

Use and Governance of Non-wood Forest Products

in Transition and Market Economies: Case Studies in
Ukraine and Sweden

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Abstract

Globally, forests and woodlands provide a large variety of non-wood forest products (NWFPs) as a resource base for regional and local development in rural landscapes. The role of NWFPs differs in time and space, and is often linked to the socio-economic context. In this thesis I (1) compared how the role of NWFPs is reflected in national policies in two countries in transition and with market economies (Ukraine and Sweden, respectively), and how these resources are used by different forest stakeholders in local landscape case studies in both countries (Roztochya and Småland, respectively); (2) identified the opportunities and challenges of sustainable use of NWFPs for local people in rural landscapes where these resources are very important for local livelihoods (Roztochya in Ukraine); (3) studied the governance of the emerging Roztochya Biosphere Reserve (BR) aimed at sustainable development towards sustainability in order to understand the roles and rights of different stakeholders in the decision-making process concerning NWFPs. Interviews with local forest stakeholders showed that (1) in both countries people have free access to NWFPs in all types of forest ownership; (2) reasons and methods of collection and amounts of harvested NWFPs by different forest users differed much between the Ukrainian and Swedish case studies, (3) traditional practices of NWFPs' utilization were retained and revived in Ukraine, and (4) were no longer economically but rather socially important for local people in Sweden. To study governance of NWFPs I focused on the recently established BR in the Ukrainian case study. Finally, I discuss the role of NWFPs in transition and market economies, respectively, the extent to which sustainable use of NWFPs is supported in national policies, and BR as a tool for social learning and as a basis for implementation of sustainable forest management, including NWFPs.

Keywords: sustainable forest management, biosphere reserve, landscape, forest policy, rural development, natural resource management.

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Dedication

To my family that always support me and my studies and also give me a lot of inspiration.

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List of Publications

This thesis is based on the work contained in the following papers, referred to by Roman numerals in the text:

- I Stryamets, N., Elbakidze, M., Angelstam, P. (2012). Role of non-wood forest products for local livelihoods in countries with transition and market economies: case studies in Ukraine and Sweden. *Scandinavian Journal of Forest Research* 27(1), 74-87.
- II Elbakidze, M., Angelstam, P., Sandström, C., Stryamets, N., Crow, S., Axelsson, R., Stryamets, G., Yamelynets, T. Biosphere reserves for conservation and development in Ukraine? Policy analysis and a case study of establishment. Manuscript.

Paper I is reproduced with the permission of the publisher Taylor & Francis.

The contribution of Nataliya Stryamets to the papers included in this thesis was as follows:

I 80%

II 20%

Abbreviations

NWFPs	non-wood forest products
NTWPs	non-timber forest products
MCPFE	Ministerial conference on protected forests of Europe (now named Forest Europe)
SD	sustainable development
SFM	sustainable forest management
FAO	Food and agriculture organization of the United Nations
BR	Biosphere Reserve
MAB	Man and the Biosphere program
NGO	Non Government Organisation
UNESCO	United Nations Educational Scientific and Cultural Organization
EU	European Union
SLU	Swedish University of Agricultural Sciences
WSSD	World Summit on Sustainable Development
UNCED	United Nations Conference on Environment and Development

1 Introduction

Forests have a huge ecological, social and economical importance at multiple levels. Globally, forest resources and products are fundamental for the livelihoods of a large part of the world's population (FAO, 1999). Forests provide a diversity of non-wood forest products (NWFPs) as a resource base for regional and rural development. NWFPs are defined as goods of biological origin other than wood, derived from forests, wooded lands and trees outside forests (FAO, 1999). Use of NWFPs has a long history as an important component for the livelihoods of people living in and in the vicinity of forest and woodland landscapes (e.g., Wong et al. 2001; Saastamoinen, 1999; Saastamoinen et al., 2000).

NWFPs have provided food, medicine, fiber, energy and other products that sustain local human communities for Millennia. Thus, use of NWFPs by humans has been documented from ancient times. Descriptions of wild fruits and their use have been found in the ruins of Babylon, Carthage, Athens and Rome (Petrova, 1986). Manuscripts of ancient China contain detailed descriptions of various wild fruit plants and recipes using them for nutrition and in traditional medicine (Ryabchuk, 1996). Among the Greeks and Romans, there is a comprehensive description of NWFP in the works of Theophrastus, Cato the Elder, Hippocrates and Pliny Elder (Terletskey, 1985; Petrova, 1986). Presently, estimates indicate that 80% of the population in developing countries uses NWFPs to meet some of their nutritional needs and provide herbal medicine (e.g., Ryabchuk, 1996; FAO, 1999; Malyk, 2006). Additionally, NWFPs have potential to contribute to local livelihoods, providing resources for value-added products such as jams, extracts for medicines, vitamins and antioxidants. Also in developed countries, where locals were dependent on NWFPs in the past, NWFPs often continue to provide important social and cultural values for local households (Kardell, 1980; Janse & Ottitsch, 2005).

Policy-makers, governmental and non-governmental organizations (NGOs) involved with rural development make different efforts to promote new modes of forest resource use, including NWFPs, to support traditional livelihood strategies (Hyde & Köhlin, 2000; Nijnik & Oskam, 2004; Nijnik & van Kooten, 2006; Forest Europe, 2011). During recent decades, NWFPs have attracted considerable interest as an important component of sustainable forest management (SFM) policies (MCPFE, 2003a; MCPFE, 2003b; The Montréal process, 2007; Forest Europe, 2011). SFM aims at combining industrial timber production with multiple uses of forests to increase different forest values for users, owners and local communities that depend on them (Forest Europe, 2011).

In addition to the inclusion of NWFP in international and national policies, implementation of policies on the ground in actual landscapes is needed. To support implementation of SFM as a societal process, and ecological, economic and socio-cultural sustainability outcomes on the ground, many international, national and local initiatives have emerged (see Shindler et al., 2003; Axelsson et al., 2008, 2011; Elbakidze et al., 2010). Biosphere Reserve (BR) is one of several concepts established to create learning sites for sustainable development (SD) toward sustainability on the ground, and to reconcile the conflicts between nature conservation and regional SD (Bridgewater, 2002). BR as a concept applied on the ground has three main functions: (1) a conservation function, i.e. to conserve genetic resources, species, ecosystems and landscapes; (2) a development function, i.e. to foster SD as a societal and collaborative processes; and (3) a logistic support function, i.e. to support research, monitoring, education, training, establishment of demonstration sites, and to promote environmental awareness related to local, national and global issues of conservation and SD (UNESCO, 1995). Thus, a BR could be used as an approach to SD that integrates ecological, social and economical issues (UNESCO, 2002).

A number of studies demonstrate the potential of using NWFPs from natural and managed forest landscapes for rural development (e.g., Godoy et al., 2000; Campos et al., 2005). However, the role of NWFPs for livelihoods of local communities in different societal contexts has not been compared in detail. In particular, there is a lack of comparative studies about the role of NWFPs supporting livelihoods in rural areas in countries with different economic and social-cultural conditions. Ukraine and Sweden are two European countries in different phases of economic development with different systems of nature resource governance and management, and with long histories of NWFPs use.

The aim of this thesis is to identify opportunities and challenges for the sustainable use and governance of NWFPs in transition and market economies, respectively, focusing on local case studies in Ukraine and Sweden. The aim of paper I is to analyze the role of NWFPs for different groups of forest stakeholders in rural landscapes in Ukraine and Sweden in order to define the contribution of these forest resources to local livelihoods in countries with different economic and social-cultural conditions. In paper II the focus is on the governance of local forest landscapes in order to understand the roles and rights of different local stakeholders in the decision-making process concerning use of natural forest resources, including NWFPs, when new initiatives towards sustainability on the ground are appearing, such as the emerging implementation of the BR in the Ukrainian case study. As a part of SFM, studying NWFPs is an applied research topic, which requires methods from multiple disciplines. My approach is thus interdisciplinary (Tress, et al., 2005; Farley et al., 2010; Axelsson, 2010; Axelsson et al. 2011).

2 Research context

2.1 Sustainable forest management

This thesis is put forward in the context of implementing SFM policy on the ground, and focuses on the use and governance of NWFPs in rural areas. SFM is about both sustainability and SD. While the term sustainability has its roots long back in time with the first signs that natural resources of our planet were not endless (e.g., Hunter, 1996; Ramakrishnan, 2001), the SD principle gained world-wide acceptance with the Brundtland report (WCED, 1987). SD is defined as "...development that meets the needs of the present without compromising the ability of future generations to meet their own needs". Since this discourse emerged during the 1980s, a range of international and national policies related to sustainable use of natural resources have been formulated (e.g., MCPFE, 1993; UN, 1992; UN, 2004). The SD principle integrates present and long-term needs at local, regional and global scales, embracing ecological, economic and socio-cultural dimensions of sustainability as interdependent components of societal development progress (e.g., WCED, 1987; UN, 1992; UN, 2004).

One of the Millennium Development Goals (UNDP, 2000) is to maintain all types of the forests in sustainable way, including both conservation and management. SFM policy refers to the management, conservation and use of all types of forests and other wooded lands globally and is defined as having economic, environmental and socio-cultural criteria. To promote SFM indicators are often used as a basis for monitoring and reporting, and norms may be formulated to define a reference for assessment of actual

forest management in relation to policy (Lammerts van Buren & Blom, 1997).

The development of SFM policy is supported by different processes and organizations, taking into account the specific forest conditions in different regions (The Montréal Process, 2007; McDonald & Lane, 2004; Rametsteiner & Mayer, 2004). For example, for tropical forests the International Tropical Timber Organisation is driving the development of SFM policies (Siry et al. 2005). The Montreal Process (MP) develops SFM principles for the temperate and boreal forests of non-European countries (The Montréal Process, 2007); and the Ministerial Conference on Protection of Forest in Europe (Pan-European process) for European countries (Forest Europe, 2011). Over recent decades the general principles of SFM have converged (McDonald & Lane, 2004, Rametsteiner & Mayer, 2004), even if each agreement presents a set of continuously revised specific criteria and indicators to guide SFM policy development and planning in the signatory nations (e.g., Lammerts van Buren & Blom, 1997).

In a Pan-European context SFM was defined as: “the stewardship and use of forests and forest lands in a way, and at a rate, that maintains their biodiversity, productivity, regeneration capacity, vitality and their potential to fulfil, now and in the future, relevant ecological, economic and social functions, at local, national, international and global levels, and that does not cause damage to non-forest ecosystems” (p.1. Helsinki Resolution H1, MCPFE, 1993). The development of criteria and indicators took place at the Helsinki, Lisbon, Vienna, Warsaw and Oslo meetings of ministers from the European Union (EU) and other European countries (MCPFE, 1993, 1995, 1998a, 1998b, 2001, 2003a, Forest Europe, 2011). The Pan-European criteria and indicators provide guidelines for SFM at the national and sub-national levels, and to operationalise and complement the existing definition of SFM (Lazdinis, 2000).

Sustainable management of NWFPs is a component of Pan-European SFM policy. For example, according to the Helsinki resolution (1993), the demand for NWFPs has been increased and encouraged (MCPFE, 1993). The same policy also promotes the cooperation of the forestry sector in developed and developing countries. There are many different terms that correspond to NWFPs, for instance, forest goods, non-timber forest products (NTFPs) (Gubbi & MacMillan, 2008), as well as secondary forest products (Anon, 1996). After the FAO (Food and Agriculture Organisation) conference in 1995 in Indonesia the term was defined and clarified (FAO, 1999). The main difference between NTFPs and NWFPs are excluding the

timber and firewood from the NWFPs definition. According to FAO (1999), NWFPs are grouped into 16 categories (Figure 1). Plant non-wood forest products are classified into 8 categories: (1) food; (2) fodder; (3) raw material for medicine and aromatic products; (4) colorants and dyes; (5) utensils, handicrafts and construction; (6) ornamental plants; (7) exudates and (8) other plants products. Animal non-wood forest products are grouped into the next 8 categories: (9) living animals; (10) hides, skins and trophies; (11) wild honey and bee-wax; (12) bush meat; (13) raw material for medicines; (14) raw material for colorants; (15) other edible animal products and (16) other non-edible animal products.

