

**FOREST INDUSTRIES TOWARDS
THE THIRD MILLENNIUM –
ECONOMIC AND ENVIRONMENTAL CHALLENGES**

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Edited by Birger Solberg, Matti Palo and Pentti Hyttinen



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Forest Industries Towards the Third Millennium –
Economic and Environmental Challenges

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Matti Palo and Pentti Hyttinen

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FOREWORD

The dilemma between economic and environmental issues related to forestry and the forest industries sector has become increasingly complex during recent years. On the one hand, people's values and attitudes have been strongly changing towards environmental conservation. Consumers have been demanding 'greener' forest products and industrial processes, and governments have been influencing similar development via numerous international conventions. On the other hand, the economic environment of the sector has changed as well. Along with lowered national trade barriers, the trade of forest products has become global in its nature, resulting in an increase in the number of mergers and in internationalisation. When Austria, Finland and Sweden entered the European Union in 1995, the forestry and forest industries of the Union also entered into a new era.

Accordingly, for the European Forest Institute, this was a most fitting situation to invite a wide audience to review these new challenges being met by European forest industries. Financial support from the Finnish Foundation for Economic Education (Liikesivistysrahasto) made the arrangements possible.

As is evident from its title, *Forest Industries Towards the Third Millennium: Economic and Environmental Challenges*, the seminar aimed to provide the participants with an overview of the issues facing the forest and forest industries sector as we head into the next century. Almost 300 people from over 20 countries attended. The wide range of participants included representatives of forest industries, forest owners, researchers, administrators and professionals dealing with matters related to the theme. To this point, this was the largest occasion arranged by the EFI.

The seminar day was complemented by an excursion during the following day, which provided the participants an opportunity to observe practical operations and to exchange views on the seminar theme. Almost 100 people participated in this field trip.

We would like to thank all speakers and participants for the most stimulating and active presentations and discussions that took place during those two days, as well as all the organisations and individuals who were involved in the arrangements of the seminar and the field trip. This successful experience encourages us to try again in the future.

Joensuu, August 1996

Birger Solberg
Director of EFI

Matti Palo
Chairman of the
Organising Committee

Pentti Hyttinen
Secretary of the
Organising Committee

WELCOMING ADDRESS

T. J. Peck

Chairman of the Board, European Forest Institute

It is my very great pleasure to welcome each and every one of you to this Seminar, and I sincerely hope that you will find it an interesting and worthwhile event. The title “Forest Industries Towards the Third Millennium – Economic and Environmental Challenges” is quite a mouthful and may appear rather ambitious for a one-day meeting. But what the organisers are hoping and expecting to achieve is not a comprehensive examination of all the challenges facing the forest and forest industries sector, but to highlight the key issues which our industries are facing as we approach the next century and millennium. For that, they have assembled an impressive panel of speakers, moderators and discussants, and I do not think that you will be disappointed with what they have to say – even if you may not totally agree with them!

These are the people you have come to Joensuu to listen to, not me. So I shall only take a few minutes of your time while I try to set the scene, so to speak, for today’s discussions. We as an industry sector have been buffeted in recent years by strong winds of change: changes in the economic climate and in the pattern of global production and trade of forest products; changes in the political scene – and here I am thinking not only of the developments in eastern Europe and the former Soviet Union, but also of the deteriorating relationship between people and their political leaders almost everywhere; social changes; technological changes, notably the communications revolution; and, by no means least, changes in people’s attitudes towards the environment. And without even looking into a crystal ball, one can safely predict that the future will remain unpredictable. Change is and will continue to be a fact of life; and the pace of change will, if anything, continue to accelerate. We have to accept that as a challenge; if not, we might as well close up shop now.

Talking of challenges, I shall probably upset some people by saying that we, the forestry and forest industries sector, have been unduly slow in the past to take up challenges. With a few notable exceptions, we have been *re-actors*, and not *pro-actors* (these words probably do not exist, but you will understand their meaning). What I am saying is that we have tended to wait for something to happen, such as an attack on our way of doing things, before we start doing something about it. We have failed to take the initiative by demonstrating and publicising the fact that our sector is based on a truly remarkable raw material that is abundant, renewable, versatile and, not least, environmentally-benign.

Wood does of course require extensive areas of land for its production, but unlike most other crops, production can be, and frequently is, combined with functions of the forest, the environmental and social goods and services, the so-called non-wood benefits. Already in some countries, the value of these benefits in aggregate exceeds that of wood production, and virtually everywhere demand for them is rising faster than that for wood. Nevertheless, it is generally the case that wood production has been, and is likely to remain, the single most important function of the forest; and its importance is enhanced by the fact that revenue from wood production often has to subsidise the provision of the other non-market goods and services. Furthermore, the value added by downstream processing, trading and utilisation of wood products, and the revenue and employment that goes with it, means that the forest and forest industries sector is a far from negligible component of the national economy, even in countries partly dependent on imports of forest products.

We in the forest and forest industries sector are aware of these things, but we tend to be surprised when other people are not. We also know that Europe's forest growing stock has been expanding over many decades, but opinion polls have shown that the general public believes that it is shrinking, as is the case in the tropics. There has been a major failure in communication here, and we have to accept responsibility for that; and we have to accept the consequences, including a poor image in the press and among the public as well as criticism from environmental groups.

Some of the criticism has been justified. Let's face it, there have been malpractices in logging and other forest operations, in industrial emissions, in wasteful use of forest products, and so on. Environmentalists were right to draw attention to the damage caused but, I believe, our industry has had a rather good record of acting to put things right and this has often not been recognized. In fact, I wonder if there is any other industry sector that has moved so far and so fast to introduce better environmental practices. But again we have been slow to explain these improvements to the public and we still continue to be criticised for practices which have largely been phased out. Stopping large-scale clearcutting in Europe is one such example; reduction of pollutant emissions by the pulp and paper industries is another; increasing re-use of waste paper yet another.

Our industries are competing in an increasingly tough and globalised market. They are not only competing against each other but also against other industry sectors. In a liberalised economy that is entirely as it should be, provided that the players are competing on a level playing field, that is, on equal terms. Even in a market economy there have to be certain constraints imposed for social or environmental reasons. One such constraint that will be discussed later today is certification of production and management according to the principles of sustainability. As applied to the forest sector, some sort of certification is not only desirable but necessary, in my opinion, but no more so than for other industry sectors and products. The question that needs to be asked, however, is whether there is the same pressure on these other sectors to ensure sustainability of their resource base, the quality of their production processes and the recycling of their products as the forest sector is subjected to.

I get the impression that the forest sector has been singled out for attention precisely because of two of its positive features: its sustainability and renewability, when properly looked after; and its diversity and versatility. These are features one does not immediately associate with, say, an oilwell or quarry or mine or even a wheatfield, but just because the

same criteria can not be applied to their exploitation, this does not mean that they and the products coming from them should not be subjected to similar constraints as wood.

Forgive me for riding some of my favourite hobby-horses here. This Seminar does seem to be, however, an ideal occasion at which to launch a united effort to promote our industry and the benefits it can bring to society – materially, culturally and environmentally. We should not hide our light under a bushel, as the Bible put it, but go out and spread the good news. Fifty years ago, Egon Glesinger wrote a book called “The Coming Age of Wood”. He may have been ahead of his time in some respects, for instance in his belief that wood would become the preferred raw material of the chemicals industry, but much of what he had to say at the end of World War Two about the longterm potential for wood and its derivatives is at least as relevant today as it was then. Our industry has been blessed with a renewable and versatile raw material coming from a sustainable and multi-purpose resource. It is up to us to make the most of the unique opportunity that this offers. That will be the challenge as we enter the Third Millennium.

We at the European Forest Institute see a vital part of our mission as being to assist decision-makers, whether in business or government, to strengthen the forest and forest industries sector throughout Europe, and thereby to make it better able to contribute to the well-being of people throughout the region. We feel we can best do this by generating and disseminating reliable and objective information at the international level about the sector and the environment within which it operates, and by providing opportunities, such as today’s Seminar, for open dialogue on the difficult issues confronting it. Hopefully such initiatives can provide a sound basis for policy-making and strategy-formulation. It was very much with this objective in view that we were delighted to join with the Finnish Foundation for Economic Education as co-sponsors of this Seminar. On behalf of both bodies I wish you a most pleasant, interesting and useful stay in Joensuu.

OPENING ADDRESS

Hannu Tenhiälä

County Governor of North Karelia
Finland

As a representative of the Republic of Finland, I have the pleasure of welcoming you to this international seminar organised by the European Forest Institute. The challenges faced by the forest sector will be evaluated and discussed in this seminar. This seminar also promotes active participation in questions concerning the international forest sector. With issues such as harvesting and the use of wood products that have been in focus lately, it is important to have an accurate picture of forestry.

Looking at the situation from the point of view of Finland, our problem is the lack of knowledge on Finland abroad – even when compared with other Nordic countries. This fact was revealed by a joint Nordic consumer survey in Germany, Great-Britain and the Netherlands. Although the survey generally gave a positive picture of Euro-consumers' attitudes towards the Finnish forestry, as many as 45% of the interviewees did not have any opinion on it. The corresponding figure for Sweden was only 25%. According to the replies, Swedish, Norwegian and Canadian forestry is believed to be better conducted than forestry in Finland. We Finns hope that along with our membership in the European Union knowledge on Finland spreads accordingly.

Forests, and everything connected with them, are close to our hearts. That is why the survey results I have just mentioned are somewhat confusing and certainly give food for thought to us. One of the particularly important matters is the dissemination of correct information on the use of forests.

Forests are the most valuable national heritage of Finland and the only significant natural resource we have. They are the source and the precondition of our economic prosperity. Today over half of our export income comes directly or indirectly from forests. That is more than in Sweden or Germany. The forest sector also acts as an engine for the development and diversification of other industries.

The structure of forest ownership in Finland is unusual. Private individuals own approximately two-thirds of the nation's forests. In addition, forests are owned by the state and companies, but to a lesser extent than elsewhere in Europe.

Finnish forests are currently in better condition than ever before. One reason for this is the structure of the forest ownership, which guarantees the high level of forest management. After all, everyone wants to take good care of their property.

Finland is one of the new members in the European Union. It has been said that the power and opportunities of the EU lie in its members' comparative advantages. Our strength lies with our forests. Forestry based on sustainable development is Finland's input to international cooperation.

North-Karelia has the honour to be the venue for this seminar. I wish to take this opportunity to say a few words about our county.

It can be said that North-Karelia is like miniature Finland, as far as forestry matters are concerned. North-Karelia and East Finland in general are very much dominated by forests. In addition, North-Karelia, and, in particular Joensuu, is an international centre of education and research.

Looking into the future, I see we have many special fields which we can specialise in, both nationally and at the European level. One of these fields is the neighbourhood co-operation with Russia where we currently export forest know-how. Another special field is the biosphere area in Ilomantsi, which is the second biosphere area in Finland. When combined to corresponding Russian areas, this provides a unique and internationally interesting field of research.

The significance of forests in the European Union has increased along with its new member states. This has also emphasised environmental requirements and environmental acceptability covering the production and distribution chains of forests.

Forestry has answered to the environmental requirements in two ways. Firstly, the number of protected areas has been increased and, secondly, forestry methods have been developed to take biodiversity into account better than before. We have also become more aware of the fact that forests are a source of innumerable values and that they give us plenty of opportunities for recreation.

Participants of the seminar, again, I wish you cordially welcome to this forest seminar. I also hope that North-Karelia in the early spring will leave you with pleasant memories of your stay.

WORLD FOREST RESOURCES – TRENDS AND PROSPECTS

K.H. Schmincke

Director of Forest Products Division, Forestry Department
Food and Agriculture Organization of the United Nations

1. INTRODUCTION

The world-wide debate on the conservation, utilisation and management of forests has taken a dimension which on the one hand reflects the high degree of public awareness of the subject, but on the other hand challenges political and economic decision makers to use this awareness in the best way for the sustainable development of global forests.

“Forests are essential to economic development and the maintenance of all forms of life“. This is quoted from the preamble of UNCED’s Statement on Principles of Forests.

However, at the end of the second millennium many voices are warning that our forests may not be sufficient to cover the increasing needs for goods and services provided by forests in the future, at least in some regions. In my speech I would like to address the issue of dwindling resources, increasing demand and possible activities to address the problem. To answer the question “Do we have enough forests ?“ is one of the major challenges of FAO and all other organizations involved in forestry outlook studies.

As a follow-up to the UNCED summit in Rio in June 1992, the forest community is organising and attending many important gatherings during 1996 and the coming years. Of note are the meetings of the UN Committee on Sustainable Development, CSD, the Intergovernmental Panel on Forests, IPF, the activities of its secretariat and the specific meetings organized by countries to cover the main themes defined in the CSD process. I should mention also two other major events planned for this and next year:

- The Commonwealth Forestry Association Conference to be held in South Africa under the theme “Forestry in a changing political environment“, and
- The World Forestry Congress to be held in October 1997 in Turkey under the title “Forestry for Sustainable Development: Towards the 21st Century“.

Underlying all these meetings are the general issues of declining forest resources, wood demand and supply, sustainable forest management, certification and eco-labelling. This seminar is one of those meetings that are important for the understanding of ongoing processes, for information exchange and for the strengthening of co-operation between forestry institutions.

2. THE WORLD'S FOREST RESOURCES

When speaking about the world's forest resources, trends and prospects, we must realise that only a review of our own past and an understanding of the present may enable us to assess the future. This is true for forestry in general and for European forestry in particular.

Many European countries which have more than one hundred years experience in forest conservation and development are in a far better position regarding sustainable forest management than other regions of the world. Private ownership based land tenure system, the intensification of agriculture, the development of industry as a major driving force for economic development and the use of new energy sources prevented us from the complete depletion of our forest resources in Europe. After the industrial age, most European countries are now in the process of entering the environment age where the utilisation of natural resources is closely monitored from the point of view of its ecological soundness. Multiple-use forestry with the recognition of the non-monetary values of forests is a part of the new approach to utilisation and conservation of natural resources.

Information given in Table 1 on forest areas in both the tropical and non tropical zones, and on the estimated changes in forest area that occurred during the 1980s summarises results obtained within the framework of the Forest Resources Assessment (FRA) 1990 of FAO and ECE. As shown in the table, the total area of world forests declined an average of

Table 1. Estimated global forest area in 1980 and 1990

Region	Forest area 1980 million ha	Forest area 1990 million ha	Total change 1980-90 million ha	Average annual change %
Tropical areas				
Africa	568.6	527.6	-41.0	-0.7%
Asia/Pacific	349.6	310.6	-39.0	-1.2%
Latin America/Caribbean	992.2	918.1	-74.1	-0.8%
Subtotal tropical	1 910.4	1 756.3	-154.1	-0.8%
Non-tropical areas				
Africa	19.2	21.4	+2.2	+1.1%
Asia/Pacific	240.5	245.4	+4.9	+0.2%
Latin America/Caribbean	90.9	93.7	+2.8	+0.3%
North America	464.6	456.7	-7.9	-0.2%
Europe	147.8	149.3	+1.5	+0.1%
Former Soviet Union	732.4	755.0	+22.6	+0.3%
Subtotal non tropical	1 695.4	1 721.5	+26.1	+0.2%
World total	3 605.8	3 477.8	-128.0	-0.4%

Sources: Forest Resources Assessment 1990 – Global Synthesis (FAO, 1995)

about 0.4% per year over the decade. Nearly all of this loss was in tropical countries, where the total decline is estimated at 15.4 million hectares annually. Nontropical forest areas on the whole actually increased by about 0.2% annually, although this statistic hides important forest losses in some individual non tropical developing countries. Most of the increase in non tropical forest areas can be attributed to afforestation of abandoned agricultural land in the industrialised world and to increasing industrialisation of agriculture respective to changing land use in countries in transition to market economy.

