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Forest Research – Challenges and Concepts in a Changing World

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Welcome Address

*Professor Risto Seppälä
IUFRO President*

This year IUFRO - the International Union of Forest Research Organizations celebrates its 110th anniversary. The Union was founded in Eberswalde, Germany, but the original proposal to create a "central organ" for applied forest research in Europe was made two years earlier in this building during the Congress of Agriculture and Forestry.

From its small beginnings in Central Europe, IUFRO has grown into a major global organization. The Union has gained reputation for facilitating research cooperation, maintaining scientific standards and promoting the exchange of information. These will remain a focus of the IUFRO also in the future.

To survive and prosper all organizations must, however, reconsider their strategy and actions regularly. The IUFRO Board accepted last year a new Philosophy with a Vision and Mission, and expanded them recently to a comprehensive Strategic Action Plan. This plan lists strategic goals that include, among others, strengthening of the IUFRO Secretariat and intensified collaboration with Austria that has hosted the IUFRO Secretariat since 1973.

These new premises here in Mariabrunn demonstrate well that we have already partially reached our goals. The Austrian Government has not only provided IUFRO with new very nice office rooms but has also increased its contribution to IUFRO's personnel expenses. In my capacity as IUFRO President and on behalf of the IUFRO Board, I express my sincere thanks to Austria and especially to the Federal Ministry of Agriculture, Forestry, Environment and Water Management for a generous support.

I am also happy that co-operation between IUFRO and the Austrian forest research community shows signs of improvement. Although the IUFRO office is no more located in the same building with the headquarters of the Austrian Federal Office and Research Centre for Forests, relations between IUFRO and BFW are getting better. Our hope is that the whole forest research community in Austria would consider IUFRO as their advocate in international collaboration.

I take this opportunity to thank the organizers of this Symposium. The Symposium has a very demanding title and therefore, I also wish to recognize the contributions of speakers. I believe that the extent of interests and experience represented here will yield substantial ideas to the solution of pending issues in forestry.

INTRODUCTION

IUFRO – From a Home of Standards to a Modern Service Centre

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The initial period

The International Union of Forest Research Organizations, IUFRO, started in 1892 as a “Central Organ” for applied forest research in Central Europe with the name of “International Union of Forest Experiment Stations”. The first target and working programme arose from the need to standardize research, its conditions and experiments in order to make methods and results comparable and ready for further development and improvement. International congresses organized periodically should help to discuss results and implement recommendations. At the first Congress it was decided, for example, to generally use the breast height diameter (BHD) at 1.3 m for the measurement of tree diameters.

Up to its reinstatement after the First World War in 1929, the Union had no organs besides the Assembly of Member Organizations and its chairperson (President). The directors of the member institutes and some individual researchers represented the “members” at the congresses and they discussed the results of their research according to the programme agreed at the respective previous congress.

The inter-war period 1929 -1948

Universities, forestry education centres and other forestry institutions joined the forest experiment stations in IUFRO. Name and scope were changed too. The “International Union of Forestry Research Organizations” adopted English as its working language; an International Committee was established where every member country was represented. Between the congresses the President was assisted by a Permanent Committee (later Executive Board). The scientific work was organized in 4 research units, and later extended to 9 units. At that time, IUFRO was already active on a global scale and tropical forestry was part of its working programme. For the first time scientific work was carried out in the form of international projects, the results were discussed at the congresses. The first Secretary General (Sven Petrini, Stockholm) took over the management affairs of IUFRO.

¹ Mr. Schmutzenhofer is the Regional Representative of IUFRO in Latin America. He served IUFRO as Executive Secretary until end October 2003.

IUFRO between 1948 and 1971

As described for the previous period IUFRO went ahead with a slightly enlarged structure. Research was performed in 12 “Sections”; a Secretariat was established at FAO (1948 - 1957). Gradually, the individual researchers and their work came up on stage in the units of the IUFRO structure and consequently gained place in the centre of forest science and related disciplines in IUFRO. Their demands generated the need for services.

IUFRO on its way to become the Advocate for Forest Science

In order to meet the challenges of the future IUFRO adapted its structure, administration and management basically at the Congresses in 1971 and then in 1990 and 2000. In a steady process the presentation of IUFRO and its products have been modernized, and finally gained a new corporate identity with a new logo replacing the old one of 1967. IUFRO World Series, IUFRO Research Series, and Occasional Papers are publication series of international reputation. The Task Forces, now 10, are active in elaborating State of the Art reports on international issues and topics. Special Programmes and Projects strengthen the visibility of IUFRO internationally and the collaboration in international fora, like UNFF, FAO and regional processes make IUFRO well known in the world. The research work carried out in the IUFRO Structure of 275 Research and Working Parties is a special highlight of IUFRO. The IUFRO Board coordinates the scientific development of the Union, the Secretariat provides management and services to support the scientific community and the officeholders.

PART I: ECONOMICS

Demands and Framework Conditions of Forest Economy

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Abstract

The paper starts out with a brief outline on the main characteristics of family forestry in Europe. Globalisation and changing socio- demographic patterns are amongst the most demanding challenges for developing sound and long-term orientated framework conditions for forest economy. Forest owners manage the most promising and multifunctional natural resource of the 21st century and they should be encouraged to continue their engagement and provide their expertise and holistic thinking to future generations. Society needs to value forest owners as partners in achieving sustainable development. With the sustainable production of timber they form the basis for producing wood and wood-based products for individual lifestyles. The forest owners' commitment to multifunctional sustainable forest management creates in the best possible way added value through non-market goods and services. Research needs to contribute to innovative solutions that capitalize on the unique opportunities offered by sustainable forest management and the production of wood and non-wood products.

Key words: Family forestry, forest economy, sustainable development, multifunctional sustainable forest management

1 Major challenges and opportunities for family forest owners in the 21st century

What are the characteristics of family forestry in Europe? Sixty percent of EU 15 forests are owned and managed by families with a generation bridging experience and know-how in sustainable forest management. The estimated share of private forestry in CEECs amounts to thirty six percent. The majority of the holdings are fragmented and of small scale with an average size of 5 ha in EU 15 and 2 ha in CEEC. Family forest owners in Europe are committed to multifunctional sustainable forest management balancing economic, social and ecological requirements taking into due account the diversity of management conditions across Europe. Forest ownership is local ownership contributing significantly to the economic and social well-being of rural communities.

Globalisation is amongst the most demanding challenges for European family forestry. Europe, having pursued for many decades an integrated approach to sustainable forest management finds itself in competition with regions where social and eco-dumping are still inherent in production processes. Thus European family forest owners are competing with

management patterns that do not comply with multifunctional use of forests, but favour a segregated approach into strictly production and strictly protection areas.

Changing socio-demographic patterns put proven cooperation models of forest owners into question. The new “species” of urban forest owners, living in distance to their property has different management objectives than the old “species” of *in-situ* forest owners that rely on forests for parts of their self-sufficiency. Ever changing Zeitgeist developments tend to put even sustainable forest management *à la mode* through looking for maximised shareholder value by creating artificial short-term demands. Along the same lines the urban population tends to draw a virtual image of nature derived from one-sided propaganda campaigns of internationally organised environmental networks.

The main asset of sustainable forest management is the production of the most promising and multifunctional natural resource of the 21st century. No other renewable resource has the same variety in application as wood and wood-based products. New technologies allow increased efficiency and variability of nearly all timber assortments: from small dimension timber to large dimension quality timber creating added value throughout the whole processing chain. Life-cycle analysis, performance in environmental impact assessment and requirements with view to public procurement offer ample opportunities for wood and wood based products to demonstrate its facets and unique characteristics. The forest owner ensures that the production is carried out in respect for the dynamic conservation of the natural heritage.

There is an increasing and urgent need for forest owner and managers to raise public awareness on the significance and necessity of non-market benefits provided through sustainable forest management. A simple opportunity cost calculation would, for instance, impressively demonstrate the capacity of forests to provide protective functions against natural disasters like floods, erosion etc.

2 Possible solutions to meet the challenges and capitalize on the opportunities

The forest owner needs to understand himself/herself and needs to be understood as multifunctional entrepreneur who does more than “just” grow trees. Enhancement of forest owner co-operation meeting the demands of old and new forest owners, improvement of the logistical chain with “just in time” delivery models and an increased corporate identity within the forest sector (from the tree to the product) facilitate a proactive approach to meet the above mentioned challenges.

Society needs to value forest owners as partners in achieving sustainable development. The wide range of products and applications manufactured and processed from wood offer a variety of life-style opportunities society is looking for in their search for individuality.

3 Conclusions


It is the task of research to further develop wood and wood based products as high tech material. Unconventional approaches are needed to find new applications for wood and wood-based products and make them an indispensable part of peoples every day life. Through testing innovative cooperation models research can assist forest owners to better meet market demands and therewith invest in multifunctional sustainable forest management.











It is the task of forest owners to develop MISS (make it simple and stupid strategies) on their commitment to sustainable development that appeal to the Zeitgeist and genuine needs of society. Forest owners are encouraged to discover the opportunities of alliances and partnerships with those who share the same objectives.










It is the task of society to have a genuine trust in the knowledge and know-how of rural actors, in particular in forest owners and thus overcome the “slaughterhouse syndrom” which will allow them to enjoy that a tree has been cut to manufacture a unique wooden chair or table.

Timber Trade Scenarios, Impacts on Global Trade

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 <p>RESEARCH CHALLENGES: TRADE, MARKETS (AND LOTS MORE)</p> <p>Kit Prins Chief, Timber Branch UNECE Trade Development and Timber Division</p> <p><small>IUFRO 110 YEARS, 9 October 2002</small></p> <p><small>TIMBER COMMITTEE ECONOMIC COMMISSION FOR EUROPE</small> <small>EUROPEAN FORESTRY COMMISSION FOOD AND AGRICULTURE ORGANIZATION</small></p>  	 <p>Contents and scope</p> <ul style="list-style-type: none"> • Trade and markets • Related sustainability issues • From policy perspective • Focus on Europe • Public and private research • Some generalities <p><small>IUFRO 110 YEARS, 9 October 2002</small></p> <p><small>TIMBER COMMITTEE ECONOMIC COMMISSION FOR EUROPE</small> <small>EUROPEAN FORESTRY COMMISSION FOOD AND AGRICULTURE ORGANIZATION</small></p>  
 <p>Background</p> <ul style="list-style-type: none"> • Forestry « under-researched » compared to some branches e.g. medicine, defence • All key policy questions now cross-sectoral • In practice difficult to separate « economics », « science » and « policy » • Governments and enterprises mostly unwilling to invest and think long term (with some honourable exceptions!) <p><small>IUFRO 110 YEARS, 9 October 2002</small></p> <p><small>TIMBER COMMITTEE ECONOMIC COMMISSION FOR EUROPE</small> <small>EUROPEAN FORESTRY COMMISSION FOOD AND AGRICULTURE ORGANIZATION</small></p>  	 <p>First challenge:</p> <ul style="list-style-type: none"> • To persuade funding agencies that forestry research is more relevant, useful and beneficial than other types of research • => explicit links to major policy or social issues (climate change, sustainability, rural development ...) • This is easier in « forest countries » ! <p><small>IUFRO 110 YEARS, 9 October 2002</small></p> <p><small>TIMBER COMMITTEE ECONOMIC COMMISSION FOR EUROPE</small> <small>EUROPEAN FORESTRY COMMISSION FOOD AND AGRICULTURE ORGANIZATION</small></p>  

 <h3>Trade, markets, sector studies:</h3> <ul style="list-style-type: none"> • Many market actors take an anti-intellectual stance • Analytical tools exist: major constraint seems to be data • Need to make the point that trade and markets are an essential point of sustainable forest management <p><small>IUFRO 110 YEARS, 9 October 2002</small></p> <p><small>TIMBER COMMITTEE ECONOMIC COMMISSION FOR EUROPE</small> <small>EUROPEAN FORESTRY COMMISSION FOOD AND AGRICULTURE ORGANIZATION</small></p> 	 <h3>Another challenge:</h3> <ul style="list-style-type: none"> • How to communicate the ideas and results? • Explain without over-simplification • But « to thine own self be true »! • Explode false impressions, still widely held <p><small>IUFRO 110 YEARS, 9 October 2002</small></p> <p><small>TIMBER COMMITTEE ECONOMIC COMMISSION FOR EUROPE</small> <small>EUROPEAN FORESTRY COMMISSION FOOD AND AGRICULTURE ORGANIZATION</small></p> 
 <h3>Data needed on trade and markets</h3> <ul style="list-style-type: none"> • Costs and prices • Industry capacity and technology • Trade patterns • End-uses of products • Roundwood supply functions/behaviour of forest owners <p><small>IUFRO 110 YEARS, 9 October 2002</small></p> <p><small>TIMBER COMMITTEE ECONOMIC COMMISSION FOR EUROPE</small> <small>EUROPEAN FORESTRY COMMISSION FOOD AND AGRICULTURE ORGANIZATION</small></p> 	 <h3>Social research should be strengthened</h3> <ul style="list-style-type: none"> • Participation • Work force • Attitudes and perceptions of forest issues <p><small>IUFRO 110 YEARS, 9 October 2002</small></p> <p><small>TIMBER COMMITTEE ECONOMIC COMMISSION FOR EUROPE</small> <small>EUROPEAN FORESTRY COMMISSION FOOD AND AGRICULTURE ORGANIZATION</small></p> 
 <h3>Innovative uses and products</h3> <ul style="list-style-type: none"> • Consumer friendly, attractive, stylish • Good price • Excellent performance • Economic of wood raw material • (responsibility of industry, not government, in most cases) <p><small>IUFRO 110 YEARS, 9 October 2002</small></p> <p><small>TIMBER COMMITTEE ECONOMIC COMMISSION FOR EUROPE</small> <small>EUROPEAN FORESTRY COMMISSION FOOD AND AGRICULTURE ORGANIZATION</small></p> 	 <h3>Everything is cross-sectoral now!</h3> <ul style="list-style-type: none"> • Understand energy, trade, biodiversity etc. • Communicate with the specialists of other fields • Work with them, learn from them <p><small>IUFRO 110 YEARS, 9 October 2002</small></p> <p><small>TIMBER COMMITTEE ECONOMIC COMMISSION FOR EUROPE</small> <small>EUROPEAN FORESTRY COMMISSION FOOD AND AGRICULTURE ORGANIZATION</small></p> 

 <h3>Forest inventories are vital</h3> <ul style="list-style-type: none">• Broaden scope to address as many as possible of indicators of SFM• Be economical of means and conscious of time factor <p><small>IUFRO 110 YEARS, 9 October 2002</small></p> <p><small>TIMBER COMMITTEE ECONOMIC COMMISSION FOR EUROPE</small> <small>EUROPEAN FORESTRY COMMISSION FOOD AND AGRICULTURE ORGANIZATION</small></p>  	 <h3>Illegal logging and trade</h3> <ul style="list-style-type: none">• Hottest new topic• How much?• From where to where?• Causes?• Feasibility of possible remedial action?• Unorthodox methods may be necessary <p><small>IUFRO 110 YEARS, 9 October 2002</small></p> <p><small>TIMBER COMMITTEE ECONOMIC COMMISSION FOR EUROPE</small> <small>EUROPEAN FORESTRY COMMISSION FOOD AND AGRICULTURE ORGANIZATION</small></p>  
 <h3>Need to share and cooperate</h3> <ul style="list-style-type: none">• Better information availability (GFIS etc.)• More joint research <p><small>IUFRO 110 YEARS, 9 October 2002</small></p> <p><small>TIMBER COMMITTEE ECONOMIC COMMISSION FOR EUROPE</small> <small>EUROPEAN FORESTRY COMMISSION FOOD AND AGRICULTURE ORGANIZATION</small></p>  	

Small Scale Forestry and Sustainable Rural Development

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Abstract

Rural regions across Europe have experienced a gradual depopulation during the past three decades. Due to the diminishing prospects for financially feasible agriculture, and the lack of supplementing sources of income, rural areas are often characterised by high unemployment, narrow occupational base and poor job creation. The result is a loss of attractiveness of rural regions and continuous emigration into urban agglomerations.

North Karelia is the most eastern province of Finland and also of the European Union. The rich combination of forest resources, forest industries and forest related know-how in the region has led to the unofficial statement that North Karelia is called the “Province of Forests in Europe”. In the regional strategies of North Karelia, a lot of hope has been put on the higher value added and especially more innovative utilisation of existing wood and non-wood forest resources. The background assumption is that, although the forest sector is not among the fastest growing sectors globally, it can be such a sector regionally.

Regardless of the fact that the employment generation possibilities seem to be the highest in small and medium size enterprises, from the viewpoint of regional income generation, the existence of large-scale forest industries is an essential factor. They guarantee the constant flow of income from timber sales to the forest owners. They also help in maintaining the infrastructure in remote rural areas. Moreover, large scale plants through their needs for constant supplies have traditionally played an important role in keeping forest owners interested in management activities and they have also played an important role in initialising co-operation among small scale owners.

It has to be emphasised that it is not only the forest products industry or intensified use of forest resources, but also the multiple use of forests that can create new job opportunities and widen the occupational base of rural regions. The innovation and marketing of activities like eco-tourism, berry picking, hunting, cross-country skiing courses and other recreational activities could create new sources of income for the entrepreneurs and forest owners of the province.

In the efforts to contribute sustainable rural development by means of small scale forestry, the attention should be drawn to the importance of the development of human rather than physical resources. Due to the fact that, from the viewpoint of rural livelihood, one of the biggest issues is the lack of employment opportunities for females, something really new, innovative forms of entrepreneurship and products could be invented by means of “female energy”. As far as the conclusions on more widely applicable policy formulation are

concerned, it has to be underlined that the success is a result of sustained efforts with several parallel and consequent means.

1 Introduction

Rural regions across Europe have experienced a gradual depopulation during the past three decades. Due to the diminishing prospects for financially feasible agriculture, and the lack of supplementing sources of income, rural areas are often characterised by high unemployment, narrow occupational base and poor job creation. The result is a loss of attractiveness of rural regions and continuous emigration into urban agglomerations. (Hytinen & al. 2002)

North Karelia is the most eastern province of Finland and also of the European Union, sharing a common border of approximately 300 km with Russia. Relatively peripheral location, long distances and sparse population together with the Nordic climate set challenges to the economic development of the region – on the other hand, they represent also many opportunities for the region's future development.

