Sustainable Development: What Does It Really Mean?¹ Chairman's Remarks

by G.R. Milne²

Good afternoon and welcome to the technical session of the Forest Economics and Policy working group. The title of today's session is:

Sustainable Development — What Does It Really Mean?

Over the past few years, we have all heard the phrase sustainable development. What emerged as a cornerstone of the Brundtland Commission report has become a common proclamation in the forestry sector from the media, government, and industry.

The scientific literature on the topic of sustainable development has mushroomed. Journals relating to the environment and ecology abound with articles describing different aspects of sustainable development. There is no shortage of articles and papers defining sustainable development in forestry. What appears to be lacking however, are rational ideas of how to implement sustainable development into everyday forestry practices and the impact it will have on the way we do business.

The CIF recently published a policy statement on sustainable development and forestry. As one of the contributing authors of this statement, I can tell you first hand how a relatively simple concept can become very complex when you begin to consider aspects of implementation in the real world.

Many questions arise with respect to implementing and working towards achieving sustainable development:

1. What do we really mean by sustainable development?
2. Is it really a new concept in forestry?
3. If it is new, what should we be doing differently?
4. What information is needed to know if we're achieving sustainable development?
5. What is a meaningful planning horizon and operating area?
6. How do we measure our progress in moving towards sustainable development?
7. What are the major costs and benefits of sustainable development?

Today, four speakers will address the concept of sustainable development in forestry and try to advance the debate by providing some practical ideas and advice. Three speakers will give presentations addressing many of the previous questions:

Dr. Jag Maini, Assistant Deputy Minister — Forestry Environment, Forestry Canada, Ottawa,
Mr. Dave Rannard, Director of Forestry, Department of Natural Resources, Province of Manitoba, Winnipeg,
Mr. Tony Rotherham, Vice-President — Woodlands, Canadian Pulp and Paper Association, Montreal.

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Le développement durable: Qu'est-ce que cela signifie réellement?¹

Commentaires du président

par G.R. Milne

Bon après-midi et bienvenue à la session technique du groupe de travail en économie et politiques forestières. Le titre de la session d'aujourd'hui est:

Le développement durable: Qu'est-ce que cela signifie réellement?

Au cours des quelques dernières années, nous avons tous entendu l'expression "développement durable". Ce qui est ressorti comme un élément-clé du rapport de la Commission Brundtland est devenu une proclamation commune du secteur forestier qu'on retrouve dans les media, au gouvernement et dans l'industrie.

La littérature scientifique entourant le développement durable s'est développée à une vitesse vertigineuse. Les revues couvrant l'environnement et l'écologie abondent d'articles décrivant les différents aspects du développement durable. On ne manque pas d'articles et d'exposés définissant le développement durable en foresterie. Ce qui semble manquer toutefois, ce sont les idées rationnelles sur comment implanter le développement durable au sein des pratiques forestières usuelles et de l'impact engendré sur la façon de mener nos affaires.

L'IFC a récemment publié un énoncé de politique sur le développement durable et la foresterie. En tant que l'un des auteurs de cet énoncé, je peux vous dire de vive voix comment un concept relativement simple est devenu très complexe lorsqu'on commence à considérer les aspects de son implantation dans un monde réel.

Plusieurs questions surgissent relativement à l'implantation et au cheminement vers la réalisation du développement durable:

1. Qu'est-ce que nous entendons réellement par développement durable?
2. Est-ce qu'il s'agit réellement d'un nouveau concept en foresterie?
3. Si celui-ci est nouveau, que devrions-nous faire de différent?
4. Quelle est l'information nécessaire pour savoir si nous tendons vers le développement durable?
5. Quelle est la durée d'une période de planification et qu'est-ce qu'une zone d'intervention significative?
6. Comment mesure-t-on notre progrès sur le chemin du développement durable?
7. Quels sont les principaux coûts et bénéfices du développement durable?

Aujourd'hui quatre conférenciers vous parleront du concept de développement durable en foresterie et essaieront de faire progresser le débat au moyen d'idées pratiques et de conseils judicieux. Trois conférenciers feront un exposé touchant plusieurs des questions abordées précédemment:

Dr Jag Maini, sous-ministre associé, Environnement forestier, Forêts Canada, Ottawa, M. Dave Rannard, directeur des Forêts, Ministère des Richesses naturelles, Province du

Our fourth participant is Dr. Gordon Baskerville, Dean, Faculty of Forestry, University of New Brunswick. Dr. Baskerville will summarize and critique the three presentations.