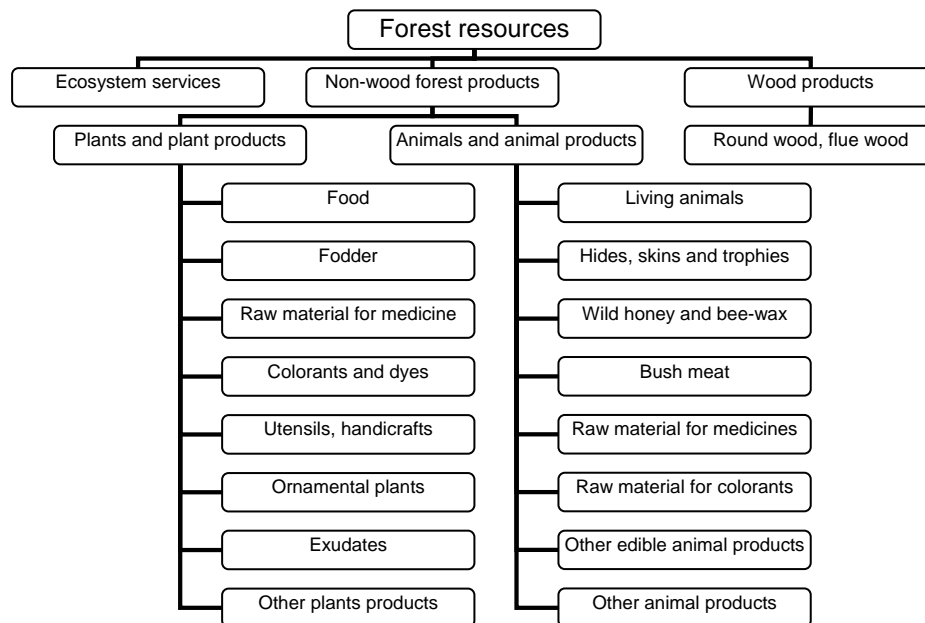


Figure 1. Main renewable forest resources, including non-wood forest products (FAO, 1999).

SFM as a research subject includes the study of how forests as renewable resource can be used for the production of goods such as timber, ecosystem services and biological diversity, taking into account economic,

environmental, social and cultural conditions. The subject of forest management is therefore multidisciplinary, and biological, geographic, technological, statistical and economic theory and methodology is thus applied (Faculty of Forest Sciences, 2010).

2.2 Governance and policy implementation analysis

Policy implementation seldom works exactly as planned, especially when it is performed from a top-down perspective imposing rules and values incompatible with norms and values at the local level (Sandström et al., 2009). The implementation of policies about SFM on the ground aims at reconciling ecological sustainability with economic use of natural resources and socio-cultural development as well as maintenance of cultural values of forest landscapes (Baker, 2006; Neumayer, 1999; Strange & Bayley, 2008). Researchers point at a number of factors such as centralized character of the new policy, vague definitions of or no tradition of public participation, the absence of collective choice mechanisms, lack of conflict management systems, undefined responsibility for the coordination of resources and conflicts related to the ownership structure of the land (Hester & Harrison, 2007).

These factors can all be summarized by the so-called ‘fit/misfit’ hypothesis (Knill & Lenschow, 2000), which is based on the assumption that policy implementation effectiveness depends on the level of correspondence between regulatory patterns at international, national and local levels. If there is a high degree of ‘fit’, policy implementation may be expected to be smooth. A considerable ‘misfit’ or ‘mismatch’ between, for example, in my study the requirements for BRs and existing institutional arrangements at the national level, could create tensions that constrain implementation effectiveness and may potentially lead to conflicts due to different expectations among involved stakeholders. Analysis of conflicts during implementation of policies about sustainability and SD, such as the local use of the BR concept, and management of natural resources, including use of NWFPs, have, for example, also focused on constraints due to lack of information or means to cultural or socio-economic issues when the rationale of nature conservation is contested. Furman et al. (2007) identified four main categories of constraints (Table 1).

Table 1. *Four categories of policy implementation constraints (adapted from Furman et al., 2007).*

<i>Policy constraints</i>	
Social constraints	Process (participation, communication, legitimacy, values, motivations, perceptions and attitudes)
Policy constraints	Knowledge and information Policy options or goals (institutional fit/misfit) Acceptance and legitimacy Policy integration and coordination between levels
Economic constraints	Capital Labour Natural resources (land, water, forests, NWFPs etc.)
Resource constraints	Rarity of habitat, species, ecosystem characteristics

The four constraints are related to social issues, different policy options or goals, economic factors and finally the biophysical conditions of the area. The social issues concern the interaction between different levels of governance and the stakeholders, and to what extent perceptions about the SD process are shared among involved stakeholders. The policy constraints concern the sharing of knowledge and information but also integration and coordination of policy among levels such as compatible legal frameworks or compatible goals at different levels. The economic constraints deal primarily with the use of natural resources and thus often with the conflict between conservation and economic interests.

In this thesis constraints are about to what extent the implementation of a concept, such as BR, influences the possibilities to continue extracting natural resource goods from the area, or if there are alternative possibilities for income such as the development of tourism. The final constraint considers the degree, to which the area needs protection, does it hold specific species, biotopes or cultural values, and how this affects the possibilities for continued to use of the area. These four categories of constraints are useful to assess in order to understand stakeholders' acceptance of the BR on the ground, but also to what extent the implementation of the BR potentially is a source of conflict among the stakeholders involved in the process.

2.3 Landscape as a social-ecological system

The European Landscape Convention defines landscape as “an area perceived by local people or visitors where the visual features and characteristics of the landscape are a result of natural and/or cultural factors” (Anon, 2000a). A landscape can thus be viewed as a geographical area that offers a sense of place to actors and represents a wide range of dimensions including biophysical, socio-cultural and perceived dimensions (e.g., Antrop 2006, Dyakonov et al. 2007). Natural components of the landscape include habitats, species, processes, and social components include cultural heritage and places of historical importance as well as different social organizations which interact in space and time with each other. The landscape as a social-ecological system reflects the need to expand the spatial scale of management, moving from smaller units or objects to the magnitude of landscapes and regions, embracing the micro, meso and macro levels. Additionally, all social organizational scales must be considered, from individual, family, community, region, nation and global levels (Elbakidze & Angelstam 2007).

In this thesis landscapes are understood as socio-ecological systems (e.g., Folke et al., 2005) or coupled human and nature systems (Chan et al., 2006; Liu et al., 2007). Folke et al. (2005) stressed that addressing only the social dimension of resource management without an understanding of resource and ecosystem dynamics will not be sufficient to guide society toward sustainability. Thus, both social and ecological sub-systems, as well as their interactions, must be included in research and practical work with SD towards sustainability (e.g., Folke et al., 2005; Holling, 2001; Lee, 1993; Angelstam et al. 2004, Lazdinis & Angelstam, 2004; Elbakidze et al., 2010; Axelsson et al., 2011), which is consistent with the studies of complex adaptive systems. As a consequence social-ecological systems (e.g., Folke et al., 2005; Berkes & Folke, 1998; Berkes et al., 2000) or landscapes need to be studied using multiple methods, including both quantitative and qualitative ones.

However, it is challenging to understand and deal with this complexity for several reasons that include but are not limited to different traditions among academic disciplines (Tress et al., 2006; Myrdal, 2009), difficulties to fund research that bridges disciplines (Jaeger, 2008) and to mutual limited understanding of researchers’ and practitioners’ conditions (Wickson et al., 2006). Soft systems methodology has developed as a way to support SD processes toward sustainability in complex social-ecological systems (Checkland, 1989; Checkland & Scholes, 1990; Checkland & Poulter, 2006).

The term landscape approach thus captures the need to consider a concrete area for management of material natural resources as well immaterial natural and cultural values, and to include stakeholders in the SD process (Axelsson, 2009; Axelsson et al. 2011).

2.4 Sustainable livelihood as a concept

The Brundtland report (WCED, 1987) introduced the livelihood concept, which has subsequently been developed and improved over time. According to Chambers and Conway (1992) “A livelihood comprises the capabilities, assets (stores, resources, claims and access) and activities required for a means of living: a livelihood is sustainable which can cope with and recover from stress and shocks, maintain or enhance its capabilities and assets, and provide sustainable livelihood opportunities for the next generation; and which contributes net benefits to other livelihoods at the local and global levels and in the short and long term” (p. 6, Chambers & Conway, 1992).

In this thesis I study and analyze the role of NWFPs in livelihoods of rural communities, especially forest-dependent communities. Following Kusel (1996) I understand forest-dependent communities as “those immediately adjacent to forestland or those with a high economic dependence on forest-based industries, including tourism as well as timber” (p. 367). Forest-dependent communities rely on forest resources, e.g. working in forest industry, and also on NWFPs which have seasonal and cyclical yields. The sustainable livelihoods approach seeks to improve rural development policy and practice by recognizing the seasonal and cyclical complexity of livelihood strategies (Allison & Ellis, 2001). To improve rural livelihoods different approaches and initiatives could be applied (Axelsson et al., 2011). In this thesis I analyze the role of NWFPs for rural livelihoods and the ways towards the sustainable livelihoods by implementing different landscape approach initiatives like, for example, BRs (Axelsson et al., 2011). For rural livelihood creation of a BR could lead to improvement of infrastructure, e.g. roads, communications, and to open new market possibilities for value-added ecological products. Tourism development could bring income to the rural areas; however, it demands the entrepreneurship skills and knowledge of the rural inhabitants.

2.5 Case study research

According to the Oxford Dictionary (2012), a case study is (1) a process or record of research into the development of a particular person, group, or situation over a period of time; (2) a particular instance of something used or analyzed in order to illustrate a thesis or principle. Case study research is an appropriate research strategy where a contemporary phenomenon is to be studied in its natural context (Benbasat et al., 1987; Yin, 1994; Darke et al., 1998). It focuses on understanding the dynamics present within single settings (Eisenhardt, 1989). Case study research can be used with different aims, such as to develop a theory, to test a hypothesis or to provide description of phenomenon (Darke et al., 1998, p.275.). According to Yin (2003) case study research can be exploratory, descriptive and explanatory. Exploratory aims include to identify and define the hypothesis and research questions; descriptive case studies aim to do a complete description of the phenomenon; and, finally, explanatory aims at explaining how the events happened (Yin, 2003; Yin, 1994). Case study research methods can be based on a single case study or multiple case studies, and different types of analysis

Case study research can include qualitative or quantitative data collection, or both at the same time (Eisenhardt, 1989) by using different instruments of data collection, including interviews, literature review, observations, and questionnaires. Both Yin (1994) and Eisenhardt (1989) stressed that an investigator is an important tool in the case study research. In Table 2 the case studies of this thesis (see methodology below) are classified according to Yin (2003) and Eisenhardt (1989).

Table 2. *Different case studies presented in this thesis, classified according to Yin (2003) and Eisenhardt (1989).*

Paper	Type of case study	Case studies	Methods
I	Exploratory and descriptive case study	Two countries: Ukraine and Sweden.	Policy analysis In-depth qualitative interviews
	Multiply case studies	Two landscapes: Roztochya and Småland	Field observations
II	Descriptive and explanatory case study	Biosphere reserve initiative in Roztochya	In-depth qualitative interviews Policy analysis
	Single case study		Literature review

3 Methodology

3.1 Countries as case studies

Sweden and Ukraine (Figure 2) were chosen as case studies as both countries have long histories of forest resource use and have joined the Pan-European process in order to implement SFM on the ground. At the same time, there are some differences between Ukraine and Sweden (Table 3). Ukraine is a country with a transition economy and Sweden is a country with a well developed market economy. Differences in these two countries' developments are reflected in the perception of low corruption rates where Sweden ranks number 1 and Ukraine ranks 134 of 158 countries surveyed (Zinnbauer et al., 2009), and regarding democracy, where Sweden ranks number 4 and Ukraine ranks 67 of 167 (The Economist, 2010). Therefore, these two countries are good study areas for my research aimed at understanding the role of NWFPs for livelihoods of local communities in different societal contexts.

3.1.1 Ukraine

Next to Russia, Ukraine is the largest European country covering 603,548 sq. km. Ukraine ranks as the 34th in Europe regarding the proportion of total forest cover and 9th in total forest area (Soloviy & Cabbage, 2007; Buksha et al., 2003). By contrast, according to historic data, the natural and thus potential forest and woodland cover in Ukraine has been estimated to about 43% (Gensiruk, 1992), i.e. much higher than today (Table 3). Forests range from mixed hemiboreal and broadleaf forests in the north, to steppe-forest woodland and steppe in the south. The forests in the Carpathian Mountains range from temperate and mixed forests to forests with a boreal character at higher altitudes close to the tree line. In

Crimea's mountains the forests range from Mediterranean shrub to broad-leaved and coniferous forests (Gensiruk, 1992). The forest cover in different regions varies from 3.8% in the steppe zone to 40.2% in the Carpathian Mountains. The majority of forests are concentrated in the northern and the western parts of Ukraine. Conifers occupy 42.6% of the forested area, with the main species pine (*Pinus silvestris*) being dominant with 36%. Deciduous forests cover 57.4% of the total forested area, with beech *Fagus sylvatica* and oak *Quercus robur* comprising 33% (Nilsson and Shvidenko, 1999).