It is widely recognised that deforestation in developing countries is highly correlated with population growth. The exact nature of this relationship varies among the different regions and in the different types of forests. Reality in developing countries prevents us from having simplistic approaches and exaggerated expectations. The great majority of developing countries, with all their social, political and economic constraints, will not be in a position to reverse the present deforestation trend in the near future. On the contrary, expansion of all forms of agriculture over forest areas is likely to continue and, forests will be further cleared or degraded in the absence of land use plans. On the other hand we have to recognise that natural resources like forests are a base for economic and social development; the way they are used and where the profits go is a decision of sovereign countries.

Attention is commonly directed towards the forests in tropical countries. The reasons for this are manifold:

1. Tropical countries own more than half of the world's forest resources: 1.76 billion hectares out of 3.4 billion hectares, which is 52 percent. Most of these forests are endangered by clearing or degradation. 15.4 million hectares have disappeared every year during the 1980-90 period; and this is likely to continue.
2. Tropical countries supply only 9 percent of about 1.5 billion m³ total industrial roundwood production world-wide. Log production in tropical countries was rather constant over the last 10 years with about 135 million m³ annually.
3. This part of the world has a very high consumption potential which is increasing with the economic development, especially in Southeast Asia and in parts of Latin America.
4. The rapidly increasing demand for timber in Asia (China, Korea, India, Thailand and others) and the simultaneous depletion of resources in the region have induced big international companies to extend their activities from SE Asia to Africa and Latin America. Frequently forest authorities in these two regions have not the experience, skills and facilities to cope with this new wave of forest exploitation and timber export. There is again a real danger of overexploitation and of non-sustainability in forest development.
5. The increasing population in the tropics and the permanent decline of tropical forests, will also affect our welfare and quality of life and the global climate. Two thirds of the additional 90 million people entering our globe every year will come from tropical regions; all of them make a demand on land and forest products.

These are just five reasons why sustainable forest development in tropical regions takes such priority in the international community, in particular in the organisations of the UN system. Non-tropical forests such as the boreal forests are of importance, but in this speech

I will concentrate on tropical forests, since these are closely linked with the development of the countries concerned.

3. THE INCREASING WOOD DEMAND

Let us now turn to the demand side of the equation. The driving forces for wood demand are population growth and economic welfare.

From 1950 to 1990, world population increased from 2.5 billion to 5.3 billion. At the same time, wood consumption rose from 1.5 billion m³ to 3.5 billion m³. Half of this is fuel wood that is used up to 80% by developing countries. By the year 2010 a total world population of about 7 billion will consume some 4.7 billion m³ of wood, of which 50% is fuel wood. This corresponds with an increase in wood consumption of 33% from 1990 to 2010.

As we can see from Figure 1 and Table 2, a considerable increase in demand for wood products is expected on the basis of population expansion. These graphs show that while demand is rising, forest cover is declining. The curve representing the evolution of forest cover graph is based on the projections made by FAO within the framework of its global forest resources assessment programme. The demand for forest products has been converted into roundwood equivalents.

Table 2. Population, Forests, Wood Consumption to 2010

Year	1980	1990	2000	2010
Population	4.44	5.28	6.16	7.03
Forest area, ha	3.61	3.44	3.25*	3.06*
Wood Consumption, m ³	2.93	3.51	4.09*	4.66

Sources: FAO Forest Resources Assessment 1990, Global Synthesis (1995)
 FAO Forest Products Yearbook (1991)
 FAO Forestry Statistics Today for Tomorrow, 1993 - 2010 (1995)
 UN World Population Prospects (1994, Medium variant)
 * estimation

Although the total allowable felling of the world's forests exceeds in theory the projected demand for timber, the limitations in harvesting imposed by infrastructural and environmental constraints will continue to reduce the area of forest land that is available for timber extraction. This development might escalate the supply/demand situation in the long term. Many efforts are required to overcome the problem of decreasing available resources and an increasing number of consumers. The solution for overcoming future wood supply gaps does not lie only in the extension of forest area – through, in particular, the establishment of forest plantations – which will be limited by competition with other land uses. A fuller and more sustainable use of forest resources will be required if we don't want to be forced to substitute wood by other materials: this can be achieved in particular through an increase of material efficiency and the sustainable management of existing forests.

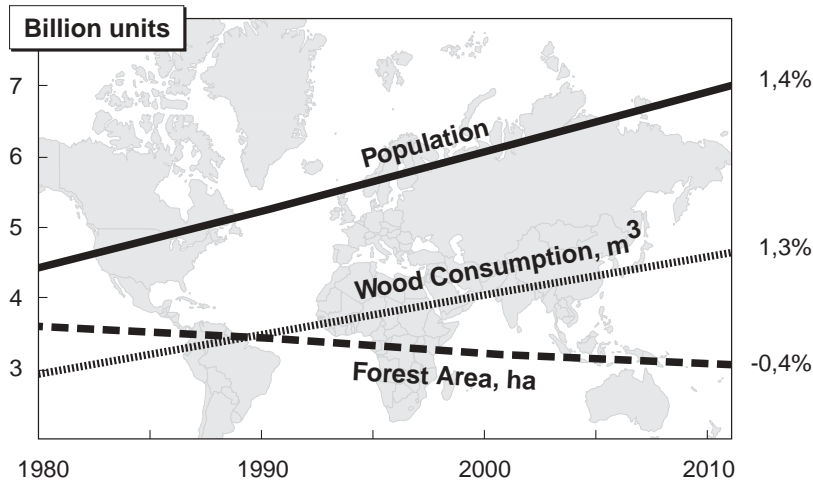


Figure 1. Population, forests, wood consumption by 2010

4. MATERIAL EFFICIENCY AND WASTE MANAGEMENT

Increasing material efficiency and reducing waste are a part of present and future efforts of wise resources management. Some decades ago, the availability of wood residues and small diameter logs encouraged researchers to develop forest products based on wood chips. I am speaking of wood based panel products. This development reduced the need for solid wood and brought even a quality improved product with regard to dimension stability, uniformity and handling.

Currently a trend away from those traditional wood based panels towards fibre based panels can be observed. The main products are medium density fibreboard, oriented strand board and engineered wood products. The main driving force for all those product developments was, of course besides market requirements, the changing resources availability. The new products were usually less demanding to particular species, sizes or raw material quality, allowing a wider use of forest resources. Forest plantations have been established and successfully utilised for wood based panels production.

Besides an innovative product development, the increase of material efficiency in terms of increasing wood recovery and better use of wood residues could contribute to relieve the problem of dwindling resources. Increasing wood recovery has to start during forest harvesting, where a recent analysis by FAO suggests that wood residues from harvesting operations in natural forests in the tropics could be reduced by 10-30% without a significant increase in harvesting cost.

An example of raw material wastage is plywood production in tropical countries. Frequently recovery in plywood production is less than 50%, depending on raw material quality, processing techniques and required product quality, although about 60% of production cost is the cost of log. It becomes clear that an increase of wood recovery would not only have an impact on the resources economy, but could also considerably increase the profita-

bility of the production. In Asia, a comprehensive upgrading and restructuring of existing industrial plywood facilities has taken place, in order to reduce raw material needs and to improve economic viability in view of stronger competition between products and supplier countries.

Of course, material efficiency and waste management can only be part of an overall approach to better and wiser utilisation of forest resources. Market forces and cost reduction will continue to determine the success of products. Environmental considerations will have to be incorporated into economic and market strategies. Forest management is a perfect example for a resource management that allows long-term economic success only with due consideration of the social and ecological requirements.

5. FOREST PLANTATIONS

A further possibility often suggested to overcome the problem of dwindling resources is the establishment of forest plantations.

Currently forest plantations supply approximately 10% of the world's industrial wood. Altogether, this almost equals the volume of industrial roundwood which is produced annually in the tropical countries. Frequently it has been mentioned that plantations in the tropics will solve shortfalls in the wood supply and would be the future of the forest industry. It is unquestionable that already today forest plantations considerably support the forest based industry in many countries, thus reducing the pressure on natural forests.

Public criticism of plantations is mainly based on the reduction in biological diversity which they entail. On the other hand, plantation forests are easier to manage in a sustainable way than natural mixed forests. If established and managed carefully, plantations can continue to supply fibre, protect soils and increase intensity of land utilisation, especially on degraded soils and marginal sites where agriculture crops are not growing satisfactorily.

Table 3 shows the distribution of tropical plantation areas by region in the years 1980 and 1990 and the annual planting rate. The annual growth rate of plantation area in the tropics is estimated at 2-3 million hectares during the period 1980-1990, thereof approximately 1 million hectares in the form of industrial plantations. With regard to the available area of non-arable land, the current growth rate of forest plantations could be extended considerably.

The potential of forest plantations has not been fully realised. Yields and survival rates are lower than they were assumed to be originally. Experience shows that often the necessary tending of plantations, such as thinning and pruning, has not been done properly. Production costs have frequently been underestimated, especially in large scale, externally funded plantation projects. If properly planned and managed, plantations do not only relieve the pressure on natural forests, especially primary forests, but they also offer a wide range of benefits to all parties involved.

It is reasonable to assume that the importance of industrial forest plantations will continue to grow. Together with agriculture residue fibre such as rubber wood and coconut wood, a considerable share of future fibre supply will come from plantations.

Table 3. Regional plantation areas in 1980 and 1990

Region	Number of countries	Total plantation area by categories (in million ha)						Average Annual Rate, 1000 ha
		1980			1990			
		Industrial	Non-Ind.	Total	Industrial	Non-Ind.	Total	
Tr. Africa	36	0.96	0.76	1.7	1.37	1.62	3.0	127
Tr. America	26	2.55	2.36	4.9	5.10	3.54	8.6	373
Tr. Asia	19	3.57	7.60	11.2	9.16	23.14	32.3	2,112
Total	81	7.1	10.7	17.8	15.6	28.3	43.9	2,612

Source: FAO Forest Resources Assessment 1990 Project. Due to relatively low success/survival rates all area figures must be corrected by a factor estimated globally at 0.70.

6. THE RECOGNITION OF SOUND FOREST MANAGEMENT

Sustainable forest management is one component of overall sustainable development. It will ensure that the values derived from the forest will meet present-day needs, at the same time ensuring their continued availability and contribution to long-term development needs.

FAO's main interest is to encourage countries to implement sound forest management practices in order to secure the conservation of the world's forests. We should, however, acknowledge that there is not a single path to sustainable forestry. Different climate regions, different forest formations and, last but not least, different cultures call for appropriate management systems. Sustainability does not just include sustained timber yield but also maintenance of environmental functions and participation of local population in all benefits accruing from the forests.

It is recognised that sustainability can only be achieved with regard to a limited set of objectives of forest management, whether these be timber production, non-wood forest products or ecological functions, which should be clearly defined prior to the formulation of forest management plans.

Timber production will certainly remain a major objective of management of most of the world's forests for the foreseeable future. The challenge is, therefore, to integrate timber production with the provision of non-timber services of forests, such as soil and water conservation, climate stabilisation, conservation of biological diversity and social functions in a broad concept of sustainable management for the benefit of all parties involved.

To some producer countries, sustainability may even mean drastic cutbacks in production, foreign exchange reductions and job losses. The most serious issue concerning sustainable timber production will probably be the determination of the volume of harvestable timber volume.

Malaysia and Indonesia, for instance, experience the most rapid growth of wood demand because of their fast growing economies and rising appetite for wood products. A recent ITTO analysis for Malaysia revealed that by 2010 Malaysia would have just enough timber

to meet its own internal needs and would eventually become a net importer of forest products. This would have significant effects on Malaysia's economy. Export earnings would disappear, thus lowering the availability of foreign exchange and investment capabilities. Other countries in the region are already, or will be, affected in the same way.

When dealing with supply and demand of forest products and the improvement of forest management practices, we have to consider the certification of timber and other forest goods as a marketing tool for the trade-industry-consumer chain. Higher rewards for certified timber, though this is by no means certain, might become an incentive for forest owners and managers to establish and maintain a high level of forest management.

Not only do we need to make management practices technically better and environmentally more friendly than before but we also have to evaluate them. Evaluation of management could be done by certificates for sustainable forest management. Certification must therefore include the control and verification of management practices through independent organisations or bodies.

Many governments and companies are considering the introduction of forest certification schemes, or have already taken steps to implement them. However, to do so, it is important to have a clear understanding of what sustainable forest management is. There is the danger of proliferation of certification systems competing with each other and to confuse more than to clarify the discussion. Systems that are not approved on a broad base and tested in a scientific manner might be harmful to the overall implementation of certification schemes.

Strong calls for harmonisation and unification of certification systems are heard everywhere. Initiatives at the forest management unit level, such as the ISO approach and the Forest Stewardship Council Criteria, have to be related to national-level initiatives, such as the Montreal and Helsinki processes. The requirements of many parties involved, such as forest owners, industry, governments, scientists and environmental groups have to be met.

Exporting countries have recognised that many of their markets are likely to introduce some form of certification, and they are working to develop acceptable schemes to ensure open markets. Amongst the countries working on certification schemes are Indonesia, Malaysia, which has indicated its intention to develop a system by the year 2000, the Nordic countries, Canada, USA, Brazil, Australia and New Zealand. Most African producer countries are represented by the African Timber Organisation, which has initiated moves towards a label.

Few of the certification schemes are unbiased, reliable and operational. Two weeks ago I participated in a meeting on criteria and indicators for SFM on Forest Management Unit level in Costa Rica, convened by the Center for International Forestry Research (CIFOR), in which all certifying companies were present.

The main task was the review of testing criteria & indicators done in 3 countries with the overall result that

1. practical research still has to go a long way before a clear, generic and site-specific set of practical criteria & indicators will be defined allowing the monitoring and assessment of forest management practices;
2. all certifying companies have to learn much more than their own standards to make certification reliable and acceptable.

Negative impacts of certification might be discrimination vis-à-vis those unable or unwilling to achieve the defined forest management standards and misuse of certificates in

favour of unsustainably produced timber. However, certification cannot be ignored any more. Producers must pay serious attention to the development of policies and strategies appropriate to their own situation. They must actively participate in development at all levels in order to ensure that their own interests are not ignored.

7. THE FAO GLOBAL FIBRE SUPPLY STUDY

What has been said above about the situation of forest resources, wood demand and the possibilities to overcome potential supply gaps, shows that it is justified for the whole forest community and the public at large to put forward the following basic question:

Where is the raw material that will cover our forest products needs going to come from?

The reverse could be formulated as:

How much productive forest will we need to supply the expected fibre demand in the future?

To answer this is difficult. I am sure that the issue of dwindling wood resources is not relevant to the Nordic countries. You are certainly more concerned with conservation and economic performance of your forests, since wood resources in Nordic countries are still abundant. However, the debate of sustainable forest management, including all environmental forest services has become an important element in the public discussion also in those countries.

But little is known about the amount and mobilisation of the potential yield of forests in Russia and in the three main tropical sub-regions: Amazon, the Asian Southeast (Indonesia, Malaysia) and in the Congo basin. No significant attempt has been made so far to assess the current and potential wood availability from those regions where there is a general lack of long-term forest development planning and a weak database on forests and wood resources. Available timber resources are often overestimated, which can easily lead to a continued overutilisation of forests if the national budget calls for cash revenue from wood sales.

With regard to the importance of identifying the source to supply the potential requirements of wood and non-wood fibre and its uses, and in order to help reply to the question on whether we have enough forests, FAO has recently initiated a **Global Fibre Supply Study**. The time horizon of this study is the year 2010. The study aims at describing the current sources of industrial fibre and their relative importance, their uses and markets. It will provide projection and analysis of future developments in fibre supply and demand, based on explicit consideration of major factors affecting them.

Wood fibre, non-wood fibre and recovered fibre for the primary forest based industries such as sawmills, veneer mills, pulp and paper mills will be considered, providing market analyses and uses.

Initial research work demonstrated that the bottleneck of all resources studies in developing countries is a lack of reliable data on wood volumes, both in terms of harvested volumes and of annual growth. 70% of all inventory data on these regions are more than 10 years old. Available sources of information are frequently outdated or not satisfactory. An

opportunity to improve the data quality has been recognised by doing research in the relevant supplier countries. This does not include research fieldwork, but the establishment of direct contacts to authorities, institutions and the private sector in those countries. We assume that the private sector is probably the most sensitive body with regard to wood volumes and to developments in wood supply and demand. We expect therefore information and many valuable contributions to the study from this side.