In the regional strategies of North Karelia, a lot of hope has been put on the higher value added and especially more innovative utilisation of existing wood and non-wood forest resources. The background assumption is that, although the forest sector is not among the fastest growing sectors globally, it can be such a sector regionally. By creating an innovative milieu and investing in infrastructure, decision makers expect the forest sector to increase employment opportunities and to raise the economic benefits obtained from forests (Tykkyläinen & al. 1997).

2 Province of forests

The surface area of North Karelia is 21,585 km², with maximum distances of 250 km from the south to the north by 120 km from the east to the west. A little more than 170,000 inhabitants reside in North Karelia, making 3.5 % of Finland's total population of some 5.2 million. The province boasts 19 municipalities. The city of Joensuu, with 52,000 inhabitants, is the largest city and the capital of the province.

Forest-related activities have a significant impact on employment with over 6,000 people earning their living directly from forestry or forest industry - and taking into account the income effect from timber sales to the forest owners, this figure is even doubled. The sector is most important provider of export income in the region. The share of the forest sector of the regional GDP in North Karelia is 16.5 %, which is more than double compared to the national average of 8 %. (Niskanen et al. 2000).

A total of 1.6 million ha, which makes 90 % of the total land area of North Karelia, is classified as forests and other wood land. Forest ownership is divided almost equally into four categories: state, forest industry companies, farmers and private non-farmers. There are close to 20,000 private forest owners in the province. Farmers and private non-

farmers together own over a half of the forest land area, and their significance in providing timber for the industry is unrivalled. An average size of a forest holding is 38 ha with a growing stock of approximately 102 m³ per ha. (Korhonen & al. 2001)

During the past two decades, North Karelia, and particularly the city of Joensuu, has become to a centre of know-how in forest sector. The initial stimulators were the establishment of the Joensuu Research Station (nowadays Joensuu Research Center) of the Finnish Forest Research Institute in 1981 and the start of university education in forestry in 1982 at the Forestry Faculty of the University of Joensuu. The region is also home of the European Forest Institute which started its operation in 1993.

Nowadays, there are numerous public and private forest related establishments benefiting from the dynamic milieu in the region. For example, the Joensuu Science Park works for catalysing the research findings to business ideas. A specific R&D testing laboratory for wood products, Puugia, has recently started its operations. The rich combination of forest resources, forest industries and forest related know-how in the region has led to the unofficial statement that North Karelia is called the “Province of Forests in Europe”.

3 Both large scale and small scale industries are needed

Regardless of the fact that the employment generation possibilities seem to be the highest in small and medium size enterprises, from the viewpoint of regional income generation, the existence of large-scale forest industries is an essential factor. They guarantee the constant flow of income from timber sales to the forest owners. They also help in maintaining the infrastructure in remote rural areas. Moreover, large scale plants through their needs for constant supplies have traditionally played an important role in keeping forest owners interested in management activities and they have also played an important role in initialising co-operation among small scale owners.

As to the employment generation, mechanical wood processing offers the most promising future prospects. There the investment needs are relatively low, the economies of scale do not play such a substantial role as in pulp and paper industry, and local markets supplement the export opportunities. SMEs focusing on productions of higher value added products have significant importance. Such enterprises have made up for the majority of new employment. Specialised products can profit also from more local or regional markets, however the development of export-markets for such products is essential.

It has to be emphasised that it is not only the forest products industry or intensified use of forest resources, but also the multiple use of forests that can create new job opportunities and widen the occupational base of rural regions (Hyttinen & al. 2000). The innovation and marketing of activities like eco-tourism, berry picking, hunting, cross-country skiing courses and other recreational activities could create new sources of income for the entrepreneurs and forest owners of the province.

4 Emphasis rather on human than on physical resources

As far as forest related services are concerned, stronger links between the urban demand and the rural supply should be created. The comparative analysis of the FORWARD project reveals that the potential of rural areas as high-quality living environment is rather poorly utilised in North Karelia (Niskanen & al. 2000). Abundant space, quietness, flexible logistics, non-existent waiting lines are some examples of the characteristics that could be used increasingly for the benefit of the province.

In the efforts to contribute sustainable rural development by means of small scale forestry, the attention should be drawn to the importance of the development of human rather than physical resources. Due to the fact that, from the viewpoint of rural livelihood, one of the biggest issues is the lack of employment opportunities for females, something really new, innovative forms of entrepreneurship and products could be invented by means of “female energy”.

The forest sector seems to possess various further opportunities for growth and for generating employment and income in North Karelia. The utilisation of these opportunities requires a lot of co-operation, innovation and exchange of ideas among and between all levels of actors: entrepreneurs, administrators, educators, financiers, and other relevant interest groups. As far as the conclusions on more widely applicable policy formulation are concerned, it has to be underlined that the success is a result of sustained efforts with several parallel and consequent means.



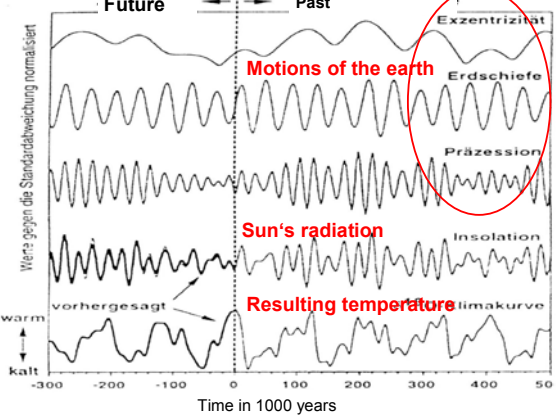
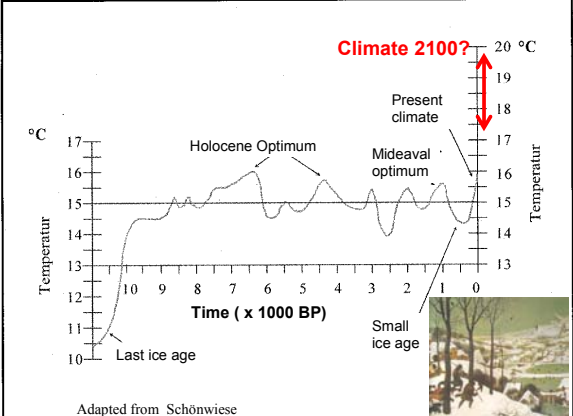
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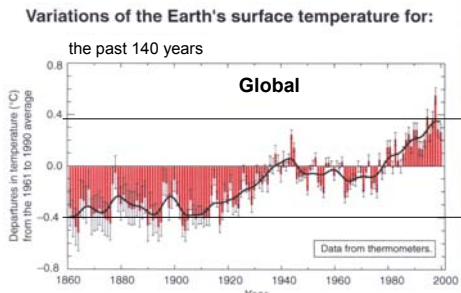

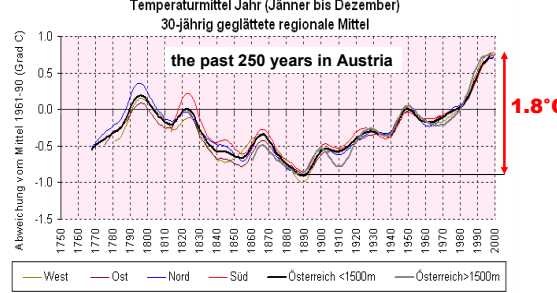

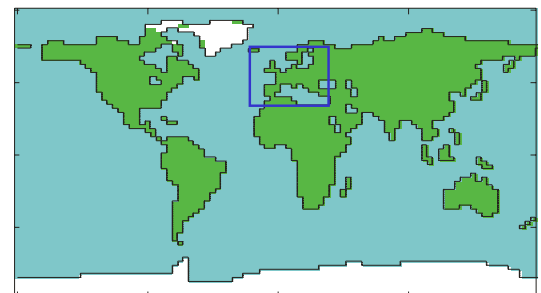

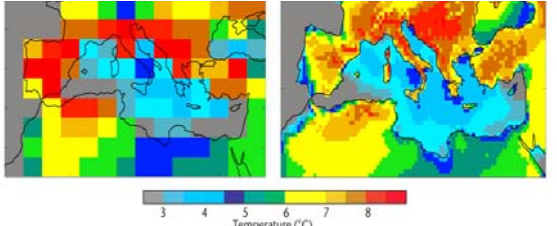

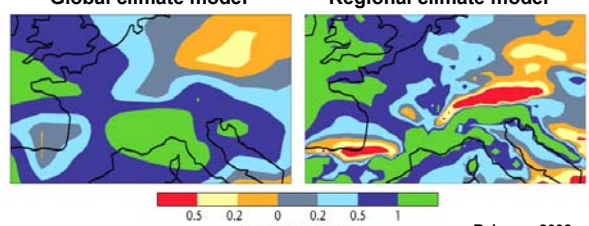
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II. SCIENCE

Climate Change and Impact Assessment on the European Scale

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<p style="text-align: center;">Institute of Meteorology and Physics </p> <p style="text-align: center;">Climate Change and Impact Assessment on the European Scale</p> <p style="text-align: center;">Forest Research – Challenges and Concepts in a Changing World Mariabrunn, 9.10.2002</p> <p style="text-align: center;">Helga Kromp-Kolb University of Agriculture, Vienna</p>	<p style="text-align: center;">Institute of Meteorology and Physics </p> <ul style="list-style-type: none"> • The Scale Problem <ul style="list-style-type: none"> – in time – in space • Europe: regions and topics <ul style="list-style-type: none"> – past and future change – Impacts • Climate Change - Global change
	 <p style="text-align: center;">Adapted from Schönwiese</p>

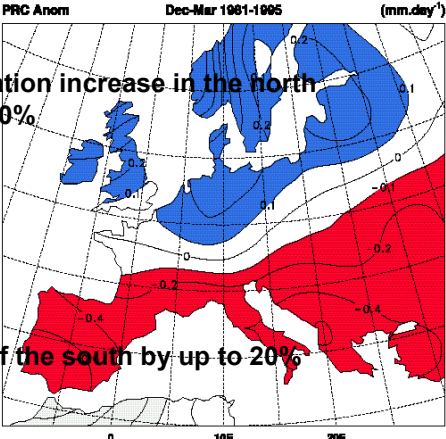
<p style="text-align: right;">Institute of Meteorology and Physics </p> <p>100 years ago.....</p> <p>...IUFRO was foundedmy father was bornDaimler produced the first car ...the Wright brothers flew the first airplane ...Thompson & Rutherford published the first models of the atom</p>	<p style="text-align: right;">Institute of Meteorology and Physics </p> <p>Variations of the Earth's surface temperature for: the past 140 years</p>  <p style="text-align: right;">IPCC 2001</p>
<p style="text-align: right;">Institute of Meteorology and Physics </p> <p>Temperaturmittel Jahr (Jänner bis Dezember) 30-jährig geglättete regionale Mittel</p> <p>the past 250 years in Austria</p>  <p style="text-align: right;">ZAMG 2001</p>	<p style="text-align: right;">Institute of Meteorology and Physics </p> <p>CLIMATE MODELS</p>  <p style="text-align: right;">Met Office / Hadley Centre</p>
<p style="text-align: right;">Institute of Meteorology and Physics </p> <p>SUMMER TEMPERATURES in the 2080s compared to the present day, due to A2 emissions</p> <p>Global climate model Regional climate model</p>  <p style="text-align: right;">Climate on islands changes very differently to the surrounding Mediterranean Sea, and can only be predicted using an RCM Hadley Center 2002</p>	<p style="text-align: right;">Institute of Meteorology and Physics </p> <p>Changes in winter precipitation 2080 vs. present for A2 emissions</p> <p>Global climate model Regional climate model</p>  <p style="text-align: right;">R Jones 2002</p> <p>Reduction of precipitation in the Alps and Pyrenees only in the regional model</p>

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Observations of Climate Change

- Temperature rise since 1750: 0,8°C
- Increase stronger by night than by day
- Related to increased cloudiness ?

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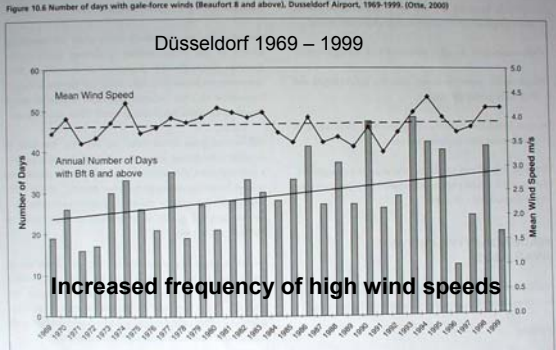


- Precipitation increase in the north by 10 - 40%
- Drying of the south by up to 20%

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Days with windspeeds above 8 Beaufort

Figure 10.8 Number of days with gale-force winds (Beaufort 8 and above), Düsseldorf Airport, 1969-1999. (Ott, 2000)




Increased frequency of high wind speeds

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Wurtenkees/Alteck, Kärnten

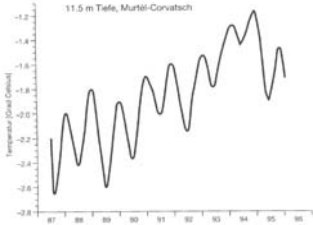

1981 1994




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Thawing of permafrost


11.5 m Tiefe, Murteil-Corvatsch

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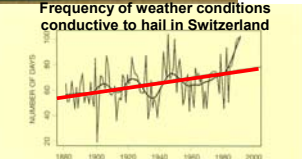
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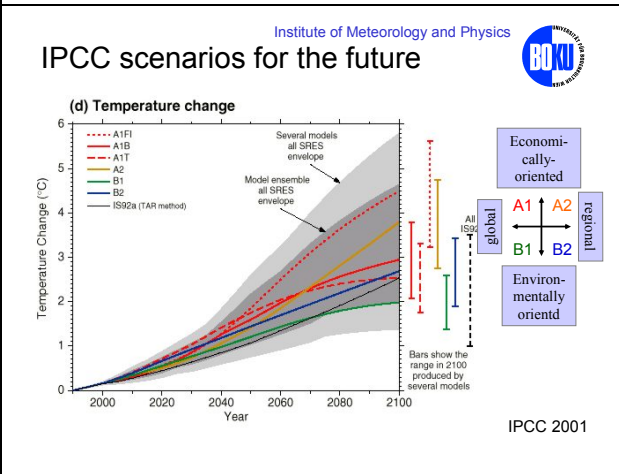
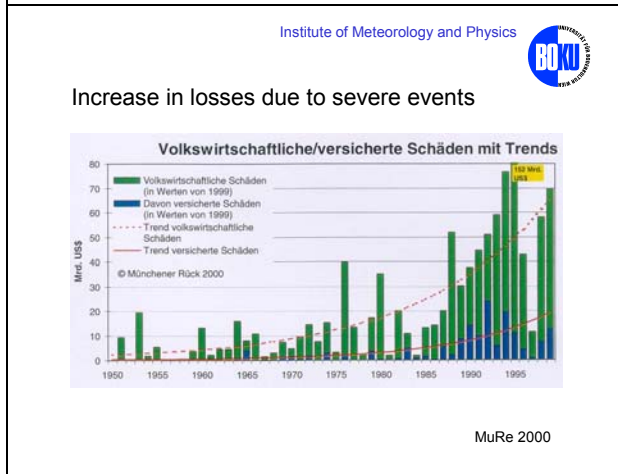
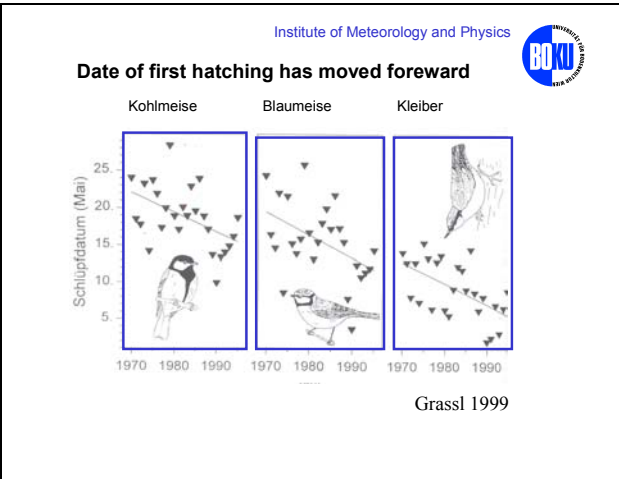
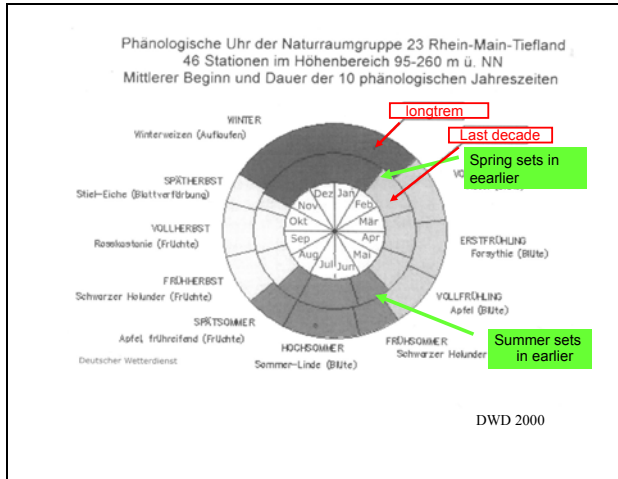


MuRe 2000

Frequency of weather conditions conducive to hail in Switzerland



NFB 31



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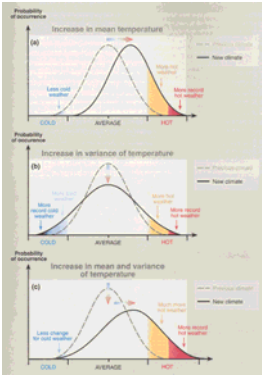

