International perspectives

by Ralph W. Roberts, R.P.F., ing. f.

Introduction

This article is comprised of nine separate contributions from the recipients of the CIF-IFC International Forestry Award. Coincidentally, each contributor has an interest and experience in a somewhat different field. The international perspective is the common denominator. The ensemble of these outlooks provides a fascinating mosaic of prognostications that view the international scene across a full landscape of forest-related endeavours. The topics covered include:

- International Development Cooperation
- Forest Research
- Forest Tree Seed
- International Dialogue on Forests
- International Economic Adjustment
- Forestry Education
- Wildland Fire Management
- Policy, Governance and Leadership
- Forest Conservation and Deforestation in the Tropics

The individual perspective pieces are presented in chronological order according to the date the award was granted.

I would like to acknowledge the help of Richard Baerg, R.P.F. He ably translated the idea for this article into reality.

1988 – Ralph W. Roberts, R.P.F., ing.f.

Chief Forester, Canadian International Development Agency, Hull, Québec Canada

INTERNATIONAL DEVELOPMENT CO-OPERATION

The Problem

Sustainable forest management (SFM) by definition is unlikely to require infusions of external support. It should pay for itself. Externalities will have been internalized. Unfortunately, forest practices in the tropics are far from sustainable. Less than 5% of the area is being well managed for just timber let alone the vast array of other non-timber forest values. Local and international demands on tropical wood and environmental services have never been stronger and they are increasing. This translates into a growing need for support from the North to the South, to assist the movement towards better managed tropical forests.

The world's forest resources have been in flux for centuries. However, the decline in forest degradation and deforestation accelerated significantly during the last half of the 20th century. Forest degradation, or change in forest type, is a shared phenomena in both North and South characterized by a paucity of information.

Deforestation, or change in land use, is better known. According to the Food and Agriculture Organization (FAO), the world's forest cover has shrunk by more than 400 million hectares during this century and today forests cover approximately 3.4 billion hectares of the globe with tropical forests representing about 2 billion hectares. The current annual rate of loss of natural tropical forests amounts to about 0.8% or 14 million hectares. Plantation establishment in some countries is on the upswing. In contrast, the area of natural temperate forests in developed countries grew by 0.1 percent in the 1980s and continues to grow at a low rate.

Canadian Assistance

Canadian international co-operation in forestry began shortly after World War II with the Colombo Plan. Forestry assistance at that time was biased towards forest industry development. Canada's official foreign policy statement, *Canada in the World* (February 1995) highlighted forestry as sector important to Canada and to the developing countries we partner through our Official Development Assistance (ODA) program. A significant change will be an increasing focus on the social and cultural aspects of forest management. Rural communities will play a more prominent role in forest stewardship and the way we manage forests while maintaining poverty alleviation as a goal. Current annual support of approximately \$50 million is directed to about 120 projects in more than 50 countries and includes contributions to forest related activities of the United Nations (UN) and other international organizations. This equates to about 2% of Canadian ODA which is roughly the same as the percentage forestry receives as its share of ODA from all countries. Achieving the internationally accepted target for development assistance of 0.7% of GNP would require more than a pro rata doubling of our assistance in forestry and conservation.

Technology Transfer

Over the last millennium there has been an unprecedented accumulation of technological capability. Most of this information is found in northern developed countries and, in many instances, has not been accessible to developing countries. Developing countries with low forest cover are often most in need of support systems which allow for the transfer of these technologies and the expansion of human resource development capacities. As such they are a target group of development assistance agencies. The transfer of environmentally sound technologies in the forestry sector will be an important part of international strategies for enabling these countries to manage, conserve and sustainably develop their forests.

Finance

Financial support for tropical forestry development is rapidly changing as well. Paradoxically, since the Rio Summit in 1992, public sector ODA supported forestry activities have declined significantly. On the other hand, private sector financial flows to tropical forestry have increased significantly,

a trend that is expected to continue. In addition to these two broad sources of funding, the creation of a Global Forest Facility is currently being discussed in international fora. A mechanism of this nature would encourage and support the addition and inclusion of forestry activities within broader based natural resource management projects. However, while the goal may be similar the objectives sought by the public, private and Global Forest Facility interests will all be somewhat different. Therefore, the creation of a new international agency – an Investment Promotion and Development Agency – to act as a broker for facilitating financial flows, technology transfer and capacity building holds some promise to address the varying objectives of investors in the most effective and efficient manner possible.