So far, close scientific collaboration has been established with the United States Forest Service, the Swedish University of Umeå and the German Federal Research Institute for Forestry and Forest Products. For the next steps of the study, we are also welcoming co-operation with **EFI**.

EFI has certainly the expertise to cover the data needs for the European Union, Russia and the former Soviet Union Republics. We believe that such challenging work as the fibre supply study can only be carried out as a joint effort between all parties involved and interested in it. In this sense, we look forward to a fruitful cooperation with your institute and your member governments.

In a similar vein, there is a need to look into the future on a regional basis. Some regional and subregional outlook studies have been carried out in the past. Probably the best known are the studies prepared for Europe and North America. In both regions, the forestry sector analysis and resources planning have long traditions. In Europe the FAO/ECE Timber Trends Studies have been carried out since 1954, while in the United States the overall resources planning has been carried out since 1974 in the Forest and Rangeland Renewable Resources Planning Act (RPA).

From all that I have stated here, it is clear that the many problems facing global forestry can only be solved by coordinated efforts of all parties concerned, be these governments, research and development institutions, private companies and associations or other NGOs. In a time of decreasing resources, all forms of duplication and overlapping should be avoided. FAO has opened its doors for enhanced cooperation, invited the private timber industry to contribute actively in its work on sustainable forest development and called for environmental groups to participate in a constructive dialogue. We are confident that our efforts will bring the expected results for the improvement of forest conservation and development world-wide.

RESPONSE TO K.H. SCHMINCKE

Claire Hubert

Director of AFOCEL-ARMEF
France

First of all I want to apologize for J. Sturm who could not attend this meeting. As a discussant, I will focus on different aspects raised by Dr. Schmincke's paper.

- 1) **Future prospects are difficult because of uncertainty in relation to demand** (population growth, people's welfare, substitution products technology etc.) **and supply** (forest area, productivity etc.).

Dr. Schmincke pointed out that there are "weak databases on forest and wood resources". This is obviously true, but let us see what is happening in France. There is a permanent National Forest Inventory that assesses both dendrometric and ecological factors on 145.000 plots every ten years. There is also an annual exhaustive survey on the wood consumption of forest industries. AFOCEL uses these data to forecast wood availability for forest industries in different regions. The analysis of two successive inventories allows the calculation of ratios and the validation of hypotheses on thinning, clearcutting, plantation and so on. Then silviculture models are applied and prognoses are made. Although this work leads to interesting conclusions, the results present a great deal of uncertainty. The National Forest Inventory costs 8 million ECU per year (0,5 ECU/ha/year). The weak data bases are certainly one reason for poor estimates, but is it realistic to conduct such expensive inventories everywhere? Technology will change and satellite information will be used increasingly for the purposes of forest evaluation. However, the prospects for forest resources other than wood are unknown.

- 2) **There is no biological constraint in relation to the prospects for wood demand.**

The various prospects for wood demand differ from each other. For example, FAO expects an increase in total industrial wood consumption of 34%, whereas Jaakko Pöyry expects an increase of 21% between 1990 and 2010. FAO estimates an increase of 1.2 billion m³ by the year 2010 and a total consumption of 4.7 billion of wood. This, compared with the total for-

est area, shows an average consumption of 1 m³/ha/year in 1990 to 1.4 m³/ha/year in 2010. There is no biological constraint as a whole, but there might be local problems because this demand will not be uniformly distributed. Of the present forested area only 7% could biologically produce enough wood for all, at an average production basis of 20 m³/ha/year. Although there is no biological problem, this would need very strong changes in forestry: plantation, obtaining available wood from the former USSR and so on. These necessary changes raise political and socio-economic questions.

3) Even in a rapidly expanding market the situation will be very different in various places.

The current trend is towards a far wider worldwide market because of new international commercial agreements, the decrease of freight costs and so on. However, for different reasons the surplus of wood in rich countries will not cover the need of the developing countries, as it does not with food markets. This is obviously true for the huge demand for fuel wood but to a less extent also for industrial wood. The fuel wood demand is a very different problem that will not be studied in this paper. The trends for industrial woods in the different continents vary but can be summarized as follows:

In 2010 The pressure will be strongest in Asia where there will be a projected increase in needs, but where the forest area has been reduced in the previous decades because of the growing need for agricultural land.

- In Europe the proximity of East Europe and the increase in resources may be sufficient.
- In North America there will be a decrease in production in the North West but an increase in the southern regions. As a result, exportation from America could decrease.
- Latin America, South Africa and Oceania will export both wood and wood products.

4) There will never be a gap between wood resources and wood demand.

The demand is always equal to the supply because of the many regulatory factors. Many prospectors expect a supply driven era. If there is an increase in the wood demand the prices will rise and therefore

- the supply will increase. The forest owners will sell more wood, and the harvesting will become more effective. This may have environmental disadvantages in some places but many advantages in others, like in France.
- the substitution of forest products by other products could become easier.
- wood technology may change.
- the profitability of forest investments will increase and wood resources will become more strategically important for the forest industries. In this context a surrounding intensive forest will increasingly gain real competitive advantages for these indus-

tries, especially for the pulp industry in which costs are very similar from one location to another.

5) Are these investments impossible in the forest sector?

Jaakko Pöyry expects an increase of 180 million m³ of wood for pulp in twenty years. This can be produced with a plantation programme of 50 000 ha/year with an average outcome of 20 m³/ha/year. The estimated cost is 7.2 million ECU which is approximately 15% of the annual industrial investment of the pulp and paper industry.

Are these expectations unrealistic for a capitalist industry?

Investing in their forest resources is a present day tendency of many companies. Dr. Schmincke and others have projected that an increasing amount of wood will come from plantations in the future. The main constraint may be the availability of adequate land.

Conclusion

In this context of possible increasing demand, *the conditions for developing forest industries in Europe exist.*

- Forests, including plantations, have to be grown and harvested on a *sustainable basis*. This idea has been developed by Dr. Schmincke. But, apart from the ongoing discussion in various governmental bodies, the scientific basis for objective evaluation is still inadequate.
- Forest products are *better than competing products from an environmental point of view* (ecomaterials). Sound information needs to be collected and effective public promotion should be implemented.

If successful progress is to be achieved, then large investments in forests will need to be made in order to achieve adequate future supply for industry.

RESPONSE TO K.H. SCHMINCKE:

SOME REMARKS ON THE WORLD FOREST RESOURCE SITUATION

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The ability of the world forestry to deliver wood is one of the most critical issues in the development of the forest industry. It is perhaps even more critical if we regard the living standards of the poor and densely populated parts of the world.

In most studies the world's forest resources are forecasted to become more scarce. As stated in Mr. Schmincke's paper, the most significant factor behind this conclusion is the population growth, often combined with demands to preserve forests due to environmental reasons. A rapidly increasing wood demand in combination with a slower growth rate creates, as time goes by, a wood deficit.

In general I agree with Mr Schmincke's conclusions. However, I act here as an opponent, and therefore I have concentrated on questions which might eventually have some relevance with respect to the wood resources and thus add some reservations and modifications to his paper.

Wood appears at very different markets. In my opinion, we must make a clear distinction between wood for industrial uses (I-wood) and wood for local, non-industrial uses (L-wood).

There will, of course, never be a long term physical shortage of wood. Instead, there will be a balance between the price and the wood supply. If the price is high enough it will cover the costs of new plantations, long distance wood transport and so on. If the price becomes too high for the pulp and paper industry to pay due to lack of profitability, the industry will close, the wood demand will decrease, there will be no longer a need for plantations and long distance transport and the price of wood will sink until it reaches a level which a smaller industry is willing to pay.

L-wood is quite another matter. In poor and densely populated areas, for example Africa and parts of Asia, wood is a necessity used for instance for heating, yet people have limited resources to pay for it. There is an evident risk that the wood market might show similarities to the food market. In other words, a calculation of the actual needs shows a deficit, but due to economic factors some areas show a surplus of wood at times in spite of the fact that a lot of the poor actually need more wood.

In relation to the actual resources of I-wood, I can think of at least three questions which are difficult to answer. Firstly, will there be an efficient transition from L-wood to I-wood

in the areas where living standards are rising? This was actually the case in Europe, for instance, when the population became increasingly urban, but will this also be the case in the over-populated countries of the south, and has this been taken into account in the calculations of the future resources? Another large question mark is of course linked with the tremendous forest resources of Russia. To what degree could, and would, these resources become activated? Theoretically these resources could be of greater significance to the forest industry in the future than the forests of North America. A third question is to which degree forest production capacity could actually be used in the developed countries in Europe, North America and so on. Environmental and social factors will, without a doubt, hamper the degree of utilisation of the forest resources, and it seems wise not to count on more than reaching approximately 70-75% of the yield capacity, at its best.

My general conclusion is that in the long run we will face an increasing pressure on the global wood resources. This will result in higher real prices, at least of certain assortments, such as high quality timber from slow growing species. Local shortages of wood in poor and densely populated areas will also occur. However, market forces will work rather efficiently against higher relative prices of industrial wood. As wood flows, the growth and cut will be rather small in comparison to the inventory, however, market forces will have good possibilities to compensate for shortages by changing the price of wood. We could all look into our pulpwood log inventories at the moment to see this. There are also great resources to be activated in Russia and plantation forestry could also offer possibilities. The expected real increase in prices may take a long time, perhaps several decades, to arrive, and therefore the real challenge for most European forest industries in the foreseeable future will be to try to decrease the cost of wood.

MERGERS, ECONOMIES OF SCALE AND INTERNATIONALISATION OF THE FOREST PRODUCT CORPORATIONS:

WHAT ARE THE NEW ITEMS IN THE CORPORATE MANAGERIAL AGENDA FOR THE NEXT TEN YEARS?

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This paper is an attempt to “simulate” corporate management thinking in the large forest product corporations after the wave of acquisitions, mergers and internationalisation of the last ten years. It is suggested that four items are bound to emerge on the agenda of corporate management: (1) the content and role of the corporate identity, (2) orientation models for directing and controlling collective action in the management of business processes, (3) diversity of managerial competencies and (4) assessing business opportunities in the more down-stream business operations. The paper looks at these items from the point of view of how they contribute to a mode of operations which is more customer and market oriented than the traditional one based on economies of scale and cost leadership.

1. PERIOD-SPECIFIC THEORIES OF MANAGEMENT

During the last ten years comparative research on firms and management has reached a new understanding of the variety effective firm types and management styles in different institutional conditions (Whitley 1994). Emergence of this comparative business system paradigm was, of course, very much influenced by the penetration of Japanese firms into the global markets in several core industries. Moreover, globalisation of competition in many industries, technological discontinuities, institutional changes and their interrelationships with the business cycle have emphasised the dissimilarity of managerial problems under structurally determined periods of time (Lilja, Räsänen and Tainio 1987).

The functions of corporate management are derived, firstly, from this corporation-environment interface: it has to navigate the corporate business portfolio through a stormy sea, confronting unexpected high waves, undercurrents and sometimes also calm bays. Different parts of the fleet operate in contrasting situations and under different temporal horizons. The environmental constraints and opportunities are one source of issues in the agenda of corporate management. Another source of issues is the path-dependent nature of corporate evolution: especially in capital intensive industries it takes decades to transform a business

portfolio to qualitatively different types of operation and style of corporate management - unless a very heavy hand is used in acquisitions and divestments.

In the case of the large Finnish and Swedish forest product firms, the recent wave of acquisitions, mergers and internationalisation has to be interpreted as an action programme to cope with the new dimensions of environmental volatility. The larger size is a shelter for financial autonomy and it supports investment power. Internationalisation provides an organisational infrastructure for local responsiveness. But there is a long way from the juridical foundation of a new corporate structure to the actual mobilisation and integration of the competencies for efficient use under the newly defined structure of business operations.

The purpose of this paper is to sketch a hypothetical action programme which complements the agenda of the corporate management during the last period, characterised by the large acquisitions, mergers and internationalisation. We assume that the agenda items of the earlier period, i.e. those of mergers, acquisitions, internationalisation and the improved economies of scale in the upgraded product segments are still important. They function as entry barriers and sources of rents in the competitive arena. But we assume that such a recipe has to be complemented with new functional competencies which strengthen the customer and market orientations of the business units and business areas.

2. COLLECTIVE ACTORS BEHIND THE SUCCESS RECIPE OF THE FINNISH FOREST INDUSTRY CORPORATIONS

We have outlined the success recipe of the Finnish forest product firms in many earlier publications (Lilja, Räsänen and Tainio 1991; 1992; Lilja and Tainio 1996). There are also several other attempts to identify the ingredients of the success recipe and their interrelationships (Lammi 1994). There is no doubt that the long evolutionary process of the so called 'forest industrialisation' in Finland (Koskinen 1983) has been based on the availability of forests. But without research based practices and institutional regulations for sustainable development this opportunity could have been lost rather quickly. In this context the role of the forestry professionals has been crucial in Finland (Palo 1993; Eriksson 1995). Besides the forestry professionals, also various communities of engineering professions have been central in developing the knowledge bases for the increasingly complicated technological systems in both chemical and mechanical wood processing (cf. Tushman and Rosenkopf 1992). The co-operation of these professional communities has shaped the success recipe of the Finnish forest product firms. It has meant that there has been a great concern for the substance of raw material processing and a deep commitment to the industry. Strong professional identities have not hindered the adoption of modern managerial systems into the forest industry corporations. These firms have been the core firms in Finland and thus managerial and organisational innovations have diffused to them rather early.

It is widely recognised that the success recipe of the Finnish forest industry corporations has two types of levers: at the level of the firm such features like cost efficiency in the production, experience curve effects in production and development projects, constant upgrading of products and an attempt to market domination, especially in Europe, have been important. Moreover, in addition to the firm level innovations, it is important to point to a sectoral effect: a sector level upgrading of the integrated production systems decade after dec-

ade during the last hundred years has occurred. This upgrading has taken place under a very specific risk-sharing arrangement where both the bank system and the state in various capacities have been deeply involved (Lilja et al. 1992).

In capital intensive industries, the role of economies of scale and scope can never be underestimated. However, in this paper we will seriously address the challenge put forward to the forest product corporations to meet the demands for increased customer and market orientation. It appears to us that professions in such fields as accounting, finance, marketing, human resources, information systems and logistics have not yet been able to introduce distinctive ingredients to the current success recipe. However, within these professions new practices have been developed, which could make a difference also in the management of the forest product corporations. New opportunities could be seized by paying more attention to marketing investments, by being more sensitive to the changing trends in consumer values, developing new forms of internal organisational practices, identifying untapped creativity and competencies within the personnel, using new types financial instruments and quasi-market types of governance structures of the corporation, moving to more downstream phases of the value added chain and so on.

3. AGENDA ITEMS FOR THE NEXT TEN YEARS

On this occasion, it is not possible to go through all the potential managerial practices which derive from the business school context or scan the interfaces with different stakeholder groups. We know that we are not in a position to give an overall description of the corporate managerial agenda, nor evaluate the relative importance of the items which we suggest for a more detailed discussion. The items reflect rather our own biases. Our assumption is that in the large Finnish forest product corporations, which have internationalised and gone through several acquisitions and mergers, there is a great need to consider the following issues:

1. the content and role of the corporate identity.
2. orientation models for collective action in the management of business processes.
3. diversity of managerial competencies.
4. assessment business opportunities in more down-stream business operations.

4. CORPORATE IDENTITY

Corporations which grow through acquisitions and mergers have to reinstitutionalise themselves, not only for their customers but to their employees and the wider public (Olins 1990). In firms which have long traditions, both customers and employees have created strong habitual and emotional bonds with the former corporate names, product specifications and brand names. This identification process occurs not only at the level of symbols but, more importantly, at the level of work practices, social relations and collective memories formed around them, especially in connection with major accomplishments. Thus new

identities cannot be produced only through increased communication around new values and symbols. It has to be created in action which then becomes cognitively framed in a positive way.