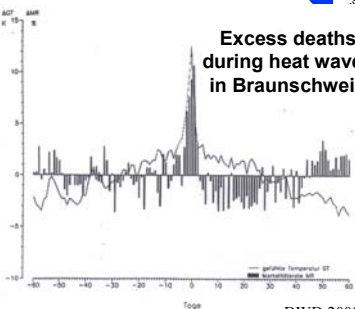


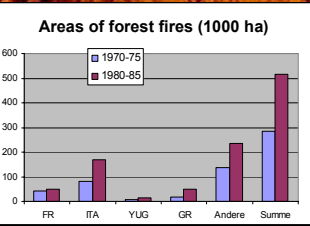

Temperature projections

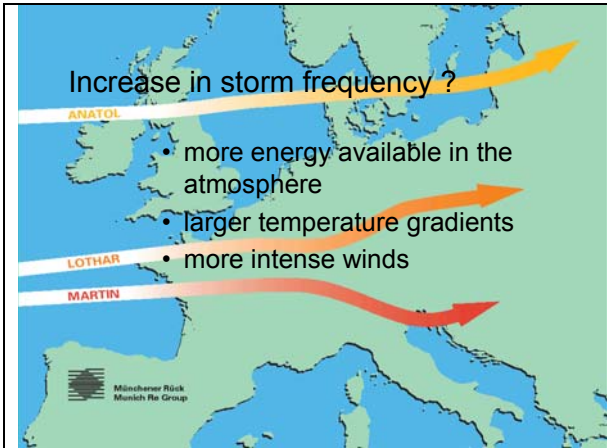
- Temperature increase: 0,1 – 0,4 °/d higher in the S and NE, less on the Atlantic coast.
- In winter more rapid warming of continental Russia
- in summer strong N-S gradient, as South warms at double rate of north

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Projections - Precipitation

- Increase in the north (+1 – 2% / d), weaker decrease in the south (-1% / d).
- in winter increase (+1-4% / d) in summer in the north +2 %/d, in the south -5%/d.
- Discrepancies between models
- The quality of the soil suffers in warmer, drier scenarios

<p>Institute of Meteorology and Physics </p> <h3>Extreme Events: statistical approach</h3>  <p>IPCC 2001</p>	<p>Institute of Meteorology and Physics </p> <ul style="list-style-type: none"> • By 2080 nearly every summer is hotter than the 1-in-10 hot summer at present  <p>Excess deaths during heat waves in Braunschweig</p> <p>DWD 2000</p> <ul style="list-style-type: none"> • Cold winters will become rarer 																					
<p>Institute of Meteorology and Physics </p> <h3>Effects on human well being</h3> <ul style="list-style-type: none"> • Change in tourism and recreation: <ul style="list-style-type: none"> – more options in summer in the north – longer bathing period – Southern Europe too hot in summer – winter skiing resorts at risk • Health risks due to heat waves, air pollution, spreading of vector borne diseases, flooding. 	 <p>Attractive?</p> <p>Schöne neue Alpen, 1998</p>																					
<p>Increase in risk of forest fires.</p>  <table border="1"> <caption>Areas of forest fires (1000 ha)</caption> <thead> <tr> <th>Region</th> <th>1970-75</th> <th>1980-85</th> </tr> </thead> <tbody> <tr> <td>FR</td> <td>~50</td> <td>~100</td> </tr> <tr> <td>ITA</td> <td>~100</td> <td>~180</td> </tr> <tr> <td>YUG</td> <td>~20</td> <td>~40</td> </tr> <tr> <td>GR</td> <td>~30</td> <td>~60</td> </tr> <tr> <td>Andere</td> <td>~120</td> <td>~250</td> </tr> <tr> <td>Summe</td> <td>~220</td> <td>~490</td> </tr> </tbody> </table> <p>MuRe 2000</p>	Region	1970-75	1980-85	FR	~50	~100	ITA	~100	~180	YUG	~20	~40	GR	~30	~60	Andere	~120	~250	Summe	~220	~490	<ul style="list-style-type: none"> • Risk of flooding increases across Europe • Season of maximum risk may shift with snow melt  <ul style="list-style-type: none"> • Dependent also on soil retention, land use, river management,.....
Region	1970-75	1980-85																				
FR	~50	~100																				
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Andere	~120	~250																				
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Impacts on forests and forestry

- Changes in species, increase in growth of some species
- Increase in draughts and fires (southern & western Europe)
- Increase in storms
- Increase in insects and pests
- Increased cost for timber work due to reduced snow cover, more rain and wetter soil in the north

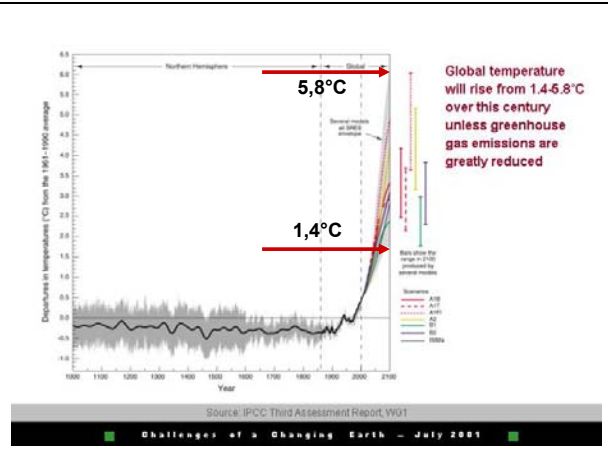
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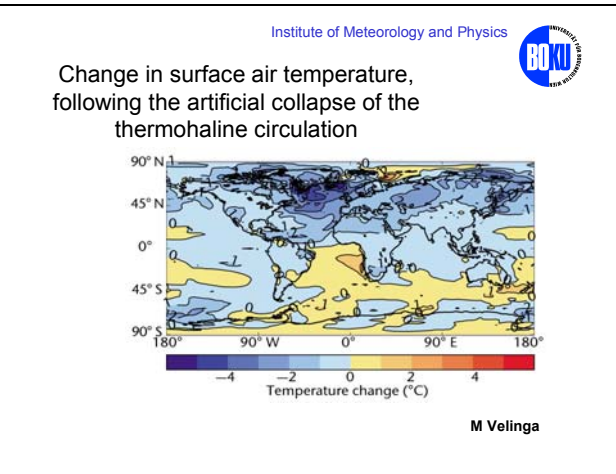
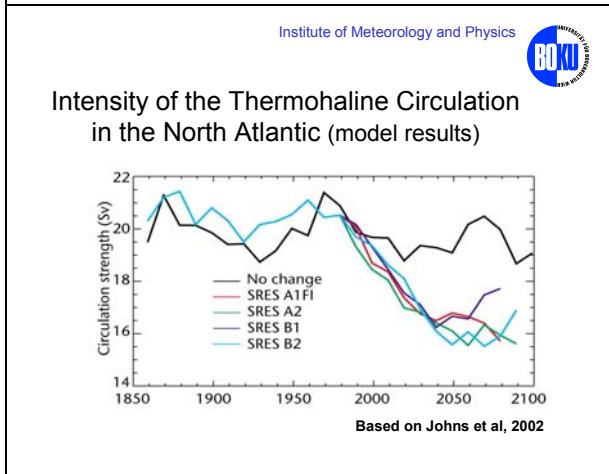
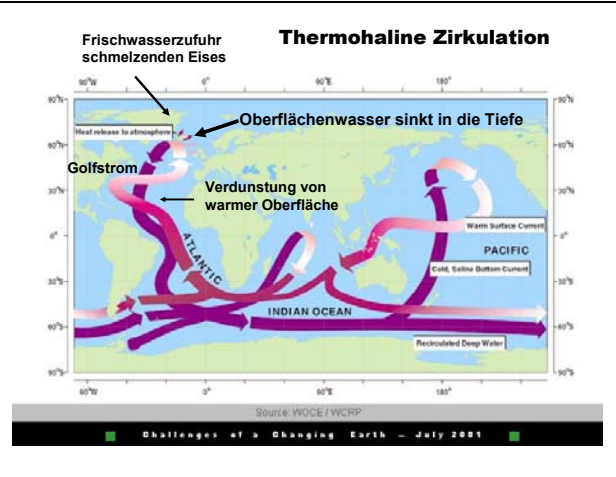
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Weather Extremes and their Impacts

Northern Europe									
River valley floods	*	*	**	*	**	**	**	*	*
Costal floods; tidal surges	*	*	**	*	**	**	**	*	*
Wind storm	*	*	**	*	**	**	**	*	*
Windstorm & heavy rain	*	*	**	*	**	**	**	*	*
Hot, dry summers	**	*	**	*	**	**	**	*	*
Extreme winter cold	*	*	**	*	**	**	**	*	*
Extreme winter snowfall	*	*	**	*	**	**	**	*	*
Southern Europe									
River valley floods	*	*	**	*	**	**	**	*	*
Costal floods; tidal surges	*	*	**	*	**	**	**	*	*
Mud and landslides	*	*	**	*	**	**	**	*	*
Winter draught	**	*	**	*	**	**	**	*	*
Exceptionally hot summers	*	*	**	*	**	**	**	*	*
Cold winters	*	*	**	*	**	**	**	*	*
Extreme winter snowfall	*	*	**	*	**	**	**	*	*

Acacia 2000





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ACACIA Summary

- The balance of the impacts of CC will be more negative in southern than in northern Europe.
- Primary sectors, such as agriculture and forestry, will be more affected than secondary or tertiary sectors, such as manufacturing and retailing.
- More wealthy regions and sectors will be less adversely affected than more marginal and poorer ones.

Consequently, climate change has major implications for Europe's policies of development and environmental management.

Climate Change – Requirements for Genetics

Ladislav Paule

Faculty of Forestry, Technical University

Zvolen, Slovakia

Abstract

For thousands of years, forest trees as long-living organisms have been confronted with environmental changes, which are considered to be a part of their evolution. At the present time we expect that global climate changes will be faster than ever and their consequences will have significant impacts on the populations of forest ecosystems and their components.

If global warming takes place as projected, natural and artificial regeneration of forests with local seed sources will become increasingly difficult. However, the impact of climate changes is still far from real, and the individual models differ in magnitude and timing at least twofold. Most of the models are based on the mean temperature changes, what is rather simple and understandable. Selection processes are mostly the consequence of extreme temperatures and precipitation rather than of mean ones.

Extensive genetic inventories based on molecular markers could serve as a proper tool for testing the autochthony of individual populations and develop the marker-based seed zonation, or combined with growth traits. At the same time, these inventories could also serve for the development of gene conservation strategies for individual tree species and the selection of gene reserves for individual contrasting sites. Gene conservation strategies (both *in situ* and *ex situ*) should emphasize the need for a sufficiently broad genetic basis of tree populations to enable subsequent selection processes.

Existing provenance trials established in the previous decades are good model objects to evaluate the response of individual provenances to the environmental conditions especially in a warmer and dryer climate. Larger provenance trials with Norway spruce (1,100 provenances) and European beech (more than 150 provenances) established on more than 20 sites in contrasting ecological conditions represent a good experimental basis for modeling the response of provenances in growth and adaptive traits.

Tree improvement programs were in the past mostly aimed at the maximization of yield in a defined environment. For the period with expected climate changes of unexpected magnitude the improvement programs should be modified and aimed at an uncertain future. The improvement and reforestation programs should deploy non-local seed sources, imported from the southern and lower sites, and they have to be tested on a wider set of environments than is usually the case now.

Forest, Forest Pathogens and Forestry

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University of Pretoria
Pretoria, South Africa

Abstract

It is surprising to remember that little more than 100 years have passed since Robert Hartig first promoted the understanding that trees suffer from diseases. In fact, the first text book on this topic and masterpiece by Hartig in 1874, appeared, not very long before the establishment of the International Union of Forestry Research Organisations (IUFRO) in 1892. This period was clearly very active and might be considered the birth of forestry research. Commercial forestry was also growing rapidly at that time and it was not long afterwards (1905) that the devastating chestnut blight caused by *Cryphonectria parasitica*, was first recorded in the United States. In not much more than fifty years, this pathogen decimated one of the most important timber species in the eastern United States. We know today that the pathogen originated in Southeast Asia and that its dreadful impact is directly linked to its accidental introduction into North America and Europe.

Many other similar tree disease epidemics have followed, including Dutch elm disease (*Ophiostoma ulmi* and *O. novo-ulmi*) in Europe and North America, white pine blister rust (*Cronartium ribicola*) in North America and pine wilt caused by the pine wood nematode, *Bursaphelenchus xylophilus* in Japan and South East Asia. Similar new disease epidemics continue to appear in the northern Hemisphere and most can be linked to trade in forest products. They are less well known in the Southern Hemisphere, which is probably linked to lower levels of movement of people and products in this area. There is, however, good evidence to show that this is a situation that is changing rapidly. I, thus, foresee new and devastating forest diseases problems in many parts of the world. These are likely to have serious negative impacts on forests, forestry and society. Although this predicted course of events will probably not be stopped, with substantial effort and investment, negative impacts could be substantially reduced.

Wisdom and leadership, in the IUFRO tradition, are needed to preserve forests and to promote forestry in the face of an easily overlooked and insidious threat.

Impacts Like Forest Decline in Different Parts of the Globe

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University of Agricultural Sciences (BOKU)
Vienna, Austria

Abstract

Decline and dieback of trees (species) and forests caused by biotic and abiotic influences are reported from all continents; first records reach back about two centuries. The most recent period of widespread declines happened during the 1970ies and 1980ies (Cfr. Hüttl & Müller-Dombos 1993; Ciesla & Donaubauer 1994). In Central Europe and North America impacts by man-made air pollution were considered as the main cause for the observed macroscopic symptoms and tree mortality. In general the synchronous occurrence of declines in non-polluted areas and in many other parts of the globe was not included in the discussions and hypotheses in these regions. The focus of scientists and public on the effects of air pollutants on forests and their ecosystems had as a consequence that much more research was started and financed by the governments. But the general neglect of other possible causes of decline in public media and discussions lead to set-backs (image and research budget) as soon as the occurrence of decline phenomena decreased in Europe. Due to the former non-scientific campaigns it is not easy to convince stakeholders that air pollution is a continuing threat and needs further intensive research.

We know a number of biotic causes (pests and diseases) of forest decline, some are provoked by forest practices others by climatic conditions etc. or both (e.g. by planting a tree species far outside of its natural range, such as *Pinus* spp. too far north). The global trade with wood and wood products also brings about a steadily increasing threat through the introduction of harmful pests and diseases. Some of the introduced species have the potential to cause declines and serious losses.

It was an early reaction of governmental authorities in Europe to the occurrence of macroscopic symptoms (such as number of needle sets, colour of needles etc.) to develop monitoring systems (for the annual observation of crowns). According to our knowledge of tree physiology and pathology, such symptoms are non-specific and therefore not very helpful, because they may be caused by insects and pests, climatic influences, etc. Still, the annual results of symptom-monitoring are used and interpreted by politicians; I think there is a need for a serious re-orientation with the help of forest sciences.

Climatic extremes have caused/incited forest declines in the past (e.g. in 1928, severe frost in parts of Europe; long-lasting drought periods: Decline of Neem in the Sahel). The global change of climate will trigger further problems – very likely in new dimensions. The changed site conditions and the interrelationships with indigenous or/and “immigrating” potentially harmful diseases and pests call for intensified research concerning these upcoming risks of new forest declines as soon as in the next half century.

1 Introduction

Forestry and the public were frightened by decline symptoms and increased mortality of certain tree species or mixed stands during the 1970ies and 1980ies. (Cfr. HUETTL & MUELLER-DOMBOIS 1993; CIESLA & DONAUBAUER 1994). Declines and diebacks of various tree species have been reported in literature since the early days of forest science (reaching back to at least two centuries) – first from Europe and later from all other continents. The cause-effect-relationship was studied and cleared for many, but not all declines. Many biotic – mostly climatic influences, diseases, and pests were identified as causes.

The recent period of declines excited first European and North-American stakeholders and led to simplifications in public arguments and to problematic reactions of many scientists, too. First in Western and Central Europe – later in North-America, too – man-made air-pollution was considered as the main or only cause of the phenomenon and no other possible causes were discussed seriously. It was amazing how governments, governmental organizations and NGOs reacted on the political level in an unprecedented way. The first action was to establish programmes for annual assessments of crown conditions (colour and density of foliage) within the ECE region. (Simple parameters were chosen to provide unified criteria of assessment; differences of ecological conditions and provenances were not taken in consideration.) Meanwhile, the simple mapping of macroscopic visible symptoms was improved by additional and more scientific studies (so-called level 2 & 3 studies). Still, the results of symptom assessments play a major role in the annual publications and statements of stakeholders. (e.g.: LORENZ et al.2002). Politicians, public press, and various other stakeholders still stick to the opinion, that there exists a monocausal relationship between air pollution and the phonology of tree crowns.

2 IUFRO's role

Even IUFRO did not escape from the problematic public reactions and neglected the state of its own scientific knowledge (of its own Subject/Working Groups) and established a Task Force following the view of forest politics. One of the most active Working Parties (later Subject Group) of IUFRO had been dealing with impacts of air pollution on forests and forest ecosystems since the 1950ies. When I took over the chairmanship of the group in 1968, it was already clear that a first reaction to air pollution influences of conifers is not seen in any macroscopic symptoms of the crown habitus but in annual increments! Other results were, among many others, methods for sampling of needles for chemical analyses, thresholds of natural contents of sulphur in coniferous needles, air quality criteria etc.

When the symptoms of forest decline developed more and more in Europe during the later 1970ies the existing data on air pollution loads and deposition did not show correlations with macroscopic symptoms.

2 The reaction of governments

2.1 The new awareness of forest health

It is a pity that the sudden publicity of forest declines left aside more or less the basic findings of research and the state of knowledge in forest plant physiology/forest ecology/forest pathology etc., and last but not least, the input of IUFRO in general. Forest research on the matter lost a lot of image, because many scientific disciplines got the feeling that their fields were neglected and can offer no new goals. Further, the public press developed an interest on the matter of Forest Decline and many reports implied that a great part of our forests was going to die soon (within a single decade, as a statistician published his prognosis!) due to air pollution.

ECE became active to coordinate the interest in monitoring systems and was successful to establish a minimum-programme first: Mapping of macroscopic symptoms, in spite of the fact that representatives of several countries recommended analyses of the deposition of air pollutants and many other parameters. (Later additional studies were installed in the ECE: so-called Level 2 and Level 3 monitoring programmes). At present, 39 countries (including EU-members, Canada, and USA) are participating. (For more details see: LORENZ et.al.2002).

Several countries accepted the recommendations for the visual assessments of crown conditions, but started or intensified their own monitoring projects on the deposition of air pollutants, their impacts on soil parameters etc. (like France, Finland, Norway, Austria and several others).

