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Matti Palo
Erkki Lehto

Private or Socialistic Forestry?

Forest Transition in Finland vs. Deforestation in the Tropics

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WORLD FORESTS

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To professor Ari Siiriäinen (1939–2004)

We got to know Ari in the middle of the 1980s. He was a Professor of Archeology at the University of Helsinki, Finland. He developed a major interest in prehistory and history of deforestation in sub-Saharan Africa. Ethiopia and Kenya became well-known countries due to his field work there. We shared a joint tour to Indonesia with him in 1996 (Photo 5.6).

Once he made a unique exploratory study tour by walking 500 km alone in Sahel in Niger for four weeks, making his visual archeological observations on his way. Ari was motivated to research the expansion of shifting cultivation and deforestation in Africa over several millennia.

He was our loyal partner from 1987 to 2000 in a number of joint research projects on tropical deforestation. We miss a pioneering scientist and a close friend.

Foreword

The book by Matti Palo and Erkki Lehto is coming to print at a very critical moment, in which deep changes are needed in the way forests are managed in the tropical countries. We are destroying a vital resource for the economic and social development of our countries. Consequently, we are generating serious externalities. And worse yet, opportunities are lost, particularly in territories that are rich in forests and with plentiful forestry labor opportunities. Additionally, we are not providing the global service of carbon fluxes regulation (maintaining stocks and sequestration).

Matti Palo and Erkki Lehto show us, through the elaboration of research toward the formulation of an integrated model of forest transitions, some robust tools to clarify not only the why and how we have made the transit from forests to deforestation (Mexico and tropical countries), but also from deforestation to sustainable yield forestry (Finland). They have in that way reinforced the model of forest transition to sustainable development available to other countries and territories.

The rationale of the book is extremely useful for devising strategies not only to explain deforestation, but also for devising strategies to make the transition to good forest management.

First, the bases of an integrated theory of transition to sustainable forest management are set.

Second, the adjective "integrated" for the theory is well explained in the sense that it is not only about forestry and forest-based development but also about international and inter-sector issues, about environmental variables, and about coevolution (which operates in the first stage of the destructive use of lands and forests, and also in the second stage toward sustainable forestry).

Third, it refers to the importance of institutions and to the new institutional economics, including power, markets, and property rights.

Fourth, it shows with the cases and models of Finland, Mexico, and the tropical countries in a general model of the transit from preindustrial forestry and forest industries to sustainable forestry. But it shows also that the path towards a forest-based development and a sustainable forestry is far from being achieved and in some cases is being aggravating in the tropics.

Finally, the key chapter of the book (Chap. 5) merits special comment. It states that deforestation is a tragedy of socialistic forestry. But intentionally the book defines the socialism only by the ownership type that is predominant: state ownership of the forests. It shows clearly that the state in tropical countries has failed to make the transition. But many of the countries in which the state owns the forests are politically not socialistic at all, which implies a major contradiction.

The book also puts a strong emphasis on corruption as a determinant of deforestation but places corruption mostly as a national phenomenon, a vice practiced by public servants. Corruption is much wider and also affects the national and international private sector, not only because of subsidies for reforestation, for example, but also because of the commoditization of plantations and the proliferation of foreign intermediaries that want to make profits.

In the case of plantations, this commoditization is threatening to evolve to a bubble, like the real state bubble that produced the 2008 global financial crisis. The difference made in the analysis of deforestation in the tropics between poor and less poor countries is an emphasis that needs to be taken into account in further analysis of forest policies, and is a recognition of differences.

The chapter also analyzes the underlying causes of expansion of plantation forests. An interesting result is the different effect of plantations in relation to deforestation between poor and not so poor countries. In the poorest countries, there is no impact of plantations in the reduction of deforestation, as opposed to the not so poor countries, were plantation forests seem to contribute to reduce deforestation. This fact is a clear message that poverty is a dominant cause of deforestation, and that in order to reduce deforestation there is a need to tackle poverty, thus it is a general and not a forestry political issue.

The authors make also a strong call for the international system to improve the statistics around the forest sector and underline the difficulties for designing good policies under a scarcity of quality information. I have had the opportunity to interact with the researchers of Metla (Metsäntutkimuslaitos/Finnish Forest Research Institute) who are in charge of the annual forest statistics of the country: the quality and coverage of subjects permits informed policy decisions.