Table 3. *Ukraine and Sweden as case study countries (Anon, 2004; Anon., 2011; Statistics Sweden, 2011)*

	<i>Ukraine</i>	<i>Sweden</i>
Total area	603,548 sq.km.	450,295 sq.km.
Forested area, %	15.6 %	60.3 %
Forested area, ha	9.5 million ha	22.7 million ha
Forest ownership	State, common	Private 52%, companies 23% and other 25%
Forest access	Free	Free
History of forest use	Long	Long
Population	45.6 millions	9.4 millions
Rural population	~ 31 %	~ 15 %

Ukraine is in a transition from a planned socialist economy to market economy, which has been accompanied by political and economic crises during the last decade (Nijnik & Oskam, 2004; Nijnik & van Kooten, 2006; Angelstam & Elbakidze, 2009; Elbakidze & Angelstam, 2009). During this difficult transition period, many people in forest-dependent communities revived their traditional subsistence farming and forest use to maintain their livelihoods (Bihun, 2005; Elbakidze & Angelstam, 2007, in press). NWFPs thus continue to be a part of the livelihood (Bihun, 2005; Malyk, 2006).

To promote sustainability of forest and woodlands on national as well as regional and local levels, Ukraine has joined processes of developing and implementing SFM principles. The strategic objectives of the Ukrainian national forest legislation are oriented towards sustained yield forestry, maintenance of forest biodiversity and socio-cultural values of forests (Anon., 2006). Ukraine has signed the 17 resolutions of the Ministerial Conferences on Protection of Forests in Europe (Anon., 2004).

3.1.2 Sweden

Total area of Sweden is 40.8 million hectares, including 22.5 million hectares of forest land (Anon., 2011). Forests range from the nemoral region of the south, across the hemi-boreal region and to the boreal region in the north (Nilsson, 1997; Gustafsson, 2000). Dominated forest type in Sweden is pine forest which covers 38% of Sweden's productive forest area next other important forest types are spruce forest (27%), mixed coniferous forest (15%) and deciduous forest (6%) (Anon., 2011).

Production forests differ considerably from natural forests with more even-aged stands, less dead wood, and fewer old trees and deciduous trees (Gustafsson, 2000; Angelstam et al. 2004). The natural forests occupy 10-20 % of Sweden's productive forest area (National Biodiversity Strategy and Action Plan, 2006). The distribution of productive forest land by ownership classes are 50 % individual owners; 25 % private owned companies; 14 % state owned companies; 6 % other private owners; 3 % state and 2 % other public owners (Anon., 2011).

Sweden has a well developed market economy. Here, urbanization has increased the disconnection between people and natural resources, and reduced their use of NWFPs (Kardell, 1980, Laird et al., 2010). Nevertheless, intensification and modernization of natural resource use has resulted in depopulation of rural areas in both countries (Bryden & Hart, 2004; Government Offices of Sweden, 2008).

Sweden has a long history of gradual development of policies aiming at sustainability in terms of sustained wood yield (e.g., Hagner, 2005; Enander, 2007) and biodiversity conservation (SEPA, 2005). The Swedish national forest and environmental policy objectives include maintenance of sustained wood production capacity and conservation of viable populations of all naturally occurring species (Swedish Forestry Act, 1993; Boström, 2002; Eriksson & Hammer, 2006). Recent forest policy documents (e.g., Anon., 2007/08) confirm this development and stress focus on sustained and increased wood production, as well as ecological and socio-cultural sustainability.



Figure 2. Location of Ukraine and Sweden in Central and Northern Europe.

3.2 Landscape case studies

3.2.1 Roztochya (Ukraine)

This case study area is located in the western part of Ukraine and eastern Poland, and forms the watershed between the Baltic and Black Sea catchments. The Ukrainian part of Roztochya is situated in the temperate lowland forest ecoregion in western Ukraine, and covers 992 sq. km (Figure 3). It is an important green infrastructure that forms a corridor for biodiversity and cultural heritage across the Eastern European Union border. The Roztochya landscape holds high natural and cultural values (Stryamets & Danchuk, 2007). Forests cover about 44% of the total area,

and the rest is made up by agricultural land, cultural woodlands and villages. The forest types are very diverse ranging from dry sites with Scots pine [*Pinus sylvestris* (L.)] to mesic sites with beech [*Fagus silvatica* (L.)], and wet sites with ash [*Fraxinus excelsior* (L.)] and black alder [*Alnus glutinosa* (L.)] (Stryamets & Ferenc, 1999; Stryamets & Danchuk, 2007). The villages are generally traditional with a gradient from houses with gardens, in-fields used for growing food or as orchards, agricultural crops and hay production, and out-field pastures and grazed forests (e.g., Elbakidze & Angelstam, 2009).

The area hosts many different stakeholders, which have the right to use forest and woodland resources for commercial, nature conservation and domestic purposes. The population density is about 80 persons per sq. km (Anon., 2008b). There are 120 settlements in Roztochya with 59,922 inhabitants (Yavorivskiy and Zhovkivskiy rayons). There are also 8 state forest management units, which are under the management of different governmental organizations, including the State Forestry Committee, Ministry of Defence and Ministry of Agriculture, Ministry of Education and Science. In addition, there are two protected areas, Yavoriv National Nature Park and Roztochya Strict Protected Reserve, which are under the management of Ministry of Environmental Protection and Ministry of Education and Science, respectively.

During the Soviet period (1917-1991), sulphur mining formed the base for the economy in the Roztochya region, and more than 20,000 people, locals and incomers, were employed by the mining industry. In the villages within the region, collective agricultural farms were the main employers for local people. After the collapse of the Soviet Union in 1991, the mining industry was closed and, as a result, people lost employment. The collective farms that were created during the Soviet period were reorganized into small-scale farms or were abandoned due to the new political and economic development towards market economy. Unemployment is still a main problem in the area.

To support the process of SD toward sustainability in Roztochya there are ongoing efforts to develop the Roztochya BR. Different types of landscape actors in the area are developing partnerships to integrate their efforts to use forest and woodland landscapes in a sustainable way. The BR consists of three management zones with different regulations and restrictions concerning nature conservation and use of forest landscapes. There is a core zone (3.9% of the BR area) with strict restrictions to any human activities; a buffer zone (5.4%) with protective functions, and where tourism and recreation activities are allowed by following the strict

regulations; and finally a transition zone (90.7%), which provides a smooth transition to the surrounding and where adapted economic and socio-economic development functions are planned to take place (Figure 3, 5).

3.2.2 Småland (Sweden)

The Swedish case study area is located in the central part of Småland, an upland area in southern Sweden (Figure 4), the core of which forms the southernmost larger island of boreal forest in Sweden and is dominated by Scots pine and Norway spruce [*Picea abies* (L.) Karst.]. Toward the south is a gradual transition to hemiboreal and the northernmost part of the temperate lowland deciduous with beech. Today's forest-dominated landscapes have a very long history of animal husbandry and farming (Lagerås, 1996, 2007). Forests were grazed, and near villages there were dry and wet meadows, fields and gardens. The best soils were cleared for agricultural use, a process that started 6200-3800 BC in this part of Sweden (Johansson 1999). Already more than 2000 years ago (Johansson 1999), human use developed to a traditional village system that shaped over the years with high natural and cultural values (Berglund et al., 2002). During the second half of the 20th century, grazed mixed deciduous and coniferous forests were transformed into production forests by introduction of Norway spruce plantations and gradual development of sustained yield forestry (Björkman, 1996; Bradshaw et al., 2000).

Private landowners are key local stakeholders in the social system governing the economic use of forest resources. Non-industrial private forest owners own 80-85% of the forests in the study area (The Swedish Forest Agency, 2010). The other main forest owners are the state forest company Sveaskog, municipalities, and the Swedish Church. The Swedish study area encompassed 22 parishes (Norra Sandsjö, Sävsjö, Vrigstad, Hjälmeryd, Stockaryd, Vetlanda, Ramkvilla, Södra Solberga, Korsberga, Lanna-Skede, Nottebäck, Växjö tätort, Sjösås, Drev, Tjureda, Söraby, Tolg, Asa, Aneboda, Berg, Ormesberga, Ör) with a total area of 1792 sq. km, and an average population density of 53 persons per sq. km, but with only 13 per sq. km in rural parishes without towns. The population trend is negative, especially in rural areas which host 26% of the population (Statistic Sweden, 2011). Nevertheless, unemployment rates are lower than the Swedish average.

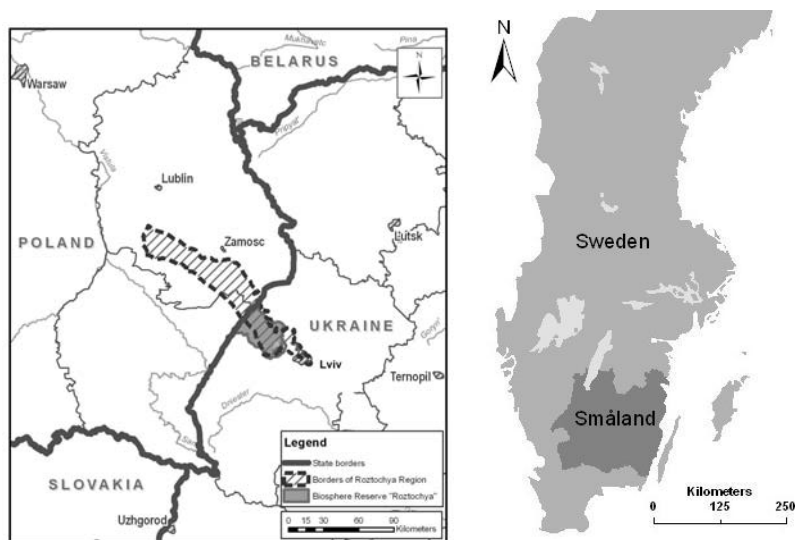


Figure 3. The Roztochyia region is situated across the border between Poland and Ukraine (left) and Småland is situated in southern Sweden (right). The main similarities of the two case studies lie in the strong historical use of forest resources. The other similarities are predominating rural residents in the areas, high percentage of forest cover.

3.3 Methods

To work with complex issues such as implementation of SFM in landscapes as integrated socio-ecological systems requires multiple methods (Flood & Romm, 1997; Folke et al., 2005; Axelsson, 2009; Farley et al., 2010; Axelsson et al., 2011). Studying SFM policy and sustainable use of NWFPs and its governance requires use of methods from natural and human sciences. The methods applied in this thesis include (1) analysis of official policy documents, (2) comprehensive literature review, and (3) qualitative interviews with stakeholders. I analysed global, international and national forest policy documents, as well as management regulations concerning use of forest resources in Ukraine and Sweden (Paper I). A comprehensive literature review about NWFPs, management of forest resources, rural development and governance preceded the interview manual development and the field work (Paper I and Paper II).

For Paper I I did qualitative semi-structured interviews (Kvale, 2007; Kvale & Brinkman, 2008) with local forest stakeholders in my study areas in spring and summer 2010. An interview manual was developed that included a mixture of open-ended and closed questions. The collected data

contained information about: (1) the type of harvested NWFPs; (2) the volume of collected NWFPs and methods, (3) ways of its utilization, including traditional practices, and (4) information about the collector (age, gender and community background) (see Annex). Due to the confidentiality as one of the most important ethical concerns of the qualitative research interviews, no names were recorded. Each interviewee was given full freedom to talk about the subject and during the interviews additional questions appeared. The interviews were taken with different groups of stakeholders including villagers in settlements with different population size located at different distances to the forest; managers of forest enterprises; and managers of protected areas in my study areas. Interviews in Roztochya were done in Ukrainian by myself, and in Småland in Swedish with the assistance of an interpreter.