The first nation-wide grid for chemical analyses of needles was established in Austria more than 3 decades ago, and was soon joined by Bavaria and Slovenia.

The general problem resulted in several controversial consequences:

- Relevant (forest) research gained high publicity during the 1970ies and 1980ies and the general uneasiness resulted in increased research funds for a great number of activities. Research on air-pollution effects on forests became interesting for many disciplines and finally the results have increased our knowledge in the field considerably. The governments provided special funds for research on forest decline.
- The forests did not die over large areas – as some prognoses indicated – and some tree-species recovered considerably (as *Abies* spp.). The increment and growing stock is increasing.
- The historical development showed that the non-scientific assumption of a direct correlation between macroscopic symptoms and the effect of air pollutants was completely wrong.

Due to multiple miss-understandings and confusion about the effects of deposition of air pollutants, forestry research has lost a great deal of image and it resulted in very critical discussions in several parliaments and in esteemed journals like the “Neue Zürcher Zeitung”.

The consequence was that research funds were cut and it is not likely that it would be easy to find a similar enthusiasm for new efforts and funds for this important matter.

Today, it is really not easy to explain to funding organizations that the deposition and effects of air pollutants may cause not only short-term influences, but that they have to be considered in a long time-span, too – orientated at least towards the rotation periods of our commercial tree species. Furthermore, healthy looking trees may react to relatively low concentrations of air pollutants by invisible symptoms such as reduced increment or changes in the rhizosphere. In addition, a certain level of depositions of low concentrations/deposition loads of air pollutants must be considered as a possible/relevant predisposing factor for complex causes of forest declines.

4 Causes of forest declines

In consideration of scientific literature in a world-wide view, we must conclude that the forest declines during former periods in general and specifically at present, had various causes. Among these I would like to stress the importance of a number of influences; these factors might act one after the other ('chain' of negative influences); in other cases several stress factors act simultaneously and each single factor might be unimportant for the vitality and viability of trees or stands, but the occurrence of a couple of such stresses within a certain time-span leads to critical physiological situations and may result in different kinds of symptoms.

To facilitate our understanding, it is common to distinguish between predisposing, triggering, and inciting factors. From the pedagogic point of view, I appreciate the proposals of several authors (Cfr.e.g.: MANION 1991). Nevertheless, let me comment on a selection of questions:

Predisposing factors:

I propose to consider two groups of pre-disposing factors first: long-lasting stresses and severe short-term influences. Furthermore, we may distinguish between natural and more or less man-made pre-disposing factors, which may include the change of forest biodiversity, development, and age of stands. Among the known or plausible influences we may think of many, e.g.:

- silviculture (as non-adequate provenances and tree-species, stand structure, senescence etc.);
- change of climatic influences (water regime, disturbances of temperature influences);
- multiple land use: Grazing of cattle, house animals and other wildlife in forests;
- latent infections of root system or stems. (Recognizing the influence of forest practices);
- latent or periodical stresses by harmful insects and diseases;
- latent deposition of air pollutants.

Triggering factors (contributing factors)

Triggering factors may occur occasionally or periodically and may be the result of the

- synchronous occurrence of certain predisposing factors;
- climatic perturbations (drought, frost, floods etc.);

- epidemics/outbreaks of diseases and insects;
- impacts by toxic substances (dry and wet deposition of air pollutants).

Inciting factors

When we think of visible symptoms in connection with forest declines, the occurrence of such symptoms may be the result of long-lasting stresses and/or severe short-term events (e.g. extreme deviations of climatic conditions).

Looking back, we may draw the conclusion that the repeated occurrence of drought conditions since the early 1970ies caused (finally) the forest decline symptoms in large parts of Europe and in various regions on other continents. Beginning with 1986 the situation (recovering of tree crowns) started to improve with most tree-species (first with Silver Fir).

Forest declines in other continents are often associated with different combinations of influences (Cfr. HUETTL & MUELLER-DOMBOIS 1993; CIESLA & DONAUBAUER 1994).

5 The outlook – when will the next Forest Decline take place?

The global climatic change is supposed to cause not only an increase of seasonal or mean temperature but other regional changes may also be expected like bigger droughts in already dry regions, more rain than snow and damage by winter frost caused by increased temperatures.

The up-take and effect of air pollutants (SO₂) may increase during the dormant season. The outbreak conditions for many native forest insects are favoured and could continue for further generations. Insect pest and diseases migrate from South to North and from lower elevations to higher ones.

It should be considered that provenances will more or less lose their “home-land” within a few decades, meaning that intensively managed forests with long rotation periods will run into trouble if their present age is under half rotation period. Therefore, the next period of forest decline may be expected within a time-span of a few decades.

As far as the influence/deposition of air pollutants is concerned, their role in respect to ecological effects or as one among other stress factors, as well as in the combined effect of low concentrations of several pollutants, needs intensified research efforts. In future, research results have to be the basis for a serious view of the causes and consequences of forest decline events. It is an urgent task to convince all stakeholders of the need of serious research on the complex issue of forest decline events to provide the necessary funding.

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III. POLICY

The Changing Role of Forestry in Urbanized Societies

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Niels Elers Koch

Cecil C. Konijnendijk

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Abstract

The third millennium has taken mankind into a truly urban era. More than half of the world's population now resides in urban areas. Europe has been heavily urbanised for some time now, but even Asia and Africa are on the brink of having the majority of their population living in towns and cities. Urbanisation is not only a demographic and geographic phenomenon. Through world-wide globalisation, economies based in the main urban centres drive today's societies. Urban norms and values have become dominating in our cultures.

These urbanisation processes have had their impact on forests and other natural resources. In an urbanised society, urban forests, including urban woodlands, parks and street trees are recognised as major contributors to the quality of the environment. Urban forests assist in creating liveable cities through their range of ecological, economic, cultural and especially social functions. The full potential of urban forests, however, is often not met, e.g. due to the high level of urban pressures, the lack of integrated planning and management and the limited specific knowledge base on urban forests and urban trees.

During the past decades, urban forestry has emerged as a promising integrative, efficient and socially inclusive approach to urban forest and urban tree planning and design, selection and establishment, and management. As any approach, it still needs co-ordination efforts, especially as many different disciplines are involved in the planning and management of urban forests.

In this paper, a state of knowledge overview of research and higher education on urban forest and urban trees in Europe will be presented. The analysis indicates that research on urban forests and urban trees in Europe has had a wide scope but has been rather fragmented and uncoordinated. Furthermore, research has been mono-disciplinary and primarily local and regional. Universities and state research institutes, mostly with a forestry or horticultural background, have dominated the research arena. Relevant research has primarily been funded from state and municipal sources. Significant differences have been noted between countries with regards to the level of activity, research topics and institutions involved.

A similar picture emerged from the study of higher education on urban forests and urban trees in Europe. Specific urban forestry education at academic level was found to be very scarce, particularly in terms of full programmes or curricula. But on the other hand a clear increase in urban forestry education with focus on the different elements of the urban forest and multidisciplinary during recent years was noted.

It is concluded that the future urban forester should be a team player, operate on a strategic level, e.g., all green spaces from city level to individual tree level, and be able to communicate with other city planners, civil engineers etc. on an even level. He/she should work with the whole urban forest, including street trees, park trees and urban woodlands.

Keywords: urban forestry, social values, research, education, Europe

1 Urbanising Societies

Urban values have become increasingly dominant in today's society. The share of the world's population living in urban areas has now bypassed that of those living in rural settings.

Urbanisation is a worldwide phenomenon; the World Resource Institute (2001) estimated that in 2025 more than 50% of the African and Asian populations would be living in urban areas. In Central and South America these figures would be between 75 and 85%. Seen from a rural – urban perspective, the most significant increase in population was projected to be in urban developing areas. (Figure 1)

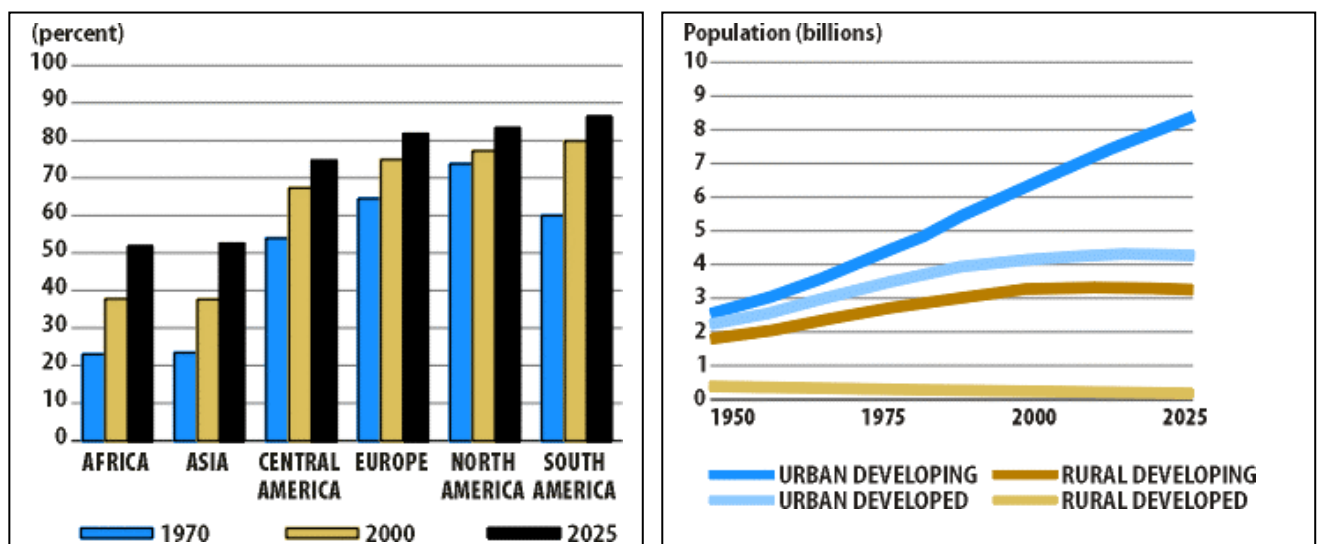


Figure 1: Estimated urban population by region. Figures from World Resource Institute (2001)

Managing urban population change will be one of the most important challenges during the next decades. In developed countries, the urban future will involve dealing with complex changes in the composition of urban populations while also containing urban sprawl beyond

suburbs into what remains of the countryside. In developing countries, where 80% of the world's population resides, central issues will be how to cope with an unprecedented increase in the number of people living in urban areas and with the growing concentration of these urbanites in large cities with millions of residents. In developing countries, urban forests and other green areas can provide an important supplement of food, fodder and wood to urban dwellers. The functions of green areas in and near cities in moderating harsh urban climates, preventing desertification, and in wastewater treatment have been under investigation. As more knowledge on these aspects is required, urban forestry research has to be further extended both in the developed and in the developing world.

2 Dominance of urban values and norms

The socio-economic, cultural and ecological footprint of urban areas extends far beyond their physical boundaries. The world's rural and nature areas have become 'backyards' for the world's cities, primarily aimed at delivering goods and services to them. Cities have gradually been 'eating away' at the countryside, not only through direct building activities, but also via the extension of railroads, roads and communication infrastructures. Through the latter, the dominance of urban values and norms has increased.

Economic development became increasingly concentrated in cities and pulled people from the countryside. This process is still ongoing, particularly in developing countries. Cities have been windows of opportunity, offering prospects to dramatically change people's life.

Urbanisation has drastically changed the relationship between people and nature. People are primarily spending time in sealed, climate-regulated buildings. Only two or three generations ago the majority of the people was directly involved in primary production of food and fibre. Today, the majority of people are born and raised in the cities and primarily work in the service sector. Encounters with nature are restricted to the *Ficus benjamini* in the hallway and the Grand Canyon screen saver on their computer.

Forests and forestry are among those areas affected by the process of urbanisation. Forestry has typically been characterised as a rural profession. However, forestry today, to an increasing extent, has to deal with the dynamics of urban society. As a result of these developments urban forestry has been emerged as a profession and a research field during the past few decades.

3 Research and higher education on urban forestry

Being the cradle of the urban forestry concept, North America has so far developed the most elaborate research community as well as specialised education (see e.g. Miller 1997). The work of for example the International Society of Arboriculture (ISA) has been instrumental in this respect. Recent years have shown a similar trend emerging in Europe. Initiatives such as COST Action E12 'Urban Forests and Trees', a network of European urban forestry

researchers funded by the European Union², were set up to coordinate, promote and develop research on urban forests and trees (Forrest et al. 1999, Konijnendijk et al. 2000).

One of the objectives of COST Action E12 was to describe the status of research and higher education on urban forests and urban trees in Europe. Results of this activity were published in an overview of research (Forrest et al. 1999, Konijnendijk et al. 2000) and higher education (Randrup et al. 2001, Andersen et al. 2002). The surveys showed that urban forestry is an expanding element of both European research and higher education.

European research within urban forestry is relatively new. Many disciplines have been involved in research on urban forests and trees, with forestry and horticulture as leading scientific disciplines to date. Within European research, universities and state institutions have been most active. Maybe as a result of the dominant role of universities, national funding has been the main source of finance. Research has primarily been applied and has tended to have strong local, municipal focus. Thus, there was a clear lack of coordination and exchange of ideas on an international level before the emergence of initiatives such as COST Action E12. A reason for this may have been the fact that the majority of research publications have been issued through national, national-language journals.

When looking at higher education in Europe, urban forestry has primarily been taught as a part of other educational programmes (e.g. forestry, landscape architecture) and not as a programme of its own. This is in contrast to the United States, where more than 30 programmes on urban forestry are offered (Miller 2001). Student numbers following urban forestry programmes and courses in Europe have been low so far. Similar to research, higher education on urban forestry in both North America and Europe has involved a broad range of disciplines and has tried to find ways of incorporating both natural and social science approaches. Together with the general trend towards internationalisation in education, this calls for better co-operation between educational institutions, nationally and internationally.

Conclusions

Never before have so many different users wanted so many different values and functions from the forests. Even the most remote forests of Europe are confronted with the specific demands of an urbanised society. Urban dwellers have been looking for their 'great escape' from their daily environs, roaming on foot, by bike or in their four-wheel drive. Even when not actively using forests, they have a clear opinion about what should be done with these. No longer can and should forestry research and management be focusing on economic production and preservation of natural values. Social values and functions will become even more important in the future. Forests will increasingly function as stress relief, playground,

² COST stands for 'European co-operation in the field of scientific and technical research', and has as its main objective the co-ordination of national research at the European level. COST Action E12 'Urban Forests and Trees' was operative from 1997 until 2002, and involved more than 80 experts from 22 European countries. The main objective of the Action was to improve the knowledge-base needed for better planning, design, establishment and management of urban forests and urban trees in Europe, and, by doing this, to establish urban forestry as a scientific domain in Europe (e.g. Forrest et al. 1999).

meeting place, visual and sound barriers or simply as (urban) scenery for a primarily urban population. Also their role as air and water purifiers, climate controllers and food and fuel-wood suppliers will become increasingly important.

Should the forester of the future be an urban forester? Not in general, but it will certainly need to be a forestry professional or scientist that has come to terms with the urban side of the profession, opposed to the traditionally rural perspective. Otherwise, their legitimacy as leading caretakers of the forests will be challenged further. Foresters of the future should also be good team players and be able to communicate and cooperate with city planners, civil engineers and even health experts.

Urban forestry as a research field has started to develop well over the past years, but there is still a need for more research, better coordination, better dissemination and more internationalisation. There is a clear need and function for IUFRO (International Union of Forest Research Organizations) also for these aspects.

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International Environmental Instrument On Forest Policy and Management

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When I was asked for the title of my presentation today, I proposed a more restrictive one. However, I now see that in the final version of the program my paper has been entitled "International Environmental Law".

However, if we use the term "environmental law", we could, in my opinion, organize a separate seminar on the subject, which could easily last two weeks. Lectures would have to be prepared for the following categories:

- The first one would have to cover international customary law.
- The second one would refer to the binding or so-called "hard law".
- The third category would be "soft law". There exists a plethora of documents which are not legally but morally binding for States.
- The fourth category would be devoted to resolutions, declarations and programs of action that have been agreed to mostly by consensus, by the Member States of the United Nations. These also contain at least morally binding provisions.

Let me just give you an idea of how extensively international law covers issues related to the environment: Our collection of multilateral treaties at this date contains 534 legally binding texts. This does not only include treaties and various protocols that have been added over the years.

I believe that, for the purposes of a meeting where a number of researchers from one discipline have invited a lecturer from another field, they would rather prefer to have a summary of the current state of affairs and prevailing trends to be followed by an interactive dialogue on the challenges and concepts in a changing world.

I had requested our documentation centre to run a search in its computer database of international environmental law with the keywords "forest", "trees", "woods", "timber" and "flora". I myself was surprised at the sheer number of legal texts that resulted from this search.

I shall just state briefly that texts that concretely address the fields of forest policy and management are found mostly in relation with the term "forest". Under "woods", "trees" and "flora", one mostly finds documents related to scientific and technical aspects, and the term "timber" appears predominantly in trade-related agreements.

You would be surprised to learn how many international agreements are related to forestry. These address not only management and reforestation, fire prevention or plant protection issues but also endangered species, and, it goes without saying, biodiversity. There are perhaps not many people who realize that trees also play a role in the *Antarctic Treaty*. On the other hand, it is very obvious that *the UN Framework Convention on Climate Change* (UNFCCC) is of utmost significance to forests.

Another framework convention, the *Convention for the Protection of the Alps* reflects a more recent trend in structuring treaties: general provisions agreed to by States are followed by detailed protocols that address specific policy areas. For example, in the case of the *Alpine Convention* a special *Protocol on Mountain Forestry* was added, but forest management also was mentioned in a number of its other Protocols, such as those on *Land Use Planning and Sustainable Development* and on *Soil Conservation*.

Furthermore, I wish to draw your attention to the fact that these legal texts not only address environmental aspects but also social and economic questions. This shows us that the concept of sustainable development is nothing new. In relation to legal instruments on forestry, the three so-called "pillars" of environmental, social and economic policy have been widely taken into account.