Manitoba, Winnipeg; M. Tony Rotherham, vice-président, Division des bois et forêts, Association canadienne des producteurs de pâtes et papier, Montréal.

Notre quatrième participant est le Dr Gordon Baskerville, doyen, Faculté de Foresterie, Université du Nouveau-Brunswick. Le Dr Baskerville fera le résumé et la critique des trois exposés.

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Practising sustainable forest sector development in Canada: A federal perspective

by J.S. Maini¹

Abstract

Stewardship of Canada's vast forest environment is a national as well as a global responsibility. Forests have environmental limits and degrade when these limits are exceeded. Sustainable development requires managing the impacts of human activities within these tolerance limits. Moving towards sustainable development demands changes in current forestry practises and forest product manufacturing, and better protection of forest lands from other industrial activities. Forestry Canada is playing a lead role in this effort through its research, development, federal-provincial forestry development agreements, and policy formulation.

Introduction

The Canadian forest land covers about 50% of Canada's land surface and constitutes nearly 10% of the global forest resource. The overwhelming significance of the Canadian forest sector (i.e., forests, forest industry and the supporting infrastructure) from economic, social and environmental viewpoints is well recognized by Canadians. The economic significance of this sector is expected to continue in the future with anticipated world-wide increased demand for forest products over the next 20 years.

Stewardship of Canada's forest ecosystems and sustainable development of the Canadian forest sector is a Canadian responsibility from both national as well as global points of view. While the provinces and territories have full responsibility for the management of forests within their jurisdiction (about 80% of the total forest land in Canada), the federal government has influenced forestry practises in Canada through its research and development activities and a wide range of cooperative programs pursued under Forest Resource Development Agreements (FRDA's).

Defining Sustainable Development

Before describing the federal perspective, it is important to define sustainable forest sector development and describe some characteristics of Canadian forests. The following principle governing the use of forest environment has been proposed by Maini (1989, 1990):

"Sustainable development of the forest land and its multiple environmental values involves maintaining, without unacceptable impairment, the productive and renewal capacities, as well as species and ecological diversity of forest ecosystems."

As long-lived and rather resilient ecosystems, most forests are not ecologically fragile and are able to withstand a considerable degree of natural disturbances, such as climatic fluctuations, fires, insects and storms. However, forests, like all other ecological systems, have "environmental limits" and degrade when these limits are exceeded. Sustainable development requires managing the impact of human activities within

the tolerance limits of forest ecosystems. Practising sustainable development of the Canadian forest sector is now emerging as an ethical responsibility to the future generations. Five objectives have been proposed to meet this challenge within three broad categories (Maini 1990);

Forestry Practices:

1. maintain the productive and renewal capacities, as well as species and ecological diversity of forest ecosystems;
2. protect non-timber forest values, such as wildlife and fisheries habitats, watersheds and aesthetics.

Forest Products Manufacturing:

3. protect the quality of water, air and soil from industrial effluent, to environmentally acceptable levels.

Protection of Forest Ecosystems from other Industrial and Human Activities:

4. reduce pollutant deposits on forests from other production and consumption activities to levels that are within the assimilative capacity of the forest ecosystems and that do not cause unacceptable impairment of ecological integrity,
5. formulate strategies and action plans to minimize adverse impacts of anticipated global warming.

Forestry Canada and Sustainable Development

In recognition of the overwhelming socio-economic and environmental significance of the Canadian forest sector, the federal government established a Department of Forestry in 1989. The Canada Forestry Act, defining the mandate of Forestry Canada, explicitly requires the federal Minister of Forestry to promote sustainable development of the Canadian forestry sector. It should be noted that the Canada Forestry Act is the first federal legislation that includes explicit reference to sustainable development. This objective has been recognized as one of the four principal thrusts by Forestry Canada in its recent Strategic Plan (Forestry Canada 1990). The Canadian Council of Forest Ministers is considered to be an important forum to advance this objective.

In order to accomplish the five objectives listed above, the preferred policy stance is to "anticipate and prevent" rather than to "degrade and cure". Federal response to some of the actions proposed (Maini 1990) for the practise of sustainable development within the forest sector are described as follows:

- (A) use existing knowledge to practise integrated forest management;

Forestry Canada is making special efforts to synthesize existing information and strengthen technology transfer. The establishment of research advisory committees at provincial/regional as well as at national levels and close federal-provincial cooperation on FRDA programs have provided improved opportunities for the application of Forestry Canada's research outputs (Forestry Canada 1991).