In total 54 interviews were taken in 26 settlements in Ukrainian Roztochya and 60 interviews in 36 settlements in Swedish Småland. The interviews took 20-60 minutes. All interviews were digitally recorded, transcribed and analyzed for emergent themes related to NWFP utilization and practice. The gender distribution of the sample in Roztochya was 55% females and 45% males. The Ukrainian population gender distribution was 54% women and 46% men (Anon., 2008b). The gender distribution of the sample in Småland was 53% females and 47% males. The gender ratio of the Swedish population is 50% women and 50% men (Statistics of Sweden, 2011). The survey differentiated among four categories of age. In Roztochya, 6% of the respondents were 16–25 years old, 43% were 26–50 years old, 36% were 51-65 years old, and 15% were 66 or older. Children were not included in the investigation. In Småland, 18% of the respondents were 16–25 years old, 42% were 26–50 years old, 25% were 51-65 years old, and 15% were 66 or older (see Figure 4). In order to understand the system of governance of NWFPs in the Roztochya case study, BR development in the area was studied. Thus, a qualitative research approach was chosen (Paper II). Interviews for Paper II were done in 2009-11.

The goal was to analyze the perception of the emerging BRs initiative by different stakeholders, and to identify local forest stakeholder's rights in the process of the BR development. Semi-structured interviews with open ended questions were conducted (Kvale, 2007; Kvale & Brinkman, 2008) with the key informants in the study area. These informants represented the following groups: (1) promoters of the BR initiative, (2) leaders from the village communities within the proposed BR's boundaries, and (3) forest managers from the state forest enterprises and managers of protected areas located in the study area. Promoters of the BR initiative included those

individuals that promoted the BR idea in Roztochya, and were involved in the discussions with local stakeholders about the importance of local BR establishment. Informants from this category included researchers, managers of protected areas and leaders of local and regional administrations publicly promoting the proposed BR (8 informants).

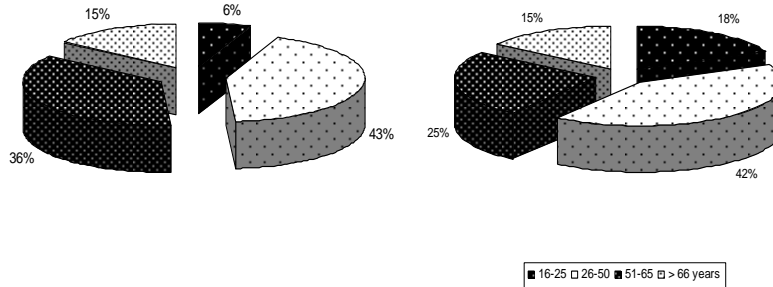


Figure 4. Age distribution of the respondents in Roztochya (left) and Småland (right).

To identify the informants from this group I used snow-ball sampling (Biernacki & Waldorf, 1981) until no additional interviewees were identified. Leaders (group 2) were the heads of all ten village communities within the borders of core and buffer management zones (zones where the limitations on nature resource use, including NWFPs, might be introduced after establishment of BR) of the proposed BR. Their role in the BR development process was to explain the BR initiative to villagers at numerous meetings. These informants were asked to discuss both their own private perspectives and those expressed by villagers in their respective communities at numerous meetings concerning the development of BR initiative (10 informants, which forms the total population possible to interview in this group). Finally, forest managers from each of all the state forest enterprise in the case study area were interviewed (5 informants) as well as the directors of Yavoriv National Nature Park and Roztochya strict protected reserve (2 informants) (group 3). In 3 village communities, the interviews were supplemented by focus group discussions with villagers attending public meetings about the proposed BR creation. Interviews lasted up to 2 hours, were recorded digitally and transcribed. Through a line-by-line revision of transcripts, the main motivations and perceptions of BR establishment were identified.

4 Results

4.1 Policy documents and management regulations concerning NWFPs

4.1.1 International policy documents

NWFPs have received increasing attention in SFM policy regarding their potential as resources for rural development and efficient forest resource use (Chandrasekharan 1993, 1995; Janse & Ottitsch, 2005; FAO, 2002; Ticktin, 2004). At the United Nations Conference on Environment and Development (UNCED) in 1992 in Rio de Janeiro it was declared that the promotion of and use of NWFP is an important part of SD (UNCED, 1992). Sustainable management of NWFPs is a component of SFM principles according to international policy documents (see Table 4), such as, for example, MCPFE resolutions. Following the Helsinki resolution (MCPFE, 1993) the interest of and demand for NWFPs is increasing in Europe and should be encouraged as a part of SFM (Anon., 2008a; Forest Europe, 2011). To promote SD toward sustainability of forests management on national as well as regional and local levels, both Ukraine and Sweden have joined the Pan-European process of developing and implementing SFM principles (Anon., 2004; MCPFE, 1993 Siry et al., 2005).

Table 4. *International and national policy documents concerning NWFPs.*

EVENT	CONCERNING NWFPs
<i>International level</i>	
United Nations Conference on Environment and Development (UNCED) (Rio de Janeiro, 1992)	Forest Principles; Sustainable forest management conception
World Summit on SD (WSSD) (Johannesburg, 2002)	Social-cultural functions of the forests
<i>European level</i>	
2nd Ministerial conference MCPFE (Helsinki, 1993)	Helsinki resolution H1 i H2: definition of SFM; Pan-European criteria of SFM
3rd Ministerial conference MCPFE Lisbon, Portugal, 1998	Resolution L2 and L2: encourage productive functions of forests (wood and non-wood)
4th Ministerial conference MCPFE (Vienna, 2003)	35 new indicators, including use of NWFPs
5th Ministerial conference MCPFE (Warsaw, 2007)	Highlighted the importance of NWFPs investigation
Forest Europe (Oslo, 2011)	The reported value of marketed NWFPs
<i>National level</i>	
Forest Code of Ukraine (Kiev, 2006)	Secondary forest products
Resolutions of Cabinet Ministers (Kiev, 1996)	Resolution on the harvesting of forest materials and secondary forest products
The Swedish Forestry Act (Stockholm, 1979, 1992/1993)	Social considerations (include berries and mushrooms picking).
The Swedish Environmental Code (Stockholm, 1998, 2000)	Promotion of SD

In the Resolution L2 (MCPFE, 1998a), criterion 3 is to maintain and encourage different productive functions of forests, which include both

wood and non-wood products. The descriptive indicators of criterion 3 require the development of management plans for NWFP (MCPFE, 1998a, 1998b). At the 4th Ministerial conference in Vienna criteria and indicators were added with the aim to increase benefits of rural livelihoods from forests (MCPFE, 2003a; Rametsteiner and Mayer, 2004) and included values and quantity of non-wood goods from forests and other wood lands (Rametsteiner and Mayer, 2004). Vienna Resolution 2 highlighted the importance of promoting the use of both wood and NWFPs (MCPFE, 2003a, 2003b).

According to MCPFE (1998) one of the criterion is maintenance and encouragement of productive functions of forests both wood and NWFPs. Similarly, the Montreal process criteria and indicators for the conservation and sustainable management of the temperate and boreal forests describe non-wood forest resources as important parts of SFM (Criteria 2 and 6, indicators 2.5; 6.2; 6.6).

Thus, sustainable management of NWFP is important and could potentially provide resources for rural development (MCPFE, 1998b). This includes social-cultural, ecological and economic dimensions. NWFP and their value-added processing have attracted considerable interest as a component of different development projects in recent years due to their potential ability to support rural livelihoods (Arnold & Perez, 2001; Angelstam & Elbakidze, 2009). The economic value of NWFPs and services provided by forests has been increasing, but often they are not marketed. In some European regions, NWFPs and services provide more revenue than wood sales (MCPFE, 2007a; Arnold & Perez, 2001; Turtiainen & Nuutinen, 2011). The total reported value of marketed non-wood goods amounts to EUR 2.7 billion and has almost tripled since the 2007 assessment of MCPFE (Forest Europe, 2011). However, there are still many challenges to balance production of wood as still economically the most important function of forests and the increasing demand for NWFPs from the European forests (MCPFE, 2007a).

4.1.2 Ukrainian policy documents and management regulations

The strategic objectives of the Ukrainian national forest legislation are oriented towards sustained yield forestry, maintenance of forest biodiversity and socio-cultural values of forests (Anon., 2006; Stryamets et al., 2010a; Stryamets et al., 2010c). Ukraine has joined the process of developing SFM principles, which have been adopted into the national legislation and forest programs. In Ukraine legislative frameworks of

forests and forest resource management are formulated in the Forest Code of Ukraine (2006), the Law on the Environmental Protection of Ukraine (Anon., 1992), and other legislative documents and governmental regulations that play a role in developing environmentally sound forest operations. While analyses of the forest policy and its implementation in terms of policy instruments and institutions in Ukraine indeed shows an orientation to SFM, there are many obstacles to implement it on the ground in actual landscapes.

In Ukraine, the main trend in forest policy development has been to provide a balance between the conservation of forest ecosystems and sustainable multi-purpose use of forests (Stryamets et al., 2010a, 2010c). Forest management should be conducted according to the Forest Code (2006) and within the framework defined by the State Program “Forest of Ukraine in 2010-2015” (Anon., 2009). The Forestry Code of Ukraine (2006) consists of 110 articles; however, only four of them have information about NWFPs (Stryamets et al., 2010c, 2011). Additionally, there is neither full explanation about what kinds of non-wood products those are included into this category, nor how they should be managed. The direct use of NWFPs includes harvesting of hay, grazing, wild fruits, nuts, mushrooms, berries and medical herbs (Anon., 2006). Hunting is not included into the NWFPs definition and is treated separately by a specific law on hunting regulation of Ukraine (Anon., 2000b). The collection of NWFP for private needs in state and community forests is free for everyone, including foreigners. According to the Forest Code of Ukraine, in private forests, local people have to secure a permit for harvesting of NWFPs from the owner (Anon., 2006). The private ownership for forests had not developed yet in Ukraine, but there process of privatization had started. Collection of NWFPs for sale is called “special use of NWFPs” (Anon., 2006). Commercial collection of NWFPs by a private person or a company requires a special permit and the collector has to pay to the forest owner or leaser (Anon., 2006).

The State Program “Forests of Ukraine during 2010-2015” (Anon., 2009) is based on the MCPFE criteria and indicators, and defines the guidelines for forest management towards SFM in Ukraine. The state forestry enterprises are obliged to protect forest wood and non-wood resources from illegal or harmful collection by people. Collection of NWFPs (termed in Ukrainian legislation secondary forest products) in managed forests should be done without harming forest ecosystems (Anon., 1996). Medical herbs and mushrooms which are listed in the Red Data Book of Ukraine (Anon., 1996; Red Data Book of Ukraine, 2009) are not

allowed for harvesting, not even parts of the plants or mushrooms. There is a list of species that are endangered but may be collected under strict guidelines. For these, a special ticket for picking must be purchased from the forestry enterprise. Harvesting of plant parts and berries is allowed if the berries comprise more than 10% of the ground cover in the forest and the ground cover of medical herbs more than 5% (Anon., 1996). The requirements concerning harvesting of medical herbs also include regulations about the parts of herbs which could be collected. For example, less than 10% of roots and 40% of leaves from the plant are allowed to harvest.

There are many restrictions for harvesting of NWFPs from protected forests in Ukraine. It is forbidden to collect NWFPs in strictly protected reserves (Anon., 1992). In national nature parks, collection of NWFPs is prohibited in the management zone of strict nature protection. However, it is allowed in the management zones for tourism and recreation, where tourist facilities are located and where local people conduct their land use activities. There are restrictions in Ukraine related to hunting, and the hunting organizations are responsible for providing licenses to hunters. Hunting organizations also protect animals from illegal hunting and take care of game during the winter season by feeding wild animals. Hunting of different game species is allowed during specific seasons of the year (Anon., 2000b). It is forbidden to hunt Red listed species in Ukraine (Red Data Book of Ukraine, 2009).

4.1.3 Swedish forest policy documents and management regulations

The Swedish Forestry Act from 1979, which regulates the forest resource use, does not include any kind of direct information about NWFPs. According to the revisions of this Act wood production and environmental goals are of equal importance for Sweden's forests (Anon., 1992/1993). The new forest policy from 1992/1993 has increased the number of environmental tasks (Anon., 1992/1993; Lidestav & Sjölander, 2007; Angelstam et al. 2011). However, berries and mushrooms are mentioned under the heading "social considerations", and hunting is described both as a NWFP and a tourist attraction (Anon., 2007/08). The Swedish Environmental Code, which was adopted in 1998 and amended in 2000, declares the promotion healthy environment for present and future generations but provides no specific explanation about NWFPs (SEPA, 2005). Recreation should be done without harming the forest ecosystems.

