies in sustaining non-wood forest products”. It is a comparative study focusing on Finland, Russian Karelia, Estonia, Laos and the Philippines. Olli Saastamoinen is leading both projects.
2. THE SAMPLE

The sample consists of two sub-samples. The size of the base national sample was 5149 households and it was divided by the previous Finnish counties. The sample allocation was carried out by using in weighing household expenditures on wild berries and mushrooms and income received from commercial collecting of wild berries and mushrooms in each county. Thus it was possible to secure that the sample size will be sufficient in those areas where gathering of wild berries and mushrooms have significant meaning. The sample was divided into Finnish counties as is presented in Table 1.

Table 1. The division of the sample into Finnish counties

<table>
<thead>
<tr>
<th>County</th>
<th>The size of the split lot</th>
</tr>
</thead>
<tbody>
<tr>
<td>Uusimaa</td>
<td>683</td>
</tr>
<tr>
<td>Turku and Pori</td>
<td>676</td>
</tr>
<tr>
<td>Häme542</td>
<td></td>
</tr>
<tr>
<td>Kymen</td>
<td>395</td>
</tr>
<tr>
<td>Mikkeli</td>
<td>300</td>
</tr>
<tr>
<td>North Karelia</td>
<td>338</td>
</tr>
<tr>
<td>Kuopio</td>
<td>300</td>
</tr>
<tr>
<td>Central Finland</td>
<td>300</td>
</tr>
<tr>
<td>Vaasa</td>
<td>334</td>
</tr>
<tr>
<td>Oulu 683</td>
<td>683</td>
</tr>
<tr>
<td>Lapland</td>
<td>598</td>
</tr>
<tr>
<td>Total</td>
<td>5149</td>
</tr>
</tbody>
</table>

In order to get accurate results also at local levels in a few Finnish municipalities, the questionnaire was sent also to 400 households in Joensuu, 300 in Ilomantsi, 300 in Suomussalmi, 400 in Rovaniemi region and 300 in Inari. All these municipalities are located in the areas where the gathering of forest products has above average importance. These particular municipalities were chosen because the are earlier studies from them, thus enabling the possibility of comparisons. The size of the whole sample was 6849. The sample was drawn out from Finnish National Population Register.

3. QUESTIONNAIRE FORM

A major focus of the nation-wide survey was to find out how much people collected forest products for their own use and for sale as well as how much they used time and other resources for collecting activities. In the questionnaire it is also asked how people value the products collected by themselves. The purpose was to find out information of
the products concerned by species. The questions were directed for the whole household thus including the gathering activities of all family members.

The questionnaire was divided to four categories according to major product groups concerned: wild berries, wild mushrooms, wild herbs and the other non-wood forest products. The category “berries” includes nine berry species. The amount of the berries collected only from forests was targeted. Swamps, fells and clearcut areas were naturally included into forests, but, for example, gardens, backyards and fields were not.

The measurement unit was a litre. The berries given to relatives and familiars without payment were included in the “own use” category. It was also important to ask whether the household had collected the products somewhere else than in the families’ own municipality. This gives a possibility to locate the origin of the berries. The questions concerning mushroom are the same, but in addition the treatment of the trade mushrooms was asked.

Two important questions dealt with the collecting trips made by the members of the household. With this question it was attempted to find out the structure of the family (ages, sex) and especially who in the family were collecting the products. The question no. 4 focused on more specific information of the collecting trips: the distance from home or from summerhouse to the collecting place, purpose of the trip (own use, recreation, collecting for sale) and time used for the trip. These questions will be used to investigate the costs of picking and the productivity of typical trips.

The concern of the third group of questions was whether the household had collected wild herbs. Eleven typical forest herbs were given as choices. Own use was assessed in fresh-kg and sold herbs with dry-kg. The purposes of using the products were asked, too. Questions concerning whether the respondent had collected wild herbs somewhere else than in forests and if the household has bought any herb-based products in 1997 were also included.

The fourth group concerned other non-timber forest. For this question the most typical products collected in Finland were chosen: bath whisks, sap, lichen, moss, conifer twigs, knars, cones and flowers. The amount of collecting for own use could be described with own words – the reason was that it was regarded difficult, useless and possibly even misleading to give any standard measurement units for products that are versatile and used in various ways. However, for the sold products the same unit that was used as for trade.

The next set of questions dealt with the selling and buying of non-timber forest products. Questions included: to whom did the household sell the products; what share selling of wild berries had in the total income of the household; and what were the price, with which the respondent would have been willing to collect more for the sale. Also the extent to which the domestic products replace foreign fruits and mushrooms in the households’ use was asked.

The last question concerned the valuation of the self collected products. The focus of interest was whether the own product was regarded as having the same value (price) as the market product or was it regarded higher or lower. Some possible reasons that might have meaning for the collector were given, e.g. the quality of own product was known, collecting had recreational meaning and the respect of own work. It was also directly asked whether the respondent can define how much the chosen reason gives additional monetary value to the product.
4. PRELIMINARY RESULTS

The results for the whole country are not finished yet, but some results for two forestry centres, North Karelia and south-west Finland, are presented here. As all the data has not been stored yet, these results may change in the future.

The collected amounts were considerably higher in North Karelia than in South-West Finland. The collecting of wild berries was also more common in North Karelia, because 83% of households were involved in berry collecting while in south-west Finland only 63% collected berries in 1997. Lingonberry was the most popular berry in both areas. When households in North Karelia collected lingonberries 26.7 litres on average for their own use, the corresponding amount in south-west Finland was only 7.9 litres (Table 2). The total average in North Karelia was 66.7 litres and its over three times higher than in south-west Finland.

Table 2. The amounts of wild berries collected by households for own use in North Karelia and south-west Finland.

<table>
<thead>
<tr>
<th></th>
<th>North Karelia</th>
<th>South-west Finland</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>mean (l)</td>
<td>sum (1000 l)</td>
</tr>
<tr>
<td>Blueberry</td>
<td>23.7</td>
<td>1768.2</td>
</tr>
<tr>
<td>Lingonberry</td>
<td>26.7</td>
<td>2009.7</td>
</tr>
<tr>
<td>Cloudberry</td>
<td>7.3</td>
<td>546.7</td>
</tr>
<tr>
<td>Raspberry</td>
<td>7.5</td>
<td>556.1</td>
</tr>
<tr>
<td>Cranberry</td>
<td>1.0</td>
<td>72.9</td>
</tr>
<tr>
<td>Crowberry</td>
<td>0</td>
<td>3.2</td>
</tr>
<tr>
<td>Bog bilberry</td>
<td>0</td>
<td>1.3</td>
</tr>
<tr>
<td>Arctic bramble</td>
<td>0.1</td>
<td>3.5</td>
</tr>
<tr>
<td>Rowanberry</td>
<td>0.1</td>
<td>9.2</td>
</tr>
<tr>
<td>Others</td>
<td>0</td>
<td>0.4</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>66.7</strong></td>
<td><strong>4971.2</strong></td>
</tr>
</tbody>
</table>

The order of berries in popularity was quite similar in both areas. The total amounts collected were however higher in south-west Finland, simply because it is more densely populated.