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- (B) reduce harmful pollutant emissions from forest products manufacturing activities by using pollution abatement technologies;

The federal government has developed national regulations on pollution emission from various industrial activities, including, for example, the pulp and paper industry. Forestry Canada has promoted meaningful dialogue between the industry and the federal government to ensure that regulations include a balanced consideration of environmental and economic dimensions.

- (C) "Do more with less" by reducing waste and encouraging better utilization in the harvesting and processing of wood; encourage recycling;

Forestry Canada supports research to reduce waste, both in harvesting and in manufacturing of forest products through its sizeable financial support of extra-mural research at Forintek and the Forest Engineering Research Institute of Canada. This work is undertaken in close collaboration with the industry to ensure its practical relevance (Anonymous 1990).

- (D) develop the capability to predict the environmental consequences of various human interventions through systematic research; establish a national network of forest reserves to serve as environmental baselines, and as biomonitoring sites;

Research designed to "anticipate and predict" is at least partially a new endeavour, which partly involves insightful re-interpretation and synthesis of the results of previous research as well as designing new research. This area, recognized as a priority area in Forestry Canada's Strategic Plan (1990), is considered to be a key to the practice of sustainable development through enhancing our anticipatory capability. A principal component of this thrust is to establish a national network of ecological reserves that would serve as ecological baselines as well as locations to preserve biodiversity in situ. Forestry Canada has already established an Acid Rain Network for Early Warning Systems (ARNEWS). This in conjunction with the field plots established by Forestry Canada's Forest Insect and Disease Survey (FIDS) provides the basis to establish a more comprehensive national biomonitoring network (Magasi 1988). The significance of this type of network is further enhanced to monitor the biological impact of anticipated global warming.

Plans are now underway to review and improve Forestry Canada's existing biomonitoring network and to promote the establishment of a national network of ecological reserves.

- (E) develop the capability to recognize early warning signals of environmental stress;

This is another important component to practise the "anticipate and prevent" philosophy. Personally, I believe that by the time the symptoms of stress in forest ecosystems are visible (e.g. dieback and yellowing of foliage), we are no longer operating in the "anticipate and prevent" mode.

We need to undertake insightful policy research to recognize early warnings at the source of biological stress, i.e., socio-economic and industrial policies.

The Canadian forestry community with its traditionally long-term perspectives, is already ahead of other natural resources sectors in developing approaches to sustainable development. While sustained yield in forestry is concerned mainly with an even, annual sustained flow of timber, sustainable development of forests is much broader and concerned with integrated forest management, maintaining the supply of timber as well as of other environmental values. Forestry Canada is committed to play a significant role in the proposed shift from sustained yield to sustainable development and from forest management to forest ecosystem management.

Summary

The Canadian forest sector faces the challenge of remaining competitive, maintaining its share of expanding world markets, and, at the same time practising sustainable development. Through innovation, practising integrated forest management and application of pollution abatement technologies, the Canadian forest sector can become a world-class model of sustainable development. Forestry Canada, through its research and development and FRDA's is an important player in accomplishing this objective.

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Sustainable development (in forestry) — What does it really mean?

by C.D. Rannard¹

Abstract

Sustainable Development, the new buzzword introduced by the Brundtland Report, is an expanded philosophy to sustained yield and other terms historically in the forester's vocabulary. Manitoba's Sustainable Development Workbook on Forests combines philosophies and concepts which not only works toward sustainable development of our forests, but can also be developed into daily action plans. However, it is important to realize the high cost of information acquisition. This includes the information exchange in the public forum needed to make these strategies reflect societies needs while providing a suitable framework for forest management.

Résumé

Le développement viable, une expression récemment mise à la mode par le Rapport Brundtland, est une extension philosophique du rendement soutenu et d'autres termes du même genre qui font partie depuis toujours du vocabulaire de l'aménagiste. Le Sustainable Development Workbook on Forests du Manitoba réunit des philosophies et des concepts qui, en plus de militer en faveur du développement viable de nos forêts, peuvent aussi servir de plans d'action dans la vie de tous les jours. Toutefois, il faut souligner le coût élevé du processus de collectes de données, qui doit intégrer l'échange d'informations en assemblées publiques pour faire en sorte que les stratégies adoptées correspondent aux besoins des sociétés tout en débouchant sur schéma d'aménagement forestier satisfaisant.