This is evident in global treaties such as the *Convention on Wetlands of International Importance* especially as Waterfowl Habitat, also known as the *Ramsar Convention*, the *Convention Concerning the Protection of the World Cultural and Natural Heritage*, or *World Heritage Convention* for short, the *Convention on International Trade in Endangered Species of Wild Fauna and Flora* (CITES) which includes plant and trees in its annexes, the *Convention on the Conservation of Migratory Species of Wild Animals* (CMS), the *ILO Convention*, as well as regional agreements such as the *Africa Convention on the Conservation of Nature and Natural Resources* (also known as *the Algiers Convention*), the *ASEAN Agreement on the Conservation of Nature and Natural Resources*, the *Apia Convention on Conservation of Nature in the South Pacific*, the *Treaty for Amazonian Corporation* and the *Berne Convention on the Conservation of European Wildlife and Natural Habitats*.

The *International Plant Protection Convention* recognizes "the usefulness of international cooperation in controlling pests of plants and plant products and in preventing their spread and especially their introduction across national boundaries, and desiring to ensure close coordination of measures directed to these ends".

With regard to tropical timber, the *Tropical Forestry Action Program* (TFAP) and the *International Tropical Timber Agreement* (ITTA) should be mentioned.

Where do we go from here?

The 1992 United Nations Conference on Environment and Development (UNCED) represents a major watershed by pushing for the recognition of the concept of sustainable

development. Since then the international community has begun increasingly to embrace the concept in a number of other intergovernmental fora.

In addition to the *Rio Declaration*, which mentions forestry in relation to general principles of sustainable development, *Agenda 27* has a chapter devoted to Combating Deforestation (Chapter 11). However, there was also a major discussion on whether to include general legal principles on forestry management and the call for a Convention for all types of forest in this chapter. You are surely aware of the conflicting positions and reason why this was not the case.

A Non-legally binding authoritative statement of principles for a global consensus on the Management, Conservation and Sustainable Development of all Types of Forests or Forest Principles in short, was adopted instead.

Other important examples of multilateral legally binding instruments, which pertain to forests, were opened for signature at Rio:

- *United Nations Convention to Combat Desertification in Those Countries Experiencing Serious Drought and/or Desertification* (UNCCD)
- *Convention on Biological Diversity* (CBD)
- *United Nations Framework Convention on Climate Change* (UNFCCC)

In the follow-up to Rio, the *Intergovernmental Panel on Forests* (IPF) in 1995, later the *Intergovernmental Forum on Forests* (IFF) in 1997, and finally the *United Nations Forum on Forests* (UNFF) in 2001 were established. The UNFF is entrusted with the task of recommending "the parameters of a mandate for developing a legal framework on all types of forests" which are to be considered by the United Nations Economic and Social Council and the General Assembly within five years and on the basis of an assessment¹.

The following two major alternatives are still under consideration: a legally-binding treaty on forests; or a protocol on forest under CBD. Yet, no decision on the prospective development of an international legal instrument is to be expected at the UN level in the immediate future.

In the course of preparations leading up to the World Summit on Sustainable Development (WSSD), whose task it was to review the implementation of Agenda 21, the UNFF released a report along with a number of recommendations. These found their way into the *Johannesburg Plan of Implementation* which was adopted on 4 September 2002. Paragraph 43 entails an extensive set of 9 areas of activities, including the expression of support for the United Nations Forum on Forests and the pledge to accelerate the implementation of the IPF/IFF proposals.

I just would like to add as a footnote that, in response to this, the European Parliament and Council of the European Union are currently considering a proposal for *Guidelines for Monitoring Forests and Changing Conditions of the Environment within the Community* (Forest Focus).

¹ Report of the Intergovernmental Forum on Forests on its fourth session, New York, 31 January- 11 February 2000.

In February 2001, the Governing Council of the United Nations Environment Program (UNEP) adopted a new Program for the Development and Periodic Review of Environmental Law for the First Decade of the 21st Century, also known as the Montevideo Program III. It was prepared by a geographically balanced group of law experts and contains a special section on Forests (para 13) which underlines the objective of enhancing the conservation and sustainable use of all types of forests. The proposals for action are aimed at the development and implementation of legal measures to the following effect:

- (a) Promote the integration of environmental concerns into domestic forest policies and legislation and the integration of forest conservation goals into other laws related to the use of forests;
- (b) Promote, where appropriate, means in domestic law and practice that provide incentives and remove disincentives for local people to conserve forest;
- (c) Encourage the elaboration of domestic laws and enhanced international cooperation in the prevention, assessment, monitoring and mitigation of forest fires;
- (d) Assist in coordination among international institutions in the development and implementation of internationally agreed actions on forests.

This is in line with the overall consensus of the drafters of the *Montevideo Program III*, namely that, with the overall volume of existing environmental law, the focus must be shifted towards implementation. This also pertains to compliance and enforcement aspects.

As a general matter, I wish to emphasize that, when considering the development of new international legal instruments, one should take care not to create rights and obligations which conflict with or duplicate general rules or principles that are already in force. Having too much or conflicting regulation, which often leads to a non-harmonious interpretation, is one of the major problem areas confronting international environmental law.

For this reason, a small working group of independent legal experts first met in 1989 in an attempt to consolidate into a single juridical framework the vast body of widely accepted but disparate principles in this field. In support of this process, the UN Secretary General in his Report stated:

"The Charter of the United Nations governs the relations between States. The Universal Declaration of Human Rights pertains to relations between the State and the individual. The time has come to devise a covenant regulating relations between humankind and nature."

The resulting document, the *Draft International Covenant Environment and Development*², was first launched in 1995 and highlights among other areas the role of forest" as a natural means to control erosion and floods, and for their role in the climate system (Art. 20 (a))", and its importance in implementing integrated physical planning systems.

In closing, I wish to add that in designing any further accord for a particular area, such as forests, one also needs to evaluate which aspects require a transboundary rule or a

harmonized regime while taking into account the principle of subsidiarity. Some policy areas are better carried out on the national and others on the international level. Having these matters sorted out will not only cause negotiations, but also serve to avoid over-regulation.

² The current text of Draft Covenant can be found at <http://www.jucn.org/themes/law/info04.html>. *Draft International Covenant on Environment and Development* (Environmental Policy & Law Paper Series No.31, Second Edition: Updated Text, 2000) published by the Commission on Environmental Law of the International Union for Conservation of Nature and Natural Resources (IUCN) in cooperation with the International Council of Environmental Law (ICEL).

Annex: Selected Excerpts**Agenda 21:**

Chapter 11 on combating deforestation has four components or program areas:

- (a) Sustaining the multiple roles and functions of all types of forests, forest land and woodlands;
- (b) Enhancing the protection, sustainable management and conservation of all forests and the greening of degraded areas, through forest rehabilitation, afforestation, reforestation and other rehabilitative means;
- (c) Promoting efficient utilization and assessment to recover the full valuation of the goods and services provided by forests, forestlands and woodlands;
- (d) Establishing and/or strengthening capacities for the planning, assessment and systematic observation of forests and related programs, projects and activities, including commercial trade and processes.

But also Chapter 12 on Managing Fragile Ecosystems Combating desertification and drought, and Chapter 10 Integrated approach to the planning and management of land resources and numerous other chapters, including atmosphere, biodiversity, agriculture and sustainable development of mountain areas.

Rio Declaration:

- Principle 2: "States have, in accordance with the Charter of the United Nations and the principles of international law, the sovereign right to exploit their own resources pursuant to their own environmental and developmental policies, and the responsibility to ensure that activities within their jurisdiction or control do not cause damage to the environment of other States or of areas beyond the limits of national jurisdiction";
- Principle 5: ensure better living standards;
- Principle 6: special situation and needs of developing countries;
- Principle 8: "reduce and eliminate unsustainable patterns of productions and consumption and promote appropriate demographic policies.";
- Principle 9: "scientific understanding through exchanges of scientific and technological knowledge, and by enhancing the development, adaptation, diffusion and transfer of technologies.";
- Principle 12: better address the problems of environmental degradation;
- Principle 22: Indigenous people and their communities and other local communities.

Johannesburg Plan of Implementation:

43. Forests and trees cover nearly one third of the Earth's surface. Sustainable forest management of both natural and planted forests and for timber and non-timber products is essential to achieving sustainable development and is a critical means to eradicate poverty, significantly reduce deforestation and halt the loss of forest biodiversity and land and resource degradation and improve food security and access to safe drinking water and affordable energy, highlights the multiple benefits of both natural and planted forests and trees; and contributes to the well-being of the planet and humanity. Achievement of sustainable forest management, nationally and globally, including through partnerships

among interested Governments and stakeholders, including the private sector, indigenous and local communities and non-governmental organizations, is an essential goal of sustainable development. This would include actions at all levels to:

- (a) Enhance political commitment to achieve sustainable forest management by endorsing it as a priority on the international political agenda, taking full account of the linkages between the forest sector and other sectors through integrated approaches;
- (b) Support the United Nations Forum of Forest, with the assistance of the Collaborative Partnership on Forests, as key intergovernmental mechanism to national, regional and global levels, thus contributing, *inter alia*, to the conservation and sustainable use of forest biodiversity;
- (c) Take immediate action on domestic forest law enforcement and illegal international trade in forest products, including in forest biological resources, with the support of the international community, and provide human and institutional capacity-building related to the enforcement of national legislation in those areas;
- (d) Take immediate action of the national and international levels to promote and facilitate the means to achieve sustainable timber harvesting, and to facilitate the provision of financial resources and the transfer and development of environmentally sound technologies, and thereby address unsustainable timber-harvesting practices;
- (e) Develop and implement initiatives to address the needs of those parts of the world that currently suffer from poverty and the highest rates of deforestation and where international cooperation would be welcome by affected Governments;
- (f) Create and strengthen partnership and international cooperation to facilitate the provision of increasing financial resources, the transfer of environmentally sound technologies, trade, capacity-building, forest law enforcement and governance at all levels, and integrated land and resource management to implement sustainable forest management, including the Intergovernmental Panel on Forests (IPF)/Intergovernmental Forum on Forests (IFF) proposals for actions;
- (g) Accelerate implementation of the IPF/IFF proposals for actions by countries and by the Collaborative Partnership on Forests, and intensify efforts on reporting to the United Nations Forum on Forests to contribute to an assessment of progress in 2005;
- (h) Recognize and support indigenous and community-based forest management systems to ensure their full and effective participation in sustainable forest management;
- (i) Implement the Convention on Biological Diversity's expanded action-oriented work program on all types of forest biological diversity, in close cooperation with the Forum, Partnership members and other forest-related processes and conventions, with the involvement of all relevant stakeholders.

Montevideo Program III:

13. Forests

Objective: To enhance the conservation and sustainable use of all types of forests.

Strategy: Promote the development and implementation of measure aimed at the protection, conservation and sustainable use of all types of forests.

Action:

- (a) Promote the integration of environmental concerns into domestic forest policies and legislation and the integration of forest conservation goals into other laws related to the use of forests;
- (b) Promote, where appropriate, means in domestic law and practice that provide incentives and remove disincentives for local people to conserve forests;
- (c) Encourage the elaboration of domestic laws and enhanced international cooperation in the prevention, assessment, monitoring and mitigation of forest fires;
- (d) Assist in coordination among international institutions in the development and implementation of internationally agreed actions on forests.

IUCN Policy Statement on Sustainable Use of Wild Living Resources:

- adopted at the World Conservation Congress in Amman, Jordan in October 2000;
- acknowledges sustainable use as an important tool.

International Tropical Timber Agreement (ITTA):

- entered into force 1985;
- effective framework for consultation among producer and consumer member countries on all aspects of the world timber economy.

International Tropical Timber Organization (ITTO):

- illegal logging and trade;
- failure of markets to remunerate the global services provided by natural forests.

ASEAN Agreement on Transboundary Haze Pollution:

- signed 10 June 2002;
- prevent a repetition of the suffocating smog caused by forest fires in the region between 1997 -1998.

Revision of the **1968 Africa Convention on Conservation of Nature and Natural Resources**, generally referred to as Algiers Convention.

- Article VI. LAND AND SOIL
 - 3 (b) (ii) improve soil conservation and introduce *sustainable farming and forestry practices*, which ensure long-term productivity .of the land.
- Article VIII. VEGETATION COVER

International Goals of Forest Conservation in the Russian Context

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Abstract

This paper reviews IUCN – The World Conservation Union Forest Conservation programme objectives concerning management, protected areas, forest ecosystems restoration and cross-sectoral issues, and how they relate to the Russian context. The paper was presented at the international symposium “Forest Research - Challenges and Concepts in a Changing World” (Vienna, Austria, October 9, 2002).

Key words: IUCN, Russia, nature conservation, forestry, forest use, public, conflict, history of forests

1. Introduction

Estimations made by the World Resources Institute show that eighty percent of the forests originally covered the earth have been cleared, fragmented, or otherwise degraded. Those that remain are located mostly in the Amazon Basin, Central Africa, Canada, and Russia (Bryant, D. et al., 1997).

The forest sector is one of the leading ecological, economic and social components of sustainable development. Conscientious forest maintenance, sustainable use and augmentation of forest resources lead to the growth of social welfare (World, Forests, Society and Environment, 2000). However, this will be possible only due to joint efforts of forestry professionals and the public. As the title of the paper assumes a broad scope of issues, it is necessary to narrow it down displaying nature (forest) conservation targets set up in Russia and promoted by IUCN - The World Conservation Union.

2. Background

Likewise in many countries, the so-called “green movement” has appeared in Russia in a protest form. Air quality, soil and water pollution, forest over harvesting, land use change, roads and pipelines construction across nature conservation areas and other lands of high biodiversity value have become people’s concerns.

According to theory and experience, major reasons for conflicts are misunderstanding or miscommunication between authorities and the public, between the government and the civil

society (Teplyakov V. et al., 2000a). Mostly it concerns economical, ecological and social values of forests, and almost no conflicts arise when we talk about forest fire suppression, pest control, forest restoration, watershed management, and protection of forests along roads or at the Extreme North.

When it comes to nature conservation, woodlands in Russia were protected for defensive purposes, game, beaver or bird hunting and the trees, in which bees collected honey. To protect the water level of rivers for navigation and easier floating of timber, Peter the Great recognized watershed forests along rivers, and tree species suitable for shipbuilding (oak, maple, pine, elm, larch) were restricted for public use (Decree of 1 February 1703). The punishment was severe - up to capital punishment (Teplyakov V. et al., 1998).

The first nature reserve “Barguzinsky” was established in the Buryat Republic, Siberia, in 1916, and the first national parks “Sochinsky” on the Black Sea shore and “Losiny Ostrov (Moose Island)” near Moscow were created in 1983.

However, environmental consciousness is rather low in Russia. Due to the reasons rooted in the history and conditioned by the specific features of the country’s development, the general public shows indifference to nature conservation. Among the stereotypes hindering the development of environmental consciousness in Russia one can name the following: “Russia has endless nature and forest resources”, “Technical considerations are more important than environmental ones”, “Biodiversity conservation is a whim of ecologists”, “Climate change is a global speculation”, etc.

Russia is not unique in such a historical development: many countries in the world are going along this road of understanding and revising their approaches towards nature conservation.

3. IUCN’s Forest Conservation Programme goal and objectives: application in Russia

The IUCN Forest Conservation Programme (FCP) “aims to maintain and, where necessary, restore forest ecosystems to promote conservation, sustainable management and equitable distribution of a wide range of forest goods and services” (An Introduction to the IUCN Forest Conservation Programme, IUCN, 2000). The FCP has identified four objectives that guide its work in management of forests, forest protected areas networking, forest ecosystem restoration and cross-sectoral issues. To deliver these objectives in Russia, IUCN FCP, IUCN Temperate and Boreal Forest Programme (TBFP) and IUCN Moscow office developed a comprehensive document “The Future of Forest Conservation in Russia” (Deutz A. et al., 1999). In the following sections, each of the FCP objectives is shown in the Russian context.

“Management of forests that is environmentally sound, socially beneficial and economically viable, and is integrated into an ecosystem-based approach”

Most of the world’s forests are located outside protected areas (PAs), and “most biodiversity has to survive without the luxury of full scale protection” (An Introduction to the IUCN Forest Conservation Programme, IUCN, 2000). Hence, some people and non-governmental

organizations assume that forest management in Russia does not meet this IUCN objective because of illegal logging, or the big number of forest fires, and pay no attention to biodiversity conservation and old-growth forests preservation. Furthermore local people began to fight for their rights to get more benefits from timber harvesting in nearby forests.

People link forest management only with timber growing and harvesting, although forests produce numerous goods and services. Forest managers, wisely using forests for people and environment, could significantly increase forest benefits, such as recreation, soil and water protection, food, medicinal plants, resins and other non-timber forest products (NTFPs). The ecosystem and multipurpose approach is still underdeveloped in Russia, which is criticized by environmental NGOs and the public. IUCN is trying to fill the gap by making research on NTFPs in Russia as well as in Asia, MesoAmerica and Eastern Africa. This is especially significant for forest dwellers and indigenous communities living in woods.

This is also true for many places in Russia where people traditionally collect berries, nuts, mushrooms, medicinal plants, birch sap, honey and other non-timber products. Cooperative enterprises almost disappeared during the perestroika and transition periods. For example, NTFP collection decreased from 26,321 tons in 1990 to 490 tons in 2000, and, consequently, for cranberry and cowberry 1,081 and 80 tons (Forest of Russia, 2002). Now people collect NTFP products for personal consumption and/or selling in the cities. They recognize this activity as one of the survival trends.

“Networks of forest protected areas that are ecologically representative and resilient to environmental change, and that allow key stakeholders access to management decisions and benefits”

The ongoing IUCN project “Building Partnerships for Forest Conservation and Management in Russia” with financial support from the Canadian International Development Agency (CIDA) also demonstrates that most PAs are not resilient to environmental change and key stakeholders do not have access to the decision-making. This is a twofold issue, because in strict nature reserves there are no activities permitted. In national parks many forestry activities are allowed, but people do not know how management decisions are made, especially on timber logging. In some places people believe that PAs are badly managed or exist only on paper (“paper parks”). By employing a participatory approach, the project involves a wide variety of partners, helping to assess management effectiveness of protected areas.

Many problems are faced when PAs are established within industrial or defragmented forests with currently low but originally very high biodiversity. Local people loose jobs; infrastructure is becoming weak and forest benefits are reduced. Transparent decision-making and community involvement is highly important to avoid social tension in these areas.