National Forest Programmes

The Tropical Forestry Action Plan of the mid - 1980's has evolved and has laid the foundation for the establishment of numerous National Forestry Programmes (NFP) in developing countries. These NFPs will increasingly define the priorities that governments attach to their forestry sector. The political will to create, implement and regulate forest policies has continuously been shown to be the key element in effectively managing national forest resources. Those countries which demonstrate a high degree of political will through the implementation of NFPs can expect to attract the lions share of private and public capital flows. In addition, NFPs will continue to be an important tool to support co-ordination among national and international donors and the private sector.

Leadership

International leadership and governance have been discussed at length over the last two decades. An international forest convention may provide significant benefits in this regard but it is likely to be supported by most developing countries only if they are assured of financial help and the transfer of technologies to support their obligations under any legally binding instrument. A Forest Security Council, as proposed by the World Commission on Forests and Sustainable Development and composed of those countries which dominate forest cover, production, trade and consumption, may be another effective way of strengthening international leadership.

Outlook

Looking forward, the issues are numerous and complex and need to be tackled with more vigour than ever before if we are to secure the planet's future forests beyond the next millennium. There will continue to be a role for ODA and Canada. As a country rich in forest resources and forestry skills we must take action. Consultants, public agencies, forestry schools, industrial firms and NGO's all have a part to play. We have much to offer and much to gain.

1990 – James H. Cayford, R.P.F.

Forest Consultant, Nepean, Ontario

FOREST RESEARCH

Traditionally, forest research has been the responsibility of national governments and has been funded according to national priorities. While some countries, particularly in

Europe, North America and Asia, have strong programs, most countries throughout the world have given low priority to forest research. This low priority for forest research often stems from the fact that forestry has been allied with agriculture within many government structures and has often been assigned much lower priority.

Notwithstanding the national role in forest research, in 1892, forest research organizations from Germany, Switzerland, France and Austria formed an international union to facilitate cooperation. Initially this union maintained a European focus. In 1929, however, it became truly international in scope and was renamed the International Union of Forestry Research Organizations (IUFRO). The union, strong in promoting cooperation among scientists, is currently strengthening its role in promoting dialogue between scientists and policy-makers and in summarizing and synthesizing available world literature. Canada has played an important role in IUFRO. It has convened numerous IUFRO meetings, provided senior office holders, including two vice-presidents, and in 1990 the XIXth IUFRO World Congress was held in Montreal.

At its 1981 World Congress in Japan, IUFRO was challenged "to strengthen research related to forest resources in developing countries". Subsequently, in 1993, it established a Special Program for Developing Countries (SPDC). This continuing program has focused on identifying research needs and priorities, providing assistance and training for developing country scientists, and holding training workshops.

In 1977, with the strong support of the Canadian International Development Agency (CIDA) and the International Development Research Centre (IDRC), an International Council (now Centre) for Agro-Forestry Research (ICRAF), now headquartered in Nairobi, Kenya, was founded. More recently, and with the support of most developed countries, the Centre for International Forest Research (CIFOR) was established in 1993 in Bogor, Indonesia. Both centres are playing key roles in undertaking forestry and agro-forestry research of international significance.

Issues, Concerns and International Considerations Information

One of the important issues relates to the need to summarize and synthesize the vast amount of information that is currently available, but not in a form understandable by policy makers or indeed by other scientists. IUFRO has established a Task Force on the Global Forest Information Service to provide a metabase of data bases and libraries that can act as a first-stop-shop for forestry inquiries.

Forest Policy

Research priorities have often been established by scientists with no clear recognition of the needs of policy makers. While researchers do not make policy, they need to be able to advise policy makers of the likely impacts of policy decisions. A recent external review of IUFRO has recommended that IUFRO improve the interface between science and forest policy.

Inter-sectoral and Inter-disciplinary Collaboration

In order to be truly effective, forest scientists from a variety of disciplines must work together without fear of competitive disadvantage or an inability to publish or to be assessed for inter-disciplinary work. Additionally forest research must take into account not only specific forest ecosystems, but must consider broad land use and management issues. Such inter-sectoral and inter-disciplinary research will require changes in both research institutions and in scientists themselves and recognize the need for biophysical and socio-economic scientists to work together.

Key Scientific Topics

There are some specific topics that will be of high priority over the next decade. Among these include:

- forests and environmental and climatic change;
- forest genetic resources conservation and improvement
- sustainable forest management and its measurement and monitoring through the development of criteria and indicators;
- valuation of all goods and services provided by forests;
- development of new products and processes; and
- evaluation of the risks and benefits of genetically modified trees.

The International Dialogue

It was clearly recognized at the 1992 United Nations Conference on Environment and Development (UNCED) that the world's forests are in a crisis situation and that urgent and coordinated international attention is required to move towards sustainable forest resource management. Forest research has been specifically noted as one area requiring attention.