In commercial collecting the difference between these two areas was even more clear. A typical household in North Karelia collected 20.1 litres berries for sale, when the corresponding amount in south-west Finland was 2.7 litres (Table 3). The amounts were greatest for lingonberry, 14.2 litres in North Karelia and 1.6 litres in south-west Finland. Blueberry and lingonberry were only wild berries, which had commercial meaning in south-west Finland. The total amount of commercial collecting was almost two times bigger in North Karelia than in south-west Finland.
Table 3. The amounts of commercial collecting of wild berries in North Karelia and south-west Finland.

<table>
<thead>
<tr>
<th></th>
<th>North Karelia</th>
<th></th>
<th>South-west Finland</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>mean (l)</td>
<td>sum (1000 l)</td>
<td>mean (l)</td>
<td>sum (1000 l)</td>
</tr>
<tr>
<td>Blueberry</td>
<td>5.0</td>
<td>375.2</td>
<td>1.1</td>
<td>313.0</td>
</tr>
<tr>
<td>Lingonberry</td>
<td>14.2</td>
<td>1060.3</td>
<td>1.6</td>
<td>479.8</td>
</tr>
<tr>
<td>Cloudberry</td>
<td>0.6</td>
<td>41.9</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Raspberry</td>
<td>0.1</td>
<td>7.1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Cranberry</td>
<td>0.2</td>
<td>12.4</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Crowberry</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Bog bilberry</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Arctic bramble</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Rowanberry</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Others</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>20.1</td>
<td>1496.8</td>
<td>2.7</td>
<td>792.9</td>
</tr>
</tbody>
</table>

Also collecting of wild mushrooms was more popular in North Karelia, but the difference was less significant concerning wild berries. In North Karelia, 56% of households collected mushrooms in the year 1997, when the corresponding rate in south-west Finland was 49%.

Table 4. The amounts of wild mushrooms collected in North Karelia and south-west Finland.

<table>
<thead>
<tr>
<th></th>
<th>North Karelia</th>
<th></th>
<th>South-west Finland</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>mean (l)</td>
<td>sum (1000 l)</td>
<td>mean (l)</td>
<td>sum (1000 l)</td>
</tr>
<tr>
<td>Household use</td>
<td>9.3</td>
<td>695.7</td>
<td>9.8</td>
<td>2851.6</td>
</tr>
<tr>
<td>Commercial</td>
<td>1.5</td>
<td>110.1</td>
<td>0.1</td>
<td>18.3</td>
</tr>
<tr>
<td>Total</td>
<td>10.8</td>
<td>805.9</td>
<td>9.9</td>
<td>2869.9</td>
</tr>
</tbody>
</table>

The amounts collected for household use were, however, higher in south-west Finland, but the difference wasn’t remarkable. Households collected 9.8 litres mushrooms on average in south-west Finland and 9.3 litres in North Karelia (Table 4). However, commercial collecting was more abundant in North Karelia. In south-west Finland the commercial collecting was only 0.1 litres per household. The set of species collected for sale was also more diverse in North Karelia.
REFERENCES


H. Gyde Lund
European Forest Institute
Finland

1. INTRODUCTION

25 experts from the Boreal and Cold Temperate Forest Region participated coming from the countries of Armenia, China, Czech Republic, Denmark, Estonia, Finland, Latvia, Lithuania, Italy, Netherlands, Poland, Russia, and the USA. FAO, ECE, EFI, MAF, Universities, Ministries, and NGOs were represented. Also invited, but unable to attend, were experts from Canada, Germany, Korea, Sweden, Norway, CIFOR, UNIDO, and IFEAT.

Key issues identified during the course of the meeting for further discussion were the following:

• What is the scope for discussion and development?
• All possible NWFP, NWGS? Only ‘tangible’ products, or are ‘services’ also included, and if so, which?
• National level considerations or Boreal Cold Region as a whole?
• Do we include biodiversity as an objective?
• Lack of definitions and standards for reporting and measuring and reporting change (formal and informal).
• Unclear NWFP indicators of sustainable development and damage.
• Unclear information rights.
• Unequal property rights.
• Declining or lack of Interest and incentives for NWFP
• Poor access and unknown markets.
• Lack of production and value estimates and prognosis.
• Communication and co-ordination between donors.
• Lack of tools to plan and manage NWFP.
• Lack of understanding of impacts of development. For every action there is an opposite and equal reaction.
• Should NWFP development be resource driven or market driven?
2. WORK GROUPS

Four work groups were formed to clarify issues inhibiting sustainable development and develop recommendations that will lead to actions as shown in Table 1.

Table 1. Work groups and members

<table>
<thead>
<tr>
<th>Work Group Topics</th>
<th>Work Group members</th>
</tr>
</thead>
<tbody>
<tr>
<td>People and Social Needs</td>
<td>Lelde Vilkriste, Mika Rekola, Marjatta Hytönen, Jiang Chunqian, Rebecca McLain</td>
</tr>
<tr>
<td>Inventory and Assessment</td>
<td>Linda Langner, Roman Michalak, Ludek Sisak, Natalia Demidova, Taimi Paal</td>
</tr>
<tr>
<td>Planning, Management and Harvesting</td>
<td>Paul Vantomme, Jyrki Kangas, Algirdas Rutkauskas, Peter Munk Plum</td>
</tr>
<tr>
<td>Marketing and Trade</td>
<td>Sarah Lloyd, Andrei Zakharenkov, Olli Saastamoinen, Tatu Ollikainen</td>
</tr>
</tbody>
</table>

3. RESULTS

General Recommendations

- Use case studies for developing practical solutions – these can enable researchers to develop and test theories about complex interacting factors affecting NWFP use and management as well as trade and market development.
- Use pilot studies in policy implementation to test how research results could be implemented in practice.
- Focus on dimensions of institutional development (for example, under what circumstances is it helpful to have a lot of industry associations, and under what circumstances is it not helpful?).
- Conduct relevant research and practical development projects linked with each other.
- Produce an analytical framework to help analyse the NWFP sector.
- Promote education and extension activities within all the topics discussed as a means for development. Note: a listing of over 800 forestry education institutions in about 110 countries is available from FAO. See Appendix 1 or <http://www.fao.org/waicent/faoinfo/forestry/free/foedu.htm>. A listing of primarily US universities offering courses in ethnobotany may be viewed at <http://www.siu.edu/~ebl/gradsch.htm>.
3.1 People and Social Needs

3.1.1 Status
NWFP in cold temperate and boreal forests provide important income and domestic use products for a wide range of people and serve as economic buffers for urban and rural people in times of economic hardship. Many NWFPs in this region also are valued for recreational purposes, and in some areas, have religious or other cultural significance. Many NWFPs in the boreal and cold temperate forest region tend to be open access resources, with relative equality in terms of who potentially has access to them. However, there are often inequalities in terms of financial capacities to invest in NWFP related activities, and also in terms of access to credit and information as one goes along the production chain. In some countries, there are labour rights abuses with respect to NWFP harvesters. There still exists in many countries a lot of local and indigenous knowledge which could be maintained and developed. Participation of NWFP user groups in forest planning and management is generally weakly developed. Women, older people, and children are important participants in many areas. Although there are some areas near densely populated areas where over-harvesting presents a problem, in general utilisation rates are low enough that they do not appear to be significantly affecting NWFP reproduction. Finally, NWFPs provide important educational opportunities for people to learn about multi-purpose forestry.