Chapter 5 also analyzes the effectiveness of the global forest politics and policies and calls for changes that do not permit another failure on this front. Many of the international initiatives have failed decade after decade to reduce deforestation.

Recently, I had the opportunity to participate in two events. The first was the Congress “Wood Lives and Carbon Neutrality” (Costa Rica) and the second was the 7th Central American Forestry Congress in Managua, Nicaragua, under the motto “Forests Without Frontier for Everybody and for Common Good”. Costa Rica decided to be carbon neutral by 2021, but it is quite clear that the path to carbon neutrality will operate unavoidably through the management of all natural forests, secondary forests, plantation forests, and trees in agriculture and pastures to produce wood and capture carbon in durable goods.

Costa Rica made the transition from deforestation to forest cover recovery but has still not made the transition to generalized sustainable forest management for wood production. In the case of Central America, as a region, the situation can be

identified very clearly in all the variables and consequences shown in this book: deforestation is rampant, population is still growing, poverty is generalized, per capita income low, just like corruption, productivity of land to produce food has not increased, there are weak institutions, and a passive wood and wood products trade.

The cases of Costa Rica and Central America are very well mirrored in the models presented by the authors. But also, and most important, from the point of view of the integrated forest transition model, it is possible to derive concrete policy proposals to reduce or eliminate the barriers to transform the forest sector in an engine for sustainable development and also to carbon neutrality.

There are many forest-rich countries in the tropical world that could use the explanatory power of the transition model presented here to go for a forest-based development model, Westoby's style, but with all the corrections from the results of the running of the models for the tropical countries, but in particular learning from the lessons of Finland and Mexico.

Finally, this book is a challenging piece of work for researchers and policy makers because it poses so many key questions that need to be addressed in further development and testing of this integrated forest transition theory.

I noted to my class on Science and Society at CATIE that in Newton's *Principia Mathematica*, the author lists more than 60 research questions derived from his capital work that kept the mathematicians occupied in the last 300 years. This book by Matti Palo and Erkki Lehto in the final discussion of each chapter poses questions that need to be addressed in order to make the badly needed transition from deforestation to forest-based development and sustainable forestry. Thanks Matti and Erkki for keeping us busy for the many years to come.

Ronnie de Camino Velozo
Deputy Director General of CATIE, Director of the Latin American
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Turrialba, Costa Rica, July 2011

Preface

A novelty in this book is that I have developed an integrated theory of forest transition that has been applied in analyzing both the historical forest transition in Finland and contemporary deforestation in the tropical countries. The theory of property rights gives a solid foundation for the analysis of the success and failure in sustainable forestry in private, community, and socialistic forests in Finland, Mexico, and 74 tropical countries. By following a multiple-case study methodology rational comparisons of the impacts of the different forest tenures become feasible.

My home country is Finland. It has the most northern location in the world. I became initially acquainted with tropical forests and deforestation in 1975–1983, when I consulted on FAO forestry projects in Malaysia, Mozambique, the Philippines, and Nigeria. Accordingly, contrasts between my country and the four tropical countries were multiple. The most dramatic experience was to see ongoing deforestation with its serious consequences, especially in the Philippines and Nigeria, contrasting the expanding forest resources in Finland.

After returning home from Nigeria I mobilized at the Forest Research Institute Metla in Helsinki our first study on the causes of tropical deforestation with my first published paper on this theme in 1984. Then a 5-year project on tropical deforestation at Metla and a 3-year project by Metla and the World Institute of Development Economics Research of the United Nations University (WIDER) was carried out. Finally, Metla with WIDER and the European Forest Institute (EFI) mobilized a global research program on "World Forests, Society and Environment" (WFSE). These activities provided me a network of nearly 200 forest scientists on six continents.

I have worked in 15 tropical countries in Asia, Africa, and the Americas. I have also worked longer periods in Denmark, the United States, and South Korea – altogether about 7 years abroad. The research plan for this book was initiated at Seoul National University. I have given lectures also on global and international forest and environmental politics and on the historical forest transition in Finland at the University of Joensuu (presently: University of Eastern Finland) and the University of Helsinki – both in Finland, and at CATIE and the United Nations University of Peace – both in Costa Rica.