“Forest ecosystem restoration programmes that are environmentally sound, economically viable and socially equitable”

Russia, one of the pioneers in converting steppe lands into forests, introduced forest restoration some 150 years ago, and in Volgograd oblast only there are about 300,000

hectares of manmade forests. Although, from the beginning and even now some agricultural organizations argue about the importance of forest ecosystem restoration for soil protection, water accumulation, biodiversity restoration in shelterbelts as well as providing local people with wood, NTFPs, recreation, and shade during summer work in the fields. Major arguments are: “We lose arable land”, “We change land use from productive to “useless forests”, “Nobody has proved the effectiveness of planting forests in such areas”, and so on. In this case forest professionals should be more active and better articulate the significance of these forests.

“Cross-sectoral issues - such as over-consumption, pollution and the damaging impacts of trade - addressed in partnership with IUCN Commissions, Members and other organizations”

Although it is not forbidden by law to implement forestry practices in national parks, social tensions appear when people see logging in national parks, when valuable, rare or endangered tree species are felled. According to WRI estimations, about 12-15% of old-growth forests are left in the north European Russia, and environmental NGOs are trying to protect them against logging (Bryant, D. et al., 1997).

Industrial forest use for pulp and the lake Baikal pollution, forest pollution around Norilsky Nickel enterprises and oil spill in Komi Republic forests are well known examples of conflicts involving both national and international nature conservation organizations. To protect the lake Baikal, it was included along with adjoining forest areas into the UNESCO list of World Heritage Sites.

Russia faces an added danger from forest fires. Some 3 million ha of forests in Russia are contaminated with long-lived radionuclides and forest fires in these contaminated areas can re-mobilize these radionuclides (Teplyakov V. et al., 2000b).

From a historical perspective, forests should be viewed as the main global deposit of carbon, and it is necessary to evaluate Russian forests and their input into global carbon and oxygen cycles. Consequently, the provision of sustainable management, exploitation, conservation, protection and restoration of forest resources in Russia is not only a national but a global goal.

4. Conclusion

Forest conservation targets are set upon people’s everyday life, needs, creeds and concerns, and are very often connected with democratic traditions and human rights. Russian economy in transition also does not allow people to invest more efforts in forest conservation.

There is no conflict when environmentalists are invited to participate in the decision-making process, when they clearly articulate their position concerning biodiversity to logging companies, and when authorities are ready for constructive dialogue.

There should be no conflict between forest conservation and forestry, because conservation is for our future, and forestry is for our future, but also for today.

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Scenarios and Forest Policy Responses

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Effective real world policy connects local action to plans and programs through integrating institutions and top-bottom linkages. These linkages comprise information flows, debate, and partnerships (Mayers and Bass, 1999).

Abstract

This paper was presented at the IUFRO Symposium “Forest Research – Challenges and Concepts in a Changing World” held in Vienna, Austria on 9 October 2002.

1 Introduction

A lot of efforts are being made today in the form of policy reforms of the world's forest sectors. Unfortunately, we cannot point at many success stories, and the degradation of the forests in different forms continues in many countries. Therefore, it seems necessary to try to draw lessons from the many efforts already going on in order to be successful in designing and implementing new policy reforms for sustainable development of the forest sector in different parts of the world. This paper starts with describing some basic concepts regarding policy design and implementation; then it reviews experiences and lessons from several countries; and, lastly, it describes some of the implications of these lessons for policy reforms needed in transition countries and other countries.

2 Background and conceptual framework

In order to achieve sustainable forest sector development there is a need to balance the economic, ecological, and social aspects of the sector. To achieve this objective, most countries have realized that there is a need for a holistic and cross-sectoral approach for forest sector policy settings and that these policy programs must be linked to rural development and environmental conservation (UN, 2001). We define policy as a course of action adopted by stakeholders, and any course of action adopted as advantageous or expedient (modified from the Oxford English Dictionary).

Solberg and Rykowski (2000) made a literature review of studies on forest policies and concluded: “A long range of studies is found of various forest policy instruments, but nearly all of the studies describe the instruments. Very few studies exist which analyze the effectiveness and costs and benefits of various instruments. Even less studies exist which evaluate alternative policy instruments”.

However, evaluations of policy frameworks established a long time ago show very strong impacts on the development of the forest sectors. One example is Sweden, where a policy framework for the forest sector and forestry was established 100 years ago. This framework has of course been modified and improved over time. But a recent evaluation (SNFB, 2001) shows that the policy frameworks established have, for example, protected the forests from exploitation, increased the restoration of earlier mismanaged forests, increased the production and harvest potentials substantially, increased the quality of forests, and during the last 20 years substantially protected the environmental, ecological, and social values of the forests.

Policy frameworks have a long-term impact on the development of the forest sector and especially on forestry. This is illustrated in Figure 1. As illustrated in this figure, an important component of the implementation is to evaluate the consequences or impacts of the implemented policies in order to see that the implemented frameworks will give the desired results. The policies implemented today are also strongly influenced by the historical development of the forest sector. Therefore, there is a need to analyze and understand the historical development of the sector.

Forest sector policies are often complicated and there are substantial uncertainties involved with respect to dose/response efforts of policy means, goal specification, policy adaptation, policy implementation, and future trends affecting the forest sector (Solberg and Rykowski, 2000).

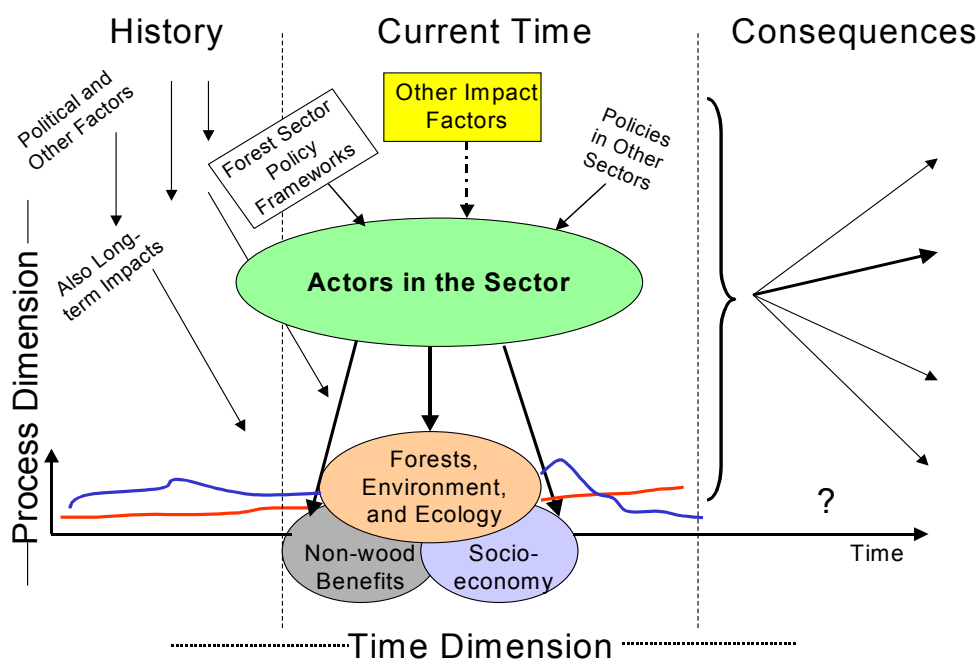


Figure 1: Policy Framework Impacts on Forestry. Modified from SNFB (2001).

This leads to the conclusion to follow an adaptive approach in the process of policy reforms.

The impact of implemented policy tools or instruments depends on other policy instruments in place in the sector or other sectors influencing the forest sector.

All governments have to make decisions about: (1) how they organize their public administration (including what level of government has what authority to do what); (2) policy instruments (like legislation, taxes, permits, etc.); (3) policies; (4) what the roles of civil and private society are going to be; (5) monitoring performance; and (6) how the forest sector relates to other sectors.

Unfortunately, in most cases, these different elements are disconnected, not coherent, and do not lead to the kind of outcomes desired. The overall goal with a framework and related policies for sustainable development of the forest sector is *to provide a coherent structure* of available means and measures for governments to reach the social, environmental, and economic goals of the forest sector. In order to reach coherency, the framework has to be simple and have political support of key constituencies in society.

We also think that the framework should aim toward objective-oriented approaches, namely the broad results we expect from the sector.

In this section we will present a proposed scope (content/outline) of a Framework for Sustainable Development of the forest sector (Figure 2). This framework is based on experiences of policy work in transition countries, (countries of the former Soviet Union), developing countries, the Nordic countries, and Canada (Nilsson, 2000a, b; 2001; 2002a, b, c; Nilsson and Gluck, 2001). The experiences show that a framework of this kind is needed in order to achieve sustainable development in a broad sense of the forest sector. But it should be underlined that there is no clear-cut outline of the framework valid for every country. There are many variations on the same theme because the different components of the framework often overlap. The framework also has to be adjusted to the specific conditions in each country. The experiences from the reforms in Transition Countries contributing to the proposed framework are discussed in Section 4 and the experiences from the reforms in Developing Countries in Section 5.

The proposed Framework for Sustainable Development presented in Figure 2 has to be implemented in the Policy Process in order to be operational. In Section 3, we present our proposal, based on our experiences in other countries, on the Policy Process and we call it the Policy Cycle.

As stated earlier, we have developed a concept based on work in many countries and is presented in Figure 2.

The concept of Figure 2 will be discussed in the following paragraphs. Due to the complexity of the issues, the indirect nature of many of the causal relations involved, and the wide diversity of situations, any attempt to generalize is inherently difficult and invites justifiable criticism (Kaimowitz and Angelsen, 2000). However, the concept presented has similarities with the comprehensive forest policy frameworks or “National Forest Programs (NFPs) for Sustainable Forest Management” proposed by the Intergovernmental Panel on Forests (IPF, 1997). In this document it states that NFPs should follow a broad intersectoral approach,

including the formulation of policies, strategies, and plans of action, as well as their implementation, monitoring, and evaluation. The programs should be implemented in the context of a country's socioeconomic, cultural, political, and environmental situation and be integrated with wider programs for sustainable land-use and with the activities of other sectors.

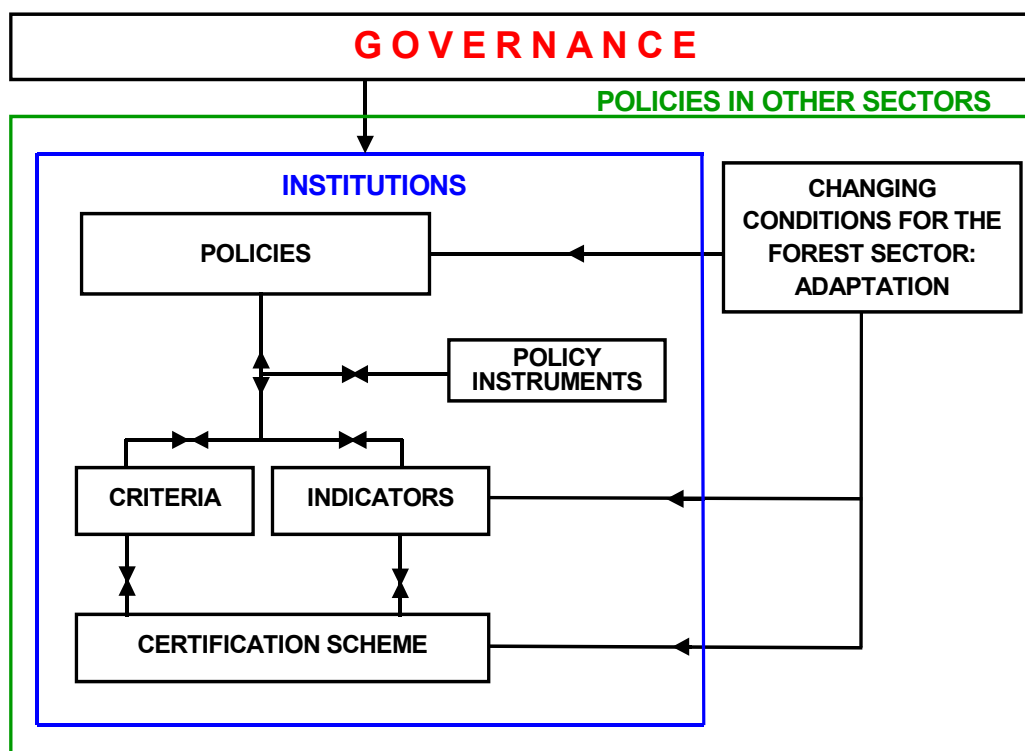


Figure 2: The Scope of a Framework for Sustainable Development.

2.1 Governance

The umbrella for policy reforms in the forest sector is the general governance conditions at hand in a country. Governance is sometimes defined as “the exercise of authority through formal and informal traditions and institutions for the common good” (Thomas, 2000). The general governance conditions in a country are decisive for the possibility of carrying through policy reforms in the forest sector. There seems to be a positive correlation between the existence of effective democratic institutions and successful policy reforms. A key issue for success in policy reforms is to what extent the political forces support the reforms and allow for participation and consultation in the reform process.

But there is also a “Governance” issue within the forest sector. There must be a good climate for reforms within the sector, which requires strong leadership that can only come from within the forest sector — from the people who know and understand the sector. These people have to communicate their understanding and visions to the society and governments in order to bring about reforms (Apsey *et al.*, 2000).

2.2 Integration with policies in other sectors

The forest sector is just one part of the total economic activities of a country. The impact by the forest sector on regional/rural development and the environment may be high in some countries but in many countries the policies implemented in other sectors of the economy are more important for the forest sector than implemented forest sector policies are in other sectors of the economy (Peck and Descarques, 1995). Examples on broad policy issues interacting with forest sector policies and influencing the functioning of the forest sector are policies dealing with:

- agriculture/land-use,
- energy,
- environment,
- employment,
- trade,
- transportation,
- macroeconomic and social policies and investments,
- technological development,
- rural/regional development, and
- climate change.

In many cases, policies may be well conceived in a narrow (sectoral) context but are unsustainable in a broader context.

Special emphasis must be paid to integrate social, rural, environmental, and forest policies (World Bank, 2000).

However, there is hardly any country so far that has properly managed this integration of policies between different sectors.

2.3 Policies for the forest sector

Bluntly expressed, the establishment of Policies is the process where *we formulate what the society wants from the forest sector and forestry in the future* (Apsey et al., 2000; Nilsson and Gluck, 2001) or how to get where we want to be. *“The starting point [for policy formulation] must be the social objectives. It must provide for specified goods and services to go to specified groups by specified dates. That means finding out what people want... Thus the creation of a forest policy is a process which should involve all groups and institutions with a direct or indirect say in the forest or with responsibility for implementing policy”* (Westoby, 1989). Within the sustainability concept, we think Policies is one of the most important components. It is in this component that society should have an intense debate on setting conflicting and balancing goals. Balancing of goals is required both within the forest sector and between the forest sector and other sectors of the economy to fulfill overall development objectives of the society. This balancing is missing in most countries today.

Policies should consist, in one way or the other, of the following components: Overall Societal Goals for the Forest Sector, Overall Forest Policy Goals, Detailed Goals for Sustainable Forestry, and Detailed Regional Goals for Sustainable Forestry (see Figure 3). There is a broad variation between countries in the formulation of these goals.

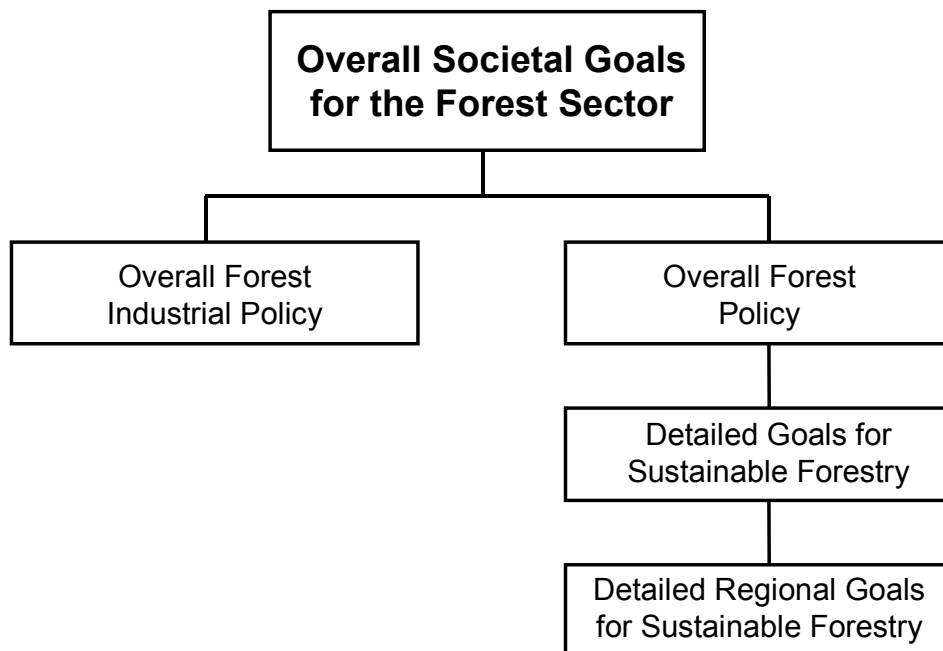


Figure 3: Illustration of the Policy Components.

With respect to Forest Sector Policies a certain problem exists, which is caused by administrative measures. We define the “Forest Sector” as containing the components “Forestry”, “Forest Industry”, and “Markets”. In many countries, the policies for “Forestry” are set by a Ministry for Agriculture and/or Forestry and the policies for the “Forest Industry” and “Markets” by Ministries for Industry and/or Trade. This means that there is not an overall harmonized policy for the forest sector but there are individually set policies for the different sub-components “Forestry” and “Forest Industry”. The most developed part, so far, of the Policies is with respect to “Forestry”.

The social values to take into account by the forest policies vary greatly, depending on culture and social group, and the roles that forests play in their livelihoods and quality of life. Examples of these social values are presented in Table 1.

Table 1: A Spectrum of Social Values Associated with Forests. Modified from Mayers and Bass (1999).