The newly formed forest product corporations have great difficulties in creating a monolithic, corporate-wide identity in the markets and among their personnel. This is due to the strength of mill level identities, their growth strategy, diversified business portfolio, the long tradition of using sales associations and their market area based sales companies, etc. It is true that in business-to-business marketing long established personal relations are more important than the symbolic presentations of firms and products. Thus there is not an urgent need to reshape the fragmented corporate identity. But with the increased globalisation of operations it seems to become more and more relevant to promote a corporate identity in connection with product families. Otherwise marketing investments of mills, various incorporated firms and subsidiaries do not support each other and accumulate in the long run. Also due to environmental concerns of consumers, corporate level good-will in this respect can be a source of strength. However, it is also clear that a monolithic corporate identity is a risk in case of failures in any of the products linked with the corporation. Thus the question is: are the large Finnish forest product corporations such global players that they should start a process which narrows down the multifaceted nature of their corporate identity?

5. ORIENTATION MODELS FOR COLLECTIVE ACTION IN THE MANAGEMENT OF CORE BUSINESS PROCESSES

Sources of identity and direction are needed also at other levels than that of the whole corporation. Forest product corporations have tried to solve these planning, motivation and control problems by organising the mill based corporations first as industry based divisions and later on with the increasing specialisation of the corporations as product based divisions. These divisions contain even international operations and incorporated subsidiary companies. However, the marketing and staff functions of the divisions have been relatively weak and the divisions have relied, to a great extent, on centralised, corporate level resources. The operative decisions have been made at the mill and machine level especially in the pulp and paper industry divisions. The mills are natural units for making sense of the performance of the lower levels of the corporation as well as for making projections on the returns on investments. For these reasons, the mills and a production based logic of action or orientation model continue to have a strong position in the system of managerial work. The availability of operative and financial performance data as well as the possibility to ground investment decisions on explicit calculations at the mill and machine levels make it very difficult to introduce new orientation models for the management of the forest product corporations.

However, it is not far fetched to say that in the chemical forest industry a customer orientation is deeply entrenched in the core business process of the mills through the system of key customers. It is embedded in a system of long term delivery contracts, tight personal relations from the top of the supplier corporation and that of the buyer corporation to the lower levels of the hierarchy, and supported by a variety of conventions. During booms key customers can be ascertained that they are prioritised in case the demand exceeds the avail-

able capacity. During recessions key customers help to keep the production in motion by avoiding opportunism in the search for the most advantageous market price. However, the old concept of a key customer has been very much mill-based.

With the increasing size of the newly formed forest product corporations, it is not at all obvious how the product variety, multiple sourcing possibilities and consulting skills are turned into offerings which are optimal for solving the problems of a key customer, maximising at the same time the efficiency needs of the supplier. For instance, the order of a publishing house may contain a wide assortment of paper grades which could be directed to alternative divisions and mills located in many alternative countries. The opportunities for economising on co-ordination have increased considerably but these opportunities cannot be reaped by only reshuffling the line organisation. They have to be identified and negotiated in a much more sensitive way by relying on technological and social networks. New managerial roles, cross-functional teams and inter-firm relations have to be established in order to have full leverage from the capabilities contained within the corporation.

In most cases the key customer approach is not enough to secure the profitability of the production lines. Thus part of the production capacity has to be sold to channels where the ultimate user is beyond the immediate social contact of the producer. To manage this interface forest product corporations have developed product families with distinct brand names. It seems obvious that mobilisation of managerial resources and the control of profitability could happen in the future much more under the orientation model provided by product families. Thus paper products could be produced in different mills though they are sold under the same product family label. To keep track of profitability in the management of product families with multiple sourcing opportunities, increased use of activity-based accounting is needed.

Of the Finnish forest corporations, Enso Oy seems to have a headstart in the rationalisation of the number of its product families. It is abolishing Tampella brands and in general, increasing the use of corporate based brand names by taking advantage of the short and linguistically easy corporate name (Mikkonen 1995). However, the objective does not seem to be that of a monolithic corporate identity where the brands are solely under the umbrella of the corporate name. Instead, some of the acquired companies and subsidiaries can still retain their original identity in their brand names. The complexity in the management of brand names is further increased by the opportunity to produce, for example, office papers under the labels of wholesalers (see Rosenbröijer 1994). Moreover, the symbolic dimension of forest products is also accentuated with the launching of ecolabels. These observations point to a new trend: marketing investments are getting an irreversible foothold in the management of forest product corporations.

6. DIVERSITY IN MANAGEMENT COMPETENCIES

It has been claimed that in the Finnish-based forest product corporations production logic has dominated customer and market orientations. This can be explained by the long history of the separate organisational existence of the production and sales ends of the value chain. In addition, the location of the mills far from the main markets have led to an emphasis on the importance of cost advantage, based on economies of scale. It is also true that in the

markets for relatively standardised industrial commodities it is in the interest of the buyer to keep several suppliers in competition with each other, which often leads to an arms length relationship between the seller and the buyer. Thus geography, institutional heritage and market structure have resisted the addition of new ingredients and layers to the success recipe. The engineering competencies are still the dominating ones.

However, after the new wave of acquisitions, mergers and the internationalisation of the forest product corporations, the configuration of professional competencies has changed. The new corporate context has internalised the marketing function, R&D resources have improved and in general the variety in managerial experience has increased in the management pool. But there are also internal obstacles for being able to tap to the available resource and competence pool. For instance, it is well-known that within a strict hierarchic line organisation it is very difficult to share and diffuse the available experience stock, best practices and creativity. The cultural and communication gaps between the social systems of the production and marketing operations are well known. The differences in professional and national backgrounds also set limits for efficient communication and co-operation. Even within sales organisation the ways of operating are very different depending on the types of products and markets.

To mobilise at least some of the competence potential for a wider use within a corporation, various procedures have been proposed. One of them is to rely on show case projects in mobilising cross-functional specialist competencies. This approach is in contrast with the idea that mobilisations are attempted by changing the whole organisation structure of the corporation from top down. The show case approach is based on “overresourcing” prioritised development projects. They allow cross-functional learning, support innovations and build momentum for bottom-up renewal processes. Earlier research on such invention-based business development processes emphasises the importance of complementary sets of roles of managers: like vertical role structures of the product and business champions linked to the sponsor role at the level of the divisional or corporate board (Burgelman and Sayles 1986).

One of the advantages of introducing collective orientation models for core business process management is that they define different types of intrapreneurship roles and show cases. Thus in the key customer approach one potential type of a show case could be the objective of turning a prominent and demanding potential customers into a key customer. The nature of the task is to study the customers value creating process and orchestrate an offering both from the internal competence pool and from external business networks which matches best the demands of the customer (Normann and Ramírez 1993). The rationale behind this type of over-resourced show case approach is very much based on a snowball effect which highly visible customers create as sources of reference and credibility for the supplier. Similarly, the management of product families contains collective projects which are intimately linked with the changing technologies of the leading edge customer segments and offer ideas for the introduction of new products and the renewal of the whole product family.

While the intrapreneurship, product and business champions and sponsor roles are forms to intensify competence mobilisation to market and customer focused actions, the system of mentor roles is a way to secure the reproduction and diffusion of managerial competencies within the corporation. Mergers, acquisitions and internationalisation have increased the need for mentor support because they increase the uncertainty for career advancement and

the variety of signals in the internal system of management. At the same time the changes and new stimuli in the structural and institutional environment create opportunities for learning. Personal orientation models provided by mentors are invaluable cultural resources which can help individual managers to redefine their personal growth objectives towards learning instead of internal politicking.

The examples of various complementary roles of managers are useful tools for incrementally increasing the organic features in the modes of operations. Such an approach is a necessary complement to the top down organisational reforms which often leave the cross-functional and interunit relationships undefined. Without an explicit model of support for bottom-up renewal activities a lot of creativity and potential innovations are lost.

7. DOWN-STREAM BUSINESS OPERATIONS

The capital stock of the Finnish forest industry firms is locked into the investment based phase of the value chain, especially in the chemical forest industry. To stay competitive, there is a constant need to make new investments to adopt technological inventions. This mode of operation absorbs so much resources that attempts to penetrate more down-stream business opportunities, especially in wholesales and paper converting, are difficult. They constitute still a relatively small part of the overall turnover, though there are also good examples of innovation based businesses in paper converting in the Finnish forest industry corporations. Organisational research has demonstrated very well that the organisational and managerial culture has to be much more organic in the innovation based phases of the value chain than in the investment based phases of it. Thus the issue of forward integration from the investment based volume production into paper converting or wholesales is very similar to the issue of unrelated diversification. The problem lies in the structural strain caused by two types of business logic which have to be related at the corporate level.

Our thesis is that the relevance of identifying and fostering the heterogeneity of managerial competencies in the managerial pool is very much linked with the extent to which there are visions to penetrate, on a wider scale, to the more down-stream phases of the value chain at the border lines of forest industry and other industries as well as to the wholesales. This is due to the fact that experience-based competencies in business management take decades to mature.

8. CONCLUSION

In this paper we have sketched some agenda items for corporate management from customer and market oriented perspectives. One of the tasks of the strategy, marketing and human resource professions is to articulate diagnostic tools with which it becomes possible to discuss the shaping of corporate identity and different orientation models or logics of action within the business areas and units. New frameworks and analyses are also needed to take into account the variety in the professional and national backgrounds and the experience of the managerial pool. Multifunctional experiences are especially valuable in the more down-

stream phases of the value chain. By respecting the variety in the management and even increasing it, it is possible to invent new layers of capabilities to complement the current success recipe of the Finnish forest product corporations.

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ECONOMIC AND ENVIRONMENTAL COMPETITIVENESS OF FOREST INDUSTRY PRODUCTS

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1. INTRODUCTION

The term “environmental competitiveness” is increasingly used to denote a new dimension in corporate strategic thinking. However, the next stage is already upon us: the term may be obsolete at birth. There is only total competitiveness, which includes economic and environmental competitiveness, so tightly interwoven as to be almost inseparable.

The forest industry, like the steel industry and the chemical industry, is capital-intensive and resource-based. Unlike the mature steel industry, however, it is a growth industry, with the growth following GDP. It is still fragmented: the global top 150 companies account for only 65% of the total production. It is based on a renewable resource; yet it has strong environmental boundaries both locally and globally.

Key global trends affecting total competitiveness for the forest products industry can be summarised as:

Consolidation:	Globally, a pattern of consolidation into larger units appears
Globalisation:	In parallel, the industry perspective is changing from national via regional to global
A new environmental viewpoint:	In matters of the environment, two revolutionary points of view can be discerned, the full impact of which is still to be realised.

Simultaneously, the often-repeated perceptions about the forest products industry can also be summarised as:

- Small is beautiful
- Technology is evil
- The pulp and paper industry contributes to forest depletion

What follows is a view of what happens to the total competitiveness when the key trends meet these perceptions which need to be questioned.

2. IS TECHNOLOGY EVIL?

The view of technology as a monster escaping its leash is not the problem of the forest industry alone. Yet, the chemical forest industry is based on complex processes, where state-of-the-art technologies from domains such as chemistry and information technology combine. This combination is one of the industry's strengths.

Figure 1 shows the two revolutions in insights into the environmental impacts of forest industry. Knowledge and the pursuit of knowledge produce revolutions. The starting point was the old assumption that increasing production meant increasing pollution – a hypothesis still visible in all too many conclusions about the forest industry.

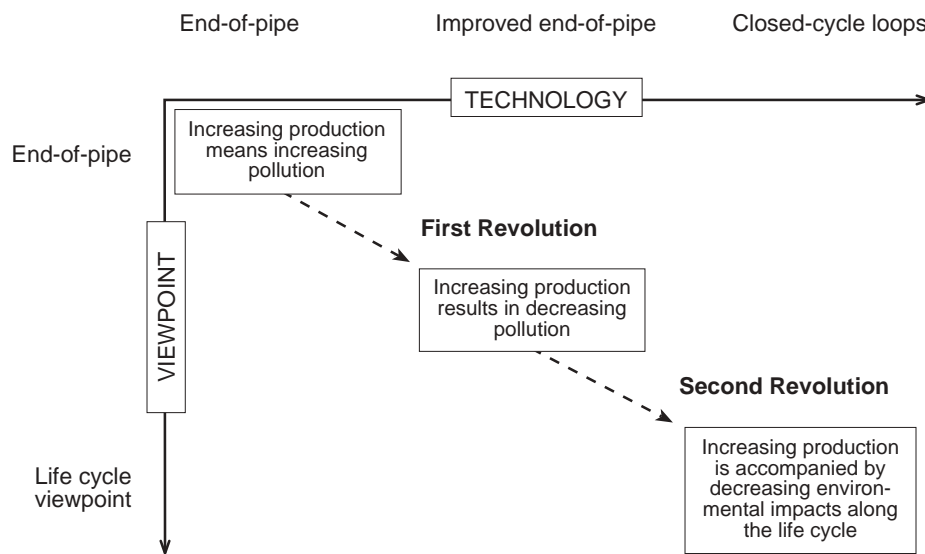


Figure 1. The Two Revolutions

The first revolution: old perspectives, new insights

In the 70's and 80's, technological developments led to paths characterised by inverse relationships between production and environment: growth in production was accompanied by diminished discharges (see Fig. 2). The viewpoint was still mostly end-of-pipe: i.e., the output of the production process was filtered until it had very little impact on the environment.

The second revolution: new perspectives, new insights

In the 80's and 90's, a change in perspective from end-of-pipe to a life cycle viewpoint accompanied another wave of technological development which is still continuing. It was un-

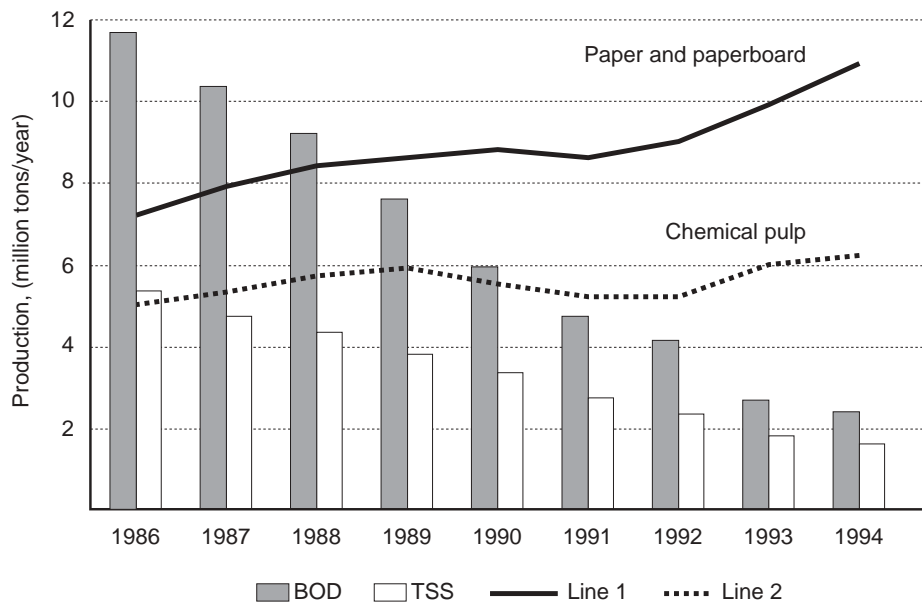


Figure 2. An Increase in Production Leads to a Decrease in BOD Discharges

derstood that it was necessary to master the complex process - a succession of end-of-pipe filters was simply not enough. The drive towards closed-cycle processes combined with impact minimisation along the life cycle is the current revolution. It will, according to current projections about closed-cycle bleaching, lead to a situation where the environmental impacts (e.g. global warming potential, acidification) along the life cycle will diminish while the production will increase.

How does the statement “technology is evil” match the trends? A globalising industry is exposed to the environmental legislation of a multitude of regions. The global viewpoint makes it necessary for a company to internally harmonise its environmental performance towards the stricter end of the legislative spectrum. Only new technology makes this feasible. Larger, consolidating units can also better exploit advances in technology and simultaneously adapt the technology for various types of products. An environmental view along the life cycle of the product, from forest to disposal, helps identify the key points where technological improvements have the greatest total impact.