Following UNCED, the United Nations Commission on Sustainable Development (CSD) established an Intergovernmental Panel on Forests (IPF) which has been succeeded by an Intergovernmental Forum on Forests (IFF). Forest research has been one of the themes for study by both the IPF and the IFF and considerable success has been achieved in documenting international research needs. These include the:

1. Strengthening of forest research to inform policy makers, solve national problems and meet national priorities;
2. Encouragement of countries to give priority to the forest sector through allocation of resources to national research capacity building;
3. Mobilization of increased resources for research, with international organizations and financial institutions contributing to funding in developing countries;
4. Adequate use of traditional knowledge in sustainable forest management;
5. Improvement of research coordination and the identification of global and eco-regional interdisciplinary research needs; and
6. Improvement of research mechanisms to support sustainable forest management and maintenance of forests.

The fourth and final session of the IFF will be held in February 2000. Following this session the IFF will report to the United Nations Commission on Sustainable Development (UNCSD) with its recommendations on each of its various theme areas. Decisions on the recommendations will play a key role in determining the future role for forest research at the international level.

The author wishes to thank J. Burley and H. Schmutzenhofer, IUFRO, and V. Nordin, Forestry Chronicle, for providing helpful comments.

1991 – Ben S.P. Wang

Emeritus Research Scientist, Petawawa Research Forest, Canadian Forest Service, Chalk River, Ontario

FOREST TREE SEED

Tree seed has been the primary source for reforestation despite the recent development in micropropagation and in vitro cultures. Since the late 1970s there has been increased research and development in seed science and technology concomitant with the rapidly expanding artificial regeneration programs in Canada. Consequently, volumes of useful information on various aspects of seed science and technology have been generated and made available to seed users. An annotated bibliography on conifer seed procurement and processing with special reference to British Columbia was published in 1975, which covered 476 papers from 1935 to 1974 on tree seed in general, seed production, collection, processing, and seed science and technology. Over half of the papers were published in the 1960s.

More recently, genetics research has revealed the importance of genetic diversity and its maintenance through proper forest management in future regenerated stands. Planting in Canada has begun to use genetically improved seeds from seed orchards. To make the maximum value of such a scarce material, improved processing equipment and technologies have been used to produce high-quality seeds that allow for single-seed per cavity sowing in container seedling production. Such a practice is genetically sound as it will prevent possible losses of families and changes in genetic diversity due to differential germination rates in multiple-seeds per cavity sowing of bulk seedlots followed by thinning.

In seed treatment, cold stratification was found not only beneficial to non-dormant tree seed germination (e.g., jack pine and black spruce) but also has ameliorating effects on handling, processing and ageing of seeds. Seed vigour has been investigated with several tree species and it was found that accelerated ageing and conductivity tests have been found to be effective and applicable. In seed storage, advances in cryopreservation can extend storage life of both orthodox and the recalcitrant seeds; and increased tropical seed research has led to the discovery of a new "intermediate" seed storage behaviour.

Internationally, the IUFRO Research Group on Seed Physiology and Technology has played a significant role in advancing tree seed science and technology. Since the early 1970s the Group has continuously promoted tree seed research and development through its frequent sponsorship of international scientific and technical symposia on various subject topics in different countries. Its published proceedings have been well received.

The International Seed Testing Association (ISTA) has contributed to tree seed science and technology through its Tree

and Shrub Seed Committee (TSSC) and other technical committees. In addition to its responsibility for periodically updating the tree seed testing methods and procedures described in the international rules based on new research results, the TSSC has published the "Tree and shrub seed handbook" in 1991 and the "Tropical tree seed and shrub handbook" in 1998. FAO has promoted seed science and technology through its publications such as "A guide to forest seed handling with special reference to the tropics" and "Ex situ storage of seeds, pollen and in vitro cultures of perennial woody plant species." Similarly, Danida Forest Seed Centre in Denmark has published many useful technical notes as well as provided technical training in seed technology. The Australian Tree Seed Centre has been well known for supplying known origin tree seeds of many fast growing species to many tropical and sub-tropical countries.

The Canadian International Development Agency (CIDA) has helped Southeast Asia to establish the regional ASEAN Forest Tree Seed Centre Project in Thailand and the SADC Tree Seed Centre Network Project in Zimbabwe. One of the most common problems recognized by most developing countries and international donor agencies is tree seed supply. These international projects should help alleviate that problem.

For CIDA's now-completed ASEAN Tree Seed Centre Project in Thailand, continued funding would be worthwhile so that Canadian-trained competent scientists and technicians can effectively conduct needed research and development. These activities are now constrained by lack of funding.