My co-author Erkki Lehto has visited most countries of Central America as well as Indonesia and Malaysia. He has also stayed a few weeks at the Headquarters of FAO in Rome in order to familiarize himself to the statistical data published by FAO.

I feel confident that our personal acquaintance with tropical forests, forest people, and deforestation in the field and our familiarity with the relevant data and statistics with their validity and reliability problems and pitfalls have supported our research and modeling.

In fact, my mission by FAO in the four tropical countries and at the Headquarters of FAO in Rome was to review the quality of forest sector information and statistics. A high number of deforestation modelers hardly ever have wandered in a tropical rainforest or seen ongoing deforestation or a shifting cultivator with their own eyes. This may have handicapped their understanding of the deforestation problem under study.

During my one-year stay in Seoul, far away from Finland, I viewed my home country's forestry from an angle of an outsider. There has lately been a boom in studies of the Finnish forest history but none of them studied the issue against the theory of forest transition, which was my point of view here.

John Stuart Mill was a British scholar of the middle of the nineteenth century. I thought his idea to view a problem of study at its maximum and minimum was worth trying. This kind of reasoning led me to integrate and develop a universal forest transition theory and apply it both ex post on forest transition in Finland for about a century ago and ex ante on contemporary tropical deforestation.

My division of the work with Erkki Lehto has been the following. I have written the research plan, Chaps. 1–4 on forest transition theory and on evolution of forestry and forest transition in Finland. Jointly with Erkki we have made the modeling of underlying causes of deforestation in the tropics and in Mexico as well as modeling of underlying causes of expansion of plantation forests in the tropics and modeling of underlying causes of poverty in the tropics (Sects. 5.2–5.5).

I have alone written about the tragedy of socialistic forestry in the tropics, "Wild West" in uses of forest data in deforestation studies, and about global forest politics (Sects. 5.1, 5.6 and 5.7). Jointly we have discussed and concluded Chap. 5 in Sect. 5.8 and made the comparison of findings from the tropical countries, Mexico, and Finland in Sect. 6.1. Finally, I have written the Sect. 6.2 on policy implications, and Chap. 7's summary of the book.

Deforestation and forest degradation have increased greenhouse gases in the atmosphere by about 20% of the total global emissions. This has mobilized a fresh interest in redressing the emissions from deforestation and forest degradation or REDD+ by several bodies of the United Nations. Also enforcement of the Millennium Goals of the UN has focused increasing environmental and social interest on tropical deforestation. Plans exist to allocate billions of US dollars to tropical countries in order to stop deforestation.

So far no deceleration in tropical deforestation of natural forests has taken place in spite of the huge global and international efforts to stop deforestation.

Erkki Lehto and I believe that our book will bring some novel findings and insights on the underlying causes of tropical deforestation to support the design and enforcement of new remedies in this front. Some policy implications are introduced at the end of Chap. 6.

Another volume by Springer/World Forests will shortly be published under the same primary title "Private or Socialistic Forestry?". The subtitle of the new book reads as "Globalization of Forest Cluster and Transition to Postindustrial Forestry". I shall be the author.

Toholampi, Finland, July 2011

Matti Palo
Independent Scientist

Acknowledgments

Professor Yeo-Chang Youn of Seoul National University hosted me as a Visiting Professor at his university during 2003–2004. Yeo-Chang participated from the beginning actively in the brainstorming and design of this research project. He also organized four workshops in January 2010 to support our efforts. Furthermore, Yeo-Chang partly funded my research through his university and gave a fruitful hint to apply for traveling money from OECD.

Professor Wil de Jong of Kyoto University joined our planning team a little later. He made a critical review of our research plan at the time, which was beneficial for the formulation of the final plan. He organized with Yeo-Chang a couple of our planning workshops in Seoul. He was also able to channel funding of Kyoto University to cover the costs of the participation of myself and six participants from the tropical countries at the last workshop in January 2010.

Unfortunately, we never received funding for the full implementation of our research plan. Yeo-Chang published a case study of South Korea in Korean but no comparative studies were possible.