3.1.2 Development Objectives
- Develop NWFP for the benefit of local peoples;
- Develop NWFP in environmentally sustainable manner so as to preserve biodiversity (and cultural diversity);
- Develop NWFP in ways that respect local cultures and social structures.

Sub-objectives:
- Include local people and migratory NWFP user group in policy and planning processes;
- Support infrastructure that increases the profitability of NWFP enterprises;
- Strengthen financing and institutional capacity at all levels along the production and marketing chain;
- Increase economic awareness, financing and institutional capacity at various levels of the production and marketing chain;
- Develop appropriate resource tenure arrangements and fiscal policies; and
- Improve extension of information about NWFP regulations.

3.1.3 Needs
Policy: Interdisciplinary/multi-disciplinary approaches are needed for policy development and research. Consider broad-based participation mandated by legislative measures.
Research: Need for research
- on which existing policies affect NWFP use and management, including non-forest policies such as agricultural and fiscal policies;
that identifies participatory methods that work under a variety of circumstances that are present in the boreal and cold temperate forest zones; and
• that focuses on developing a clearer picture of the cultural and social structures associated with NWFP use and management in the boreal and cold temperate forest zones.

Infrastructure
• Develop extension and education to incorporate NWFPs.
• Develop informational systems for NWFPs.

3.1.4. Recommendations
1. Develop locally available consumer-producer information systems: Local governments working perhaps in collaboration with NGOs and industry associations could develop a system for making knowledge about NWFPs available to both producers and customers. The information could be available both on the Internet and on paper in a local office open to the general public. Information about how and where to obtain products and prices could be included. Samples of the products, or pictures of sample products could also be made available.

2. Develop a forecasting information system: Develop a system of gathering and reporting forecasts of NWFP crops with high season variation in yields, such as berries and mushrooms. One of the aims of the system is to manage NWFPs collection in a sustainable manner, such as to avoid unnecessary crop seeking and damage. Concrete uses of the system would be inventories (see also 2.2.2) which are applied to forecast and dissemination information to newspapers, TV, radio and the Internet. A similar system is already applied by the Finnish Forest Research Institute.

3. Sustainable management of forest berries and property rights institutions: Conduct a case study of NWFP regulations to identify disjunctures between the intent of regulations and how they actually work out in practice. For example, license and permit systems are widely used to gain information. A more reliable system may be the use of surveys. The studies could examine the development of a license or permit system that effectively regulates NWFP collection and create more sustainable management. The change of income/welfare distribution should also be carefully analysed.

4. Develop indigenous/local knowledge summaries and workshop: Local researchers working with local peoples could develop summaries of local/indigenous knowledge on NWFPs for different countries with boreal and cold temperate forests. A series of international workshops could then be sponsored to exchange information about both local knowledge bases and data gathering and analysis methodologies. A partnership of national government funding agencies, NGOs, and community
organizations could be responsible for data gathering and analysis. International education and networking agencies, such as the FAO or EFI could be called upon to conduct the workshop.

3.2 Inventory and assessment

3.2.1 Status
Inventory needs for NWGS include estimating resource potential, resource use, and commercial use. Currently there are few national inventories of non-wood goods, potential product or use in the Boreal/Cold Temperate Forest Region. The few there are usually focus on mushrooms and berries. There are national needs for reporting on and tracking national data for environmental services, carbon storage, threatened and endangered (T&E) species, hunting, protected areas especially since UNCED.

3.2.2 Development Objectives
To improve information about the availability of NWGS at the national and international levels. Goals for resource inventory are for policy development involving forest and resource management and use, economic and trade, social, and land use. Resource inventories and associated monitoring should be used to:

- Assess resource condition and use;
- Identify areas with production potential;
- Identify areas with potential conflicts;
- Source of educational information to public;
- Determine importance of wild versus cultivated production; and
- Fulfil international reporting requirements

3.2.3 Needs
Policy
For policy development in the Boreal/Cold Temperate Forest region we need:

- Surveys non-wood goods
- Common terminology and methodology for national and international reporting
  (have adequate sample methods for human use)

Research
- Life history of non-wood goods
- Sampling methodologies for non-wood goods. Many plants are highly variable in life cycle. Methods may vary for every product

Infrastructure
In most cases, Government organisations already exist, however they may need additional NWFP expertise and visibility at the highest level. There is also need for
national NWFP data base with standards and quality controls common throughout the Boreal/Cold Temperate Region. This could be part of existing inventories and data bases which should be the main source of information.

3.2.4 Recommendations

1. Regionally
   • Develop a workshop on inventory methods for non-wood products – Organisers could be EFI and IUFRO and the meeting held in the summer 1999 for instance.
   • Complete the IUFRO project on common terminology ensuring NWGS are included – IUFRO working groups.
   • Review of TBFRA 2000 results. Identify data gaps and next steps. This could be done at the IUFRO World Congress 2000 and/or an ECE/FAO workshop with country experts 2000 meeting as appropriate.
   • Incorporate information on NWFP into FAO’s Forest Products Statistics. Use the Forest Resource Assessment (FRA) 2000 as starting point.

2. Locally
   • Educate/retrain the appropriate staff in data collection needs and technologies.
   • Improve information and its delivery to forest owners on the management of NWFP and income potential

3.3 Management, Planning and Harvesting

Main focus is on products and goods, however, services are considered when relevant. (For example, hunting where meat is a product, forest recreation activities have impacts on forest management planning and implementing activities).

3.3.1 Status
Status of NWGS management, planning and harvesting in boreal/cold temperate zones is shown in Table 2.

3.3.2 Development Objective
Sustainable development of NWGS and conservation of biodiversity.

3.3.3 Needs
Needs and corresponding recommendations apply to all above described non wood goods in general and cover policy, projects, research, tools, and institutional, funding arrangements. Identified needs include:
   • More public participation (particularly local interest groups and inhabitants). This implies that higher attention must be given to NWGB. Although some starting data, methodologies and tools already exist, they are still not sufficiently accurate and
practical to apply by user/owner groups’ civil service agents (at all levels).

- More research, case studies, networking, exchange of experiences, data and methodologies, etc. (at national and international level among the countries in the region).

- Guidance (including through strengthened extension, owners/users associations, etc.) and tools (guidelines, computer programmes, or others) to assist resource managers, planners and owners.

- Improved technical skills on non-wood goods resource ecology and dynamics and to include these skills as courses for curriculum development at all levels (as well as for training of professional staff of the relevant agencies responsible for resource management, with particular reference to agencies, research institutes and universities in Eastern Europe).

3.3.4 Recommendations

*For research bodies like the European Forest Institute:*

- Identify and recommend appropriate proposals for direct/indirect support/incentives/subsidies/compensations schemes and regulations for multiple use forest management planning for (private) owners (as owners can’t make benefits from berries, mushrooms and most other NWGB collected by others) for their submission to relevant ministries and other relevant agencies to be considered for incorporation into national (or international) forest policies and regulations, in line with the relevant international Criteria and Indicators for Sustainable Forest Management and/or other relevant follow-up UNCED recommendations.

- Co-ordinate a comparative and comprehensive review in the region of the “state of the art” of existing approaches, resource data information systems, technology needs and practices to incorporate effectively non-wood goods (and some benefits) into multiple purpose forest management planning, implementation, monitoring and (participatory) evaluation (including biodiversity conservation considerations as far as applicable to forest management); and based on the outcome of this study, identify gaps and appropriate actions, programmes or projects for submission to relevant donor agencies.
Table 2. Management, planning and harvesting status of NWGS in Boreal and Cold Temperate Zones.