Looking ahead, research and development in tree seed science and technology require attention, especially in tropical seeds. Although the development of in vitro cultures looks promising as an alternative seedling production strategy, it will take some time to perfect the systems for commercial production. Forest Managers not only have to recognize the importance of seed source and seed quality but also the maintenance of genetic diversity in future regenerated stands. In the tropics, vegetative propagation has been well developed and only requires further refinement for wide application.

1992 – Jagmohan (Jag) Maini

Coordinator and Head, Secretariat to the Intergovernmental Forum on Forests

INTERNATIONAL DIALOGUE ON FORESTS

Forests and "other wooded lands" (OWL) covering nearly one-third of the planet earth's landscape, are unevenly distributed around the world. While six countries (i.e., Russia, Canada, USA, Brazil, Congo and Indonesia) collectively possess nearly 60% and about twenty five countries contain nearly 85% of the world's forests and OWL, over seventy mostly developing countries are classified as low forest cover countries (LFCC). Forests continued to be a priority on the international policy and political agendas during the past decade. These international deliberations have largely focused

on the concerns of countries richly endowed with forests. Recently, however, political attention is also focusing on the special concerns of developing LFCCs, where several hundred million people live in and around forests and depend on them for their subsistence.

Forests as a Global Issue

The international deliberations on forests are complex, cross-sectoral, and involve many international organizations, legally-binding conventions and legally non-binding agreements. These deliberations have considered a range of issues aimed to address conservation and sustainable management of forests and OWL, as well as, the well-being of people who depend on them. While the sovereign right of countries, to utilize their resources to meet their national priorities and policy objectives, is widely recognized and not questioned, a number of concerns related to forest have "internationalized" the forest issue. These concerns include:

- unacceptable rates of deforestation (e.g., 13.7 million ha/annual), mostly in developing countries with rich forest cover and degradation and loss of forests in LFCC due to increasing pressure from expanding population and its impact on human well-being;
- the need to respond to increasing demand in some developed countries for "green products" from certified "green forests";
- increased recognition to maintain global forests in a healthy state for their environmental values and services (e.g. biological diversity, carbon sequestration, soil and water conservation);
- the ability of ever-shrinking forest cover to meet future demands for forest products and services associated with increasing population and expanding economies;
- the need to foster enhanced international cooperation between the developed and the developing countries to conserve and sustainably manage all types of forests and to restore and rehabilitate degraded forests and OWL.

The intergovernmental deliberations at the Earth Summit at Rio (1992), the Intergovernmental Panel on Forests (IPF) and the Intergovernmental Forum on Forest (IFF), held from 1995 to present, have all recognized that forests and OWL simultaneously provide a wide range of benefits and services and that conservation and sustainable forest management (SFM) requires: i) cross-sectoral policy harmonization; ii) a participatory decision making process involving all stake holders, iii) long-term political commitment and iv) forest ecosystem management based on sound scientific knowledge.

The IPF/IFF process has also emphasized that formulation of a national forest program (NFP) is fundamental to attain SFM objectives and that it should involve an open, transparent and inclusive participatory process as well as a strong sustained political commitment. Furthermore, the formulation of a NFP can not be undertaken in isolation from transboundary, regional and global context.

Implications for Canada

Canada, with about 10 % of the world's forests and about 20% of the international trade in forest products has long recognized the transboundary (e.g., USA), regional (e.g., NAFTA) and global contexts of its forest policy. Canada's National Forest Strategy and National Forest Accord, first formulated in

the mid-80's and prepared through an extensive multi-stakeholder consultation process, was years ahead of other countries in both context and process. It recognized that protecting and maintaining Canada's forests in a healthy state is in Canada's national interest as well as a global responsibility. Canada's forest policy should be long term and include cross-sectoral policy harmonization and thereby used as an indicator of Canada's commitment to sustainable development.

During negotiations on forests at the Earth Summit, Canadian leadership helped to structure the debate on forests and to define the global agenda on forests, being fully cognizant of the fact that intergovernmental decisions and agreements on forests would have a direct impact on Canada's forest policy. Canada shaped and was shaped by international deliberations on forests.

Now, 10 years after Rio, Canada needs to take stock of its forest policy in the emerging global context and consider its priority actions at both international and national levels.

At the International Level

Continue providing leadership in the international arena as a senior "forest statesperson" by championing the concerns of forest rich as well as of LFCC. While issues of priority concern to forest rich countries (including Canada) are environmental, trade and economic, those to LFCC in developing countries involve human well-being – all consistent with Canada's foreign policy objectives. The following activities are proposed:

- Undertake systematic analysis of international developments to identify emerging opportunities associated with the anticipated increase in the demand for forest products and services;
- Significantly increase the long-term and sustained allocation of resources for international cooperation on forests, with particular attention to LFCC;
- Market Canada's forest-related knowledge in addition to forest products, i.e., knowledge processing as well as materials processing.