3. IS SMALL BEAUTIFUL?

The view of small being beautiful is offered as the counterpoint to the giant “juggernaut” paper machines. Yet, small units (city mills, local non-wood mills etc.) can only serve as a useful complement in filling the global need. Only large units give the resources to improve the total performance of the industry as a whole – including the environmental performance.

Only large units have the wide interests that ensure a global optimisation. Figure 3 shows three different consolidation paths taken in key forest industry regions between 1980-1995.

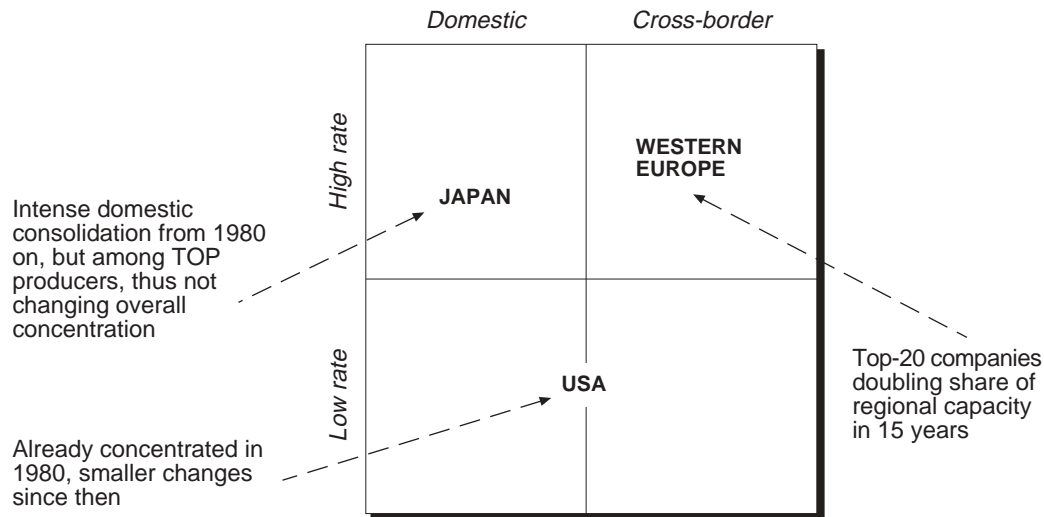


Figure 3. Consolidation paths 1980-1995

If we choose the dimensions “rate of consolidation” and “mode of consolidation”, with values from low to high and domestic to cross-border, respectively, the key regions fall into three categories. Japan typifies a high domestic rate: an intense domestic consolidation has progressed from 1980 onwards, but only amongst the top producers, thus leaving the overall concentration measured by e.g. the top 20 companies’ share unchanged. In the US, there is a low rate of mostly domestic consolidation; the concentration level was already high in 1980, and the changes have been limited since then. In Western Europe, however, a high rate of cross-border consolidation has been witnessed, with the top 20 companies doubling their share of regional capacity in the last 15 years.

How does the statement “small is beautiful”, again, match the trends? A globalising industry is exposed to global corporate risk. Its interests are global, and its environmental viewpoint is global. At the corporate level, a consolidating industry has the financial, R&D and other resources to evolve. At the mill level, the shared resources can be adapted most efficiently locally. Environmental investments cost: large profitable units can afford them. An environmental view along the life cycle of the product shows that it is the combination of many small, beautiful details in a large chain, bigger than the sum of its parts, that is truly beautiful.

4. DOES THE PULP AND PAPER INDUSTRY CONTRIBUTE TO FOREST DEPLETION?

The view of the pulp and paper industry as the key contributor to forest depletion is regrettably widespread. Yet, the forest industry has the potential (which it utilises e.g. in Scandinavia) to ensure that it only harvests a part of the growth. It is also precisely in the vital interests of the forest industry to make sure that the forests of the world are *not* depleted – a vital, flourishing industry lives by a vital, flourishing forest. Figure 4 shows global wood use.

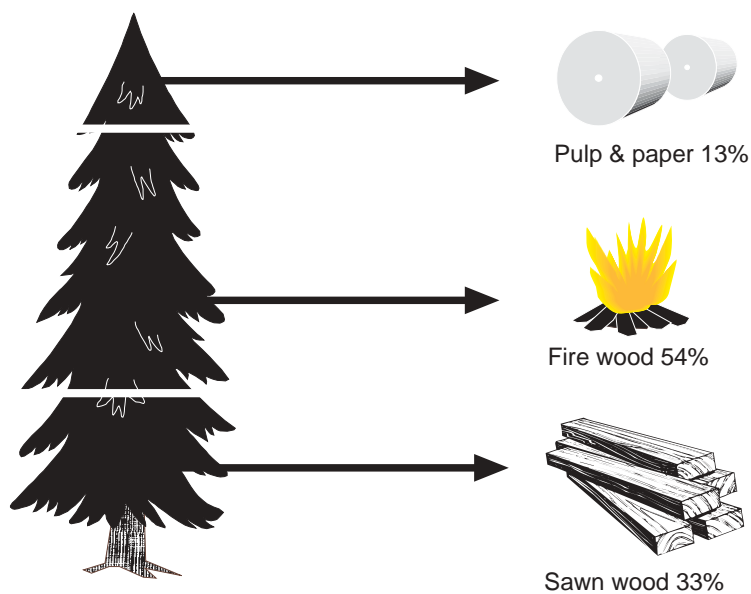


Figure 4. Wood use in the world

More than half of the world's wood is used as firewood. The mechanical wood industry's share is one third, and the pulp and paper industry is responsible for less than one sixth of the wood consumption. Figure 5 shows how the world's fibre needs are filled.

Of the world's pulp, about 80% is made from virgin wood fibre. Dividing this further, 30% of the world's pulp stems from managed natural regeneration, 23% from plantations, 14% from unmanaged natural regeneration and another 14% from original forests. It is obvious that the first two categories must grow, and the last shrink until closer to zero. The role of plantations is evolving. Theoretically, the world's current need of pulp fibre could be filled by 40 mill. ha of high-yield industrial plantations, which is less than four times the current area of industrial plantations, and about 1.5% of the global closed forest area. This is the theory, but, for many reasons, the combination of managed natural forests and

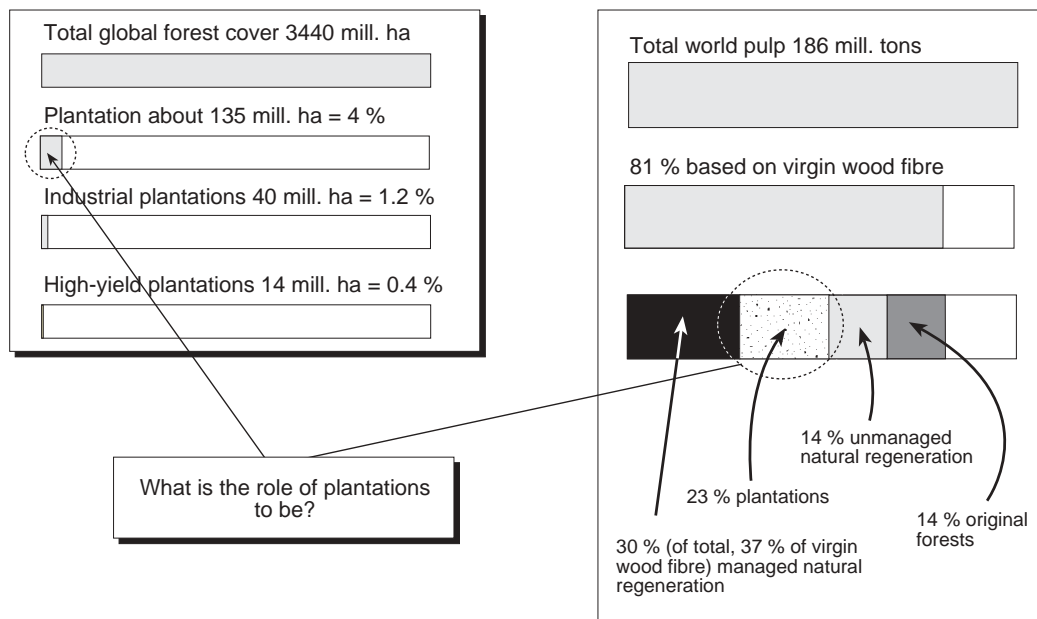


Figure 5. Filling the world's fibre needs

plantations is a key to successful long-term forest management. Global units operate in a variety of forest zones and they must take into account the needs of both local populations and the environment. Large, consolidated units also have a complex production structure that demands an optimised fibre mix. This process of providing a continuous fibre supply is another key to successful long-term forest management. A life-cycle viewpoint finalises the combination where the forest industry optimises its fibre resources from a multitude of aspects, all conducive to forest growth, not depletion.

5. CONCLUSION

Thus, small is beautiful in itself but perhaps it lacks the power to solve the big problems; technology seems to lean towards the side of good, not evil; and the pulp and paper industry has the keys to replenish, not deplete, the world's forests. These are aspects of the total competitiveness of the forest products industry. They offer a difficult challenge in a difficult environment. The forest products industry, like any other human enterprise, can mismanage its affairs and fail. It is, however, a dynamic industry, transforming into a truly European industry, combining the best of its constituent nations. It has had its share of problems, but it also has the potential and the ability to solve them. For the solutions to be found, a fifth EU clause of freedom, in addition to the free movement of goods, services, people and capital, must exist, that is, the free flow of thought, ideas, innovations – with a responsibility to the environment.

RESPONSE TO RAINER HÄGGBLOM

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INTRODUCTION

Rainer Häggblom's paper faces an economic and environmental challenge in itself. How to limit this huge subject to a 25 min. paper? How to cover all the environmental issues? Of course he has had to be selective, but he has concentrated only on the pulp and paper industries, particularly pulping processes. There are of course other forest industries (cf. Table 1), and one very important point to bear in mind about the other industries in the forestry sector is that their rates of economic growth are extremely variable. Whereas for pulp and paper growth may be at or even well above GDP, in some cases, growth for certain mechanical wood products is generally slower. Of course there are exceptions like Medium Density Fibreboard (MDF) and Oriented Strand Board (OSB), but mature products such as some plywood grades and mining timber witness declines in their respective consumptions. So a more comprehensive analysis of the forest industries' spectrum would certainly not give a generalised image of the expanding universe witnessed for pulp and paper.

MAIN MESSAGE AND CRITIQUE

Through well-documented examples of the advances made by some sectors of the forest-based industries over the last decades to improve their environmental performances, Mr. Häggblom states that economies of scale made by them for corporate reasons have also paid environmental dividends. In an increasingly global market for some forest products, where corporate consolidation is often perceived as a key to survival and/or efficiency in the context of what he labels "total competitiveness", he attacks the concept that "small is beautiful" when applied to forest product enterprises. Notwithstanding that this concept of consolidation may only sometimes be a perception, or even the delusion that "remaining competitive means copying what the competition do", one might ask whether true "total competitiveness" should not also take account of at least some social considerations, along with the economic and environmental (?).

Taking the case of the pulp and paper industry as his example, he argues that only corporations having sufficient critical mass can afford the investments in financial, technical and human resources necessary to research the environmental problems facing the industry and hence bring about the significant, rapid and prolonged improvement which is needed. Technology, he suggests, far from being an evil instrument for environmental destruction, can and has provided the answers to environmental problems, at first through "end-of-pipe" clean-ups, but increasingly through in-built prevention and closed systems for pulping processes.

Mr. Häggblom gives a concise quantitative analysis (mainly based on FAO data), of the sources of fibre to the pulp and paper industry, indicating that world-wide 81 % of pulp still comes from virgin fibre (compared with an EU 15 average of 58 %), of which 35 % comes from unmanaged natural regeneration or original forests. He then sets out to undermine the argument that the forest-based industries – especially through their use of high-tech processes – contribute to the world-wide destruction of forests. However, his figures do not convince me that the forest industries have an entirely clean bill of health.

Whilst a small concentrated area of highly productive plantation might provide for all fibre needs, he argues that it may not be the feasible fibre source in all cases. Nonetheless, there is certainly a need to reduce our exploitation of the unmanaged regeneration and virgin forests, particularly in the face of shrinking forest resources overall. Häggblom does not, however, argue for an optimised mix of virgin and recycled fibres by the pulp and paper industry.

Likewise, certain negative aspects of consolidation and large plant sizes are not treated. For instance, the increasing capital intensity of the pulp and paper sector, with ever greater unit and total capacities, also renders it more vulnerable to further economic and environmental changes. Big machines have long pay-back periods and have to run near full capacity to generate profits. As they continue to grow, the "quantum theory" of the paper machine can mean that over-capacity becomes a real danger. Furthermore, social costs and problems – at all levels of the corporate hierarchy – can arise alongside the benefits to shareholders stemming from the merging of corporations. Often, the newly merged enterprise does not have to pick up the whole social tab which comes in its wake.

It would also have been interesting to have seen similar analyses in other forest industries, such as sawmilling, where big may not necessarily be ugly, but small certainly can be beautiful, flexible and profitable at modest capacity utilisation rates. Similarly, a broader geographic scope and range of environmental problems than pulping emissions would be useful. Some of the other major environmental issues facing the forest-based industries are over-laid on the "wood chain" in Table 1. Not least of these at the wood procurement end is so-called "certification" of forests and timber, which really affects the whole chain. Thus, those in the front line are often not the foresters or industrialists, but the editors and publishers of newspapers and magazines. Further along the chain we see problems associated with emissions from wood preservatives and bonding agents. etc., etc. As a whole these environmental challenges can be classified into two types, as follows:

sector specific	eco-labelling of paper and products
	food contact directive
	packaging directive

horizontal v.o.c. directive
hazardous waste directive etc. etc.
ecotax / energy tax

All these issues have their own challenges so what we might call the industrial/environmental interface is really quite broad.

Overall, I have to describe Mr. Häggblom's paper as a useful, but somewhat partial analysis of the economic and environmental challenges confronting the forest industries as they enter the third millennium. He portrays many truisms about benefits coming from size, but there is an essential role for smaller enterprises which has been overlooked. Each needs the other, and more than ever into the twenty first century, the forest needs them both.

Table 1. The forest / wood / paper / graphic chain (cycle?)

Structure of forestry sector (resources and processing industries) - the "forest/wood/paper/graphic chain"															
ACTIVITIES	PLANNING & PREPARATION	SEED COLLECTION NURSERIES	FOREST PLANTING & ESTABLISHMT.	MANAGEMENT, MAINTENANCE PROTECTION IMPROVEMENT	HARVESTING & MARKETING		ROUND-WOOD	SAWN GOODS	PANELS	PULPS	PAPER & BOARD	P & B CONVERTING	PRINTING	PUBLISHING	RECYCLING
					felling extraction cutting-up de-barking stacking loading marketing etc.	construct. pillings transmis. fencing fuelwood industrial wood etc.	sawn softwood sawn hardwood veneers parquet sleepers	plywood particle bd eg. OSB fibreboard eg. MDF glulams LVL, LSI blockbds etc.	mechanical chemical - sulphite - sulphate etc. semi-chem thermo-mech ctmp etc.	newsprint other graph. packaging grades hygienic & sanitary other	packaging hygienic office other	gravure offset other	newspapers magazines books others	waste wood waste paper: eg. newsprint OCC wood-free mixed	

ACTIVITIES	FOREST CERTIFICATION / REGISTRATION		LEGISLATION: Wood preservation, formaldehyde		ECOLABELLING	PACKAGING DIRECTIVE
	Forest management	Felling	Wood working industry	Pulp	Paper & Board Converting	Print & Publication Recycling
MATERIAL FLOWS			TIMBER CERTIFICATION	B.A.T., Best Available Technology Emission Directive	FOOD CONTACT DIRECTIVE V.O.C., Volatile Organic Compounds Directive E.M.A.S. HAZARDOUS WASTE DIRECTIVE	

ENVIRONMENTAL IMPACTS OF FOREST PROTECTION: SOME COMPLICATIONS

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Western North America has significantly cut back on its timber harvests as a result of logging restrictions. These restrictions, which are now being authorized in British Columbia as well as the US, are intended to reduce regional environmental damage associated with logging activities. But the restrictions could simply relocate such damage because they are triggering increases in timber harvests elsewhere in the world. Ironically, the very environmental concerns that have led to decreased logging in western North America could result in a net *increase* in global environmental damage. Some regions that are likely to be affected are identified and some near-term and longer-term implications on global timber harvests are developed. More importantly, these types of regional interactions will surely become more powerful in the future.