<table>
<thead>
<tr>
<th>NWGS</th>
<th>Management</th>
<th>Planning</th>
<th>Harvesting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flora Goods</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Berries</td>
<td>In general there is no management for berries resources because there is free access to the use of them, therefore private owners do not have interest to promote them.</td>
<td>In general many yield data and practical examples are available but useful yield tables and models are strongly needed in many cases for forestry management plans, e.g. for computer programmes.</td>
<td>Completely unexplored and many data for planning are needed for the hole boreal zone.</td>
</tr>
<tr>
<td>Mushrooms</td>
<td>Same problems as for berries, with little information available on the mushroom resources.</td>
<td>Same, but as less information is available on the resources, the management planning for mushrooms is limited to the incorporation of general statement on NWFP.</td>
<td>Same as above</td>
</tr>
<tr>
<td>Medicinal</td>
<td>In many boreal countries, the users (collectors) and the land owners have different interests, because of many medicinal plants are only known by few specialists, except in the case of some Chinese trees.</td>
<td>As no resource information is available, there is no incorporation of medicinal plants.</td>
<td>Same as above</td>
</tr>
<tr>
<td>Resins</td>
<td>Still possible but for the moment without any economical interest – therefore not considered in management, planning, and harvesting</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lichen</td>
<td>Local importance in Finland ⇒ reindeer husbandry affect management and plans locally</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Peat moss</td>
<td>Lithuania: peat was important earlier but now (almost) stopped (&quot;bogs&quot; situated in nature reserves). (Finland: locally important energy source no relevance to timber management but highly important habitat for cloud berry.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NWGS</td>
<td>Management</td>
<td>Planning</td>
<td>Harvesting</td>
</tr>
<tr>
<td>------</td>
<td>---------------------------------------------------------------------------</td>
<td>--------------------------------------------------------------------------</td>
<td>------------</td>
</tr>
<tr>
<td></td>
<td><strong>Abies nordmanniana:</strong></td>
<td>No evident problems</td>
<td></td>
</tr>
<tr>
<td></td>
<td>In Denmark, very effective management but the widely use of pesticides as well as fertilisers can worry growers, environmentalists as well as the public, the politicians for future restrictions that will stop the production more or less completely. <strong>Other Christmas trees:</strong> No evident problems</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fauna Goods</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reindeer</td>
<td>Considerations of reindeer husbandry (having such great cultural values in Northernmost Finland) are normally taken into account in management and planning to some extent, when necessary. Issue of 'overgrazing' is discussed: key question is how to improve carrying capacity of pastures.</td>
<td>For example, increase rotation cycles to allow more lichen production.</td>
<td></td>
</tr>
<tr>
<td>Game</td>
<td>Fodder assessment is a base for establishing game density levels (very important) and may include “game feeding” plots (open areas in forests) Game issues are well taken into account.</td>
<td>Planning for appropriate wildlife levels will avoid damages to forests. Some cases: different planning for forest timber production and ‘game’ production.</td>
<td></td>
</tr>
<tr>
<td>Services</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Recreation</td>
<td>These are partially and indirectly covered by the management for the above mentioned goods.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Water</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CO₂</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Biodiversity</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
3.4 Processing and marketing

3.4.1 Status

• Processing and marketing of NWFPs are uneven across the boreal and cold temperate regions, however much development is currently on-going.

• Medicinal plant processing is more established and perhaps better documented because of the nature of the product than other NWFP.

• The level of organized industry across the region is not well known.

• Markets are increasing for medicinal and food NTFPs in the region and internationally.

• Regarding processing equipment, China, Central and Eastern Europe have primarily antiquated or older technology. Information and access to newer technologies may not be available in these countries. Small-scale equipment is seldom available on the market or no longer exists. Some pre-processing small-scale equipment (i.e. pressing or drying equipment) is still available.

• The current market has lots of small actors and middlemen.

• Marketing in the countries in transition, as a general concept, has just begun. In the “west” marketing is not a new thing but “natural” and “green” markets are a newer evolution and are expanding. In the former CIS countries, demand for “natural” or “ecologically clean” products usually exists. It is a buyer’s market for raw material.

3.4.2 Development Objectives

• Improve the spread of the natural product sector regionally and internationally.

• Monitor the validity of natural, as well as, sustainable (socially and ecologically) claims.

• Employ appropriate technology for supporting rural communities with long term employm

3.4.3 Needs

Policy
Harvesters need support to ensure better welfare. The regional governments need to support and control regulatory systems of licensing and registration to promote legal trade according to the rules and good for all. Better tracing of product movement and markets to increase monitoring and control of yields. Government participation in monitoring of product claims. Rationalisation of the licensing and registration systems and other regulatory instruments to ease trade and commercial development and logistics.

Research
Lots of research needed in general. More scientific research is needed to back up natural claims made in the market.

Infrastructure
Better distribution of information is needed. In the development of the resource and
products, the role of middlemen need to be scrutinised. Funding needed for processing equipment and marketing. Access to the Internet for small communities can provide valuable access and information on global markets.

### 3.4.4 Recommendations

1. *Create an NGO Boreal and Cold Temperate NTFP Information Network* to collect and supply information on the latest processing technologies and on market realities to assist governments and administrations in policy-making, taxation, legislation, etc. This could be housed in an existing research or information centre in the region.

2. *Relevant international agencies, such as FAO, ITC, etc., create a directory of contacts* from manufacturers of processing equipment and international directory of trade promotional organisations.

3. *Improve business plan development* for enterprises to attract possibilities for joint-ventures. To be carried out by business development programs in each country (either domestic small business promotion programs or foreign aid supported business development programs.)

4. *Relevant agencies, such as FAO, UNIDO, or bilateral sponsors, should promote “twinning” of established NTFP industries* with emerging enterprises in Eastern and Central Europe for information exchange.
EDUCATION INFORMATION SOURCES

Paul Vantomme
Forest Products Division, FAO
Rome, Italy

1. FAO

Information about Forestry Educational Institutions may be found through the FAO at http://www.fao.org/WAICENT/FAOINFO/FORESTRY/ForeData.htm


Hard copies of the two directories are available upon request from:
FAO, Forestry Research, Education and Extension Group
Forest Resource Division

Postal address:
FAO, FORC, Room B362'Viale delle Terme di Caracalla
I-00100 Rome, Italy
Tel: +39 6 5225 4776
Fax: +39 6 5225 5137
Email: FREE@FAO.Org

2. GRADUATE PROGRAMS IN ETHNOBOTANY

List adapted from an SEB Newsletter:
Southern Illinois University Carbondale / Ethnobotanical Leaflets /
URL: http://www.siu.edu/~ebl/gradsch.htm
Last updated: 09-December-97 / du
NOTES:
1) Contact individuals for specific information about programs
2) Please address comments about list (e.g. changes or additions) to: Ms. Trish Flaster, 1180 Crestmoor Drive, Boulder, CO 80303 USA (tflaster@rmil.com).