I have worked and published together with Erkki Lehto for about two decades. Our first joint paper on underlying causes of tropical deforestation was published in 1996. Erkki as a specialist in computers and statistics has organized our databases and run the models in Chap. 5. However, the design, interpretations of our findings and writing of the texts have been our joint effort. Erkki has also made most of our graphs, tables, maps, and some photos. He has made a careful work in proofreading the book.

Professor Olli Saastamoinen of the University of Joensuu (since January 2010 University of Eastern Finland) in Finland has played a special role in supporting this book. Since about 15 years back he has invited me biannually to give an intensive course of 16 h lectures on international forest politics. The last time was in April 2010, when I had 22 postgraduate students from 20 countries on 5 continents. Three of them, Pradipta Halder of India, Stéphanie Deffontaines of France, and Charles Kilawe of Tanzania, have written boxes for this book. Olli has also read Chaps. 1 and 2 of our manuscript and provided useful comments. However, he never agreed on the title of the book and on the concept of socialistic forestry, which pressured me for improvements in the definition of socialistic forestry.

Professor Jose Campos, present Director-General of CATIE of Costa Rica, has along with Professor Markku Kanninen, previous Deputy Director of CATIE, supported my affiliation to CATIE, where I was nominated in 2001 as an Affiliated Professor. This has brought me on several lecturing visits to speak before an audience of graduate students from the American tropical countries.

Professor Ronnie de Camino, present Deputy Director of CATIE and earlier faculty member of the University for Peace (UPEACE) in Costa Rica invited me as a Visiting Professor at this University. These opportunities in Costa Rica, South Korea, and Finland for lecturing and testing a great deal of the material included in this book have been most helpful and supportive for me.

Professor Jussi Uusivuori, my successor as the Professor of Forest Economics at Metla in Finland, has supported our undertaking in various ways. He has recommended publishing of our book in Springer's World Forests series, of which we are both Series Editors. Jussi has also read various parts of our manuscript and has given useful comments.

Professor Risto Seppälä of Metla, the past president of IUFRO, has read our entire manuscript and has given useful comments, which have improved the outcome. Dr. Jim Douglas of Australia, previous Chief Forester of the World Bank, has read, commented on, and language checked Sect. 5.1. Professor of History Jari Ojala of Jyväskylä University, Finland, has read and commented on Chaps. 1 and 2. Professor Matti Leikola, the past Chairperson of the Society of Forest History in Finland, has read and commented on Chaps. 3 and 4. Jan Heino, the past Assistant Director General of FAO, has provided some useful information and given comments on Sect. 5.7. Dr. Jussi Saramäki and Dr. Martti Varmola of Metla have commented on Sect. 5.3. Professor Simo Poso has read and commented on Box 2.3 and Sect. 5.6. Yrjö Sevola of Metla has read and commented on Sect. 5.6 and proofread of parts of Chap. 5 and Chaps. 6 and 7. Dr. Kari T. Korhonen of Metla has kindly provided us information about the Finnish national forest inventory system and has written Box 5.4. Dr. Matti Katila of Metla has reviewed and commented on Sect. 5.6.

Erkki Oksanen (Metla), Dr. Jari Parviainen (Metla), and Dr. Martti Saarilahti of Finland as well as Professor, Dr. Klaus von Gadow of University of Göttingen, Germany have kindly provided us a number of photos.

Catherine Cotton, Valeria Rinaudo, and Ria Kanters of Springer have been patient and utmost helpful through the lengthy process of this book making. I apologize to them that we were not punctual in matching the deadlines of the book finalization.

I retired from the vacancy of Professor in Forest Economics at Metla in 2003. Thereafter, I was nominated as an Associated Scholar (ulkopuolinen tutkija) at Metla, which has maintained me some helpful privileges. I have been linked with Metla's research station in Kannus, 500 km north of Helsinki – next to our farm in Toholampi, where I have done most of the writing. I have been happy with Metla's e-mail, library services in particular, but also with some computer and copy services by Markus Takalo-Kippola of Kannus.

I have enjoyed financial support by OECD of Paris, Kyoto University of Japan, Seoul National University of South Korea, and by two Finnish foundations, Metsämiesten Säätiö and Niemi-Säätiö. This funding has allowed me to pay for

some services supporting book making and for some of my travelling. The Finnish Forest Research Institute Metla has provided most valuable in-kind support.