Social Values	Forests Provide
<i>Livelihood Basics:</i>	
Staple food	Carbohydrates and protein for forest-dwelling communities Fuelwood for cooking
Supplementary food	Variety/palatability to diet through meat, fish, fruit Seasonal buffers/famine foods
Health	Water supplies Climate moderation Medicine Vitamins and minerals
Shelter	Poles, thatch
<i>Economic Security:</i>	
Main income	Forest products for sale Forest services, e.g., tourism for sale
Supplementary income	Forest products for sale
Savings/social security	Timber stocks Land value
Risk reduction	Biodiversity Multiple products Soil conservation Water conservation
<i>Cultural and Social Identity:</i>	
Cultural, historical, spiritual and symbolic associations	Forest Landscapes Forests as sacred groves Individual species and their products
Social identity and status	Forest as source of power from ownership/cultivation/clearance Ability to pass forest on to future generations
<i>Quality of Life:</i>	
Education/science	Biodiversity conservation Means of access to forest
Recreation	Biodiversity conservation/control Forest-based facilities
Aesthetic values	Landscape design and management Biodiversity/conservation

The legislation is probably the strongest policy instrument. The legislation can be divided into *nominal* and *functional* laws (Schmithüsen, 1992). The nominal laws are constituted by the legislation directly dealing with forestry, and the functional laws are regulations outside forestry but affecting forestry. Law and legislation content should be reflecting the result of

the policy formulation but is, at the same time, a prerequisite for the implementation of the policies adopted.

In many countries, the forest legislation is not sufficient in order to reach the goals of the Policies discussed in Section 2.3. To reach these goals, other political measures and voluntary actions by the forest owners beyond forest legislation are required.

2.4 Policy instruments

Policy Instruments are the tools that try to move development towards the goals set in Policies. Thus, there should be a strong link between Policies and Policy Instruments. There are many Policy Instruments in the policy process available for implementing the adopted forest policies. One way of classifying the instruments is presented in Table 2.

Table 2: Policy Instruments.

Regulatory/Juridical:
Constitutional guarantees, laws, by-laws and other regulations, rights, tenure, trade, legally-binding international connections
Economic/Market:
Taxes and revenue systems, subsidies, stumpage, permits, auctions, certification
Information:
Extending science, education and training, research, monitoring and information systems, policies in other sectors
Institutional:
Property regimes, concession systems, mechanisms for dialogue and partnership, mitigation of corruption and capital flight
Agreements:
Management agreements, non-legally-binding international agreements
Adaptation and Evaluation:
Manuals and plans
Sustainable Development Frameworks (overall coordination)
Forest Sector Programs (strategies), National Forest Programs , etc.
Choice of Implementation Strategy
Plans on How to Implement Policy Frameworks

2.5 Criteria and indicators

Over 150 countries are currently in one or more international processes that aim at the development and implementation of criteria and indicators for sustainable forest management (Palmberg-Lerche *et al.*, 2001). The ultimate goal with this system is to promote improved forest management practices over time, taking into consideration the social, economic, environmental, cultural, and spiritual needs of the full range of stakeholders in forestry.

The transparency concerning the actual state and trends of forestry that follows from open dissemination of the indicators is, in itself, a vital tool and has resulted in improved forest reporting (Duinker, 2000).

As an entity, the focus on “criteria and indicators” may be quite misleading. Criteria are a *set of core values*, while indicators are a *set of core data*. These are two very different concepts, and we think it is important to see them as such. There are positive experiences with the criteria and indicators concept but there are also a number of limitations to be considered. We are not going to burden this paper with a discussion on the limitations but reference Nilsson and Gluck (2001). It is clear that the “criteria and indicator” concept has an important role to play in a sustainable development framework for forestry. But in order to be this important tool, the sets of criteria and indicators have to be harmonized with the goals of the Policies discussed in Section 2.3. This harmonization is, to a large extent, missing in most countries today. In order to move in that direction we think it is, in the future, important to operate with three levels of indicators: (a) the international level, where the internationally agreed indicators are reported in common format; (b) the national level, where the indicators are closely linked with the content of the national policy framework; and (c) the regional level, where the indicators are closely linked with the regional goals of forestry (Nilsson, 2000b).

2.6 Certification

The original purposes of market-oriented certification are: (1) to improve the quality of forest management, and (2) to provide market advantage or improved access for products from sustainably managed sources (Bass and Simula, 1999). Certification of forest management is defined as an established and recognized verification procedure that results in a certificate on the quality of forest management in relation to a set of predetermined criteria based on an independent (third party) assessment. Verification takes place through an audit. In assessing forest management quality, it is established whether the performance requirements, expressed as criteria and indicators (standards), are complied with in a defined forest area. The criteria are generally associated with sustainable forest management and may often consider various sets of internationally agreed “Criteria and Indicators” discussed in Section 2.5 (Bass and Simula, 1999).

Schopfhauser (2001) estimates that there are some 70 systems being developed worldwide but only a small number are operational; most of them are market-oriented schemes and only some 90 million ha was certified in 2000 (Bourke, 2001).

Thus, there are reasons to see Certification and “Criteria and Indicators” systems as complementary efforts with largely the same final aim — to promote the sustainability of forest management. However, their functions are markedly different. “Criteria” stands for core values, while up-to-date dissemination of results on “Indicators” supply the status on core data. The “Criteria and Indicators” originate from international agreements. A certification standard constitutes an agreement between consumers and producers of forest products and/or services on a voluntary basis. We see certification as a pure market instrument. There are still many issues to be resolved with respect to certification (Bourke, 2001; Nilsson and Gluck, 2001) but we omit these issues from the discussion in this paper.

In the same way as “Criteria and Indicators”, the “Certification” can play an important role in a sustainability framework. But our major concern is that the certification systems should be harmonized with the goals of the Policies discussed in Section 2.3, and without this harmonization there is a risk that the certification systems can become counterproductive to the overall policies.

2.7 Institutions

In order to get the Policies, Policy Instruments, Criteria and Indicators, Certification Schemes, and balancing with policies in other sectors harmonized and efficiently operational, efficient Institutions have to be established. There is a consensus that Institutions constitute a major bottleneck for the sustainable development of the forest sectors in many countries (Ljungman, 1998; Nilsson and Gluck, 2001; Nilsson 2002a; Carlsson *et al.*, 2001). Ljungman (1998) claims that the main obstacle for establishing efficient Institutions or reforms is the presence of powerful stakeholders with an interest in maintaining the status quo.

The Institutions should be understood as “the rules of the game” in a sector, not as organizational entities (North, 1990; Crawford and Ostrom, 1995). Thus, Institutions consist of those formal and informal rules that are *de facto* used by a set of actors. Pejovich (1998) defines institutions as “...the legal, administrative, and customary arrangements for repeated human interactions... the prevailing institutional framework in a society consists of formal and informal rules”. This implies that Institutions of a society or a sector are composed of a large number of institutions. The features of Institutions are coordination between organizations, legislation, property rights, tenures, revenue and taxes, land-use, corruption, transparency, knowledge, etc. Stiglitz (1999) states “...economic development and transition to something new is more a matter of institutional transformation than economic management”. IIASA has carried out a lot of efforts in analyzing the Institutions of the Russian forest sector.³ The lesson learned is that there are limited possibilities to achieve sustainability without substantial changes and reforms in the existing Institutions, and the reforms needed must be in harmony with the establishment of the sustainability concept illustrated in Figure 2. Apsey *et al.* (2000) and Nilsson and Gluck (2001) make similar conclusions for Canada.

2.8 Changing conditions for the sector: adaptation

The political, social, and economic conditions are changing rapidly and with that the conditions for the operations of the forest sector. In order to cope with these changes, the framework of the sustainability concept has to be adaptive and regularly revised to deal with these changes. Without an adaptive concept with revisions, the existing Policies, Policy Instruments, Criteria and Indicator Systems, Certification Schemes, and Institutions will be counterproductive from a sustainability point of view. To do this adaptation, the availability of a tool-kit for the changes is required. Thus, it is important to establish an efficient adaptive mechanism for updating the content of the framework for sustainability.

³ The reports are available on the Internet: <http://www.iiasa.ac.at/Research/FOR>.

3 The policy process — the policy cycle

In Section 2, we discussed the *Scope* (or content) of a Framework for Sustainable Development of the Forest Sector, and in this section we will discuss how to go about the *Process* of establishing the framework and *Policies* for Sustainable Development of the sector — we call the process the *Policy Cycle*.

There are many ways to try to describe the policy process. One way is to look at the process as a series of stages — e.g., information–decision–implementation–evaluation — as a cycle. A simplified “Policy Cycle” is presented in Figure 4. However, there are risks with these rational approaches because policy processes are usually products of long history, the stages may not be sequential and are not insulated from each other (Mayers and Bass, 1999). Nevertheless, in the following paragraphs we will comment on the components of the Policy Cycle.

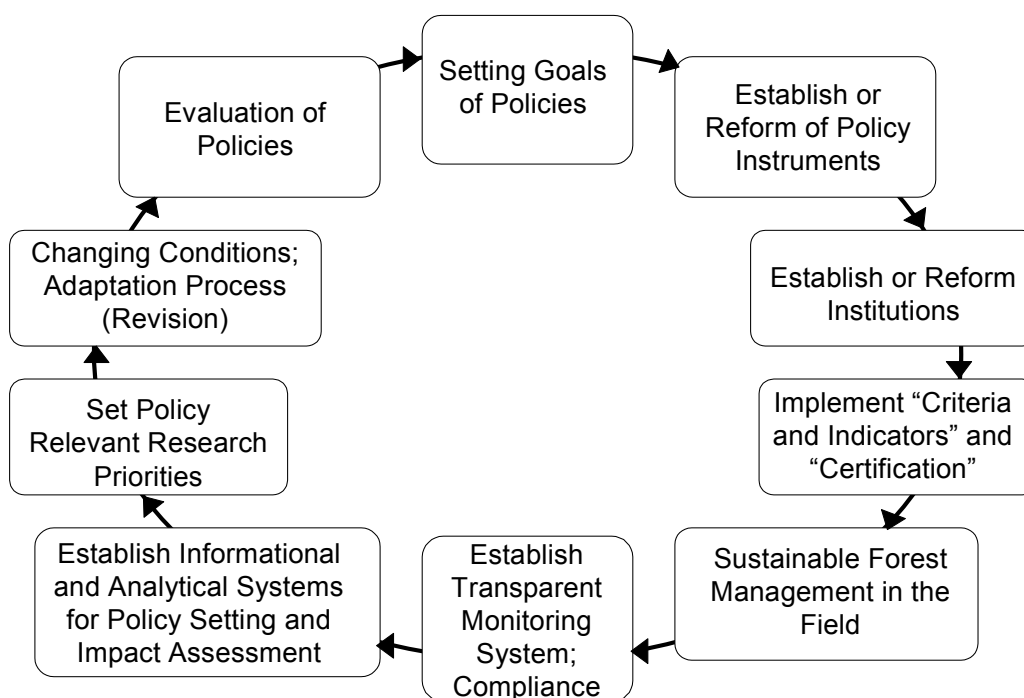


Figure 4: The Policy Cycle.

3.1 Setting goals of policies

Participation of the main interest groups in developing and implementing new goals and policies is compulsory in order for these to be well designed and for good stakeholder cooperation in the forest sector. Thus, it is important to develop *Policy Communities* of the major stakeholders in order to efficiently set goals and policies. The policy community can foster new ideas, which are important for the policy process. Thus, setting goals of the Policies requires *Participatory Approaches*. Calls for engaging stakeholders in the

development of efficient policies have been raised, among others, by Warburton (1997), Carter (1999), Buchy and Hoverman (2000), Burley *et al.* (2001), and Kennedy *et al.* (2001). IIASA has a long experience in developing and using participatory approaches in policy making. Brewer (1986) developed the concept of “Policy Exercises” to engage the stakeholders in the policy process. This concept was applied in a number of exercises with respect to the European forest sector (Duinker *et al.*, 1993). Later, the Policy Exercise concept has been used in trying to set new Policies and Institutions in forest sectors in transition, more specifically the Russian forest sector (Olsson, 2001). We will not describe the Policy Exercise concept in detail in this paper, but will only conclude that the concept works even in countries like Russia. Of course, there are also other concepts to follow for the formulation of Policies.

The process of setting the goals of Policies is an interactive process with respect to context, actors, process, content, and impact. Mayers and Bass (1999) have tried to illustrate this interaction in Figure 5.

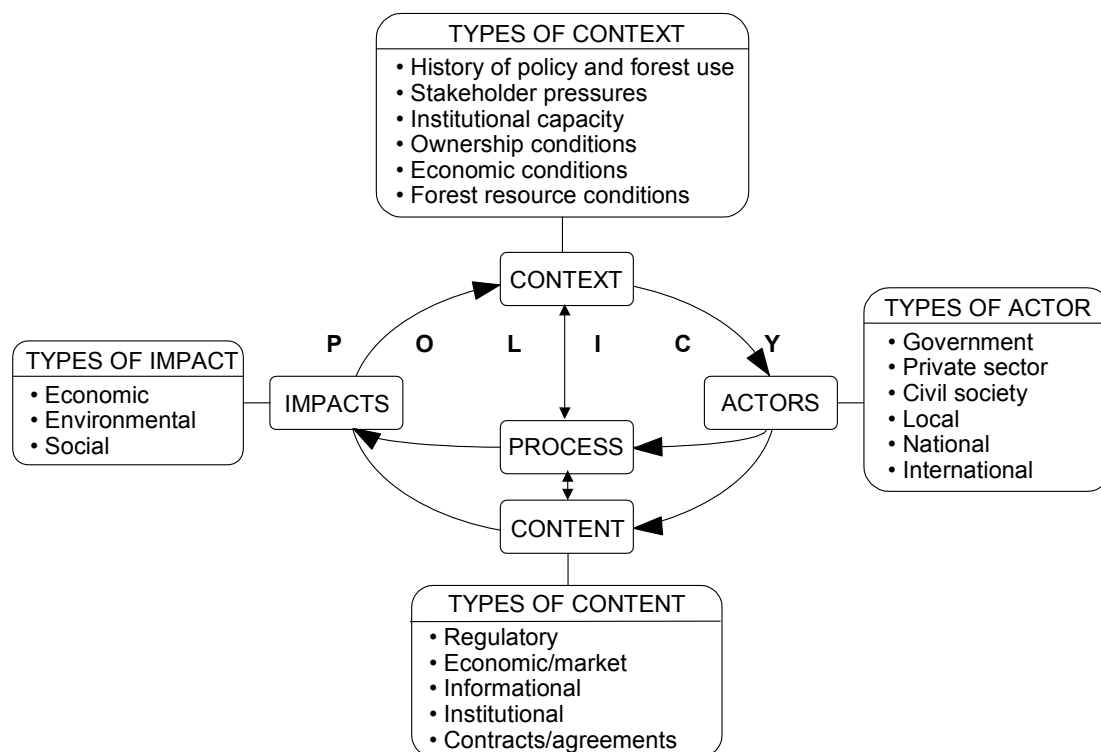


Figure 5: Interaction of Context, Actors, Process, Content, and Impact. After Mayers and Bass (1999).

Establishment or Reform of Policy Instruments

After setting the goals and policies, the policy instruments to be used to reach the goals have to be established. Some of the different policy instruments available are discussed in Section 2.4.

In many countries, the forest legislation is the basic component of the forest policy and should reflect the intentions set in the Policies. The legislation defines the binding norms to be respected by the community in operation of the forest sector toward set goals.

Establishment or Reform of Institutions

The Institutions have to be adjusted to be able to handle the goals set in the Policies and to execute the Policy Instruments. The Institutions are defined as discussed in Section 2.7.

Implement “Criteria and Indicators” and Certification

The Policy Community, discussed in Section 3.1, has to implement international agreements on “Criteria and Indicators” and also modify these in the policy process to national and regional conditions and levels. The certification should be established on a voluntary basis but the Policy Community could play an active role in stimulating the establishment of a certification scheme and make sure that both the certification scheme and the implementation of “Criteria and Indicators” harmonize with the overall concept or framework for sustainable development of the sector (see Figure 2).

Sustainable Forest Management in the Field

After the stages described above, there is a platform for operational sustainable forest management. But this is not the end of the Policy Cycle stages.

Establishment of Transparent Monitoring System; Compliance

In order to follow the policy actions, there is a strong need to establish consistent and transparent monitoring (inventory) and reporting systems. These systems have to be designed so that they can measure compliance with the goals of Policies, with the Policy Instruments, and with the implemented “Criteria and Indicators” systems.

Establishment of Informational and Analytical Systems for Policy Setting and Impact Assessments

The data from the monitoring system has to be implemented into informational and analytical systems assessing the impact of the policies adopted. The informational system also helps to set relevant policy research priorities.

Set Policy Relevant Research Priorities

The Policy Cycle is a continuous process and during the journey the need for policy relevant research agendas will be identified. The Policy Community has to communicate to the scientific community and make sure that these research agendas are implemented.

Changing Conditions; Adaptation Process

As discussed in Section 2, the Policy Cycle is an adaptive process and the environment of the forest sector is changing rapidly due to new knowledge, changed values over time, changed economic and political conditions, etc.

These changes have to be followed and scrutinized in the Policy Cycle. Some of these changes have to be analyzed in the earlier discussed Informational System and some require new research. In some cases, adjustment of the existing policies is required and in others it is not.

Evaluation of Policies

As stated in Section 2, policies in the forest sector and especially in forestry have long-term impacts. Therefore, there is a need to carry out major Evaluations of Policies. The evaluations should be made against the goals set in Policies. It is also of importance to identify cause/effect relations in the evaluations. The direct impact of the Policies is often difficult to identify from the impacts of other factors outside the sector. Therefore, there is a need to study the different actors in the sector with respect to attitudes and behaviour together with direct impacts, e.g., in forestry. In many cases, the evaluations result in redirections of the Policies, Policy Instruments, and Institutions.

Major evaluations are complicated and costly and can, therefore, only be carried out at longer time intervals. These evaluations are often initiated by major changes in the environment/surroundings of the forest sector.

4 Policy reforms in the forest sector in former centrally planned economies

In the following paragraphs, a brief summary is made of the experiences of the policy reforms during the 1990s (or how successful the policy reforms have been so far) in the former Soviet bloc.