Dr. David Bates
L.H. Bailey Hortorium
467 Mann Library
Cornell University
Ithaca, NY 14853-4301 USA
+1 (607) 255-3155

Dr. Isabella Abbott (retired)
Botany Department
University of Hawaii at Manoa
3190 Maile Way
Honolulu, HI 96822 USA
+1 (808) 956-8073

Dr. Brent Berlin
Anthropology Department
University of Georgia
Athens, GA 30602 USA

Dr. Richard Ford
Anthropology Department
University of Michigan
Ann Arbor, MI 48109 USA
+1 (313) 764-6177
RFord@Umich.edu

Dr. Walter Lewis
Department of Biology
Washington University
St. Louis, MO 63130 USA
+1 (314) 935-6841

Dr. Michael Balick
Institute of Economic Botany
New York Botanical Garden
Bronx, NY 10458 USA
+1 (718) 817-8763

Dr. Nina Etkin
University of Hawaii
2424 Maile Way
Honolulu, HI 96822 USA
+1 (808) 956-7726
Etkin@Hawaii.edu

Dr. Harold Conklin (retired)
Anthropology Department
Yale University
New Haven, CT 06520 USA
+1 (203) 432-3667

Dr. Hardy Eshbaugh (retired)
Department of Botany
Miami University
Oxford, OH 45056 USA
+1 (513) 529-4200

Dr. Donald Ugent
Botany Department
Southern Illinois University
Carbondale, IL 62901 USA
+1 (618) 536-2331
ugent@siu.edu

Dr. David Lentz
Director of Graduate Studies
New York Botanical Garden
Bronx, NY 10458 USA
+1 (718) 817-8871
dlentz@nybg.org

Deborah Pearsall
University of Missouri
Columbia, MO 65211 USA
+1 (314) 882-3038
Anthdp@MIZZOU1.missouri.edu
Dr. Paul Cox  
College of Honors and Education  
Brigham Young University  
Provo, UT 84602 USA  
+1 (801) 378-3037

Dr. Audrey Bingel  
Program for Collaborative Research in the Pharmaceuticals Sciences  
University of Illinois at Chicago (tflaster@rmli.com).  
833 S. Wood St.  
Chicago, IL 60612-7231 USA  
+1 (312) 996-7253

Dr. Nancy Turner  
University of Victoria  
P.O. Box 1700  
Victoria, BC V8W 2Y2  
Canada  
+1 (604) 721-6124

Dr. Eugene Anderson  
University of California, Riverside  
Riverside, CA 92502 USA

B. Jackes or P. Gorecki  
James Cook University  
Townsville, QLD 4811  
Australia

V.L. Harms or David Meyer  
University of Saskatchewan  
Saskatoon, SK S71-1 OWO  
Canada

Standford Zent  
Instituto de Investigaciones Cientificas
INTRODUCTION

The following presents a collection of Finnish folk beliefs about non-timber forest products. They have been chosen from the Finnish Literature Society's Folk Belief Archives.

ENSURING A GOOD HARVEST

When berry picking the harvester should make a sacrifice to metsänemäntä, the woman spirit of the forest.

Parents would advise children that when out picking for the first time they should place three berries on a rock and remember those who have died.

The first berries picked should be given to the father of the house which would bring good luck in future harvests.

On the first harvest trip of the season you should eat all that you pick that day. This will bring good future yields.

The first harvest trip of the season for bilberries (Vaccinium myrtillus) you should rub them all over your mouth.

You should not pick on Sundays. You will encounter snakes.

If children go picking on Sundays their fingers will get stuck to the leaves of the berry plants and they will be unable to break free.
If you pick on Sundays the berries will disappear.

If you pick on Sundays. You will get lost in the forest and will have to sacrifice your days harvest back to the forest in order to find your way.

Throw your picking basket up in the air. If it comes down upright then you will have a good yield.

If it is windy on Midsummer (the summer solstice) it will be a bad year for lingonberries.

If it is windy on Midsummer there will be no berries.

If it is blowing quietly on Midsummer it will be a good year for berries.

If it is blowing on Midsummer it will be a good lingonberry year.

If the stars are out on Christmas Eve it will be a good year for cloudberries and other berries. If no stars are out then it will be a bad year.

If the stars are out on New Year’s Eve it will be a good year for berries.

If there are a lot of rowan berries on the trees there will be lots of berries in the forests.

If the spruce cones are red there will be plenty of berries in the forest.

Take a stick of alder tree with you and you will not get lost while picking.

The harvester should carve a cross in the bottom of his/her tuokkonen (the traditional birch bark container used for collecting berries) and say “Devil get out of the bottom!”. This will ensure that you do not fall or that the devil will not eat your berries.

Harvesters shouted rhyming incantations before picking, calling for full buckets to ensure a good harvest. For example,

\[
\begin{align*}
Kipparj & \quad Kapparj \\
Mansikoetäätée & \quad Kippis Kappis \\
Korttel täys & \quad Korttel täys
\end{align*}
\]

You have to sneak into the forest when going to pick. If you meet someone on your way you will have no luck with berries.

If you see a Siberian Jay while picking this is a good sign.

Watch for bird droppings. If they are still wet when observed this is a good sign for berries.
WHERE TO FIND THE BERRIES

When approaching the edge of the forest throw your birch bark cap into the air. You should go to pick berries in the direction the cap landed.

Spit in the palm of your hand and then hit your palm with the fingers of the other hand. The direction in which the spit drops land should direct you how to proceed in the forest to find berries.

Take a snail in your hand and follow the direction it walks to find plentiful berry areas.

The direction in which the snail antennae point is the direction you should go to find berries.

Say to the snail “Snail, you carry the cat’s corpse, tell us where the berries are?”

Take a redwinged grasshopper (*Psophus stridulus*) in your hand. Go in the direction it hops to find berries. NOTE: This grasshopper is now an endangered species in Finland.

Take a lizard and say “Sister of my father, where are my berries?”

MUSHROOMS

If Christmas morning is bright with stars it will be a good mushroom year, especially for *Boletus edulis*.

If New Year’s Eve is starry it will be a good year for mushrooms.

If you have the “mushroom eye” (*tatti silmät*) you will always be able to find mushrooms, even in the darkest parts of the forest. If you do not, you will never find them.

HUNTING

If you kill a live bird in your trip with your bare hands you will be stricken with shaky hands.

If you do not kill a trapped animal immediately you will never have good hunting in that area again.