1. INTRODUCTION

This study can be viewed as a case study of the types of environmental problems that are associated with increasingly well integrated world markets. We have seen when reviewing the global warming issue that the actions of individual countries must be put into a global context to properly assess their global impact. In this paper we show that the impacts of region land use decision can have impact that go far beyond an individual region or country. In the 3rd Millennium the interrelationships are going to be even more pervasive and powerful.

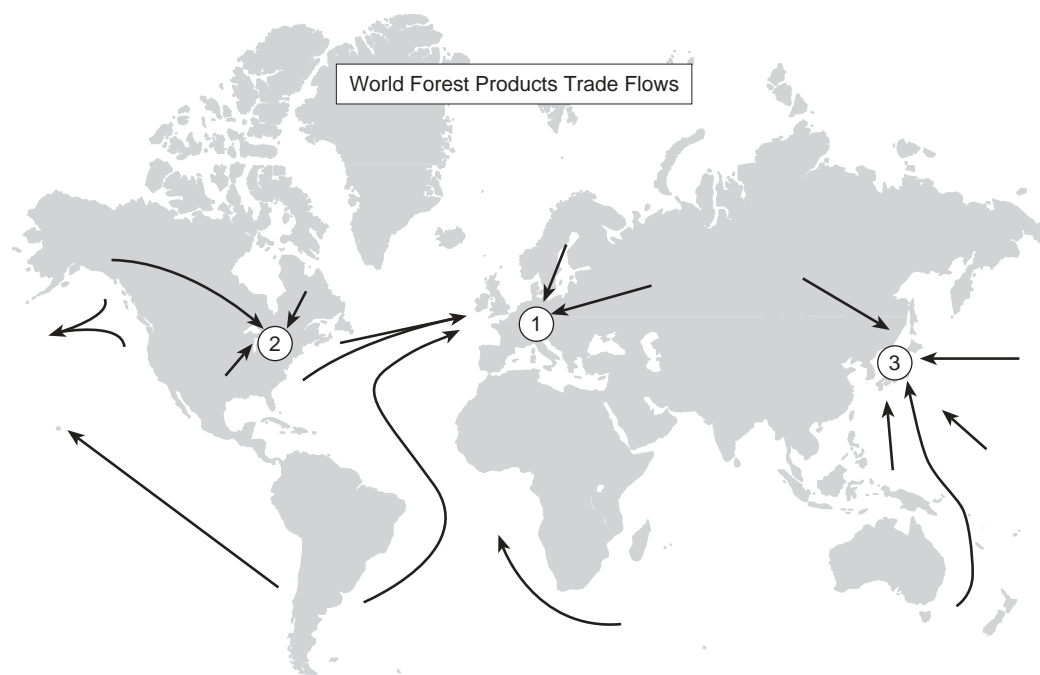
According to a popular slogan, we should think globally and act locally, that is, regard the environment from a global perspective and act locally to protect it. However, acting locally often means that environmentally risky activities are curtailed in one locality only to be transferred to another. Such an affect is now generally recognized as a potential concern when dealing with pollution generating industries. However, the global impacts of local land-use policies and restrictions have not generally been recognized. Depending on where these activities shift, a net increase in environmental damage could result. Such an increase

might be the unforeseen consequence of restrictions on the volume of timber that can be harvested in western North America.

In the US timber harvest restrictions already have been imposed on some federal timber lands and also some private timber lands in the U.S. West. In the case of federal lands, the restrictions are the outgrowth of environmental concerns, most notably those over the Northern spotted owl. In the case of private lands, they have resulted from a general tightening of various western states' forest practice acts and legal decisions that prohibit private land owners from harvesting if this destroys the habitat of species that have been listed as threatened and endangered under our Endangered Species Act. Similarly in western Canada, especially British Columbia, timber harvests on government forest lands (Crown lands) are being reduced due to pressures and environmental concerns.

In both cases the impetus for reduced harvests is a concern over the negative environmental impacts believed to be associated with logging. In both cases environmentalists have declared victory over the decision to reduce or eliminate harvest levels in these regions.

However, even as timber harvest restrictions help to allay some environmental concerns in western North America, they should arouse environmental concerns in other parts of these countries and indeed in the world. World wood resource markets are highly integrated. Industrial wood from the western US and western Canada is exported to all of the major world markets. Logs and wood chips flow to Japan and the Asian markets, European markets, as well as to North American markets. Wood flows from eastern Canada and the U.S. South also move into European and other foreign markets. The high degree of integration of the markets suggests that significant decreases in harvests in some region will set off a set of price effects that will "ripple" throughout the global system. Decreases in harvests in some regions will set in motion forces that will increase harvests elsewhere. In short, the



issue is not “to harvest or not to harvest.” Rather this issue is “where do we harvest?” However, since environmental damages are associated with timber harvesting, reducing harvest in any one region, such as western North America may not decrease global environmental damages at all. Rather, the damages will simply shift from the protected region to other regions which increase their harvests in response to reduced supplies and higher prices.

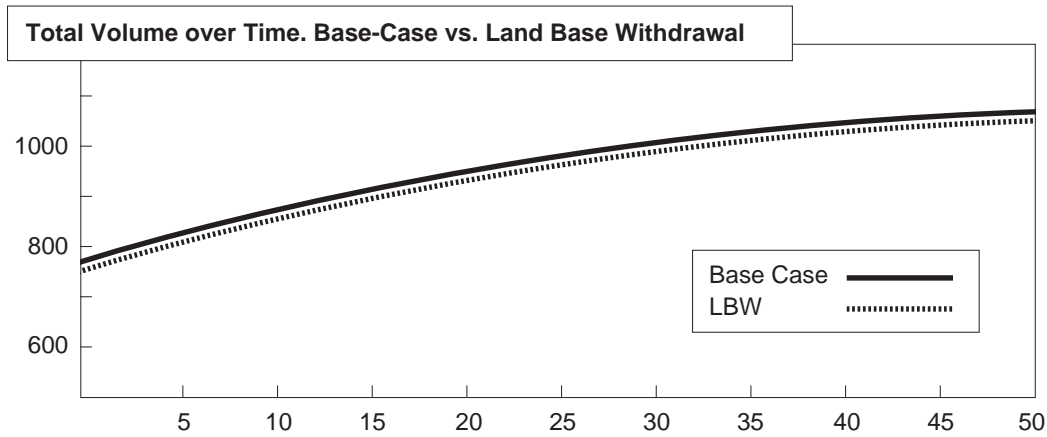
Using a timber-supply model (TSM) developed at Resources for the Future (Sedjo and Lyon, 1990) my colleagues and I have assessed where logging is likely to increase as a result of timber-harvest decreases in western North America (Sedjo et al., 1994). Below, I identify these regions and explain why the severity of environmental damage from logging depends significantly on where that activity occurs. In addition, I make some preliminary speculations about net changes in such damage in those regions where logging is potentially on the rise. Taken together, these regional damages can begin to indicate whether a net increase in global environmental damage will result from a regional restructuring of timber production. Finally, I make several suggestions regarding policies that address the environmental concerns associated with timber harvests.

2. PREDICTING CHANGES IN THE TIMBER MARKET

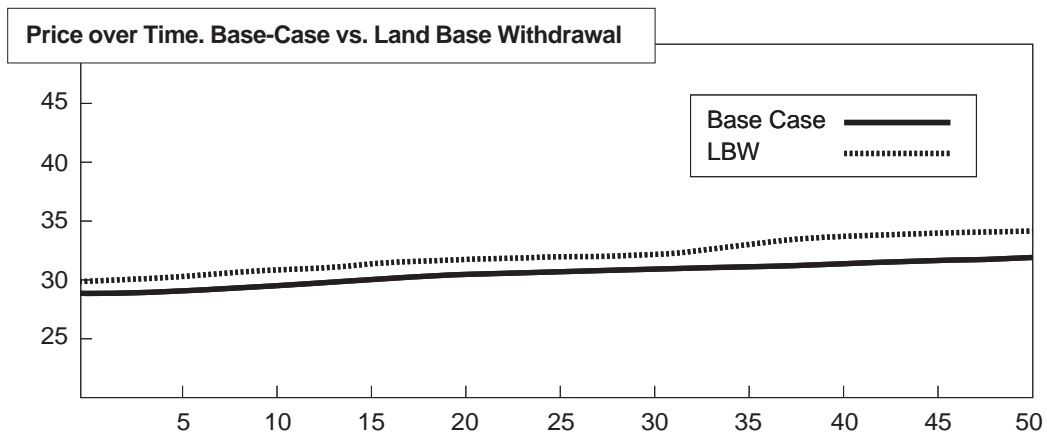
Because western North America is one of the world’s largest producers and exporters of timber, major logging restrictions in that region could be expected to reduce significantly the volume of timber sold on the world market, including the domestic market. However, the timber market typically adapts to such cutbacks. Consequently, reductions in the timber harvests of the U.S. West, which began in the early 1990s, now are being offset by increases in the harvests of other regions. To pave the way for an estimation of any net change in logging damage worldwide, we used our timber supply model to identify the regions where harvesting would increase.

The TSM projects timber production in response to changes in overall timber demand over the fifty-year period of 1990 to 2040. Its estimates of harvests are based on the assumption that timber-producing regions fall into one of two categories: those that are expected to be responsive to supply and demand forces and those that are not. The *responsive* regions are the U.S. South, the U.S. West, British Columbia, Eastern Canada, the Nordic countries, the Asia-Pacific countries, and the emerging plantation regions, which includes New Zealand, Chile, Brazil, South Africa and other major producers of wood grown on plantations. The *non responsive* regions, which are assumed to be increasing their timber production slowly over time in accordance with historical trends, are the former Soviet Union, Europe (excluding the Nordic countries), and all other timber-producing regions of the world. Each of these two groups of regions accounted for about half the world’s industrial wood production in the mid-1980s.

In the late 1980s, when we first ran our model to generate a fifty-year timber production forecast, the U.S. West had not yet reduced its timber harvests. In light of its subsequent harvest reductions and the reductions expected in British Columbia, we have revised our earlier forecast. To do so, we decreased the area and inventory of timber available for harvest in each region as originally specified in our model. Specifically, we decreased available inventory levels by 30 percent in the U.S. West and by 20 percent in British Columbia.



In our revised forecast, the level of timber harvests in the U.S. West and British Columbia is lower throughout the entire fifty-year forecast period than in our original base case scenario, and the average real (inflation-adjusted) price of timber is about 5 percent higher. During the first twenty years of this period (1990–2010), the principal focus of the analysis, our revised projections of the average annual volume of harvest in each of the seven responsive regions indicate that the decline in U.S. West timber harvests will be largely offset by harvest increases both in the United States and abroad.



3. LOCATION OF INCREASED TIMBER HARVESTS

Our revised projections suggest that the global timber-supply system can produce large volumes of wood in response to the incentive of higher prices brought about by harvest reductions. These higher prices are predicted to increase timber production in the Nordic region, the U.S. South, eastern Canada, the emerging plantation region, and other timber-producing regions. This increased production is predicted to replace about two-thirds of the harvest

shortfalls created by harvest reductions in western North America. These forecasts are corroborated by recent experience.

Early in 1993, lumber prices in the United States approximately doubled in a period of less than six months. During that period, rising wood prices around the world led to increases in timber harvests in the U.S. South and elsewhere. The upsurge in log prices was volatile, however, and fell rapidly after the initial rise, before rising once again in late 1993 and early 1994. Today, timber prices have declined substantially from their peak levels, although they are still well above their pre-1993 levels.

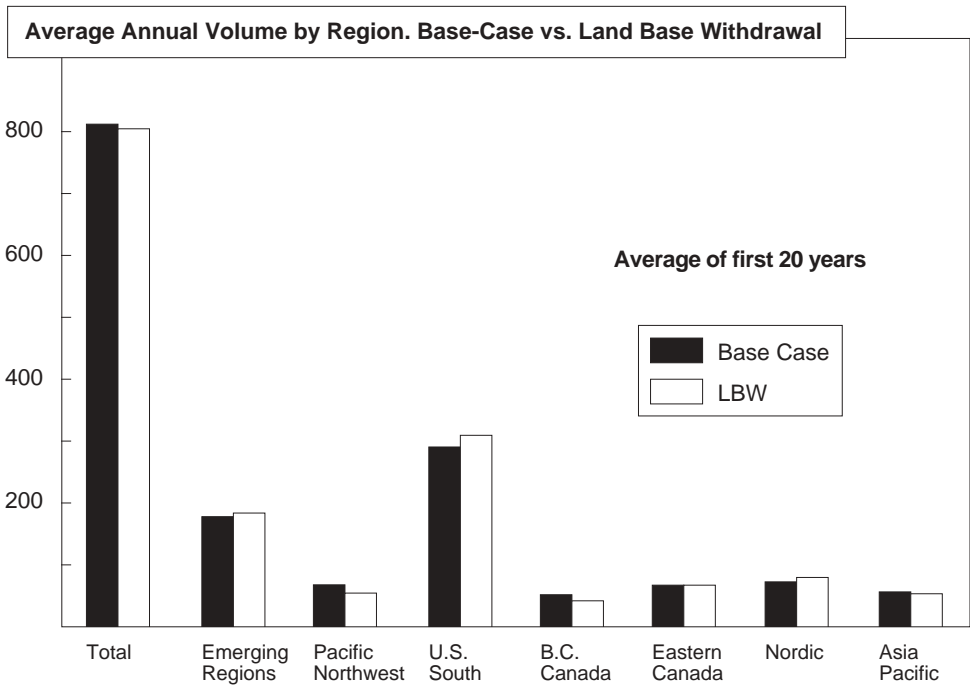
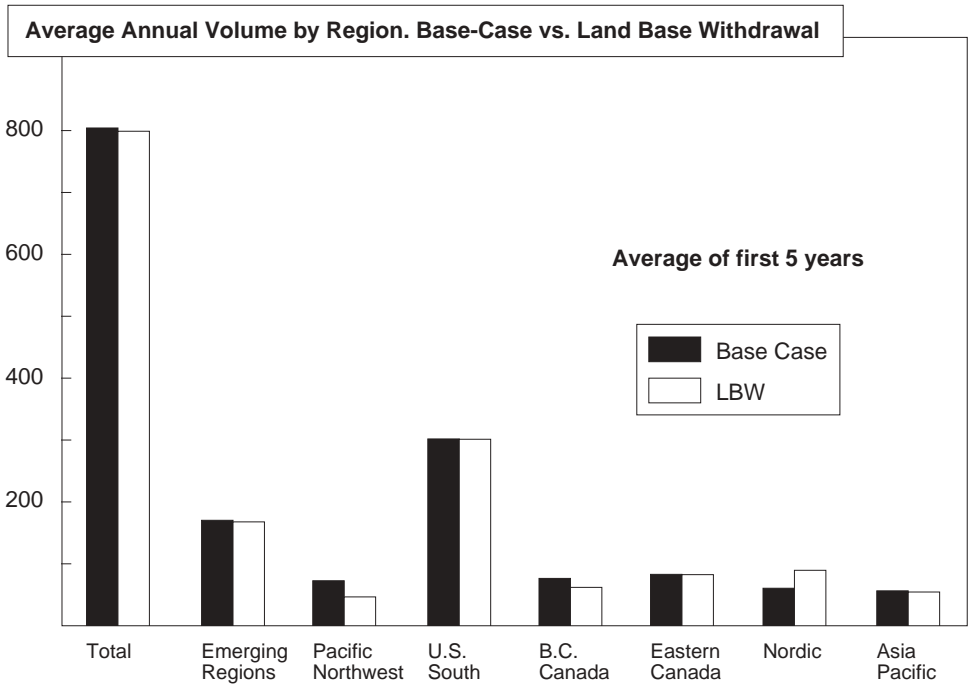
While prices were increasing in many other timber markets, they changed much less in the European market. The soft European prices, together with devaluations in the currencies of the Nordic countries, reduced the competitiveness of many North American timber producers, forcing them to curtail their activity in the European market. These producers redirected their production to the North American market. Thus, Eastern Canada and the U.S. South, both of which had increased their timber production in response to rising wood prices, have been able to offset much of the reduction in timber harvests in the U.S. West. Likewise, the over 50 percent decline in the U.S. West's log exports, which resulted from the reduction in the U.S. West's timber harvests and the redirecting of logs from the export market to the domestic market, has been offset by yet other regions. New Zealand, Chile, and Russia have filled much of the gap left by the decrease in U.S. West log exports to the Pacific Basin.