4.1 Eastern Europe Central Asia Region (ECA Region)

Solberg and Rykowski (2000) have studied the policy reforms during the 1990s in forestry of the ECA region (25 countries). They conclude that:

- The goals for forestry are not clearly defined and are not derived from the overall development goals of the respective country;
- The property rights regimes are not clearly defined and are not followed in practice;
- There are overlapping and unclear legal and institutional arrangements between governmental institutions with respect to forest policies;
- There are insufficient and insecure investments in forestry;
- Public participation and conflict resolution in forestry is not sufficient;
- The dialogue between forest authorities and other interest groups have to improve;
- Corruption is a serious problem and make reforms of forest policies meaningless;
- The knowledge of the impact of different policy instruments is not sufficient;
- There is no coordination of forest policies with policies in other sectors;
- The overall coordination of a sustainability framework is missing;
- The reforms of the state forest service is insufficient; and
- There is a lack of interface between research and policy making.

4.2 Former Eastern Europe

Nilsson (2002c) has analyzed the reports by individual countries to the European Forestry Commission (EFC, 2000) on the development of policy frameworks for sustainable development. It can be concluded that only one-third of the countries have delivered reports to the European Forestry Commission, which means that many countries have a long way to go in order to come up with solid frameworks for policies and sustainability. It is difficult to get a concrete picture from the existing reports on if and how the developed frameworks are operating in the real world. Most of the efforts have been made on forest legislation and not on a complete framework in line with Figure 2. With respect to “Institutions”, the reports mainly discuss the reorganization of the institutions. As illustrated earlier in the text, the domain of institutions is much more than just the organization and responsibility of the institutions of the forest sector. There does not seem to be any balancing of policies between forestry and other sectors, and there is no overall forest sector policy. There is not much implementation of the Criteria and Indicators system.

There are also conflicts between central and local governments with respect to the forest sector. Many institutions and legislations are outdated. Corruption and illegal harvest and trade are substantial. Governmental budgets for forest management are disappearing. The privatization of industry is suffering from insufficient reinvestments.

4.3 Belarus, Russia, and Ukraine

Krott *et al.* (2000) have studied the existing policies and policy frameworks in Belarus, Russia, and Ukraine, and make, among other things, the following conclusions:

- The status of the existing policy framework for the forest sector is weak;
- Legal rules have been reformulated but are too general or contradictory to give clear guidance to institutions;
- The implementation of laws is moving slowly;
- There is a need to strengthen independent forestry institutions for law implementation;
- Due to separation by time, space, and institutions of the central budget, there are large difficulties to coordinate the earnings with the necessary long-term investments in forestry production as well as technology and infrastructure;
- With respect to the impacts of other sectors on the forest sector, new policies and programs are established but the implementation is limited;
- There is a need to bring in managers with new skills to the forest sector; and
- The state budgets for the forest sector are not task-oriented.

4.4 Conclusions from former Eastern Europe

The above presentation may give the impression that nothing has happened with respect to policy reforms. There have been impressive changes in the frameworks in comparison with the Soviet era (UN, 2001). But the UN (2001) is also pointing out that there are problems in

the region because forestry has a marginal role in the national economic planning, the transition process in the forest sector is determined by more general transition-related factors than the needs of transition in the forest sector.

Kallas (2000) confirms that there have been substantial changes in the policy formulations, reforms of the public forestry organizations, and improvement of different stakeholders of the forest sector, but policy implementations have brought only limited results in other components of the policy and sustainability frameworks and there are no avenues for policy revisions established.

Based on the review presented above, it can be concluded that the former Eastern European countries still have substantial work to do in each component of the scope of the sustainability framework presented in Figure 2 and of the Policy Cycle in Figure 4. The review also shows the need to have a systematic and analytical approach, in line with Figures 2 and 4, in order to be successful and keep momentum in the policy reform work. The overall impression is also that the former Eastern European countries have concentrated on reformulation of Legislation of the Policy Instruments. This may be a good strategy to get moving on the reforms. The World Bank (1997) argues that the establishment of the juridical prerequisites of the forest sector is an effective strategy for reforms and transition. The experiences of former Eastern Europe also show that the policy reforms take a long time.

Kallas (2000) also concludes that the experience shows:

- That the initiative for reforms must come from inside the forest sector;
- The “right” leaders for the reform work have to be found;
- The policy reforms can only be done in a meaningful way by the people in the transition countries not by outside experts; and
- The policy reforms of the forest sector do not require huge financial resources but a substantial political will.

4.5 Russia

As stated earlier, IIASA has undertaken a major effort in studying the sustainability frameworks of Russia. For details we reference IIASA’s Forestry web page (<http://www.iiasa.ac.at/Research/FOR>) and we will not repeat the details here.

We can conclude that during the transition and the policy reforms, there has been a lack of general governance but especially a lack of governance in the forest sector. There is no coordination with policies in other sectors influencing the forest sector. Russia lacks a sufficient Policy component with respect to the forest sector. A number of efforts have been made but failed due to lack of leadership in the sector. There is a forest legislation, which has been reformulated and stipulates the organization of forest management, forest management principles, rules for forest utilization, rules for and organization of protected areas, rules for and organization of forest reproduction, and regulation of trade. But there are no links to any Policies and the law is general and, in many cases, conflicting. In addition

to the Forest Code, there are about 15 other laws affecting the forest sector and they are often in contradiction with each other.

The Forest Code stipulates the establishment of “Criteria and Indicators for Sustainable Forest Management in the Russian Federation”. The fulfilment of implementing the adopted criteria and indicator system rests with the Ministry of Natural Resources. Through our sampling we have not been able to detect any reporting by forest enterprises or regions on the criteria and indicators to the responsible authority.

Also, a mandatory Certification System is stipulated in the Forest Code, which should be based on normative legal documents, but this has nothing to do with the certification discussed in the international debate.

Detailed analysis of the Institutions of the forest sector illustrates that none of the required cornerstones of Institutions is in place to make sustainable development possible. The situation can be illustrated as: *“...the legal and administrative systems have not yet evolved that would support market economies, and they remain much as they were prior to the transition. The result is inadequate and chaotic legal, administrative, and commercial systems juxtaposed with increased democratization of political life. In such an environment, corruption flourishes, conflicts go unmediated, the climate for investment is poor, ecological qualities decline, and social coherence diminishes”*. In addition, the quality of forest education is declining, there is no policy relevant research, the quality of monitoring declines, etc.

Levintanous (2002) has recently supplemented the IIASA picture of the ongoing policy reforms in the Russian forest sector. He points out the lack of linking the forest sector with other sectors of the economy and lack of governance in the forest sector. The author continues: *“...at present a comprehensive forest policy and strategy including economic, legal, and institutional mechanisms for realization of sustainable forest management has not yet been elaborated in Russia”*.

4.6 Conclusions on Eastern Europe, Russia, and Central Asia

The World Bank (2002) has recently done an evaluation of the transition after the first ten years of transition in this region. The objective with the evaluation is to study the development of the overall economic policies but some of the findings also have relevance for the forest sectors.

The Bank concludes that newly created private businesses are the strongest engine for reforms and policy changes. For successful policy reforms, governments must be credible and able to constrain insiders, and increased transparency and accountability in governments is required. In a similar way, political contestability is an issue for success in policy reforms. The World Bank also concludes that there is a lack of confidence in Legal and Judicial institutions, a high insecurity of property rights, and stakeholders are not involved in the policy reforms. Finally, it is concluded that corruption, tunnelling, and anti-competitive practices mar all policy reform efforts.

Some readers may regard the review of the policy reforms in the captioned regions as depressive reading. But we think the review clearly illustrates:

- That there are limited possibilities to achieve sustainable development in a broad sense in the forest sector without implementing a holistic and analytical oriented framework for sustainable development;
- That any of the problems identified in the review could be handled if the countries had followed concepts similar to those presented in Figures 2–4; and this tells us
- That the presented concepts seem to be able to handle the policy reforms required in the real world.

5 Policy reforms in developing countries

Mayers and Bass (1999) have made a major effort in analyzing policy reforms and how to get policy to work in the forest sectors of developing countries (Costa Rica, Ghana, Zimbabwe, Pakistan, India, and Papua New Guinea). The common findings are that a *policy process*, *institutions* bringing stakeholders together, and applications of *policy instruments* in line with the concepts discussed in Sections 2 and 3 are needed in order to get new policies or policy reforms implemented. But they underline that these are only frameworks and should not be regarded as detailed specifications due to the fact that there are “no magic bullets”.

Mayers and Bass (1999) stress that the *context* of the policy process as the most important issue. The formation of the context involves national and regional actors and analysts. They also make a similar conclusion to what we have made based on the experiences of the policy reform in the former Eastern Block: that no outsider is qualified to intervene in the policy process until an understanding of the context is in place. Based on the six case studies in the developing countries, they conclude that there are a number of factors influencing the feature of the policy process:

- History and power structure;
- The forest asset base;
- The vulnerability of forests to external ecological influences;
- Economic and financial conditions;
- Social-cultural conditions;
- Strength of institutions; and
- Room for changes (governance).

Thus, the experiences from the developing world are similar to what we have discussed with respect to the Eastern Block.

6 Pan-Europe

The purpose of the Ministerial Conference on the Protection of Forests in Europe (MCPFE) was to establish a forum for the protection of forests at a Pan-European level. One of the concerns of MCPFE is the development of relevant frameworks for sustainability and

policies. The reason for this concern is that these frameworks are not sufficiently efficient in many European countries (including Western Europe). A number of workshops, under the umbrella of MCPFE, have taken place in order to gain experiences and consensus for future transition work on these issues. The 2001 workshop on this issue gave the following recommendations to the Fourth Ministerial Conference on the Protection of Forests in Europe to be held in 2003 (MCPFE, 2002a):

- Provide a forum to exchange experiences and to monitor progress made on sustainable development;
- Highlight issues and priorities in the forest sector, including the balance of private and public interests;
- Provide links between global, national, and regional levels;
- Recognize the cross-sectoral nature of sustainable forest management and contribute to the integration of sectoral policies;
- Reinforce political commitment to promote transparency, multi-stakeholder cooperation, and public participation;
- Promote national forest programs;
- Promote review of existing Institutions and Policy Instruments; and
- Enhance capacity building.

Later on, there was a meeting on National Forest Programs (MCPFE, 2002b), which has strong similarities with the Framework for Sustainable Development discussed in this paper. MCPFE (2002b) concludes that a national forest program “...constitutes a *participatory, holistic, intersectoral and iterative process of policy planning, implementation, monitoring, and evaluation at the national and sub-national level*”. It is also concluded that a successful national forest program requires long-term high-level political commitment. In addition, MCPFE (2002b) highlight the following elements and principles of the required programs: participation, holistic and intersectoral approach, iterative process with long-term commitment, capacity building, consistency with other national policies and strategies, consistency with international initiatives, institutional and policy reforms, partnership for implementation, and criteria and indicators is a component of the program.

The above experiences, highlighted by MCPFE, for Europe on the transformation of the forest sector towards sustainable development are covered in the Framework for Sustainable Development and the Policy Cycle presented in Sections 2 and 3 of this paper.

7 Summary of experiences of policy reforms

The overall experiences from analyses of different countries shows that without concepts of the type presented for a Framework for Sustainability and the Policy Cycle there are limited possibilities to achieve sustainable development of the forest sector. Countries having these concepts in place are doing well from a sustainability point of view, and countries lacking these concepts are doing badly. It can also be concluded that the problems identified in different countries could be taken care of if they would implement proposed concepts.

So what does make it work with the implementation of the needed concepts? A number of factors seem to crystallize:

- A long history of forest sector management;
- A systematic and holistic view on problem solving in the sector;
- Strong institutions;
- Strong leadership of the sector used to take initiative to changes;
- A well functioning Policy Community in the sector;
- A multi-stakeholder participatory process;
- A multi-sectoral approach; and
- The right national governance in place.

We also think that an important feature can be learned from the Russian macroeconomic policy setting. During most of the 1990s, Russia tried to follow the different policy recommendations coming from outside Russia with the result of no development at all. In the late 1990s, Russia realized that this was their problem and had to solve it themselves in their “Russian way”. After that, major progress has been made in the Russian macroeconomic policy setting.

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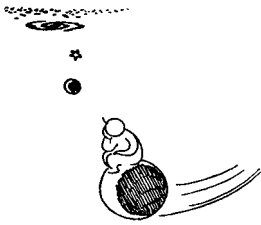



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Summary⁴

  <p>I'd like to know what this whole show is all about before it's out.</p> <p><i>Piet Hein: "Grooms"</i></p>	 <h3>Gerhard Mannsberger</h3> <ul style="list-style-type: none"> • Changing world: <ul style="list-style-type: none"> - Climate change - Water supply - Combatement of poverty - Rural development - Public awareness • Globalisation: Networks of F.R.I.
 <h3>Heinz Schmutzenhofer</h3> <ul style="list-style-type: none"> • IUFRO from 1892 to 2002 • IUFRO from a "Central Organ" in Central-Europe to the "Advocate for Forest Science". • IUFRO from a Home of Standards to a Modern Service Centre - with its heart in Austria 	 <h3>Natalie Hufnagl</h3> <ul style="list-style-type: none"> • Challenges: <ul style="list-style-type: none"> - Globalisation - Europe in competition - Socio-demographic patterns ("Zeitgeist") • Opportunities: <ul style="list-style-type: none"> - Wood - the material of the 21st cent. - Marketing of non-market benefits

⁴ The summary was prepared and presented at the symposium by Niels Elers Koch (see list of authors).

 <h3>Kit Prins</h3> <ul style="list-style-type: none"> • Forest research needs funding • Data needed on trade and markets • Social research: strengthened • Innovative uses and products • Forest inventories are vital • More joint research and sharing data (GFIS) 	 <h3>Pentti Hyttinen</h3> <ul style="list-style-type: none"> • North Karelia = "Province of Forests in Europe" • Forestry = Rural development: + 1000 jobs in know how and technology • Sensitive: + 60 Mio. € in 6 years • Develop human res.: "Female energy" • Research creates the future
 <h3>Christian Brawenz</h3> <ul style="list-style-type: none"> • Forest owners are not only stakeholders • Are we not to boring in selling our family forests timber? • Do we need a common forest policy in EU? 	 <h3>Helga Kromp-Kolb</h3> <ul style="list-style-type: none"> • Climate change more negative in Southern Europe, and primary sectors most affected • Changes in species • Increase in draughts and fires, storms, insects and pests, and in growth (+/-) • Advice: Manage for flexibility
 <h3>Ladislav Paule</h3> <ul style="list-style-type: none"> • Selection processes are the consequence of extremes • Climate change gives provenance research its revival • Maintain or maximise diversity • Bread for generalists - not specialists • Import seed sources from the southern and lower sites 	 <h3>Michael J. Wingfield</h3> <ul style="list-style-type: none"> • Robert Hartig 1874: Birth of pathology • Globalisation => trade in forest products and mobility => forest diseases (e.g. chestnut blight, Dutch elm disease, pine wilt). • I foresee new and devastating forest diseases with serious neg. impacts • Wisdom and leadership = IUFRO

 <h3>Edwin Donaubauer</h3> <ul style="list-style-type: none"> • Forest decline in Central Europe and North America 1970-80'ies due to air pollution. (Example of MISS) • The neglect of other causes lead to set-backs in image and budget • The monitoring systems of forest health are not much helpful • Need for re-orientation based on forest science 	 <h3>Niels Elers Koch</h3> <ul style="list-style-type: none"> • Societies are getting more urbanised and dominated by urbanised values • Never before have so many different users wanted so many diff. values • It is an opportunity, not at threat, if we go in to urban forestry and trees • This will call for new challenges in research and management
 <h3>Wolfgang E. Burhenne</h3> <ul style="list-style-type: none"> • More and more internationally, mutually binding, legal instruments • Major discussion point: Should forest be a protocol under Biodiversity convention or as a separate convention • Enough paper, not enough implementation 	 <h3>Victor K. Teplyakov</h3> <ul style="list-style-type: none"> • Forest conservation creates often conflicts, because forest is an important symbol of Nature • Forest conservation demand co-operation between foresters and the public to be successful • Ca. 3 Mio. ha of forests in Russia is contaminated with radio-nuclides
 <h3>Sten Nilsson</h3> <ul style="list-style-type: none"> • Need to balance the economic, ecological and social aspects of the forest sector - balancing of conflicting goals • Need a holistic and cross-sectoral approach for forest policy linked to rural development and conservation • Need quantitative scenarios to evaluate consequences of policies 	

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Annex 2: List of Acronyms

ASEAN	Association of Southeast Asian Nations
BOKU	University of Natural Resources and Applied Life Sciences
CBD	Convention on Biological Diversity
CEECs	Central and Eastern European Countries
CEPF	Confederation of European Forest Owners
CIS	Commonwealth of Independent States
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CMS	Convention on the Conservation of Migratory Species of Wild Animals
COST	European Co-operation in the field of Scientific and Technical Research
ECE	United Nations Economic Commission for Europe
EFC	European Forestry Commission of the Food and Agriculture Organization of the United Nations
EU	European Union
FAO	Food and Agriculture Organization of the United Nations
FCP	The IUCN Forest Conservation Programme
GDP	Gross Domestic Product
Ha	Hectare
IFF	Intergovernmental Forum on Forests
IIASA	International Institute for Applied Systems Analysis
ILO	International Labour Organization
IUCN	The World Conservation Union
IUFRO	International Union of Forest Research Organizations
IPF	Intergovernmental Panel on Forests
ITTA	International Tropical Timber Agreement
ITTO	International Tropical Timber Organization
MCPFE	Ministerial Conference on the Protection of Forests in Europe
NFPs	National Forest Programs
NGOs	Non-governmental organizations
NTFPs	Non-timber forest products
PAs	Protected areas
R&D	Research and Development
SMEs	Small and Medium Enterprises
SO ₂	Sulfur dioxide
TBFP	IUCN Temperate and Boreal Forest Programme
TFAP	Tropical Forestry Action Programme
UN	United Nations
UNCCD	United Nations Convention to Combat Desertification in Those Countries Experiencing Serious Drought and/or Desertification
UNCED	United Nations Conference on Environment and Development
UNECE	United Nations Economic Commission for Europe
UNEP	United Nations Environment Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNFCCC	United Nations Framework Convention on Climate Change
UNFF	United Nations Forum on Forests
USA	United States of America
WRI	World Resource Institute
WSSD	World Summit on Sustainable Development