I am deeply grateful for the support and advice from all these individuals and organizations!

Toholampi, Finland, July 2011

Matti Palo
Independent Scientist

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Chapter 1
Rationale of the Book

1.1 Problem of Continuous Tropical Deforestation

In industrialized countries deforestation and forest degradation were common until the middle of the twentieth century (FAO 1958; Morin et al. 1996). During the latter part of the twentieth century, however, a transition toward sustainable industrial forestry took place. Lately, a new transition toward postindustrial forestry has been under way (Mather 2001).

An effective judicial infrastructure and formal and informal institutions have been created to control the production, distribution, and consumption of forest goods and services to satisfy human needs. A market mechanism has been developed in countries where private forestry predominates to provide an additional control system (Palo 1997).

Consequently, in the most recent half century forest resources have increased in the industrialized part of the world, while tropical countries have faced serious market and government failures leading to continuous, large-scale deforestation of natural forests. This deforestation has grown along with increasing conversion of forests for agriculture and industrial logging, with expanding road networks facilitating access for the poor to exploit the residual forests.

Tropical deforestation of *natural forests* was estimated in 1980 as 11 million ha/year and in 2005 as 12 million ha/year (Lanly 1982; FAO 2006). Deforestation has expanded in spite of the multitude of global, international, and national political efforts to decelerate it. Our fundamental question here is why? A century ago, Finland stopped deforestation; why isn't the same possible today in tropical countries?

Some socially efficient deforestation is inevitable in originally densely forested countries in order to support economic growth and development. However, most deforestation today is not performing that function and can be regarded as a socially excessive activity.

Large-scale excess deforestation can cause serious social, economic, environmental, cultural, and spiritual problems, such as declining supplies of fuelwood and

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timber, depriving the subsistence and cultural values of the local forest people, and deteriorating watersheds and agriculture by erosion, flooding, and drought. Biodiversity, landscapes, ecotourism, and climate are also seriously impacted (cf. Douglas and Simula 2010; Lamb 2011).

Jack Westoby (1962) launched a paradigm of forest-based development, which the Food and Agricultural Organization of the United Nations (FAO) and many other development agencies adopted as a prevailing top-down approach during the 1960s and 1970s. In the late 1970s a bottom-up strategy of community or social forestry was created by FAO to replace the previous one (FAO 1978, 1979). Neither approaches were able to decelerate tropical deforestation.

Globally there has been much political rhetoric and many programs aimed at stopping excess deforestation. The International Tropical Timber Organization (ITTO) and the Tropical Forestry Action Plan/Program (TFAP) were created in 1985 with this mission. The 1992 United Nation's Conference on Environment and Development (UNCED) in Rio de Janeiro dedicated Chap. 11 of Agenda 21 to arresting deforestation.

The Non-legally Binding Forestry Principles of UNCED agreed on the first global definition of sustainable forest management to overcome deforestation and forest degradation. The follow-up to the UNCED decisions by the UN Commission on Sustainable Development and its forestry bodies, the Intergovernmental Panel on Forests (IPF), the Intergovernmental Forum on Forests (IFF), and the UN Forest Forum (UNFF), have all aimed among other purposes to decelerate deforestation (United Nations 2007).

Numerous regional criteria and indicator processes have had the same purpose (e.g., Bass 2003). Forest certification schemes have been adopted as market-based instruments against forest degradation since 1993. Illegal logging and corruption have since 1998 become explicit global problems worthy of battle by the international community in different ways. But deforestation of *tropical natural forests* has continued unabated, with only Costa Rica and a few other countries as exceptions (FAO 2001, 2006, 2010).

Earlier FAO (1993) reported the totals of tropical forests/countries separately from the nontropical countries, as well as changes in natural forests separately from plantation forests. This practice was helpful. In later FAO reports these key data are somewhat obscured. For example, Mexico is reported along with the USA and Canada and the Asian tropical countries along with Japan, South Korea, and China.

"Net deforestation" has been reported since FAO (2001) instead of deforestation of natural forests. Net deforestation refers to deforestation of natural forests plus expansion of plantation forests. The two elements are not, however, equivalent.