Sustainable Development is a new catch-all term for a philosophy that I believe, in part, has been with professional foresters for as long as the profession of Forestry. Sustained yield, sustained productivity and sustained quality are all variations on the theme from a historical and professional point of view. I don't know any professional foresters who are not concerned about sustaining the forest environment and sustaining development opportunities. The 1987 Brundtland Commission Report "Our Common Future" popularized the term and added the concept that development of the forest industry can be increased and sustained on an increasing basis so long as that development will not have an adverse impact on the forest, the productivity of forest lands and the use of the forest lands for all purposes, in particular to meet the needs of future generations.

Let us consider the term, "Sustained Development", as a peg on which current generations of foresters can hang new policies associated with forest use and management.

Grant Milne, Chairman of the Forest Economics and Policy Working Group, in providing direction regarding the topic suggested that the Technical Session should "advance the markers forward and that it should not be a session full of platitudes and general 'mush'". Furthermore, it was suggested that each presentation should be something that field foresters could get their arms around in terms of day-to-day living and management of our forest resources.

At this point I believe I have to draw on the Manitoba experience which has moved incredibly fast along the road to developing a provincial sustainable development strategy. The Manitoba Government with Premier Gary Filmon, as Chairman of the Round Table on Environment and Economy is committed to environmentally sound and sustainable economic development. While I do not want this presentation to fall into that category referenced above as one being full of platitudes and mush, I believe that there must be a starting

point of broad concepts. These philosophies can then percolate downward to where action plans can be developed such that the field foresters and their counterparts in other resource disciplines can then begin to put the concepts into day-to-day actions.

This is pictorially displayed by the pyramid diagram (Fig. 1) which shows the core document consisting of the overall strategy containing a vision for the province, fundamental principles and underlying goals. The next level is the province's sectoral strategies, issues and goals for application of the overall strategy. Structure, process and scheduling are the components requiring attention in the development of the sectoral strategies. These sectoral strategies are embodied in auxiliary documents and as can be seen from the pyramid consist of a number of very important areas of interest. Your attention should focus on the Lands and Water sectoral Strategy which is further subdivided into a number of substrategies, those with which we are perhaps most familiar. The Soil, Water, Forest and Mineral Substrategies have been completed or are in various stages of development. The procedure has been to develop, through a Substrategy Technical Advisory Committee, a draft policy workbook. These were distributed throughout the province. A number of public consultative meetings and workshops reviewed the workbook and the draft policies therein were reviewed and debated. The results of the public meetings and workshops along with the mail-in portions of the workbooks were summarized into another document entitled "What You Told Us" (Province of Manitoba 1989). This document clearly illustrates the draft policy and the final policy forged through the public consultation process.

Sustainable Development can perhaps be considered a new name for doing things in a traditional sense, traditional things that will be done taking into consideration new emphasis and focus. I believe that the term "Sustainable Development" is merely a new way to describe the management concepts that have been applied to meet the emerging needs which evolved over the past decade. For example, a document dated

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Figure 1. Manitoba's sustainable development strategy

May 1979 entitled "Forestry Imperatives for Canada — A Proposal for Forest Policy in Canada" highlighted many of the emerging needs identified at that time. This report preceded the Brundtland Report (which coined the term "Sustainable Development") by almost a decade. The document outlines 11 policy principles which are very similar to the draft policies identified in the Manitoba Workbook on Forests (Province of Manitoba 1990). The Forestry Imperatives document addresses "the need for stability of rural employment and communities, the maintenance of productivity of forest land, the endorsement of multiple use forest management, production goals to ensure a viable Canadian forest industry and environmental protection". To be sure, some of the terms used in 1979 differ slightly from those of today but essentially they mean the same. The term "integrated management" has been substituted for "multiple use" and now foresters and other resource managers alike are attempting to try and define what that means. I think that the term Sustainable Development nicely wraps up all