This restructuring of the timber market indicates that the market has adapted well to the harvest reduction in the U.S. West. As British Columbia also reduces its timber harvests, the Nordic countries, eastern Canada, the U.S. South, and the currently major forest plantation regions will be joined by other regions in increasing their timber harvests. Notable among these other regions are Latin America, parts of Asia and Oceania, and Europe. And, there have already been offsetting increases in production in Alberta and other provinces of the Canadian West.

Latin America is likely to be a major wood supplier during the next century because it has established highly productive plantation forests and they are continuing to expand at a rapid rate. Brazil has assumed a major role in the production and export of wood pulp over the past decade or so. Argentina, Venezuela, and Chile are becoming important wood producers, as well as actual or potential wood exporters.

Plantation forests are not the only source of timber in Latin America. The vast timber resources of the Amazon are also potentially exploitable and tropical timber production from the Amazon has been growing steadily for over three decades (Varangis, 1993). Traditionally, wood exports from the Amazon have been modest, due in large part to the high degree of heterogeneity in the region's timber species and the inability of markets to effectively utilize lesser known species. These obstacles are being overcome, and tropical timbers are being used increasingly. Given limitations on supplies of tropical timbers from Asia, increased timber exports from the Amazon are anticipated. Nevertheless, environmental concerns might severely limit the volume of timber produced from the Amazonian native forest.

Like some countries in Latin America, several countries in Asia and Oceania may become bigger timber exporters in the near future. New Zealand, Vietnam, and Myanmar have increased their timber exports in recent years, a trend that is expected to continue. In Malaysia and Indonesia, timber from plantations and second-growth tropical forests could be for sale in major world markets within a decade.



Europe is already a major wood-producing region and is likely to remain so. Because its forests and wood production potential are expanding substantially, it could increase its timber harvests in the event that timber supplies become tight. The Nordic countries have already done so.

One European country with significant potential for increased wood production is Russia, whose timber exports have been declining since the mid-1980s. The question is whether Russia, the world's second largest producer of industrial wood, can recover as a major wood exporter. While opinions vary, the level of recent Russian wood exports to Japan offers evidence that it can. Russian wood exports to Japan rose 22 percent in 1993 and increased again in 1994. The future of these exports might be expected to depend in part on the advent of a reasonably orderly political process in that country, clearly an uncertain prospect at present. But given its vast timber inventories, Russia may not require democracy or even market capitalism for commercial exploitation of its timber resources. Ready markets, especially in the Far East, provide incentives for significantly expanded development of these resources under a variety of social systems.

4. ENVIRONMENTAL EFFECTS OF RELOCATING LOGGING

As suggested above, in a world where wood products are heavily traded internationally, logging restrictions in one region will simply be offset by logging increases elsewhere. The global issue, then, is not *whether* to log but *where* to log. Moreover, even if logging were to decline worldwide, the environmental consequences would not be altogether positive.

The issue of where to log is important because the environmental damage associated with logging may vary considerably from location to location. For example, damage that results from tree extraction (such as soil erosion) is greater on steep terrain than on flat terrain. Damage to old-growth and other unique forests, which are often highly prized for their preservation values, can be considered more serious than damage to either second-growth or plantation forests. Thus, the global environmental damage associated with logging can increase or decrease, depending on where the logging occurs.

Yet it would be a mistake to assume that net changes in environmental damage can be calculated simply by adding up damage in each locality where logging occurs. In assessing these changes, other factors must be taken into account, including the size of any particular type of forest being logged relative to the total area of forests of the same type. If the damage to a harvested forest is severe but the total area of that type of forest is large, the marginal damage to local and global biodiversity is likely to be modest. By contrast, if the damage to a harvested forest is modest but the total area of that type of forest is small, the marginal damage to local and global biodiversity could be large. As these considerations suggest, the damage associated with logging is not limited to the areas where timber is actually harvested.

Nor is environmental damage necessarily the direct result of timber harvests. If timber production were reduced significantly worldwide, the consequent decline in timber availability would likely promote the substitution of other materials for wood. Although such substitution may appear to be environmentally desirable, it is not an unmixed blessing.

Most, if not all, alternative materials create their own serious environmental problems. For example, metals, cement, and other substitute materials are obtained through potentially environmentally damaging mining or quarrying activities. In addition, most substitute products require considerably more energy to produce than wood products (e.g., see Boyd et al, 1976). Increased use of fossil-fuel energy raises the level of carbon dioxide in the atmosphere, contributing to global climate warming. Finally, few wood substitutes are as environmentally benign as wood, which is renewable, recyclable, and biodegradable.

5. ENVIRONMENTAL EFFECTS OF TIMBER REDUCTIONS IN WESTERN NORTH AMERICA

The magnitude and nature of the global environmental effects of harvest reductions in western North America will depend significantly, but not solely, on the location of offsetting harvest increases. Assessing these global effects will require additional research, but the predictions of the TSM enable me to speculate about net changes in regional environmental damage. Such speculation is a starting point for determining whether the harvest reductions in western North America will lead to a net change in global environmental damage.

As noted above, the TSM predicts that the harvest reductions in western North America will trigger harvest increases in parts of Europe (notably the Nordic countries and probably Russia), parts of Asia and Latin America, and other parts of North America (notably the U.S. South and eastern Canada). Recent timber production and trade information suggests harvests have already increased in some of these regions. A consideration of the natural features of the forested area of three of the regions – the Nordic countries, the South American tropics, and eastern Russia – illustrates how increased logging could affect the severity of local logging-related environmental damage.

Increased harvests of the forests in the Nordic countries may generate only modest additional environmental damages. Logging in these forests is less likely to cause serious erosion and water runoff problems because the forested terrain is generally flat. Since few of the forests contain old-growth timber, the loss of preservation value resulting from logging is negligible. Therefore, a sizable, but not huge, increase in harvest levels probably poses little additional risk to biodiversity.

	plantation/ industrial	old growth	tropical	flat terrain	Environmental Damages
Nordic	yes	no	no	yes	small
U.S south	yes	no	no	yes	small
South America	yes	no	no	yes	small
SA Tropics	no	yes	yes	?	moderate-large
New Zealand	yes	no	no	moderate	small
Vietnam, Myanmar	no	yes	yes	?	moderate-large
Russia east	yes	yes	no	?	moderate
Europe, eastern	yes	no	no	?	moderate
Canada, eastern	yes	often	no	no	small

Increased timber harvests in South America may involve either logging old-growth timber or expanding plantation forests. While the risk to biodiversity is great where old-growth habitat is destroyed, the risk to native habitat from plantation forests can be small. Contrary to popular impression, plantation forests are usually established on degraded agricultural lands, rather than on land cleared of native forests. Accordingly, the environmental effects of plantation expansion on biodiversity are probably negligible and may be positive, since plantations have been shown to provide habitat for an expansion of biodiversity in some situations (Lugo et al., 1993). Selection logging in tropical forests, in which only a few trees are harvested per hectare, could lessen damage, particularly if road building is minimized and if large areas of fairly inaccessible forest remain largely undisturbed. These precautions could be especially important in preventing erosion, although this problem is likely to be a small one in the Amazon, much of which is flat.

The environmental effects of increased logging are more difficult to assess in eastern Russia than in South America or the Nordic countries. Several natural features of the forests in eastern Russia suggest that damage resulting from logging is likely to be modest. The areas of native forest are vast, and much of the terrain is relatively flat. In addition, Russian forests, like other forests in cold climates, contain considerably less, yet more broadly distributed, biodiversity than tropical forests. However, other natural features of eastern Russia's forests suggest that logging could have serious environmental consequences. The relatively low volume of timber in many of the forests necessitates logging over large areas. In addition, timber regeneration is difficult in many eastern Russian forests, especially in the more northerly regions. Land that remains without an adequate forest cover for a long period of time is at increased risk of susceptibility to environmental damage.

These speculations suggest the difficulty of making comparisons among different localities' logging-related environmental damage. In general, however, logging in plantation forests is likely to be the most environmentally benign, especially when these forests are established on former agricultural lands. Plantation sites are usually flat, and their volumes of old-growth timber and biodiversity are small. By contrast, logging in old-growth tropical forests is likely to be the most environmentally damaging, primarily because the biodiversity is greater in these forests than in any others.

6. IMPLICATIONS FOR THE NEAR-TERM AND FOR THE THIRD MILLENNIUM

At the beginning of this paper, I referred to the slogan "think globally and act locally," and I suggested that acting locally to protect the environment sometimes could lead to a net increase in global environmental damage. This is certainly a possibility as shown in our "case study" of timber harvest restrictions in western North America. Because much of the damage associated with timber harvests is localized, many people believe that reducing the harvests in their own region will be environmentally beneficial. What they often fail to consider is that much environmental damage is, in its essence, global.

In the 21st century policymakers must understand that a decision to protect the environment by reducing timber harvests in one region will not necessarily generate a *net* reduction in the global effects. Ultimately, new or increased timber harvests in other localities will affect the global environment and whether the environmental effects of this redistribution of

harvests is positive or negative depends in large part on where the activities occur. For this reason, national policies of the future must recognize their international implications. With regard to logging-related damage, the most efficient strategy may be to identify the areas where this damage is likely to be greatest and to devise incentives that discourage timber harvests in these areas. Such a strategy may result in encouraging timber harvesting in areas where that activity is more likely to be environmentally benign.

Most of the forestlands now being considered for protection are old growth forest and unique forest habitats. A reasonable prediction is that the 21st century will likely see a continuation of this trend with the emphasis on more land set-asides of old-growth and unique forest habitats of North American. I would expect that the Nordic countries and the U.S. South to be among the recipients of the deflected logging. This will have positive benefits for their wood products industries and, fortunately, the well managed forests in these countries will probably experience minimal additional environmental damages. Also, an increase in forest set-asides and protected areas in the 3rd millennium is likely to provide additional incentives for the expanded creation of intensively managed plantation forests, especially on former agricultural lands in the tropics and semi-tropics. Plantation forests are destined to become increasingly more imported supply sources. Finally, the regions most “at risk“ to experience logging damages associated with increased logging over the first part of the 21st century are probably the tropical areas of South America and southeast Asia, and, perhaps, parts of the forest of the former Soviet Union.

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RESPONSE TO ROGER A. SEDJO

Chris Elliott

WWF

Dr. Sedjo provides a useful framework analysis of the impacts of the globalisation of the timber trade. He shows convincingly that restricting harvesting in some areas may result in logging moving elsewhere, where environmental controls may be weaker. Having read the paper, the following questions occurred to me:

1. Is the phenomenon due to environmental restrictions, or are environmental pressures to conserve old-growth forests simply causing a problem which would appear anyway once the old-growth forests (with their large volumes of standing timber) are lost in a given country. Are the environmentalists being blamed for a problem caused by the timber industry? The forests or plantations will not allow the same levels of volume to be extracted per hectare, so declines in harvest levels are inevitable, with or without environmentalists.
2. Are we condemned to a scenario of increasing timber demand, on a “Club of Rome“ model, or will recycling and more useful use of timber influenced by rising prices lead to stabilisation of demand? Is substitution of wood by other products always bad?
3. What about the benefits of protected areas and other conservation measures? Also, what about equity between nations – is it morally acceptable for the developed countries to log all of their own old-growth forests and then move on the Amazon and Russia? This debate is now topical here in Finland with the recent Jaakko Pöyry report which seems to indicate that Finland cannot afford to protect more old-growth forests. If Finland cannot afford it, how can Brazil?
4. What about measures to increase supply, like the New Zealand model, where extensive areas of old-growth forests have been protected, and plantations established on old pastures? New Zealand is now a major forest products exporter.
5. Does global substitution apply equally to all wood products? Pulp and low grade - lumber may be readily substitutable, but what about high quality veneers?

INDEPENDENT CERTIFICATION OF FORESTS AND FOREST PRODUCTS

Francis Sullivan

Board member, Forest Stewardship Council

As we near the end of the millennium, there now exists the opportunity to review the state of the world's forests, examine the trends in their area and health and pose the question – What sort of forests do we want to have?

1. THE STATE OF THE WORLD'S FORESTS

The human threat to the world's forests has never been greater. Recent research shows that only 6% of the world's forests currently lie within protected areas; on the ground the reality is far worse, with many protected forests existing only on paper.

The status of forests outside these few protected forests also makes depressing news. Within the tropics, FAO data shows that the rate of deforestation is now nearly 2% per annum. In fact, the rate of deforestation is continuing to rise, increasing from 11 to 15 million hectares per year during the 1980s.

The picture in temperate and boreal forests may at first sight appear to be less bleak. In some regions of the world the area of forest and standing volume of timber is rising. However, this is usually shadowed by a decrease in the *quality* of the forests.

Throughout temperate and boreal forests, forest quality has suffered as a direct result of silvicultural techniques which have narrowed the genetic base, replaced native vegetation and impoverished native biological diversity. Unless current trends can be reversed then many countries including those in Scandinavia will see extinction of native forest-dwelling species of plant, animal and fungus.

2. RESPONSE TO THE CRISIS

Forests have been high on the international agenda for nearly fifteen years. Scenes of vast tracts of virgin Amazonian rainforest burnt to the ground, sounded the alarm around the

world. It was clear that unless deforestation and forest degradation could be halted the social, environmental and economic implications would be horrendous.

Various intergovernmental agencies and initiatives have expressed their concern for the continuing carnage. During the 1980s the Tropical Forestry Action Plan and the International Tropical Timber Organisation both attempted to slow deforestation in the tropics. However, neither has managed to tackle the principal underlying causes for deforestation. Many thought that the Earth Summit held in Brazil in May 1992 would be able to find mechanisms to “save the world’s forests”. Over the past four years, there has been a great deal of discussion with many suggestions for what should be done – but on the whole very little action.

3. THE ROLE OF THE FOREST PRODUCTS TRADE

Recent research carried out by WWF (Bad Harvest?) has shown that the forest products trade is the single greatest cause of the damage to world’s forests most rich in wildlife. Despite the strenuous efforts of some companies and their trade associations to lay the blame on the activities of poor small-scale farmers, it is now clear that many companies have had a serious negative impact – and continue to do so.

Over the last ten years, the period when the forest products industry has received the most public criticism for its effects on forests, there have been a number of industry responses. The most widespread has been the development and distribution of written claims, certificates or labels designed to reassure the customer that the product they are intending to purchase comes from a forest which under some form of sustainable forest management.

A wide range of organisations in countries such as Brazil, Canada, Finland, Ghana, Indonesia, Malaysia, Sweden, UK and USA have been involved in this practice. The result has been the confusion of the consumers and a widespread lack of trust in the environmental labels attached to forest products.

4. WHAT CAN BE DONE?

There are a few examples of action being taken around the world where forests are being protected and used in a way which will ensure their survival, as well as the survival of the lives that depend on them. Major funding of forest restoration is now starting to happen in South East Asia and Europe.

But there tends to be little news on the successful *prevention* of forest destruction – nor do we hear much about the successful establishment of incentives which ensure that forests are protected and well managed. However, over the last five years great progress has been made with a new tool which creates a market incentive for good forest management. That tool is independent forest certification.