Within Canada

- Accord high-level political status (e.g., ministerial), consistent with the significance of forests to Canada, to provide strong leadership at the national and international levels.
- Establish a senior-level Forum on Forests for thoughtful dialogue among principal stakeholders to guide the implementation of National Forest Strategy in Canada and to define Canada's international role and responsibilities.
- Review professional and technical training in Canada to ensure that Canada possesses the scientific, technical and up to date professional capacity to address the complexity of forest management in Canada. Strengthen research on forest ecosystems and forest policy.

1994 – George S Nagle, PhD, R.P.F.

President, Senior Economist, Nawitka Renewable Resource Consultants Ltd, Sooke, BC

INTERNATIONAL ECONOMIC ADJUSTMENT AND THE FOREST SECTOR

David Suzuki believes that the modern economy is "fundamentally disconnected from the real world that supports us; it is an illusion." Yet nations face socio-economic choices in

managing scarce resources in a sustainable way, and managing their differences in a civil, legal manner. International economic adjustments are essential, and will occur. As the Seattle WTO Conference opens, we may briefly examine the players, and a few issues in the new "globalized" adjustment arena.

The Players

The developed nations, in concert with the World Bank Group, largely govern the direction and volume of world trade, capital flows and official development assistance (ODA). They have responsibility for developing and protecting the means (currency) of international exchange.

The "emerging" countries such as the Russians and East Europeans; the developing giants of Asia; and the rapidly reforming countries of Latin America and SE Asia, are important. A group of poor countries is in earlier stages of reform, and hopefully will be able to garner aid and use it effectively. Another large group of the poorest countries struggles on without benefit of capital, fair trade, technology or good governance.

Significant players also include the UN family of non-bank organizations, a large set of multinational corporations, international money markets, and the international NGO community.

Aid-Trade Relationships

In spite of stiff adjustments within the developed world, the most significant adjustments to global trade remain under study, for action in the new millennium. The emerging/developing countries need improved export access to the rich consumer markets of Japan, Europe and North America, and access to industrial technology through imports. Many barriers to trade remain between countries of the emerging and developing groups.

The east-west and north-south trading relationships have often been driven by aid flows, loans, and other capital transfers. There is a growing consensus that this relationship has not always been a healthy one. External money has the desired impact only if a country has good economic institutions and policies.

Currency Reform

Currency instability is most often a reflection of misguided national economic policies. The need for cash to stabilize currencies has provided one of the major levers for international banking, ODA and regional economic communities to exert in trying to induce countries to behave differently.

Only nation-states have the ability to maintain conditions necessary to sustain their own currency. The IMF and its governing nations will in future seek to assure that market excesses or speculative moves in currency markets are not driving events irrationally during periods of adjustment.

Structural Adjustment

Improved economic structures (markets, prices, competitive conditions) and public institutions (democracy, good governance) foster sustainable socio-economic development.

State-run industries generally have wasted national savings. Problems of corruption have undermined both efficiency and growth in many national economies.

However, some countries agreed to undertake reforms that were impractical from within their current set of institutions and economic structures. In future World Bank and ODA policies will attempt to formulate and encourage improved conditions for market-oriented structural adjustment, before establishing explicit targets for structural reform.

Impacts on Global Forestry and Conservation

The problems of the global environment, and the extra costs involved in environment-friendly production, dictate that no sensible country can open its markets without reference to the environmental regime of the shipper. This opens a new Pandora's box of trade and adjustment problems, notably in forest products.

The role of INGO's has grown to such an extent that some are even anticipating that international systems of social and environmental adjustment may not remain state-centered.

One important global element remains largely "unadjusted": the UN system. In particular, the agencies responsible for forestry, resource conservation, and the environment display a persistent lack of strategic analysis, coordination of effort and leadership, despite a decade of reform.

There is room for improvement in techniques, but the evidence of harm to forests due to economic adjustment is not convincing. Many improved tools for tropical forest management are emerging, and one can hope the UN system will yet reform. There is hope for sustainable forest management to proceed hand-in-hand with economic adjustment into the new millennium.

Impacts in Canada

Canada has its own adjustment problems to face. The expected lumber export advantage due to devaluation has been constrained through countervailing actions by the US. The forest sector faces strong international competition from producers operating in recently reformed/restructured economies. Our domestic forest sector has certainly felt pressured by INGO groups in various international forums.

The role of multinational corporations is not declining in the forest sector – yet smaller firms also prosper. The main structural problem of the sector remains the heavy preponderance of public ownership of timber resources.