The Ministry of Agriculture (now called Rural Development) is responsible for forest policy development in Sweden, and the Swedish Forest Agency is the Government's expert authority on forests and forest policy. The mission is to work for a sustainable utilization of Swedish forests based on the guidelines given by Swedish Parliament and Government. Forest policy in Sweden is based on the SFM principles (Forests Europe, 2011; Anon, 2010). The new forest policy highlights forest management in relation to game management as well as the social values of the forest (Anon, 2010; Proposition, 2007/08:108). It stresses the need to enhance the outcomes from forests in terms of increased production of renewable raw material and at the same time preserve biodiversity as well as socio-cultural values (Anon, 2009/10:155; Andersson, 2011). Sweden has developed a National Research Agenda (NRA), with 14 goals for the sustainable forest based sector (NRA, 2006). The NRA underlines more multi-purpose forestry, with more social, such as recreation, health improvement and economical benefits for rural residents (NRA, 2006).

As in all Nordic countries, the "Right of Public Access" to all forests, or freedom to roam, ("allmansrätt" in Swedish) is a customary right in Sweden. Public access rights arose during the Middle Ages, allowing all people to use all property's forests for recreation and collection of flowers, berries, mushrooms and medical herbs. However, the collection of protected plants and lichens is thus prohibited. All species of orchids, for example, are under such protection (SEPA, 2009). Special rules towards nature conservation and utilization of NWFPs in strict nature reserves, national parks and historical sites have been established (SEPA, 2009). These rules are different in different areas. As an example, in Garphyttan National park it is forbidden to collect plants, but it is permitted to collect berries and mushrooms. However, in Söderåsen National Park it is forbidden to collect lichens, food mushrooms, moss and dig up plants (SEPA, 2009). It is a traditional right of public access to countryside, without disturbing or damage others property (Dahlberg et al., 2010). Private forests are also open for local people and tourists, be they domestic or foreign. Large-scale commercial berry picking is permitted (SEPA, 2009), which, however, is currently questioned. There is a long tradition in Sweden to hunt, almost 5% of adults hunt (Boman et al., 2011). In Sweden, hunting rights are linked to land ownership and landowners may hunt themselves or sell their hunting rights. While there are under normal circumstances no restrictions to harvest levels for small game, for big game such as moose and large carnivores (brown bear [*Ursus arctos* (L.)], lynx [*Lynx lynx* (L.)]), quotas are determined at regional levels (Anon., 1987).

Game management has great potential as a recreational aspect and as a food providing activity.

4.2 Role of NWFPs in local livelihoods

4.2.1 Types and amount of collected NWFPs

Roztochya (Ukraine)

Utilization of NWFPs in Ukraine has long history. Turning to the level of local landscapes, NWFPs provide important livelihood resources for forest communities in many regions in Ukraine. They were, in fact, one of the first sources of the food, medicine, fibre, and other substances that have sustained human beings throughout the millennia. In Ukraine they continue to provide important material and cultural resources for many forest stakeholders in rural landscapes. Yet little is known about their contributions to the livelihoods of people who currently rely on them. The first documents that provide information about the use of medical herbs in Ukraine are the chronicles of “Povist Vremennyh lit” and “Galucko-Volynskiy litopys” (Kruglyakov, 1991; Ryabchuk, 1996). Berries and mushrooms were important sources of food and medicine for centuries in Ukraine (Komendar, 1971; Ryabchuk, 1996). In the 18th century, in Western Ukraine, local people actively used traditional medicine based on medical herbs (Komendar, 1971). According to various sources, more than 200 species of forest plants and mushrooms have been used in traditional medicine by local people (Komendar, 1971; Yelin et al., 1987; Kruglyakov, 1991; Ryabchuk, 1996). Before the First World War, income from the mushroom export was larger than the income from timber export in the whole Ukraine (Terletsyy, 1985). Under the Soviet Union (1917-1991), NWFPs were used actively both by local populations and by forestry enterprises (Telishevskyy, 1972; Terletsyy, 1985; Petrova, 1986; Kruglyakov, 1991). For example, the state forestry enterprises had a plan concerning the amount of NWFPs that they had to harvest in the managed forests (Kruglyakov, 1991). A total of 6.5 to 9 tons of mushrooms and from 6.2 to 7.9 tons of medicinal raw materials were harvested annually in Ukraine by the state forestry enterprises (Telishevskyy, 1972; Terletsyy, 1985). The birch sap was also actively collected, more than 4 thousand tons were collected annually (Ryabchuk, 1996). There were 108 vascular plants that were officially recognized as medical herbs by the modern medicine in Roztochya region (Stryamets & Ryabchuk, 2010).

In my Ukrainian study area, all interviewees collected wild berries. Around 60 % of settlements' local people collected at least 4 different species of berries, namely wild strawberries [*Fragaria vesca* (L.)], blueberries [*Vaccinium myrtillus* (L.)], blackberries [*Rubus caesius* (L.)] and raspberries [*Rubus idaeus* (L.)]. The maximum number of collected species was eight, i.e., including also lingonberries [*Vaccinium vitis-idaea* (L.)], guelder rose [*Viburnum opulus* (L.)], common hawthorn [*Crataegus monogyna* (Jacq.)] and rowan [*Sorbus aucuparia* (L.)]. In 96% of the studied settlements, people also collected mushrooms. The most popular mushrooms in the region were penny bun or cep [*Boletus edulis* (Bull. ex Fr.)], red-capped scaber stalk [*Leccinum aurantiacum* (Bull. ex Fr.) S. F. Gray], honey fungus [*Armillaria mellea* ((Vahl. ex Fr.) Kumm.)] and birch bolete [*Leccinum scabrum* (Bull. Gray)] (Table 2). Respondents mentioned that they liked to collect sheep's head [*Grifola frondosa* ((Dicks.) Gray)], a Red Book listed species of mushroom in Ukraine (Red Data Book of Ukraine, 1996). Respondents reported that knowledge about where, how and what species of mushrooms should be collected were passed from parents to children. Additionally, in spring, the villagers collected birch sap for personal needs, as "a healthy and tasty drink".

Collection of medical herbs was popular. On average, five species of medical herbs in forests were collected by each household, e.g., guelder rose, rowan, wild strawberries, common nettle [*Urtica dioica* (L.)] and dog rose [*Rosa canina* (L.)]. In one village, people collected more than 12 species of plants. People used medical herbs as a tea and for different kinds of tinctures for support or promote health. Different parts of the plants were used as well, such as the flowers of linden [*Tilia cordata* (Mill.)], the buds of birch [*Betula pendula* (Roth.)] or leaves of common nettle. Local people used the forest also for cattle grazing and for gathering of fresh grass and hay-making. Beekeeping was also present in the region, but not as a widespread activity (Table 5 and Table 6).

The volume of collected NWFPs relay form year to year taking into account the annual yield. The interviewers give information about the annual average volume of harvested NWFPs. Some respondents pointed that amount of collected NWFPs greatly depends on the yield: "There were no good yields of mushrooms in last two years. But if it would be a good yield of mushrooms we would spend more time in the forest and pick up much more than last year". Each household collected NWFPs for domestic needs and some households for sale to generate cash income. For domestic purposes, on average, 10 litres of blueberries, 10 litres of blackberries, 6 litres of raspberries and 1-2 litres of wild strawberries were harvested

annually by each studied household harvested 10 litres of blueberries, 10 litres of blackberries, 6 litres of raspberries and 1-2 litres of wild strawberries annually. Additionally, 2 to more than 200 litres blueberries were sold annually. The volume of the collected mushroom for personal needs differed greatly among households, from 3-4 kg to almost 130 kg of fresh mushrooms. The medical herbs were consumed in small quantities. Approximately 3 litres of birch sap was consumed per household.

Hunting was not reported as being popular among Ukrainian stakeholders. Respondents said that license prices were too high, and that there was not much wild game to hunt. The average price of a hunting license was 300 UAH, or approximately 30 Euros, for one hunting season. The respondents stated that not more than 10 % of local people in the region hunted regularly. Most hunters came from the larger towns and cities near Roztochya. These hunter typically hunted ducks [*Anas platyrhynchos* (L.)], hare [*Lepus timidus* (L.)], fox [*Vulpes vulpes* (L.)], roe deer [*Capreolus capreolus* (L.)] and wild boar [*Sus scrofa* (L.)].

Småland (Sweden)

In Sweden, historically, around 35 native varieties of wild berries, fruits and other edible plants were used as a source of food (Kardell, 1980). All these species had domestic importance until the second half of 19th century. When the domestic railroad network was extended, berries gained an economic value for the rural population. However, mushrooms were not used by local populations in Sweden. According to Kardell (1980), the custom of eating mushrooms was imported from France and adopted by the Swedish nobility, but not by rural people. For the Småland study region, Nordström et al. (1989), Nordmark (1997) and Johansson (1999) described the wide use of medicinal plants until urbanization began in the early 20th century. As a sign of the past use of lingonberry, the “red gold of the forest,” these berries were still important for the sense of place in the Småland region according to brochures for tourists (Källberg, 2007), and the regional trains were called “lingonberry trains” (Swe: krösatåg) since 1985. The term stems from the time of when there was a “lingonberry boom” (Swe: lingonruschen) in Småland, when berries were exported to Germany at the end of the 19th until 1914 when WW1 began.

At present, in the Swedish study area, almost 80 % of interviewed local people collected berries. In 58 % of the studied settlements, local people collected 2 species of berries, such as blueberries and lingonberries, which were also the most popular berries in the region. The maximum number of

collected berries was 3 species, blueberries, lingonberries and blackberries, in 8 % of the studied settlements (see Table 6).

The amount of collected berries varied from 0.5 to 90 litres, and on average it was 2-5 litres of blueberries per family. The maximum amount of berries was 90 litres of blueberries and 90 litres of lingonberries. The most popular harvested mushrooms in Småland were chanterelles [*Chanterel cantharellus* (L.), Murrill)] and funnel chanterelle [*Craterellus tubaeformis* ((Fr.) Quel)]. The maximum number of mushrooms species was eight, and was collected only by one person who used it to produce colour pigments for clothes. Local people did not collect any medical herbs in this region. In the interviews, respondents often suggested that they did not have enough knowledge about the species of medical herbs or mushrooms and their uses. Besides berries and mushrooms, people collected flowers for decoration. The prevailing forest use was recreational activities. Respondents pointed that they found the forest experience rejuvenating and energizing.

In the Swedish case study area, hunting was a very popular activity among the villagers. More than 40 % of respondents stated that at least one member of their family was an active hunter. The hunting rights in Sweden always follow land ownership – the land owner, proving that has passed a national hunter's course, has the sole right to make a decision about hunting on his/her territory. Land owners often merge their hunting territory with their neighbors to form larger management units or lease out the hunting rights to other hunters. In areas with a large proportion of private forest owners, such as Småland, hunting is the NWFP use with the highest economic turn-over (Boman et al., 2011). Hunters without own forest can lease hunting rights from private or corporate forest owners either by themselves or by joining a hunting club. There were some 30 000 registered hunters in all Småland (Naturvårdsverket, 2011) and they paid an annual register fee. There were also hunting management associations which manage the used species populations, infrastructure for hunting and the development and performance of the hunting teams (Boman et al., 2011). Some respondents said that if they would own the forest, they would definitely use it for hunting. The reasons for hunting were both traditional and enjoyment. The most popular species to hunt in the study area were moose, roe deer, wild boar, hare and ducks.