If you take a live trapped bird into your home you will lose your fortune.
## ACRONYMS AND ABBREVIATIONS

<table>
<thead>
<tr>
<th>Acronym or Abbreviation</th>
<th>Meaning</th>
</tr>
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<tbody>
<tr>
<td>ACE</td>
<td>Action for Co-operation in Economics</td>
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<tr>
<td>bil.</td>
<td>Billion</td>
</tr>
<tr>
<td>CBA</td>
<td>Cost-Benefit Analysis</td>
</tr>
<tr>
<td>CIFOR</td>
<td>Centre for International Forestry Research</td>
</tr>
<tr>
<td>CIS</td>
<td>Commonwealth of Independent States</td>
</tr>
<tr>
<td>CV</td>
<td>Contingent Valuation</td>
</tr>
<tr>
<td>CZK</td>
<td>Czech Crown (monetary unit)</td>
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<tr>
<td>CZR</td>
<td>Czech Republic</td>
</tr>
<tr>
<td>DNA</td>
<td>Deoxyribonucleic Acid</td>
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<tr>
<td>EBRD</td>
<td>European Bank for Reconstruction and Development</td>
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<tr>
<td>EEK</td>
<td>Estonian Kroon (monetary unit)</td>
</tr>
<tr>
<td>EFI</td>
<td>European Forest Institute</td>
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<tr>
<td>EPT</td>
<td>Environmental Policy and Technology</td>
</tr>
<tr>
<td>EU</td>
<td>European Union</td>
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<tr>
<td>FAO</td>
<td>Food and Agriculture Organization of the United Nations</td>
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<tr>
<td>FE</td>
<td>Forest Enterprises</td>
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<tr>
<td>FIM</td>
<td>Finnish Markka (monetary unit)</td>
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<tr>
<td>FRA</td>
<td>Global Forest Resource Assessment - next one due for the year 2000</td>
</tr>
<tr>
<td>GATT</td>
<td>General Agreement of Trade and Tariffs</td>
</tr>
<tr>
<td>GIS</td>
<td>Geographical Information System</td>
</tr>
<tr>
<td>GS</td>
<td>Generalised System of Preferences</td>
</tr>
<tr>
<td>GO</td>
<td>Government Organisation(s)</td>
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<tr>
<td>ha</td>
<td>Hectare</td>
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<tr>
<td>HSI</td>
<td>Habitat Suitability Index</td>
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<tr>
<td>ICRAF</td>
<td>International Centre for Research in Agroforestry</td>
</tr>
<tr>
<td>IFC</td>
<td>International Finance Corporation</td>
</tr>
<tr>
<td>IFEAT</td>
<td>International Federation of Essential Oil and Aroma Trades</td>
</tr>
<tr>
<td>INCO</td>
<td>Co-operation with third countries and international organisations</td>
</tr>
<tr>
<td>INTAS</td>
<td>International Association for the Promotion of Co-operation with Scientists from the CIS</td>
</tr>
<tr>
<td>ISIC</td>
<td>International Standard Industrial Classification</td>
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<tr>
<td>ITC</td>
<td>International Trade Centre</td>
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<tr>
<td>ITTO</td>
<td>International Tropical Timber Organization</td>
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<tr>
<td>IUCN</td>
<td>World Conservation Union</td>
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<tr>
<td>JOP</td>
<td>Joint Venture Programme</td>
</tr>
<tr>
<td>kg</td>
<td>Kilogram</td>
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<tr>
<td>LIEN</td>
<td>Link Inter European NGOs</td>
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<tr>
<td>LTL</td>
<td>Lithuanian Litas (monetary unit) Also LTL</td>
</tr>
<tr>
<td>m³</td>
<td>Cubic meter</td>
</tr>
<tr>
<td>MAF</td>
<td>Ministry of Agriculture and Forestry of Finland</td>
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<tr>
<td>MFA</td>
<td>Ministry for Foreign Affairs (Finland)</td>
</tr>
<tr>
<td>MFP</td>
<td>Miscellaneous Forest Product(s)</td>
</tr>
</tbody>
</table>

H. Gyde Lund, Brita Pajari and Minna Korhonen (eds.)
Sustainable Development of Non-Wood Goods and Benefits from Boreal and Cold Temperate Forests
EFI Proceedings No. 23, 1998
<table>
<thead>
<tr>
<th>Acronym</th>
<th>Full Form</th>
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<tbody>
<tr>
<td>mil.</td>
<td>Million</td>
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<tr>
<td>MoF</td>
<td>Ministry of Forestry</td>
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<tr>
<td>NCM</td>
<td>Nordic Council of Ministries</td>
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<tr>
<td>NEFCO</td>
<td>Nordic Environment Finance Corporation</td>
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<td>NGO</td>
<td>Non-government Organisation(s)</td>
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<td>NIB</td>
<td>Nordic Investment Bank</td>
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<tr>
<td>Nopef</td>
<td>Nordic Project Fund</td>
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<tr>
<td>NTFP</td>
<td>Non-timber Forest Product(s)</td>
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<tr>
<td>NTRV</td>
<td>Non-timber Resource Value(s)</td>
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<td>NWFG</td>
<td>Non-wood Forest Good(s)</td>
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<td>NWFP</td>
<td>Non-wood Forest Product(s)</td>
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<td>NWFR</td>
<td>Non-wood Forest Resource(s)</td>
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<td>NWG</td>
<td>Non-wood Good(s)</td>
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<td>NWGB</td>
<td>Non-wood Goods and Benefit(s)</td>
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<tr>
<td>NWGS</td>
<td>Non-wood Goods and Service(s)</td>
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<tr>
<td>OECD</td>
<td>Organisation for Economic Co-operation and Development</td>
</tr>
<tr>
<td>PHARE</td>
<td>Poland and Hungary Assistance for the Reconstruction of the Economy</td>
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<tr>
<td>RAPA</td>
<td>Regional Office for Asia and the Pacific (FAO)</td>
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<tr>
<td>RMB</td>
<td>Chinese yuan renmibi (monetary unit) also CNY</td>
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<tr>
<td>SFP</td>
<td>Special Forest Product(s)</td>
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<td>SIDA</td>
<td>Swedish International Development Agency</td>
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<td>SITC</td>
<td>Standard International Trade Classification</td>
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<td>SME</td>
<td>Small- and Medium Size Enterprises</td>
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<td>T&amp;E</td>
<td>Threatened and Endangered Specie(s)</td>
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<td>TACIS</td>
<td>Technical Assistance to the Commonwealth of Independent States</td>
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<td>TBFRA</td>
<td>Temperate - Boreal Forest Resource Assessment; next due for the year 2000.</td>
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<td>TEMPUS</td>
<td>Trans-European Cooperation Scheme for Higher Education</td>
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<tr>
<td>UN</td>
<td>United Nations</td>
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<tr>
<td>UN/ECE</td>
<td>Economic Commission for Europe</td>
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<td>UNCED</td>
<td>United Nations Conference on Environment and Development</td>
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<td>United Nations Development Programme</td>
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<td>UNEP</td>
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<td>UNESCO</td>
<td>United Nations Educational, Scientific and Cultural Organization</td>
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<td>UNIDO</td>
<td>United Nations Industrial Development Organization</td>
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<td>USAID</td>
<td>United States Agency for International Development</td>
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<tr>
<td>USD</td>
<td>United States Dollar (monetary unit)</td>
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<td>USDA</td>
<td>United States Department of Agriculture</td>
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<tr>
<td>WB</td>
<td>World Bank</td>
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<tr>
<td>WRI</td>
<td>World Resources Institute</td>
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<tr>
<td>WTA</td>
<td>Willingness to accept</td>
</tr>
<tr>
<td>WTO</td>
<td>World Trade Organization</td>
</tr>
<tr>
<td>WTP</td>
<td>Willingness to pay</td>
</tr>
<tr>
<td>WWF</td>
<td>World Wide Fund for Nature or World Wildlife Fund</td>
</tr>
</tbody>
</table>
PROGRAMME

International Workshop on Sustainable Development of Non-wood Goods and Benefits from Boreal and Cold Temperate Forests