It would be refreshing to see Canada "walk the talk" in global forest sustenance. Canada's Official Development Assistance in forestry has been declining steadily for nearly a decade. This does not balance well with our role as leading global exporter of forest products, or our national positions on global conservation, and environment conventions.

1996 – John K. Naysmith, R.P.F.

Founding Dean and Professor Emeritus Faculty of Forestry, Lakehead University, and Program Director, Ghana - Canada IN CONCERT Program and Program Director, Nepal Resource Conservation and Community Outreach Program Thunder Bay, Ontario

FORESTRY EDUCATION

Ontario has its Forestry Futures Trust. Scotland has its Borders Community Forest Trust. A common goal? Yes – maintaining healthy forests.

Recently the Finnish government set aside 77 000 hectares of old-growth forest in northern Finland. About the same time the Government of British Columbia protected old-growth forest and alpine meadows in the Stein Valley by converting some 100 000 hectares into parkland.

New approaches to forest land management? The community forestry program in Nepal has established over 5,000 forest user groups to date. One of Canada's eleven Model Forests, la Forêt Modèle du Bas-Saint-Laurent in eastern Quebec, sees forest tenant farmers managing a forest and sharing the profits with the owner.

Students increasingly need to know what their neighbours around the world are doing. Learning today from the experience of others will benefit them when working tomorrow with their counterparts in other countries.

Forestry education in the 21st century will be exciting. What will make it so? The need to produce foresters who have the knowledge and skills to successfully maintain the world's forests with their diverse values while taking into account the well-being of the world's people and their various needs.

One of the features of an ideal university is the free flow of ideas among faculty and students. What if we were to extend the reach and diversify the flow of those ideas so that knowledge, real-life experiences, research findings and practical examples were readily shared by Canadian faculty and students and their counterparts in other regions around the world.

Timely, direct and "personal" contact are a few of the terms that come to mind when we consider high-speed transmission of education programs such as interactive web, satellite-based video and teleconferencing. The potential for the free flow of ideas assumes a different dimension when distance education principles are applied in the global context. It may also be a form of the metadisciplinary rather than interdisciplinary approach to forest management of which Jack Westoby liked to speak.

An international perspective on forestry education is also enriched through initiatives such as the Canadian International Development Agency's program, University Partnerships in Cooperation and Development. This program provides excellent opportunities for Canada's forestry schools to become directly involved in projects throughout the world.

The learning opportunities can be substantial for both faculty members and students working on international development projects. Benefits include the opportunity to incorporate case-study material and real-life experiences into subsequent course material and classroom discussion. And there are the mutual benefits that come from having students and faculty from partner-country institutions participating in programs on Canadian campuses.

As the world grows smaller, opportunities increase for students everywhere to better understand international issues and to share in meeting the challenges.

Peter J. Murphy said, "Sustainable forest management is not so much a destination as it is a journey in which we must work together." An exciting journey to be sure. What makes it even more exciting is the growing number of international chal-

allenges. Like most journeys the pleasure begins with the planning and for many students in the 21st century, forestry education with an international perspective is where it will all begin.

1997 – John F. Goodman, R.P.F.

Forest Fire Consultant, Former Assistant Deputy Minister and Director of Fire Management, Province of Ontario, Ottawa, Ontario

WILDLAND FIRE MANAGEMENT

Introduction

Fire is one of the most variable natural processes known to man and one of the most dynamic. It is essential to the preservation of our ecosystems because it causes the forests of the globe to renew themselves and to thrive. As we move to the new millennium, wildland fire continues to be a significant threat to forest ecosystems and to the security of communities, public safety, and economic well being in fire prone regions around the world.

The Issue

The incidence and areas affected by wildland fire have been escalating significantly in recent years. Estimates indicate as much as one billion hectares are burned each year worldwide. Wildland fire can have major impacts on the sustainability of forest ecosystems in both the industrialized and developing world. Fire regimes are changing as global warming, climate change, fuel build-ups, exploding populations, and inappropriate land use policies become predominant. In the industrialized areas, successful fire exclusion policies using leading edge technologies have led to enhanced fire regimes and lengthened fire return intervals.

As the century draws to a close, major fire outbreaks have become commonplace, thereby capturing world attention. For example, in 1983 in Australia, the Ash Wednesday disaster claimed 77 lives, burned 340 000 hectares, and destroyed 2500 homes. In 1987, a large fire event in northeast China consumed 1.3 million hectares with significant loss of life and communities. Other similar fire events were experienced in the United States, Mexico, Russia, Canada, Southeast Asia, and Brazil. Wildland fire has escalated dramatically in recent years and some claim it has reached crisis proportions.