Table 5. The harvested non-wood forest products (NWFPs) by local stakeholders in Roztochya (Ukraine) and Småland (Sweden)

Species	Roztochya (Ukraine)			Småland (Sweden)		
	Part collected	Respondents who collected, %	Mean quantity per season, litres	Part collected	Respondents who collected, %	Mean quantity per season
Plants						
<i>Fragaria vesca</i> L.	Berries	52	2	Berries	2	2 l
<i>Vaccinium myrtillus</i> L.	Berries	85	10	Berries	56	2-5 l
<i>Rubus caesius</i> L.	Berries	65	10	Berries	0	No
<i>Rubus idaeus</i> L.	Berries	44	6	Berries	0	No
<i>Vaccinium vitis-idaea</i> L.	Berries	8	1	Berries	53	1-5 l
<i>Viburnum opulus</i> L.	Berries	~40	Small amount	No	No	No
<i>Sorbus aucuparia</i> L.	Berries	~40	Small amount	No	No	No
<i>Fragaria vesca</i> L.	Leaves, flowers	~40	Small amount	No	No	No
<i>Urtica dioica</i> L.	Leaves	~40	Small amount	No	No	No
<i>Rosa canina</i> L.	Fruits	~30	Small amount	No	No	No
Mushrooms	Mushroom	85	4 kg	Mushroom	62	1-2 kg
(all types in total)						
Animal						
<i>Vulpes vulpes</i> L.	Skin	~ 10	1	Skin	40	D
<i>Sus scrofa</i> L.	Meat	~ 10	1	Meat	40	D
<i>Lepus timidus</i> L.	Skin, meat	~ 10	1	Skin, meat	40	D
<i>Capreolus capreolus</i> L.	Meat	~ 10	1	Meat	40	D

Table 6. *The categories of non-wood forest products (NWFPs) harvested and utilized in the Roztochya region (Ukraine) and Småland (Sweden)*

NWFPs category		Roztochya region in Ukraine		Småland in Sweden	
		Number of species		Number of species	
Plants					
1	Food	Berries	4 (8)	Berries	2 (3)
		Mushrooms	5 (13)	Mushrooms	2 (8)
		Birch juice	1		
2	Fodder	No	0	No	0
3	Raw material for medicine	Medical herbs	12	No	0
4	Colorants and dyes	No	0	Mushrooms	4
5	Utensils, handicrafts and construction	<i>Salix, Juniperys</i>	2	No	0
6	Ornamental plants	<i>Salix, Vinca minor L.</i>	3	No	0
7	Exudates	No	0	No	0
8	Other plants products	Cattle grazing, hay	Yes	No	0
Animal products					
9	Living animals	No	0	No	0
10	Hides, skins and trophies	Skins	3	Skins, trophies	4 (7)
11	Wild honey and bee-wax	Beekeeping	1	No	0
12	Bush meat	Hare, roe deer, wild boar	3	Moose, roe deer, wild boar, hare	4
13	Raw material for medicines	Badger fat	1	No	0
14	Raw material for colorants	No	0	No	0
15	Other edible animal products	No	0	No	0
16	Other non-edible animal product	No	0	No	0

4.2.2 Utilization of NWFPs

Roztochya (Ukraine)

The majority of villagers collected berries and mushrooms for sale and for domestic consumption. The berries collected for sale were wild strawberries, blueberries, blackberries and raspberries. Mushrooms collected for sale included penny bun or cep, red-capped scaber stalk and honey fungus. Some interviewees reported that they earned more than 3,000 UAH (approximately 300 EUR, equivalent to two monthly salaries in rural areas) per season from selling berries. The price for one litre of blueberries was on average 10-15 UAH, which means that people collected and sold approximately 200 litres of berries. The price for one litre of wild strawberries was around 50 UAH (approx. 5 EUR), one kilogram of penny bun or cep was 60 UAH (approx. 6 EUR). The respondents did not like to talk about the amount of money that they could earn from selling mushrooms and berries, but they pointed out that they could live on that money for several months. One of the common statements was: “Because people don’t have jobs they have to find ways to earn money. Young, middle aged and old people pick berries and mushrooms”. Local people sold berries and mushrooms on the markets in the nearest cities and towns, and along the main roads in the region. Interviewees mentioned that one could earn 100 UAH (approx. 10 EUR) per day, which was more than the mean daily labour payment in rural areas. The distance to markets was 2 to 60 km. In villages located close to the border with Poland local people sold berries (mostly blueberries) to foreign companies, which transported berries to Poland to produce value-added products. Respondents mentioned that it was easy to sell to the Polish companies, because they bought all collected berries. The average price for one litre of blueberries was 10 UAH (approx. 1 EUR).

Local people also collected NWFPs for own needs. All respondents mentioned that it was a tradition to cook dishes including NWFPs for religious holidays, e.g. Christmas. About 26% of respondents mentioned that it was important to pick up mushrooms for religious holidays, which included traditional meals prepared with wild mushrooms. Observation of this tradition was

important even for respondents for whom collection of mushrooms was not an economic or subsistence activity. People collected berries for their kids because it was a clean and healthy product. One respondent stated that “I know that one should eat 3 litres of blueberries and the same amount of wild strawberries per season; then one would have enough vitamins for the whole year”. The respondents that hunted mentioned that they used meat for food. Some people stated that picking berries and mushrooms was like a hobby. Nearly 90 % of the respondents said that their parents had taught them to pick berries and mushrooms; however, some stated that nowadays kids would rather spend time with computers instead of going to the forest. A majority of the respondents mentioned that the collection of NWFPs had become more intensive compared to 20-25 years ago. One of the reasons was that, during the Soviet period, people had jobs at the collective farms or in the industry and there was no time and need to collect NWFPs to earn money. However, collective farms and many industries were closed in 1990s, when the Soviet Union collapsed. At the time of my study, unemployment was high and the forest provided an opportunity to support often scarce livelihoods. The majority of respondents pointed out that nowadays the quantity of mushrooms and berries had decreased in the forest. How one respondent said: “The forests “have been not managed properly –no silvicultural activity after the harvesting, and the shrubs are all around. There are only a few places to collect berries and mushrooms”.

Småland (Sweden)

In the Swedish case study, local people harvested NWFPs only for personal use. The villagers collected berries mainly for making pies for immediate use (e.g., blueberry pie). Several respondents also made preserves for own consumption during winter. Chanterelle and funnel chanterelle were collected once or twice per season for immediate cooking. The tradition to hunt and use meat for traditional food like game meat with wild mushrooms was popular in the study area. The hunters mentioned that they got good ecological meat for free. The meat was used for domestic consumption; only one respondent mentioned selling small amounts of meat.

Many respondents stated that collection of berries and mushrooms for food and to sell was important for livelihoods in the region 60-70 years ago. Even 20 years ago, it was more common to pick different berries and mushrooms for food. The respondents pointed out that, nowadays, one could buy everything in the stores and “at present, other things are more important than picking berries and mushrooms”. Among the respondents, people of middle age and older were most interested in harvesting NWFPs, especially if the practice was a tradition in their families and they have lived permanently in the countryside. “My husband’s father taught him to hunt. My parents taught me to go to the forest when I was just a couple of years old”.

The respondents pointed out that, after the severe windstorm “Gudrun” in 2005, picking NWFPs and walking in the forest was more difficult due to changed forest conditions. The windblown trees damaged the soil, and forestry’s use of heavy forest machinery to salvage the timber damaged the vegetation cover. Respondents claimed that as a result the berry and mushroom yields had become reduced during recent years. Intensive forest management was mentioned by the respondents as a reason for decreasing quantities of berries and mushrooms in forests.

4.3 Governance for sustainable use of NWFPs

4.3.1 Perceptions of the Roztochya BR initiative

Being an important aspect of rural livelihoods in the Ukrainian case study but not in the Swedish one, I studied the extent to which the emergence of a BR in the Ukrainian case study included governance of NWFPs. The idea to create a BR in the Roztochya area emerged during the first World Congress of BRs in 1983 in Minsk, Belarus (S. Stoyko, pers. comm). The Roztochya BR initiative re-emerged again after 1991, when Ukraine became an independent state. The transition from a planned socialistic system to a market economy was accompanied by deep economic and political crises in the country, including the local job loss. Meanwhile, different stakeholders, such as heads of regional administrations,

managers of protected areas and private businesses, explored options to regional economic development. According to the informant interviews, options for transboundary cooperation between adjacent administrative regions in Poland and Ukraine located in the Roztochya region were discussed as a possible approach to promote business development and investments. Establishment of a transboundary Roztochya BRs with a Ukrainian and a Polish part was a key concept emerging from these discussions.

Based on the analysis of the interviews with those informants directly involved with the BR planning and promotion, it was concluded that the initial main goals for the establishment of a BR were; (i) nature conservation to protect biodiversity in the Baltic-Black Sea European watershed (Parchuk et al, 2010); (ii) to address ecological issues associated with the local “heritage” of sulphur mining industry; and (iii) regional economic development driven by regional and international tourism (see also Stoyko, 2004; Parchuk et al, 2010). The proposed transboundary BR was also considered attractive for generating interest and investments from international and national sources.

Interviews with local rural residents, foresters and regional authorities showed that main apprehension concerning BR creation was to lose the free access to the forests and forest resources, like NWFPs. Especially in rural areas in Ukraine people often don't have permanent jobs and they heavily depend on subsidiary agricultural products and NWFPs. People feared further restrictions towards land-use. In 1939 in this area the 128 villages were remote and the military training area was created (Stecjkovych, 2010). Therefore local people had a mental model (Wallner et al. 2007) that the government could easily take their lands. At the same time, the people living near protected areas were very friendly to idea of BR creation. They had another mental model, that protected areas could bring tourists and better infrastructures. Some respondents pointed that they were proud that they lived near protected areas and were positive to idea of a BR creation. But to my opinion none had clear idea what BR would bring.

People see the opportunities for improving economical situation by the BR creation, but they don't know who can do it. They have

pointed that there was lack of entrepreneurship in the region. As the example they mentioned that a lot of tourists from Poland come but money goes to the Polish companies. Only managers of protected areas pointed as an opportunity the labeling of the locally produced products, which could find market in nearest big cities. Rural residents as usual have subsidiary agricultural fields and gardens even if they have permanent jobs (pers. comm.), and they produced a lot of different types of vegetables.

The perception towards BR creation greatly depended on employment and social status of person, e.g. in villages close to towns with better access to jobs and better infrastructure the perception was positive. For instance, in one meeting with the local stakeholders in remote village council the local people were very angry and wanted new roads and new job places. To my opinion it is hard to think about the biosphere reserve, when you don't have what to eat.

According to Ukrainian legislation, there are some restrictions on land use that could negatively affect natural, historical or cultural complexes located within different kinds of protected areas, including BRs. However, harvesting of wood and NWFPs, hunting, fishing and some other types of natural resource use could be conducted if not conflicting with the aims of the specific protected area, including BRs.

The analysis of interviews identified the following perceptions concerning the creation of a BR in the Ukrainian Roztochya region: (1) as an instrument for nature conservation with restrictions in use of natural resources; (2) as a tool for concurrent nature conservation and tourism development; (3) the establishment of an additional regional governing state body to control the use of natural resources. The complexity of the BR creation situation was that regional ecological authority had decided to organize the regional landscape park. The local village communities have to vote for the creation of the landscape park, and some of the respondents did not recognize the difference between the BR and landscape park. That is why the process took so long and causes a conflict. The perception of BR as an instrument for nature conservation with restrictions on nature resource use and land management was very common among both

villagers and foresters. Local peoples' livelihoods depended directly on the goods provided by forest and cultural landscapes of Roztochya. The informants perceived that the creation of a BR would limit their access to the forests and bring new restrictions on land management practices, including use of chemicals in farming, construction of buildings, and collection of NWFPs. Some villagers

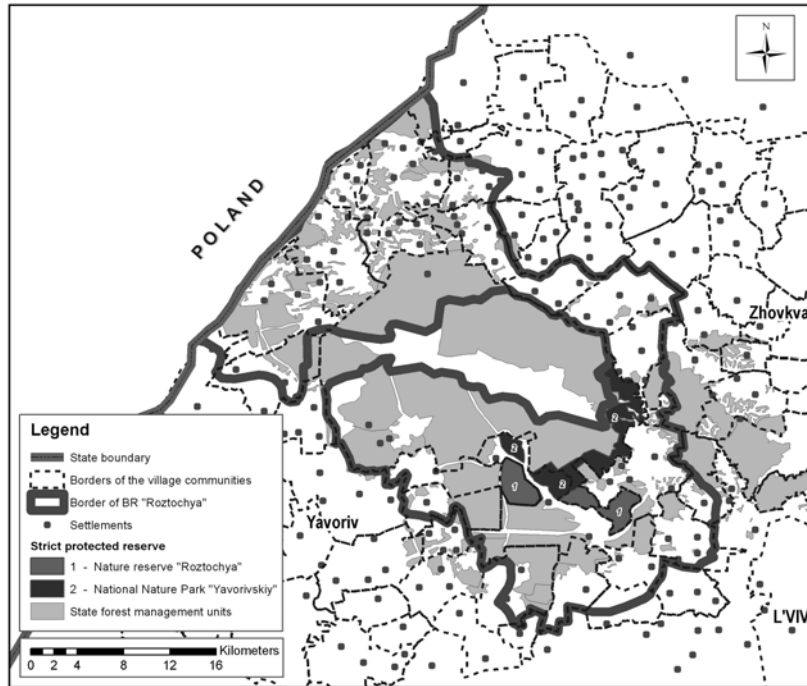


Figure 5. The area of the Roztochya Biosphere reserve in the Ukrainian part of Roztochya region in westernmost Ukraine

expressed fear that their private land would be seized and incorporated into the BR. In response to promoter's explanations that the creation of a BR would not change their land use practices or ownership rights, the most common statements were similar to the following quote "we received many such promises during the Soviet time, and everything later on showed to be the opposite". As one informant explained, "People do not trust the State, even if it is

written in the documents that it will be no restrictions, they are not sure that it will not happen". Many local landowners refused to accept the idea of the BR creation from the beginning. This perception of a BR as an instrument to bring restrictions precipitated numerous village council meetings to discuss the location of village within the border of a BR. One village community voted eight times against the BR creation over a 3-year period. The remaining village councils gathered at least twice, eventually generating a positive decision; some villages gathered 5 or 6 times to discuss the issue. Only village communities located close to the national park and the strict protected reserve were positive at the beginning and had expectations that creation of BR would contribute to their livelihoods. In total, the process of obtaining the permission from each of the local communities to include their land in the BR took almost 8 years.