of those activities into terminology with which the public generally believe they can identify. It is a term suitable for the 1990s so let's use it. The current issue of the Forestry Chronicle contains a forestry dialogue entitled "Information for Parliamentarians on Forestry and Sustainable Development". This article outlines the support of Sustainable Development and closes by stating that "a fuller explanation of Canadian Institute of Forestry (CIF) support for Sustainable Development can be found in a recently prepared policy statement, available from the head office of the CIF. The Forestry Ministers of Canada sponsored a forum on Sustainable Development in Halifax in February 1990. I have no doubt that there is very serious support by foresters, the forestry profession and senior forestry officials for Sustainable Development. The question then becomes one of how would we motivate forest managers, field foresters and forest owners both in government and in the private sector to begin to do things differently. I have suggested that in many ways traditional management concepts will not be

done differently but they will be done in keeping with Sustainable Development-oriented thinking. This may mean that new knowledge on forests and additional knowledge on wildlife, fish and other resource values will have to be gained to better understand our forest ecosystems. This knowledge will then form the basis for management decisions. This includes incorporating the needs and values of other resources within the forest landscape; reflecting new management techniques to protect the forest environment and increasing communication with the public at large. A primary communication target is members of the public espousing special interest in one particular aspect of the forest ecosystem and environment.

As referenced earlier, certain aspects of the sustainable development concept including integrated management would imply that there is a need for more detailed and new types of information. While some of this information should be acquired by the forestry sector and made available to the public through communication processes, there is a belief by some that most, if not all of it, should be collected by the forestry sector. I do not share this belief. Some information falls into the category "would be nice to have", but is not essential. Other information clearly falls into the realm of belonging to other jurisdictions who, for whatever reason, have not seen fit to collect it. The cost of collecting information is becoming increasingly expensive. New technology has helped to reduce some of the cost, provided more detail and is extremely accurate. Trends and impacts require analysis of data collected over a fairly significant period of years for it to be meaningful. While this is not true in every instance it will apply to much of the data and information needed to begin managing forests on a harmonized and integrated basis. There is always the problem of collecting too much information for which there will be no viable use. By the same token planning horizons should not go beyond the limits of our present knowledge. There are exceptions to this rule in any planning exercise, and one must always look at the probability of an event occurring and provide a contingency. In terms of sustainable development planning in a spatial context should occur at all levels within the sphere of our collective abilities.

I spoke briefly about costs associated with information and data collection. These are but one of the costs associated with the sustainable development concept and the strategies that need to be put into execution whether or not they truly fall under the heading "sustainable development". Costs associated with sustainable development strategies may come in a variety of forms whatever action triggers the expenditure. If those costs are to be initially borne by the forest sector because the responsibility to deal with them has been abdicated by others, then I believe that the public should ultimately be the bearer of those costs. We are told the public is prepared to pay for an improved environment, thus those costs should be passed to that public and there is no doubt they will. Higher costs associated with the production of forest products ultimately will be paid at the retail level. Costs for more intensive management due to a shrinking forest land base (which is tied up in the wilderness areas, gene pools, etc.), and which are not available for economic development will result in increased expenditures irrespective of whether they are government or industry. Increased communication strategies, environmental impact assessments, and costs of

integrating forest management regimes with other resource interests are a few of the examples of what society can expect when implementing sustainable development. While Geographic Information Systems (GIS) are touted as significant achievements in advancing inventory systems and modelling capabilities, each additional information layer of GIS data will be a costly proposition to produce. In Manitoba, and probably in other provinces, the forestry sector is expected by the non-forestry sectors to deliver a variety of new information layers that has not been collected and they want them all nicely wrapped up in a box in a moment's notice.

I do not wish to appear too negative on this point for a Geographic Information System is an excellent example of a tool which will provide us with the ability to measure and model Sustained Development opportunities and changes in the forest environment. The benefits that we anticipate to derive from the application of the Sustained Development concept must be measurable, both in the short and long term. With increased fiscal restraint the auditing of our activities and strategies is a must. This without question applies to traditional forestry activities but also to those new strategies that are embodied or will be embodied under a Sustainable Development concept. For example, are the improved and integrated forest management plans working or are they wishful thinking? Are the payoffs through the application of wildlife, fisheries and other management guidelines being realized.

Where do we go from here? I would now like to focus on the Manitoba Sustainable Development Workbook on Forests and several of the policies. These draft policies reflect the goals identified under the Land and Water Strategy and I believe that most foresters, either at the management level or at the field level, will be able to identify with them.