Impacts

The magnitude of the impact of unmanaged fire varies from region to region and depends on the size, intensity, and frequency of the event. There is consensus that escalation impacts are evident on the human and environmental landscape. One important impact is that an unmanaged fire is a key contributor to carbon dioxide levels affecting global temperatures and eventual climate change. More importantly, the loss of sequestered carbon and overall ecosystem degradation with reduced diversity and sustainability is critical. Fire suppression costs are very high and often tax the abilities of many industrialized and developing nations to cope with the recurring expen-

ditures. The issues are similar throughout the fire prone world. Often inappropriate land use policies and the absence of an environmental ethic contribute to large wildland fire incidents. In the developing world, forest conversion, transmigration, and the lack of established infrastructure and technologies result in unacceptable losses. This is having a major impact on the sustainability of forest ecosystems.

Change, however, is an inherent characteristic of forest ecosystems and fire is a natural change agent. The result can be positive or negative depending on your perspective.

On an international scale, commendable work has been accomplished ranging from landscape planning to computer based decision support and danger rating systems to advanced suppression technologies. As well, the development of mutual aid mechanisms has enabled agencies to share their resources globally. Canadian expertise and systems have been applied internationally through World Bank initiatives and Canadian International Development Agency and private sector involvement. Projects have been completed in China, Belarus, Indonesia, Croatia, Mexico, and New Zealand.

Some Challenges

There are several challenges for the fire community in the new millennium. They include: Global Warming, Urban Wildland Interface, Transmigration, Forest Conversion, Slash and Burn Agriculture, Reintegrating Fire to the Environment, Infrastructure and Funding, Values and Risk, Role of Volunteers, Resource Sharing, and Environmental Sustainability. These challenges need aggressive attention by governments and the scientific community.

Wildland fire will continue to occur regardless of man's interventions. Our challenge is to manage the phenomena and to continue to strive for a balance with appropriate land use policies and environmental ethics compatible with societal needs. Canada's fire community is well positioned to contribute substantially to meeting the challenges particularly in the developing world.

Philosopher Tyron Edwards stated, "hell is truth seen too late." We know the issues and truth facing fire management leadership in the next century. The real objective will be to initiate action on an international level.

1998 – T.M. (Mike) Apsey, R.P.F.

Consultant - Forest and Trade Policy, Past President, Council of Forest Industries and Former Deputy Minister of Forests, British Columbia, Victoria, British Columbia

POLICY, GOVERNANCE AND LEADERSHIP

"... and what are you doing to mark the millennium?"

There is a lot of hoopla surrounding the coming of the new millennium. A good deal of it seems contrived to enable people to sense an historical moment and to feel a part of it... a kind of "I was there" claim. In reality, that is about all that many people may be able to lay claim to – they were there.

For those involved or interested in the global forest community, however, the arrival of the year 2000 can and should be a signal event. It should mark a major turning point in the long history of Humankind's relationship with the forests. The event coincides with the need to move aggressively into the next era in the evolution of the management of the world's forests, the Sustainable Forest Management (SFM) Era.

This Edition of *The Forestry Chronicle* features a series of articles that give a good and necessary account of the status of various issues that define the state of forests and forestry today. The time has now come to say "we are where we are," to shake ourselves out of the period of identifying, studying and considering the issues and to move with determination to put in place the visions, the policies, the institutions, the instruments and the actions that will solidly establish us in the SFM Era.

That we are at another turning point is not a cause for alarm and it must not be allowed to lead to paralysis. In Canada, as the Liquidation Era transitioned into the Conservation Era a century ago, and it, in turn, into the Sustained Yield Era, those engaged in forest matters adapted, adjusted and created the necessary tools to serve those times. We need to do that again. And we need to do it now.

As we approach the required tasks today, we have advantages not available to our predecessors. We know more about the forests and the role they play in the overall security of the planet with respect to its climate, air quality and water supplies, as well as the economic and social contribution they make to the human condition. We can rely on more advanced technology and better communication links. In short, we should be in good shape to move on the important matters that will lead to global SFM.

What, then, is holding up action on this front? I believe progress is inhibited for a relatively few reasons:

- Concern that not every detail has been thoroughly thought out. We must not be afraid of making mistakes. Progress requires some risk. The larger error is a failure to act.
- A lack of effective international governance mechanisms in global forest issues. Many valuable initiatives are extant in various jurisdictions but an effective international system of governance that would bring cohesion, synergy and focus to the array is lacking.
- There is a lack of the leadership needed to propel action on critical forest matters. Good, effective, ongoing leadership is not in abundant supply and the forest sector has not attracted its share. Senior political leadership is imperative in order to establish effective governance. But so, too, is leadership in industry, and in other interests having a stake in forest matters.