The ongoing deforestation of natural forests in tropical countries has been highly resistant to all global and international political actions so far (Sect. 5.7; Humphreys 2006; Douglas and Simula 2010). Most likely the political will of national governments has been one missing link in combating deforestation.

The tropical countries also lack the "automatic" control of deforestation by the "invisible hand" of Adam Smith, competitive stumpage markets- or economic

development-based Kuznets curve. On the contrary, the invisible hand has lately benefited most of the industrialized countries.

1.2 Research on Causes of Tropical Deforestation

Many sources of research findings on the underlying causes of tropical deforestation exist (e.g., Brown and Pearce 1994; Lambin 1994; Kaimowitz and Angelsen 1998; Wunder 2000; Angelsen and Kaimowitz 2001; Geist and Lambin 2001; Barbier 2001; Barbier et al. 2005; more in Sect. 2.2). In fact, the number of various macro and micro deforestation studies has exceeded 1,000 and a few meta-studies have been produced to summarize the numerous studies. Also the forest transition mechanism has been lately widely described (Mather 2001; Sect. 2.2).

According to the most recent global forest assessment of FAO (2010) deforestation is mainly caused by conversion of tropical forests to agricultural land. This is based on viewing the visible local deforestation agents as causes of deforestation, while most scientists stress the underlying causes.

An authoritative Center for International Forestry Research (CIFOR) report summarized the underlying causes of forest transition as follows. "In the latter stages of the forest transition, rural to urban migration, agricultural intensification, substitution of wood products (e.g., replacement of fuelwood and charcoal by fossil fuels), and other processes can lead to stabilization of forest cover loss and partial forest cover restoration. Indeed, this is a pattern that has been documented in various high income countries and several developing countries" (Sunderlin et al. 2007).

Our team's own findings about the underlying causes of tropical deforestation originate from the 1980s (Palo 1984, 1987; Palo and Salmi 1987; Palo and Mery 1990). They increased during the most active global forest politics era since the UNCED in 1992 (Palo 1994, 1999a, b; Palo and Mery 1996; Palo and Vanhanen 2000; Uusivuori et al. 2002; Palo and Lehto 2005, 2011). We have lately stressed the key roles of property rights (private vs. state ownership), corruption, poverty, GNP/land area, openness of trade, and agricultural productivity as underlying causes of forest transition (Chap. 5).

However, researchers have not arrived at a consensus about the underlying causes. Why?

There may be a number of reasons for this situation. For example, effective communication is difficult for scientists from multiple disciplines because of different scientific paradigms. In addition, deforestation data have been irrelevant or of low validity and reliability (Sect. 5.6). Perhaps the adopted research strategies have not always been most relevant to cope with the multiple conjunctures about the causation of deforestation.

Many studies have approached the deforestation problem at the micro level (e.g., Geist and Lambin 2001), which can be useful for specific situations. We, however, understand that the micro-studies often face serious generalization problems.

After all, the major decisions on deforestation come primarily from the macro national level.

Maybe the national institutional factors, such as property rights and transaction costs, market and government failures, missing community and knowledge institutions are some of the key factors underlying deforestation. Due to the long maturation times of their impacts it may be cumbersome, if not impossible, to identify them in the kind of modeling that has been applied.

1.3 Forest Transitions in Finland

Comparative country analyses might appear to be a more productive approach for better understanding why some countries have been able to overcome deforestation and transition to sustainable forestry and most tropical countries not (Humphreys 2006; Douglas and Simula 2010).