Forest managers had similar perceptions about the BR as limiting land and resource management practices, and were thus also strongly against the BR. The prevailing perception among forest managers was that timber harvesting would be controlled and reduced in the BR, and, in some places, logging operations would be prohibited. The foresters suggested that the BR would be similar to a strictly protected nature reserve. All interviewed foresters expressed pride in their forest management activities because they provided jobs for local people and produced value-added products for regional and local markets. The foresters' response to the proposed BR greatly influenced villagers' perceptions because the state forest enterprises were the main employees in the region. Thus, many people depended both directly and indirectly on the continued use of forests for livelihoods. Therefore, the villagers often trusted them more than the promoters of the BR.

The perception of BR as an instrument for supporting both nature conservation and tourism development was shared by both the BR promoters and villagers. The BR promoters clearly stated that the creation of the BR would improve nature conservation, especially, in those protected areas under the responsibility of regional administrations, and, at the same time, make the region more attractive for tourists. However, the scientists and managers of

protected areas complained that the local people did not understand the value of conservation. Statements to such effect included: “people have such a low ecological awareness” and “the ecological ignorance is such that they did not respond well to the argument that we had to protect our nature for the future”. The promoters expected that the BR development would bring additional funding from the central state budget and international organizations, both of which would be used to develop a needed infrastructure for nature and cultural tourism and to improve roads. The villagers also expressed that creation of a BR would increase the opportunities for tourism and thus might lead to development of the area. However, it seems that local people did not perceive themselves as key stakeholders and often mentioned that “They (the BR’s promoters) said that tourism will develop and bring income to us”. Informants stated that more than 100,000 tourists visited the region annually, most of them from abroad. However, as one informant suggested, “all income, associated with tourist activity, went to the Polish companies that organized the tours.” The reason for this was that local communities and villagers have “no money to start our own businesses”. All informants described the area as having no good tourist infrastructure; neither places for staying overnight or eating, nor good quality roads. One interviewee said: “Although we are so close to Lviv and located in the centre of Europe, we are still very remote”. None of the stakeholders had a clear of idea of how the BR would function or how it would be financed.

Finally, several informants perceived the BR as a state organizational structure that would have the power to control land and nature resource management. These informants stated that they would have to get permission from the BR administration, located many kilometers away, in Lviv, to conduct land use activities. This, they contended, would require that they spend their time and money to go there. In addition, many perceived the BR administration as “one more body to give bribes to”, as one informant expressed it.

5 Discussion

5.1 Role of national policies for use of NWFPs

Both papers in this thesis illustrate that NWFPs in forest-dependent communities often contribute critically to local people's livelihoods. Thus, both the sustainability of the resource itself and its governance are critical issues. By contrast, in Sweden NWFPs merely satisfy recreational, traditional needs and enjoyment. Paper I shows that international policies relative to SFM stated that maintenance and sustainable use of NWFPs are important for rural development and nature resource conservation, especially in forest-dependent communities (MCPFE, 2003a; 2007a; 2007b; 2007c). Use and management of NWFPs are important parts of SFM because they provide tangible economic and social benefits to rural communities (Ticktin, 2004; Gubbi & MacMillan, 2008). From a socio-cultural perspective, the use of NWFPs has a long tradition in many forested countries and therefore reflects local knowledge and social practices that are worth conserving (Kilchling et. al., 2009; Stryamets, 2009). The potential of NWFPs to generate income and jobs could increase with the orientation of society and forest management towards sustainability (Angelstam et al., 2004; Schmithüsen, 2004; Janse & Ottitsch, 2005). Social trends towards conserving traditions and using natural medicinal products could support the marketability and profitability of NWFPs (Kilchling et. al., 2009).

In paper I, the national legislations related to NWFPs in Ukraine and Sweden were analyzed. This analysis shows, however, that there is no clear explanation what kinds of resources are included into this category. For example, in Ukraine, NWFPs are considered to be of little importance, a status reflected in their designation as “secondary” forest products. The Forest Code in Ukraine allows free collection of most NWFPs in all types of forests, except in strictly protected areas (Anon., 2006). The “Right of Public Access” in Sweden provides the opportunity to collect most NWFPs on both public and private land. The only restrictions relate to species that are red listed (Red List of Swedish Species, 2010), hunting and harvesting NWFPs in protected areas in both countries. However, there are no requirements or regulations concerning forest management in order to maintain or protect NWFPs in managed forests. In addition there are no policies or recommendations related to the promotion and utilization of NWFPs with the aim to develop value-added products from these resources in a sustainable way. At the same time, the international guidelines for SFM promote the use of NWFPs and stress the significance of value added products from those resources (MCPFE, 2003a; 2007c). Still, both Ukraine and Sweden are committed to the SFM process.

At present, NWFPs are not included into the forest management plans neither in Ukraine nor in Sweden, in spite of this being important for implementing SFM including ecological, social and cultural, ecological functions in both countries (Kilchling et al., 2009). The study shows that NWFPs may provide important resource niches to forest-dependent people, especially in countries in transition. Commercialization and value-added processing of NWFPs could improve the contribution to household income in Ukraine as a country in economical transition. Harvesting of NWFPs may find a niche role in development through ecotourism, in which collection activities are regulated and income is largely generated by providing services and valued products to tourists (Gubbi & MacMillan, 2008).

In Sweden, NWFPs lost their wide-spread economic importance to local people during the second half of the 20th century, which also happened in many other developed European countries (Kardell,

1980; Kilchling et. al., 2009). Urbanization and economic wealth have since then continued to increase the disconnection between people and environment. In southern Sweden considerable amounts of lingonberry were exported until about hundred years ago (Kardell, 1980; Källberg, 2007). During the past decades foreign citizens and companies exporting berries have benefited from the “Right of Public Access” in Sweden (Turtiainen & Nuutinen, 2011). The working immigrants from the former Soviet states, China, Thailand, Vietnam and other developing countries come to Sweden to pick wild berries, in particular blueberries and lingonberries. In some places, local people claim that tourists and intensive forest management with high basal area, shorter rotation times, and use of fertilizers as well as high density of herbivores have led to a declining blueberry cover and damaged forest ecosystems in Sweden (Kardell, 1980; Mortazavi, 1997). The Right of Public Access is important for Swedish people that enjoy different traditional outdoors activities. To some extent this is an obstacle for companies building their business on these same activities (Sandell & Fredman, 2010). There is an opinion that the “Right of Public Access” in Sweden should be reviewed in order to differentiate the collection of NWFPs and other uses for personal and commercial purposes (Colby, 1988; Sandell & Fredman, 2010). For instance, in Ukraine regulations and rules differentiate between private and commercial collection of NWFPs, where commercial users need to be pay for the right to collect (Anon., 1996). This shows that the role of NWFPs continues to change over time.

To understand opportunities for sustainable management of NWFPs, economic valuation of forest resources need to be done. First we need to classify the forest products concerning rivalry and excludability. Forest products are divided by level of rivalry and chance to exclude potential users of forest resources (Sandström et al., 2011 p.221). As a result, forest products could be classified as private goods (belonging only to one individual); public goods (free to use by the public and regarded as an unlimited resource in quantity); club goods (were access is limited by a special fee or other restrictions) and common pool goods (free to use by everyone, but regarded as a limited resource in quantity). For resources which are

rival and excludable, they are possible to market and it is easy to set a price. For public goods, which are open for free public use, for example a nice view of coniferous forest in the winter, it is impossible or very difficult to estimate its monetary value. Free riders in these case studies are companies which collect berries in Sweden using low paid immigrant workers. This problem already causes a discussion about the free access to berries by commercial collectors (Sandell & Fredman, 2010). But as soon as it would be restrictions and fees for the collection of berries they would move to the club goods or even to private goods. Hunting is well organized in Sweden (Boman, et al. 2011), because it is regarded as private goods and it is rival and excludable. Other NWFPs, like berries, mushrooms and medical herbs are subjected to rivalry because one collector could collect all berries and thus exclude others from the resource. But they are non-excludable because everyone in both case studies could collect them. The club goods are non-rival, but they are excludable, e.g. entrance fee in national park, horse riding club membership, or BR territory, to become a part of you have to apply (Table 7).

Table 7. *The economic value of the various forest goods and services. Adapted from (Janse & Ottitsch, 2005 and Sandström et al., 2011).*

↑	Non-rivalry	Club goods Horse riding, National parks with entrance fee, Biosphere Reserves status	Public goods Aesthetic, Biodiversity, Clean air provided by forests
	Rivalry	Private goods Timber, Hunting	Common pool goods Berries and mushroom picking Forest as a pasture Medical herbs
	Economic value	Excludability	Non-excludability
		→	

To conclude, while the multifunctional value of NWFPs provided by forest landscapes has been increasing at the international policy

level, it was not supported by national policy and on-the-ground management regulations. At the same time, in some European regions NWFPs and ecosystem services provide more revenue than wood sales (Arnold & Perez, 2001; MCPFE, 2007a; Forest Europe, 2011). However, there are many challenges to balance production of NWFP and wood as this is still economically the most important resource provided by forests and the increasing demand for NWFPs from the European forests (MCPFE, 2007a). Thus, to promote sustainable use of NWFPs new policy instruments should be developed in both countries. To develop policies that match the requirements from the government, landowners and the public there is a need to combine both top-down and bottom-up processes (e.g., Elbakidze and Angelstam, in press).

5.2 Roles of NWFPs for rural livelihoods

This thesis shows that local populations in forested regions have used NWFPs for domestic and economic purposes for centuries, and continue to do so. The traditional knowledge about different NWFPs, collection methods, processing, storage, and use, which have been passed through generations, was deeper among local people in Ukraine than in Sweden. By contrast, hunting was more popular, accepted, relied on old traditions and better organized in Sweden, while in Ukraine it was of minor importance to local people.

In Ukraine, in local communities, NWFPs are used to supplement the diet and household income, notably during NWFPs seasons of the year, in addition they help meet medical treatment needs, and the contribution from NWFPs are important for subsistence during periods of poor economic development, recession and depression connected to the transition from planned to market economy. My thesis indicates that due to social and economic development challenges in countries transitioning from planned to market economies, forest functions other than wood production have regained local and regional importance. The promotion of value-added products from NWFPs, such as jam, preserved mushrooms and herbal tea have a potential to enhance livelihoods of local people by aggregating more of the products value in the local community.

People's connection with the forest and forest resources that is inherited from historical times when people used the forest and its resources as their livelihood is declining. However, promotion of NWFPs use could be a "bridge" between nature and people, especially in the vicinity of urban regions. It has been argued that the potential of NWFPs could be considerably enhanced by drawing upon indigenous knowledge, value added processing and building on traditional systems for sustainable use (Arnold & Perez, 2001). Adapt management to support local rural populations use of NWFPs is one of the tasks of SFM. NWFPs provide direct benefit to local people, especially to low income social groups in developing countries like Ukraine (Stryamets, 2009a, 2009b). To protect the interests of forest dependent communities, NWFPs should be included into the forest management planning, and recommendations for management of NWFPs need to be developed. Multiple-use forest management plans to ensure that timber and NWFPs are managed in a complementary manner need to be developed. NWFPs trade has the potential to contribute to rural livelihoods (Belcher & Schreckenber, 2007). Value-added processing of NWFPs has thus great potential to contribute to local livelihoods, providing jobs and more revenue compare to sales of raw resources in both developed and developing countries (MCPFE, 2003a, Ndoye & Tieguhong, 2004; Gubbi & MacMillan, 2008; Richards & Saastamoinen, 2010).