The Era of Sustainable Forest Management might well be sub-headed the Era of Integrated Interests. Delivery of the operational requirements of SFM will ultimately fall to industry. Other interests will ensure that the broadest range of values is reflected in the regimes to be adopted. And all must be represented - economic, social and environmental.

Canada is uniquely positioned to provide international leadership in forest matters. This country is a major, respected forest power and must not shirk its responsibilities in the important decisions that relate to global SFM in the future.

Forests have supported humanity for thousands of years. As we enter the new millennium it is time for humans to support

the planet's forests. Those who take up this challenge can say with pride that they were more than "just there" when the century dawned. They will have contributed to the next Era in the continuing evolution of forest management. And in so doing, they will have helped to ensure that the magnificent legacy of the forests still will be gracing and benefitting the world when the next millennium rolls around.

1999 – John Roper

Forest Conservation Consultant, Burnaby, British Columbia

FOREST CONSERVATION AND DEFORESTATION IN THE TROPICS A Resource of Global Importance

At the close of the twentieth century, there are approximately two billion hectares of forests in the tropics. They represent an enormously valuable resource in terms of the diverse economic products and environmental services they provide. Tropical forests are the home to 70 percent of the world's plants and animals – more than 13 million distinct species. Annual wood production from tropical forests is over one billion cubic metres, mostly fuelwood. In addition to wood products, they give us a wide range of non-timber forest products, the so called "minor" forest products which in many cases are "major" forest products for the local people. These include fibres, resins, latexes, fruits, and traditional medicines. Forests are often important sources of foodstuffs, particularly in times of drought and famine when conventional agricultural crops have failed. Some 500 million people live in or at the edge of tropical forests including 150 million indigenous peoples who rely on them for their way of life.

Tropical Deforestation

Although the original forest area is not known precisely, it is estimated that the world has lost approximately 40 per cent of the original forest area of six billion hectares over the last 8,000 years. Most of the loss in forest area is a direct consequence of human intervention in the 20th century. Deforestation is the permanent loss of forests to other land uses and it is now widely recognized as one of the most critical environmental problems facing the world today, with serious long-term economic and social consequences. At the present time, 14 to 16 million hectares of tropical forests are being converted every year to other land uses, mostly agricultural.

Causes and Agents

The predisposing conditions that favour deforestation include poverty, greed, quest for power, population growth, and illiteracy. The indirect causes of deforestation include inappropriate government policies, land hunger, national and global market forces, the undervaluation of natural forests, weak government institutions, and social factors. The more visible direct causes of deforestation are the land uses that compete with the natural forests (e.g. agriculture, ranching, infrastructure development, and mining and petroleum explo-

ration). Logging, fuelwood collection, and new tree plantations also have a role in the deforestation phenomena. The principal agents of deforestation – those individuals who are cutting down the forests – include slash-and-burn farmers, commercial farmers, ranchers, loggers, firewood collectors, infrastructure developers and others.

Can Tropical Forests Be Saved?

While it is impossible to stop all deforestation in the foreseeable future, there are many opportunities for bringing it under control and minimizing its negative impacts. Alternatives include:

1. The protection and management of remaining forests – greater support for protected area networks that represent important forest ecosystems – adopt joint forest management and/or model forest approaches that encourage the participation of a wide range of stakeholders – improve the quality and reliability of forest resource information – and the widespread adoption of truly sustainable timber harvesting practices.
2. Socioeconomic development in rural areas – improve the productivity of competing land uses, namely subsistence agriculture and extensive ranching and thereby reduce their pressure to convert additional forested lands – promote the use of agroforestry to increase farm production and introduce trees on deforested lands – expand the area under tree plantation of suitable species – restore degraded lands, particularly in fragile watersheds.

3. Policy and institutional reforms – enhance the participation of all stakeholders in decision-making and benefit sharing – invest more in forest research particularly research in policy, land use, agroforestry systems, silvicultural systems, tree breeding, community-based forest management, forest valuation especially the value of non-market goods and services, and in traditional knowledge of forest products and management practices – reform government policies and institutions that negatively impact upon the sustainability of the forest resource – support education and awareness-building about forest sector issues – and support the National Forest Programs (NFP) as the best bet for achieving a broad-based, multi-sector consensus for forest sector development.

No other forest-related issues approach tropical forest conservation and deforestation in importance to the long-term well-being of our planet. While all the answers are not known, many technologies for making a difference exist. So do the approaches needed to implement them. It is time for all peoples to renew their commitment to live in harmony with tropical forests before they are lost forever.