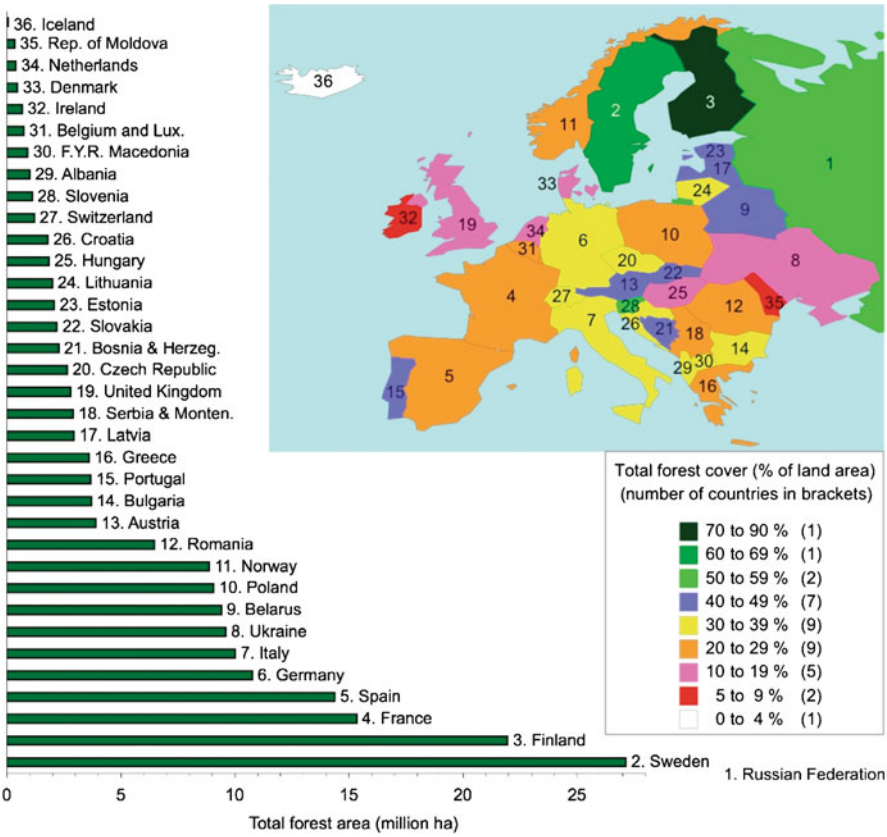
Some studies in this line have been executed (e.g., Morin et al. 1996; Pfaff 2000; Zhang 2000). A number of case studies in the first reference lack any coherent theoretical framework and therefore no systematic comparative country analysis was possible. The latter two have developed different theoretical frameworks but they seem to lack power of an integrated institutional-ecological-economic theory as introduced in this book.

The African Academy of Sciences, the FAO, and Sweden launched in 2003 a project to analyze "the positive and negative experiences of various initiatives, projects and programs aiming at sustainable management, use and conservation of forest resources in Sub-Saharan Africa" (AAS et al. 2003). No country-level systematic comparative analyses were made. Positive and negative country cases were also studied in a book on "Resource Abundance and Economic Development" (Auty 2001).

Demonstrations of country cases where it has been feasible to force institutions to arrest deforestation and to facilitate transitions to sustainable industrial forestry and toward postindustrial forestry have been largely missing. There is a lack of knowledge about common underlying causes existing among different countries in the South and in the North that would explain these successful processes. This book aims to fill a part of this empty niche.

Finland has the third largest forest area in Europe after Russia and Sweden (Map 1.1). Forest area per capita in Finland is the highest in Europe, which implies a high relative economic abundance of forests. Finland has only 0.5% of the total global forest area, but its share of the global exports of all kinds of forest products is 10% and 25%, respectively, of printing and writing paper.

Next to Canada, Finland is the largest net exporter of forest products in the world. Canada, however, has 8% of the total global forest area. Russia has 22% of the world's forests, but it is not a big player in the global markets of forest products (MCPFE 2007; Peltola 2007).



Map 1.1 Total forest cover and total forest area in 37 European countries (Data source: FAO 2005)

Finland has the highest forest cover per land area (73%) in Europe (Map 1.1), which implies also high environmental benefits. How has this kind of positive coevolution of forestry and society been possible in Finland? In tropical and most other countries, along with population and economic growth, the forest cover has considerably declined. This is one question we aim to explore in this book.

In Finland private forest ownership, predominantly family tenure, covers 69% of the total forest area. In the tropics, Russia, and Canada the state is the principal forest owner. We assume that property rights and ownership play a fundamental role in transition from deforestation into sustainable forestry. The dominant state ownership of forests seems to be problematic, especially under tropical conditions and in Russia. We are also interested in the respective failure of community forestry, which we study in Mexico with a reference to Papua New Guinea.

For a small country exports play a vital role in economic development. Finland provides a unique case in the whole world, where forest products exports have had