The BR concept can be used as an instrument to promote sustainable use of NWFPs, management of related traditional knowledge and to develop rural livelihood based on NWFPs. Traditional knowledge about medical herbs and edible mushrooms were still present in Roztochya, the Ukrainian case study, and according to interviews in Småland people were interested in and willing to learn more about such knowledge. Summer schools or seminars in medical herbs collections could thus be an opportunity for a tourism business or as a tool for building social capital locally. Other opportunities for local rural development are to develop value added products which could be certified as ecological products. There are positive examples in Germany, where products which were grown or collected in ecological way within a BR territory were branded as ecological products and sold at higher prices (Schunko &

Vogl, 2010; Amend et al., 2008). However, the results from the analysis of the interviews indicate that there is a lack of entrepreneurship and knowledge about products, regulations, how to market products etc..

The utilization of NWFPs by different stakeholders in my landscape cases studies, Roztochya in Ukraine and Småland in Sweden, was very different. Historically in both countries collection of different NWFPs was part of the rural livelihoods (Komendar, 1971; Telishevskyy, 1972; Terletskyy, 1985; Kardell, 1980; Lagerås, 1996, 2007; Nordström et al., 1989; Nordmark, 1997; Johansson, 1999). At present, however, the role of NWFPs for local livelihoods is clearly different in Ukraine and Sweden, and this is mainly linked to differences in economic development. Plant and animal NWFPs were used by local forest stakeholders in both study areas. However, in Ukraine, the main group of NWFPs was plant NWFPs, while in Sweden, it was animal NWFPs. In both countries, the NWFPs were used mainly as food. In Ukraine selling NWFPs for economic benefit and the recreational and cultural aspect of collecting NWFPs in Sweden were important. The utilization of plant NWFPs and traditional knowledge about the species was greater and deeper and the amount of harvested NWFPs was much higher per family in Ukraine than in Sweden (Table 5 and Table 6).

In both study areas the use of NWFPs have different aspects which correspond to social, cultural and economical dimensions of SFM (see Table 8). In Sweden, people are highly appreciative of NWFPs and perceive their use as a civil right. In the Ukrainian case study the social dimensions of NWFPs utilization was represented by traditional use of NWFPs for religious holidays (*Viburnum opulus* L., *Vinca minor* L.), medical herbs for health improvement, and highly appreciated recreational use. By contrast, in the Swedish case study the social-cultural dimensions of NWFPs utilization were both recreational and traditional; especially traditions were connected with hunting. In both case studies informants referred to NWFPs as a part of biodiversity. Economical dimensions in the Ukrainian case study included personal use as food, complement to the diet and selling of NWFPs as an additional income. In the Swedish case study economical importance NWFPs included companies that utilize it. In Sweden value of traded berries was 32.4 million euro (Turtiainen &

Nuutinen, 2011; Statistic Sweden, 2010). For local people hunting for game meat was claimed to be economically important.

Table 8. *Role of NWFPs for sustainable forest management in two landscape case studies.*

		Roztochya (Ukraine)		Småland (Sweden)	
Dimension of SFM	Aspects	NWFP (types and species)		Aspects	NWFP (types and species)
Socio-cultural	Traditions	Herbs		Traditions	Mushrooms
	Recreation	Mushrooms		Recreation	Berries
	Medical treatment	Berries Medical herbs		Hunting	Flowers Game meat
Ecological	Biodiversity	Food and environment for birds, mammals and insects		Biodiversity	Food and environment for birds, mammals and insects
Economical	Personal use	Berries		Personal use	Berries
	Food	Mushrooms		Food	Mushrooms
	Additional income	Medical herbs		Utilization by companies	Game meat
	Medical treatment			Hunting	Hunting tourism
	Cattle hay				

5.3 Biosphere reserves for sustainable use of natural resources?

BR is one of several concepts aimed at supporting sustainable development as a social process toward sustainability (Bridgewater, 2002; UNESCO, 2008 Baker, 2006). However, the results from the policy analyses and interviews with stakeholders in the emerging Roztochya BR showed that the legislative domain of the BR concept had a clear negative impact on the different perceptions of what the BR concept is by different stakeholders in the case study.

I thus contend that, in Ukraine, where peoples' livelihoods depend directly on use of natural resources (Elbakidze & Angelstam, 2007; Stryamets et al., 2012), the nature conservation orientation of BR's management which is supported by the national legislation might create also economic constraints for implementation of BRs as initiatives aimed at SD. For example, in my study area local landowners and managers of the state forestry enterprises perceived the plan to establish a BR only as another type of protected area that would limit nature resource use and related land management. This is likely to make BR implementation challenging and wrought with conflict among stakeholders. This notion is also supported by studies in other countries, where the promoters of BR initiatives often meet resistance from local people that recognize the BR as a pure nature conservation tool (e.g., Bosak, 2008; Phillips, 1995), which brings limitations in nature resource use and does not provide any economic benefits for local people. In post-socialistic counties, there is also a legacy of private land seizure by the state and control of natural resources that contributes to mistrust or suspicion. Such was the case under the Soviet system in Ukraine. Later, during Ukrainian independence, after 70 years under the Soviet system, some of these lands were returned to previous owners. Land ownership is a source of pride and thus very important to people (Elbakidze & Angelstam, 2007). However, local people do not yet feel fully secure with their land ownership and are afraid that the government could take their property. This history, in combination with current social and economic insecurity, contributes to local stakeholder distrust of initiatives that originate outside of the community, such as a BR, and could potentially result in undesirable impacts to their livelihoods.

There are also a number of opportunities for the region with the BR creation. Among them the economic component includes the rural territories development where green tourism is thought to have a large potential (Stryamets et al., 2009). New green technologies could in connection to the BR be introduced to the area as example of sustainable resource use. Among other potentially beneficial issues for rural economic development is the transition to organic farming. The BR status might be an opportunity to develop a labeling scheme for organic products, like it was done in some

European BR (Amed et al., 2008). For the local stakeholders the BR status could lead to new funding opportunities, for example related to the treatment of old environmental issues related to the previous large scale sulphur mining in the area.

There is thus a need to develop a collaborative learning process for BR managers, local leaders and local people to develop skills for economic and social improvement in the region (Axelsson et al., 2011).

5.4 Integrative research as a journey

Carrying out forest management research involves both to understand ecological and social systems, and to focus on solving real management and governance issues. The term integrative research captures this, and refers to both interdisciplinary and transdisciplinary studies (Tress et al., 2005; Farley et al., 2010; Axelsson, 2010; Axelsson et al., 2010). To carry out comparative studies of forest management in different contexts is an efficient way of identifying barriers and bridges for the implementation of SFM policy (e.g., Elbakidze et al., 2010, 2011). This thesis focuses on the use and governance of NWFPs with Ukraine and Sweden as case studies at the national level, and Roztochya and Småland landscapes at the local level. The perspective chosen is problem-solving (Farley et al. 2010), and in this thesis my journey of understanding the role of NWFPs as a part in implementation of SFM on the ground in countries with different types of social and economic contexts has now begun (Figure 7).

The bottom level of the policy implementation process (sensu Lundquist, 1987; Sabatier 1986) concerning use of NWFPs was local people in Ukrainian rural forest and woodland landscapes (field work in Roztochya in spring 2010 for Paper 1). When analyzing these results the idea emerged to compare this with another country, which has come further in economic development than Ukraine (i.e. Sweden), and a similar local setting to Roztochya with a long history of forest landscape use (i.e. Småland). Data were hence collected in summer 2010 for the Swedish part of Paper I. It was concluded that

NWFPs were much more important for villagers in the Ukrainian than in the Swedish landscape case study. During the field work in Ukraine I learned that a new effort to support sustainability and the sustainable development process appeared in the Roztochya study area in terms of introducing the BR concept. As NWFPs is a vital part of SFM in the Roztochya area, it should thus be considered when developing new governance arrangements in the appearing BR. This became the topic of Paper II from my perspective and thus the parts that I have included in this thesis, both with respect to the BR concept at the national level, and with respect to the inclusion of NWFP stakeholders in the local Rostochya BR initiative. When I started to work as a PhD student I was oriented as natural science researcher, but during my studies I have understood that to work with such complex issues as SD and especially SFM interdisciplinary approach is needed. There is a need to elaborate and evaluate sustainability policies towards SFM, both in developing countries like Ukraine and developed like Sweden. However, the profiles of issues are likely to be different.

My plan for the second part of my doctoral study at SLU will focus on (1) NWFPs as a component of SFM in the Komi Republic in the Russia Federation, which represent an earlier phase in the transition from planned to market economy than Ukraine; (2) impact of different forest management systems on the ground cover and crop of blueberry; (3) NWFPs are a part of the provisional ecosystem services for rural livelihoods. The field work for Plan 2 partly was done in summer 2011. The cover and crop of blueberry in forest stands of different age classes and site types in south-central Sweden were estimated. The research context of the future research will be SD and SFM and landscape approach (Axelsson et al. 2011), and methods from natural and social science will be applied.

6 Conclusions

Sustainable development towards social, economic and ecological sustainability to meet the needs of future generations requires research about sustainable development as a process and its consequences for sustainability on the ground. To implement SFM policy, governance at global, international, national, regional and local levels need to be better integrated. My case studies in Ukraine and Sweden showed that use of NWFPs is still important for rural residents, but there is a difference between the value for the people in developed countries and countries in transition, respectively. Traditional knowledge and traditional ways of using the NWFPs were present in both countries, but there is a risk to lose such knowledge, because of the depopulation of rural areas, increased welfare, and development of other interests than nature and peoples disconnection from nature. At the same time NWFPs have great potential for rural development, as resources of medicinal extracts, vitamins and other health products. Knowledge about the importance and benefits from the NWFPs need to be maintained and developed. To promote sustainable use of NWFPs there is a need to start a collaborative learning process with forest management to discuss the opportunities of including interests of the local rural population, and particularly to include NWFPs into management plans. The implementation of SFM from an NWFP perspective will thus require an integrated top-down and a bottom-up approach, which involves stakeholders in a collaborative learning process.

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Annex

Interview questions, Paper I Questionnaire for the local people

Dear all!

I kindly ask you to participate in the survey, which aims to determine the species composition of NWFP that are storing, why and how many NWFP are harvesting.

Results will be used only in aggregate form, so you don't need to specify the surname.

I sincerely thank you for agreeing to take part in the survey.

Name of village: Village type: Date of visit:

Questions about person

1. What is your name?
2. How old are you?
3. What kind of education do you have?
4. What are the members of your family?
5. What do you do for a living? What is your work?

Questions about NWFP

6. Do you go to the forest? How often? What is the reason to go there?
7. Do you collect
 - Mushrooms
 - Berries
 - Birch juice

- Medical herbs
- Flowers
- Grass gathering
- Hay
- Honey
- Nuts
- Other

If yes, what kind and how much? What part of the plant do you collect, is it bark or leaves or whole plant?

8. What kind of NWFP do other people collect in your region? What kind of mushrooms do your neighbors collect in the forest?
9. What kind of berries do they collect in the forest?
10. What kind of medical herbs do they collect in the forest?
11. What kind of flowers do they collect in the forest?

Questions about places of collection

12. Where do you collect? Do you collect NWFPs on the forest meadows? Do you collect in the forest? If yes, what type of the forest?
13. How far from the village do you collect NWFPs?

Questions about volume of collection

14. How much could you collect NWFPs per year? What is minimum and what is maximum volume that you could collect?
15. What are the tendency towards NWFP collection in the region do you recognize now?
16. Why do you collect NWFP?
17. Do you sell what you have collect?

If yes, where

- At the local market
 - To the businessman
 - To some foreign firm
18. Do you sell products or raw material, for example do you collect jam or you sell berries?
 19. Do you have purveying centers for NWFP in the village? In rayon? In oblast? What can you tell about it?
 20. What traditional receptions on NWFPs use do you know?

21. What type of the NWFPs are the most common in your region? What type of the NWFPs are the most rich in your region?
22. Do your parents go to the forest? Is it traditional?
23. Do you use forest for recreation?
24. Do you hunt?
25. If yes, why do you hunt?
26. Do you use the trophies? Or do you use meat?
27. What kinds of animal are there in the forest around your place?
28. Do you use the wild honey?
29. Is hunting popular in your place, in the region?

Questions about conditions of storing up the NWFPs

30. Are there any kinds of limitations towards collection of NWFPs in the region?
31. Do you need to get permit to collect NWFPs or do you need to buy the tickets for collection NWFPs in the region?
32. Tell me please, could you collect NWFPs in the biosphere reserve, or in strict reserve, or in national park or in forestry enterprise?
33. What are the methods of collection of the NWFPs? Do you use the special equipment? Or do you know some special methods of collection of the NWFPs?
34. How do you know how to collect NWFPs? Who had taught you?
35. What are the prices of NWFP? Do you remark price-changes concerning these products over the year?