Joensuu, Finland
18-22 January 1998

Sunday 18 January 1998

19.30 - 22.00 Icebreaker at the European Forest Institute

Monday 19 January 1998

Session 1. Introduction
Moderator: Risto Päivinen, European Forest Institute

9.00 Welcoming words  
Dr. Ian Hunter, European Forest Institute
9.10 NWFP in the Finnish financed international cooperation  
Mr. Pekka Alhojärvi, Ministry of Agriculture and Forestry, Finland
9.30 Summary of other similar international meetings on non-wood forest products.  
Paul Vantomme, FAO, Italy
9.45 Objectives of this workshop  
Dr. Risto Päivinen, European Forest Institute
10.30 The non-wood forest resources mystery  
Mr. Gyde Lund, USA
11.00 Discussion
12.45 Departure to the excursion - Vinijärvi and ice-fishing
Tuesday 20 January 1998

Session 2. Regional overview of the resource situation and the present status of the utilisation of the major NWFP in the boreal and cold temperate region
Moderator: Risto Päivinen, European Forest Institute

9.00 Non-wood forest goods and benefits of boreal forests: concepts and issues
Dr. Olli Saastamoinen, University of Joensuu, Finland

9.30 Non-wood forest products from boreal and cold temperate forests
Mr. Paul Vantomme, FAO, Italy

10.00 Non-wood goods and benefits in the UN-ECE/FAO Temperate and Boreal Resource Assessment 2000
Dr. Linda Langner, USDA Forest Service, USA

10.30 Non-timber forest products in the cold temperate area of China: the example of Vaccinium spp. Development.
Dr. Jiang Chunqian, The Chinese Academy of Forestry, China

11.30 Main non-wood products importance in the Czech Republic
Mr. Ludek Sisak, Czech University of Agriculture, Czech Republic

12.00 Non-wood forest products in Poland
Mr. Roman Michalak, Forestry Research Institute in Poland

12.30 Non-wood products resources and utilisation in Lithuanian forests
Mr. Algirdas Rutkauskas, Forest Inventory and Management Institute, Lithuania

14.00 NWFP resources and their future in Latvia
Ms. Lelde Vilkriste, Latvian Forestry Research Institute ‘Silava’, Latvia

14:30 Utilisation and research of non-wood products in former Soviet Union
Dr. Taimi Paal, Estonian Agricultural University, Estonia

14.50 Denmark: assessments of NWFP in a densely populated temperate country
Dr. Peter Munk Plum, National Forest and Nature Agency, Denmark

15:20 Non-wood forest products in Finland: statistics, expert estimates and recent development
Dr. Olli Saastamoimen, University of Joensuu and Dr. Jyrki Kangas, Finnish Forest Research Institute, Finland

16.20 Review of non-wood forest production research of the Northern Research Institute of Forestry
Ms. Natalia A. Demidova, Northern Research Institute of Forestry, Russia

16.50 Current developments related to NTFPs in Russia
Mr. Jenne de Beer, Profound, the Netherlands

17:10 Belarus forestry strategic plan and the non-wood forest products
Mr. Tatu Ollikainen, Indufor Oy, Finland

17.20 Group discussion
Wednesday 21 January 1998

Session 3. The impact of the NWFP sector on rural development, environment and forestry
Moderator: Paul Vantomme, FAO, Rome

9.00 The global mushroom trade and other tales from non-timber forest products’ rise to international fame
Ms. Sarah Lloyd, Siberian Forest Protection Project

9:15 Non-timber forest products: treasure chest of the Russian far eastern taiga
Mr. Andrei Zakharenkov, Russian Far Eastern Association, Russia

9:30 International trade and restrictions of NWFP
Mr. Pekka Alhojärvi, Ministry of Agriculture and Forestry, Finland

9.45 Development issues related to marketing of non-wood forest products
Mr. Leo Lintu, FAO, Italy (presented by Pekka Alhojärvi)

10.00 Participatory non-wood forest products management: issues and recommendations from the Pacific Northwest, USA
Ms. Rebecca McLain, College of Forest Resources, Uni. of Washington, USA

10.30 The problem of NWFP ownership: property right analysis
Mika Rekola, University of Helsinki, Finland

11.30 Non-wood goods and benefits and the choice in forest management practices
Dr. Jyrki Kangas, Forestry Research Institute, Finland

12.00 The action plan to promote private nature-based small-scale business in Finland
Ms. Marjatta Hytönen, Finnish Forestry Research Institute, Finland

12.30 Collection of berries and mushrooms by Finnish households in 1997: study approach and sample results
Dr. Olli Saastamoinen, Ms. Hanna Aho, and Mr. Kari Kangas, University of Joensuu, Finland

Session 4. Identification of action proposals / group works

Thursday 22 January 1998

Moderator: Paul Vantomme, FAO, Rome

9.00 Work group reports - Various viewpoints - conclusion of the identification of development of NWGB

10:20 Non-wood forest products (NWFP) in Armenia
Dr. Karen Ter-Ghazaryan, Armenian State Forest Service, Armenia

Session 5. Closing Session
Moderator: Risto Päivinen, European Forest Institute

11.00 Discussion and closing remarks
12.00 Adjourn and Lunch
LIST OF PARTICIPANTS

International Workshop on Sustainable Development of Non-wood Goods and Benefits from Boreal and Cold Temperate Forests

Joensuu, Finland
18-22 January 1998

Mr. Pekka Alhojarvi
Ministry of Agriculture and Forestry
Hallituskatu 3 A
FI-00170 Helsinki
Finland
Tel. +358 9 1602 171
Fax +358 9 1602 266
Email pekka.alhojarvi@mmm.fi

Ms. Marjatta Hytönen
Finnish Forest Research Institute
Unionikatu 40 A
FI-00170 Helsinki
Finland
Tel. +358 9 8570 5744
Fax +358 9 8570 5717
Email marjatta.hytonen@metla.fi

Dr. Jiang Chunqian
Int. Farm Forestry Training Ctr.
Chinese Academy of Forestry
P.O. Box 38
100091 Beijing
China
Tel. +86 10 6288 9093
Fax +86 10 6288 4229
Email jiangchq@caf.forestry.ac.cn

Mr. Jyrki Kangas
Finnish Forest Research Institute
Kannus Research Station
P.O. Box 44
FI-69101 Kannus
Finland
Tel. +358 6 874 3212
Fax +358 6 874 3201
Email jyrki.kangas@metla.fi

Dr. Linda Langner
USDA Forest Service, RPA
P.O. Box 96090
Washington, DC 20090-6090
USA
Tel. +1 202 205 1370
Fax +1 202 205 1546
Email llangner@worldweb.net

Ms. Sarah Lloyd
2516 36th St.
Rock Island, IL 61201
USA
Email slloyd@igc.apc.org

H. Cyde Lund, Brita Pajari and Minna Korhonen (eds.)
Sustainable Development of Non-Wood Goods and Benefits from Boreal and Cold Temperate Forests
EFI Proceedings No. 23, 1998
Mr. Ludek Sisak  
University of Agriculture  
Faculty of Forestry  
Kamycka 129  
16521 Prague 6  
Czech Republic  
Tel. +420 2 2438 3705  
Fax +420 2 325 863  
Email sisak@lf.czu.cz  

Dr. Karen Ter-Ghazaryan  
Armenian State Forest Service  
#35 Moskovian Street  
Yerevan, Armenia  
375002  
Tel. +374 2 53 07 52  
Email root@ktg.arminco.com  

Ms. Lelde Vilkriste  
Latvian Forest Research Institute  
"Silava"  
Riga Street 111  
2169 Salaspils  
Latvia  
Tel. +371 2949 662  
Fax. +371 7901 359  
Email lelde@silava.lv  

Mr. Paul Vantomme  
FAO, Wood and Non-Wood Utilization  
Branch,  
Forest Products Division  
Via Terme di Caracalla  
00100 Rome  
Italy  
Tel. +39 6 5705 4064  
Fax +39 6 5705 5618  
Email paul.vantomme@fao.org  

Mr. Andrei Zakharenkov  
Russian Far Eastern Association for the Use  
of NTFP  
Karl Marx Street 16  
68031 Khabarovsk  
Russian Federation  
Fax +421 338 497  
Email gremline@wf.khabarovsk.ru /  
ntfps@online.fareast.ru
PHOTOS

Participants of the workshop.