5. INDEPENDENT FOREST CERTIFICATION

Independent forest certification started in 1989. The New York-based Rainforest Alliance was the first organisation to carry out single forest, third party independent forest certification. Since that time many other organisations have started to offer a certification service, and forests throughout the world have been certified.

Forest certification can be defined as a process which results in a written certificate being produced by an independent third-party attesting to the location and management status of the forest whence the forest product originated.

Certification involves independent assessment of a forest management operation on the ground using specified social, ecological and economic criteria or standards. It is currently carried out both by non-governmental organisations and by private companies, many of which operate in one country but some of which operate internationally. There are normally two components of certification:

- **Certification of forest management** (also referred to as forest auditing). This involves inspection of forest management on the ground against specified standards and review of documents such as management plans, inventories etc. Certification of forest management can be done at different levels (forest management unit, forest owner, region or country). Existing certification programmes work at the level of the management unit.

- **Product certification** In order for a consumer's purchasing choice to be influenced by certification the certified timber must be followed through the production process to the product which the consumer purchases, whether it be a table or a piece of plywood. The "chain-of-custody" involving log transport and processing, shipping and further processing is also subject to certification.

Two main objectives are usually identified for certification:

- improvement of forest management
- ensuring market access for certified forest products

In addition to the primary objectives of certification, a number of secondary objectives can be identified (Simula, 1993):

- improved transparency and control of forest management, particularly with respect to illegal logging activities (this seems to be of particular interest to the Indonesian authorities in their deliberations on certification);
- higher recovery of royalties, forest taxes and other fees;
- increased availability of funds for forest management;
- internalisation of environmental costs in the production costs of timber and timber products;
- improved total productivity and cost savings in the production chain from forest to final user, with potential reduction in the number of intermediaries.

Proponents of certification usually make it clear from the outset that timber certification has limitations as a policy instrument since it only affects the forest management unit (if this is what is being certified) and thus cannot directly influence land-use planning and national policy. It is usually seen as complementing rather than replacing tools such as provincial forest policy, legislation and education.

The intended mechanism of timber certification is to link the “green consumer” who is allegedly willing to purchase sustainably produced wood and wood products, to producers who are seeking to improve their forest management practices and obtain better market access and higher revenue. Certification can thus be considered as a category of environmental labelling which, according to the US Environmental Protection Agency (EPA), “strive(s) to make credible unbiased and independent judgements in certifying a claim or product”.

Environmental labels (or “ecolabels”) can be based either on third-party verification, or they may be self-declaration claims. Certification falls into the first category, advertising into the second.

6. THE FOREST STEWARDSHIP COUNCIL

The FSC is an independent non-profit, non-governmental organisation. It was founded in 1993 by a diverse group of representatives from environmental institutions, the timber trade, the forestry profession, indigenous peoples’ organisations, community forestry groups and forest product certification organisations from 25 countries. The FSC – which is supported by all the major international NGOs – promotes a set of Principles designed to ensure that forests of all types are managed in ways that are:

- **Environmentally appropriate**
- **Socially beneficial**
- **Economically viable**

The FSC promotes good forest management by evaluating and accrediting certifiers, encouraging the development of national and regional forest management standards, and by strengthening national certification capacity by supporting the development of certification initiatives worldwide. Already four certifiers have been accredited and more than 4,000,000 hectares of forest have been independently certified in 15 countries Belgium, Brazil, Canada, Costa Rica, Honduras, Indonesia, Malaysia, Mexico, Papua New Guinea, Poland, Solomon Islands, South Africa, UK, USA, Zimbabwe.

Already a number of retailers in Europe and the US are selling wood products from these forests. The retail and importing side of the timber trade in many countries has responded positively. In the UK, for example, the corporate members of WWF’s 1995 plus Group have responded to the challenge by committing to phase out, by the end of 1999, the purchase of all wood and wood products that do not come from independently certified well-managed forests.

The impact of the 1995 plus Group is already being felt. The Group trades over \$4,000 million worth of wood products a year, which is almost 10 per cent of total wood consumption in the UK. More than 35 million customers a week shop in their stores.

7. THE FUTURE

There is now a clear demand for forest products which can be shown to come from independently certified well managed forests. The Forest Stewardship Council has established a system of accrediting certification bodies to provide a clear definition of good forest management, which in turn gives credibility in the marketplace.

Certification in the years to come can provide an incentive through trade for improved forest management, thus reducing the environmental and social impact of the timber trade.

Increasing numbers of producers are approaching certification bodies to be audited with a view to receiving certification, in accordance with the Forest Stewardship Council Principles and Criteria.

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RESPONSE TO FRANCIS SULLIVAN

Åke Barklund

Leader of the Nordic Forest Certification (NFC) project
Sweden

The six organisations taking part in the NFC are the Central Union of Agricultural and Forest Producers of Finland, the Finnish Forest Industries Federation, the Norwegian Forest Owners' Federation, the Norwegian Pulp and Paper Association, the Swedish Federation of Forest Owners, and the Swedish Forest Industries Association. It is very important to keep in mind that there are 650 000 individuals or families in the Nordic countries that own forest. 75% of the annual cut is made on such small forest estates.

To start with I share, of course, Mr. Sullivan's concern about the rapid deforestation going on in the tropics. And I like the FSC basic approach to combine economy, ecology and social/cultural values in forestry to secure the resource base and keep up production. There should be a nice balance between them to create true Sustainable Forest Management. The most important of the three, however, is the economy; there is no example yet seen where environment and social values are secured under bad economy! We have to remember, however, that profitability is no *guarantee* for sustainable ecology or social security, but it is the *basic condition*. The first 20 forests certified along the FSC concept were, as I understand, in the tropics where there was mechanical forest industry and its source of raw material, the forest, was examined. In the Nordic countries a medium sized sawmill buys logs from several hundred forest owners and a pulp and paper mill gets its pulpwood from thousands of forest owners and chips from 15 to 20 sawmills with a great number of producers.

In the Nordic countries someone owns the forest land, normally an individual or a family; the situation is almost the same in most European countries. This means that demands on forest management always affect the individual, her economy and livelihood. In areas where the government is the landowner, economic sacrifice affects everybody, or no one.

Mr Sullivan did not say this, but he wrote in an essay he sent me a week ago that very little has happened since the Rio Summit in 1992. I do not agree with him. The ITTO-, the Montreal- and the Helsinki processes are really moving! In Sweden the new Forest Act from 1994 – inspired by Rio – states that Production and Ecology are equal goals for the Swedish Forestry, and the soon incoming Finnish Forest Act will state the same.

The idea of forest certification in Scandinavia has been under discussion for a couple of years. The NFC project was established on 1st August 1995, and over the following 6 months progress was made in several fronts. For example, attitudes towards forest certification within the forestry sector have become much more *uniform* compared with the situation early last autumn:

- A) Individual forest owners and forest companies *had* rather *diverse views on the need for forest certification*. Some were more positive to the idea, while others were much more hesitant. Comments of the latter were typically along the lines of “Forest certification is just another mayfly, today this, tomorrow that”. These days most people involved with forestry believe that forest certification, *can become* an effective way to showcase sustainable forestry to their customers and the general public. To *know*, you have to develop a system.
- B) Some individual forest owners and forest companies *thought they could gain a lot* by being among the first few to certify. Now most of them understand that solo certification can provide short-term benefits at best, mostly in terms of improving their general image.
- C) The insight that *wood production will be substantially affected* by a heavy one-eyed focus on general biodiversity in forestry is much more widespread today than it was last spring.

The NFC project noted that there is good agreement between the UNCED-documents/Helsinki resolutions and the *basic 10 principles* of the Forest Stewardship Council. Therefore, when developing criteria, national standards and indicators for certification, economic, ecological, and social/cultural aspects included in the concept of sustainable forestry will all be given due consideration.

Mr Sullivan talked about quantity and quality of forests. In the Nordic countries the annual harvests fall short of the growth by 30% over the last decades. What about the quality? We are not setting aside large areas of virgin forest to serve as natural areas because the very low percentage of untouched forests we have are already reserves, and because our general philosophy is that forests should be managed and used. However, we do place great importance on the concept of multiple-use management.

I want to stress a few characteristics of the Nordic forestry that deserve special consideration:

- It is the very long stewardship tradition, with varying trends and directions, that has resulted in our
- present forests with a high degree of heterogeneity and a very small amount of virgin forest.
- Forest owners, managers, and workers tend to be highly competent and responsible individuals
- the public is allowed free access also to privately owned forests. Since many individuals exercise
- this right, there is generally good local public awareness of the forest operations being carried out
- the approach to forestry in the Nordic countries is based on market economics, with diminutive subsidies and
- all activities, costs for obligations, and economic yield are financed by timber sales.

Forest certification offers a way to promote forest products at the expense of non sustainable substitutes along with modern LifeCycleAssessment. It is therefore important that forest certification is possible to link to the quality and ecological certification systems -ISO 9000 and 14 000 in the forest industrial and transport sectors.

The advantages of relying on *one* certification system in Scandinavia instead of several systems are obvious since from an international viewpoint, we are looked upon as one *homogeneous region*. In Scandinavia the development of forest certification serving the needs of small forest owners is given high priority. This is why the international impact is important; the forest ownership structure is the same in many other nations. Our industries are importing substantial volumes of raw material from the Baltic countries and from Russia. Thus we would like our Finnish, Norwegian and Swedish companies that are working abroad to have the same obligations back home.

Although the current Nordic debate concentrates on strategies for increasing biodiversity, this should not overshadow other aspects of sustainable forestry, including maintaining the wood-producing capacity of the ecosystems and the rest. As we read the Rio-summit documents, environmental care is viewed more as an *instrument* for increasing longterm biological production than as a *goal* in itself.

It is not possible to take in the FSC concept developed in the tropics just like that. Not only do the categories of Economic- Environment- and Social interests differ, but our forests have, for a very long time, been managed by responsible people who own their land! Standards and indicators must be developed in such a way that forest owners feel they are fair and go along with experience or new knowledge from RaD.

The NFC project team suggests that criteria be grouped into three general types:

- A) *Basic requirements* that are compulsory and must be followed from the first day. Here we are referring, for instance, to general restrictions concerning forestry practices in key biotopes, in protected zones around lakes, etc.
- B) *Targets* for measurable indicators. For example, the amount of living broadleaf trees, the volume of dead wood per ha, or the average number of the so called “eternity trees” per ha. An eternity tree is identified early in its life and is left to grow, to die and to fall down and rotten by itself, irrespective of silvicultural activities.
- C) *Commitments* proving that the forest owner has the competence and the intention to meet the basic requirements and approach the targets set.

If A, B and C- criteria are fulfilled the forest will be certified.

In a special study carried out by Indufor Inc., options for certification of different types of units were assessed. The consultant concluded that it should be possible to certify individual forests separately, as well as several small forests with different owners together.

New methods for sustainable forest management are constantly being developed. Field tests and pilot projects do not only play important roles in this work, but also provide valuable data needed for developing criteria, standards, and indicators to be used in forest certification. In Finland, a huge pilot project, called “Birkaland”, is under way, and in Norway an even larger project called “Living Forests” has been established. In Sweden, several smaller field tests and projects are being run. In mid February a Swedish FSC working Group was set up to develop Swedish Standards and Indicators for SFM.

The NFC project has identified seven areas that should be given priority to develop an effective and reliable certification system:

Most urgently:

- establish criteria, national standards, and indicators for sustainable forestry; this job is now going on in the three countries;

Then:

- evaluate alternative structures for the forest certification organisation;
- assess different ways to verify certified wood;
- develop guidelines making it possible to link forest certification to the ISO quality- and ecocertification systems in the transport and industrial sectors;
- contacts with market representatives and customers must be maintained in order to ensure that the certification system will satisfy them;
- identify the incentives needed to motivate forest owners to certify their forests.
- decide how to handle imported rawmaterial in the Forest Certification system.

Environmental NGOs from Finland, Norway, and Sweden, respectively, have been invited by the NFC project to establish a Nordic Harmonization Group together with forest owners and forest industry, in which the parties will be equally represented.

APPENDIX 1: PROGRAMME

MONDAY 18 MARCH

9.00 **Registration and Coffee**

9.30 **Welcoming Address**

Mr. Tim Peck, Chairman of EFI Board

Opening Address

Mr. Hannu Tenhiälä, County Governor of North Karelia

Moderator of the morning session: Professor Birger Solberg, EFI

10.00 **World Forest Resources - Trends and Prospects**

Mr. K.H. Schmincke, Director, Forest Products Division, FAO

Discussants: *Ms. C. Hubert*, Director, AFOCEL-ARMEF, France and

Mr. Björn Högglund, CEO, Stora Skog, Sweden

10.50 **Mergers, Economies of Scale and Internationalisation of the Forest Product Corporations: What are the New Items in the Corporate Managerial Agenda for the Next Ten Years?**

Professor Risto Tainio and Professor Kari Lilja,
Helsinki School of Economics, Finland

Discussant: *Mr. Juhani Pohjolainen*, Deputy CEO, Enso-Gutzeit Oy, Finland

11.30 **Comment by a Finnish Forest Owner, Mr. Jouko Juurikkala**
General discussion

12.00 **Lunch**

Moderator of the afternoon session: Prof. Matti Palo, Finnish Forest Research Institute

13.30 **Economic and Environmental Competitiveness of Forest Industry Products**

Mr. Rainer Häggblom, CEO, Jaakko Pöyry Consulting, Finland

Discussant: *Mr. Jeremy Wall*, (Acting) Head of Wood & Paper Industries' Unit,
DG III/C/5, European Commission

14.10 Environmental Impacts of Forest Protection: Some Complications

Dr. Roger A. Sedjo, Senior Fellow and Director, Forest Economics and Policy Program. Resources For the Future, USA

Discussant: *Mr. Chris Elliott*, WWF

15.00 Coffee break

15.30 Independent Certification of Forests and Forest Products

Mr. Francis Sullivan, Board member, Forest Stewardship Council

Discussant: *Mr. Åke Barklund*, Skogsindustrierna, Sweden

**16.10 Comment by a Finnish Forest Owner, Mr. Jouko Jaatinen
General Discussion**

16.45 Closing of the seminar

Professor Birger Solberg, EFI and

Professor Matti Palo, Finnish Forest Research Institute

18.00 Cocktails at hotel Kimmel, Sirkkala Hall

TUESDAY 19 MARCH, EXCURSION DAY

8.00 Departure to the excursion from hotel Kimmel

9.00 Demonstration of logging operations at a forest site of Enso-Gutzeit Oy.

Coffee in the forest.

Mr. Matti Karjula, District Director

10.30 Visit to Enocell Pulp Mill

Mr. Jorma Kangas, Director of the Pulp Mill

11.30 Lunch

12.30 Departure to Joensuu

**13.15 Visit to the new Forestry Building of the Faculty of Forestry and the
Finnish Forest Research Institute**

- Presentation of the activities of the Faculty of Forestry

Professor Paavo Pelkonen, Rector of the University of Joensuu

- Presentation of the activities of the Joensuu Research Station of the Finnish Forest Research Institute

Dr. Jari Parviainen, Director of the Station

14.00 Coffee and Departures

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APPENDIX 3: PHOTOS



Pentti Hyttinen and Birger Solberg catching the audience's reaction after the presentations by Kari Lilja and K.H. Schmincke.



Nearly 300 participants from more than 20 countries guaranteed a day of vivid discussions.



Local private forest owners brought their views and experiences to the day's agenda, too.



Claire Hubert, AFOCEL-ARMED, France



Roger A. Sedjo, Resources for the Future, USA



After the seminar had given food for thought, the participants gathered at a reception...



where less formal discussions followed.



Chilly Finnish winter did not stop the participants from venturing into the forest to see a logging operation by Enso-Gutzeit.



A welcomed cup of hot coffee during the excursion warmed Paul Efthymiou and Alexandros Arabatzis



K.F. Schmincke, FAO, enjoyed the winter's day