During the ice-fishing excursion, fisherman Jari Lehikoinen showed how to set the net under the ice. Risto Päivinen and Karen Ter-Ghazaryan observe.

From the left: Sarah Lloyd, Algirdas Rutkauskas, Ludek Sisak, Risto Päivinen and Paul Vantomme. Seminar co-ordinator Brita Pajari in the foreground.
A sleigh ride on the ice.
Sarah Lloyd checking the catch.
NON-WOOD FOREST PRODUCTS:
LIST OF FAO PUBLICATIONS

"NON-WOOD NEWS"

(Internet address: <http://www.fao.org/waicent/faoinfo/forestry/nwnews>)

- 1 (1994)
- 2 (1995)
- 3 (1996)
- 4 (1997)
- 5 (1998)

NON-WOOD FOREST PRODUCTS SERIES

- Flavours and Fragrances of Plant Origin, 1995 (E)
- Gum Naval Stores - Turpentine and Rosin from Pine Resin, 1995 (E)
- Natural Colourants and dyestuffs, 1995 (E)
- Edible Nuts, 1995 (E)
- Gums, Resins and Latexes of Plant Origin, 1995 (E)
- Non-Wood Forest Products for Rural Income and Sustainable Forestry, 1995 (E)
- Trade restrictions affecting international trade in non-wood forest products, 1995 (E)
- Domestication and commercialization of non-timber forest products in agroforestry systems, 1996 (E)
- Non-wood forest products: tropical palms, 1997 (E) (joint FOPW/RAP publication)
- Medicinal plants for forest conservation and health care, 1997 (E)
- Non-Wood Forest Products from Conifers (in press)

FORESTRY PAPERS

- Non-wood forest products: the way ahead 1991 (E,S,F) (Forestry Paper 97)

WORKING PAPERS

- Produits Forestiers Non Ligneux dans la region Méditerranee, FO:MISC/93/4, 1993
• Non-Wood Forest Products in Indochina - Focus: Vietnam, FO:MISC/93/5, 1993*
• Selected species and strategies to enhance income generation from Amazonian Forests, FO:MISC/93/6, 1993*
• Indigenous Multipurpose Trees of Tanzania: Uses and Economic benefits for People, FO:MISC/93/9, 1993*
• International Trade in Non-Wood Forest Products: An Overview FO:MISC/93/11, 1993*
• Nutmeg and Derivatives, FO:MISC/94/7, 1994

OTHER FAO PUBLICATIONS ON NON-WOOD FOREST PRODUCTS

General

• Unasylva 165, “Non-wood forest products”, Vol.42 1991/2 (E,F,S)
• Forests, Trees and People, (E,S,F) (Forestry Topics Report No. 2)
• More than Wood (E) (Forestry Topics Report No. 4)
• The major significance of ‘minor’forest products: the local use and value of forests in the West African humid forest zone, 1990 (E) (Community Forestry Note 6)
• Forests, Trees and Food, 1992 (E/S)
• Marketing of Brazil nuts, 1992 (E)
• What about the wild animals?, 1995 (E) (Community Forestry Note 13)
• Marketing information systems for non-timber forest products, 1996 (E) (Community Forestry Field Manual No. 6)
• Considering nutrition in National Forestry Programmes, 1996 (E,F,S)

Forestry Papers

• Fruit-bearing forest trees, 1982 (E,F,S) (Forestry Paper 34)
• Food and fruit-bearing forest species, 1986 (E,F) (Forestry Papers 44/1, 44/2, 44/3)
• Some medicinal forest plants of Africa and Latin America, 1986 (E) (Forestry Paper 67)
• Small-scale forest-based processing enterprises (E,F,S) (Forestry Paper 79)
• Small-scale harvesting operations of wood and non-wood forest products involving rural people, 1988 (E,F,S) (Forestry Paper 87)
• Forestry and food security, 1993 (E, S, Ar) (Forestry Paper 90)

Conservation Guides

• Management of vicuña: its contribution to rural development in High Andes of Peru, 1985 (E,S) (Conservation Guide 11)
• Non-timber uses of selected arid zone trees and shrubs in Africa, 1988 (E)
Non-Wood Forest Products: List of FAO Publications 263

- The management of crocodiles in captivity, 1989 (E) (Conservation Guide 22)
- Utilización de la fauna silvestre en America Latina, 1993 (S) (Conservation Guide 25)
- Income generation from non-wood forest products in upland conservation, 1996 (E) (Conservation Guide 30)

Miscellaneous publications - Limited copies available for free distribution

- Influences exercées par les essences à croissance rapide sur les sols des régions tropicales humides de plaine (Forestry Paper 21)
- Espèces fruitières forestières (Forestry Paper 34)
- Ingresos fiscales procedentes de los montes en los países en desarrollo (Forestry Paper 43)
- Essences forestières fruitières et alimentaires - Exemples d’Afrique orientale (Forestry Paper 44/1)
- Food and fruit-bearing forest species - Examples from Latin America (Forestry Paper 44/3)
- Aménagement polyvalent intensif des forêts au Kerala (Forestry Paper 53)
- Intensive multiple-use forest management in the tropics - Analysis of case studies from India, Africa, Latina America and the Caribbean (Forestry Paper 55)
- Les effets écologiques des eucalyptus (Forestry Paper 59)
- Monitoring and evaluation of participatory forestry projects (Forestry Paper 60)
- Seguimiento y evaluación de proyectos forestales de participación (Forestry Paper 60)
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Non-wood goods and benefits are of major importance in the boreal and cold temperate forest regions of the world. Up to now, however, they have received little attention as to how they can be developed and managed on a sustainable basis.

The International Expert Workshop on the Sustainable Development of Non-wood Goods and Benefits from Boreal and Cold Temperate Forests was held at EFI headquarters in Joensuu, Finland to:

- Gain better insights into the resource situation and the present utilisation status of major NWFP in the boreal and cold temperate regions, including their potential, problems and issues involved during their harvesting, processing, trade, and marketing.
- Assess and raise awareness of the importance of NWFP for rural development, the environment (biodiversity conservation), and for sustainable forestry.
- Identify key constraints and possible solutions related to the development of the NWFP sector.
- Provide suggestions and recommendations for actions at various levels to support national/regional efforts for NWF resource management and conservation and for the sustainable development of their products.

These proceedings include the papers given, key findings and final recommendations for developing this important resource.