While the four overall goals are very broad, the objectives of the eight strategic policies and the more refined sub-policies are, I believe, very concrete and understandable. Furthermore, many of these reflect activities that are currently in place today or which are being considered as activities which have and are presently undergoing an evolution. I do not intend to go into each of the policies and sub-policies in detail in this presentation as they can be reviewed in the Sustainable Development Workbook on Forests which can be made available upon request.

Let me focus on one or two of the policies within the workbook. The objective of the policy on Environmental Enhancement and Protection is to "ensure and promote forest activities that are environmentally sound and improve the environment". It is worthy of mention that at many of the consultation workshops a number of groups and individuals expressed concern about the nebulous reference to "improving the environment". This is one example of an objective and policy area that will need to be more clearly defined and other appropriate changes made to address the concerns expressed.

The first sub-policy associated with this objective is as follows: "Incentives, programs, or where necessary, regulations shall be established, implemented and monitored to ensure that forest access, harvesting, renewal and maintenance and use activities are compatible with a quality environment".

The third sub-policy relating to the Environmental Enhancement and Protection objective states: "Reforestation shall reflect the genetic diversity found within the natural forest ecosystem".

The fourth sub-policy relating to the same objectives states: "Selected forest areas shall be designated to preserve and retain genetic diversity".

Sub-policy #5 of the Supply and Allocation Policy whose objective is "to supply and allocate forest resources on a sustainable basis which optimizes social, environmental and economic benefits and opportunities to Manitoba, states that "forest resources shall be allocated in an equitable manner amongst the various users of the forests, including non-commercial needs of individuals and communities".

Sub-policy #6 states "allocation systems shall provide for security of tenure to facilitate long-term planning horizons, accommodate ecological and economic considerations and shall be reviewed on a regular basis".

I think that this sample of policies are of a nature that foresters can in fact get their arms around and apply on a day-to-day basis and certainly in the context of programs and activities for which they have responsibility. Clearly they go beyond being general platitudes. As draft policies I believe them to be a good start and you can be sure that as a result of the workshops and mail-in portions of the workbook that they will be changed and endorsed and become the rudiments for the development and maintenance of forestry strategies to be applied during the 1990s and into the next century.

A number of new policies and strategies are already being put into place across the country. New activities and new initiatives are being planned, many under the aegis of the Council of Forest Ministers. Perhaps it is good that we have a peg onto which we can collectively hang these new strategies. The peg — Sustainable Development — seems to be accepted by the public and whether or not they fully understand the concept they seem to be supportive of it. I think that the Manitoba experience supports this belief and I would like to refer to the focus that Manitoba is taking in addressing the Sustainable Development concept. Draft policies have been formulated, placed into a workbook format and discussed at workshops around the province. The feedback from the workshops and the mail-in portion of the workbook are to be collated into a brochure that provides an overview of public comment on those draft policies and which will serve as a source of ideas and suggestions for managing the province's soil, water and forest resources and ultimately

those other strategic areas of interest identified in the pyramid. The draft policies are then to be forged into suggested policies as a result of public consultation process and these will then continue to undergo revision, again based on public input, and will be scheduled for legislative review. The process suggests that there is an evolution underway; an evaluation about the way in which the forest resources of Manitoba and the country are to be managed. This will likely continue as with any evolutionary process and it will change the way in which we do business.

The need for accountability on how we manage our environment, I believe, has always been there in forestry in many respects. As the interest in our provincial, national and global forest environment continues to increase, so will the need for accountability and openness. The fanatical environment fringe fueled by a media seeking controversy has the Western European public and politicians, as well as many of the public in North America, believing that Canada's forest ecosystems and environment are not being well managed. In light of this unfounded belief the spectre of a boycott of Canada's forest products in Europe hangs in the balance. Communication and education at home and abroad has been mandated to us as a way of doing business now and in the future and I believe they are key components to defusing the "boycott" thinking and ensuring the success of the Sustainable Development concept in Forestry in Canada.

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Towards sustainable development in industrial forestry

by D.E. Barron¹ and Tony Rotherham²

Abstract

The concept of sustainable development is important to industrial forestry. Problems arising from the state of technology and social organization require technical and social solutions. Integrated resource management and equitable input from all local stakeholders, privatization of resource management responsibilities, land use strategic planning, setting of management objectives and measures of performance are important elements. Integrated forest resource management will bring costs and benefits. Essential improvements in operational planning and execution will result in increased efficiency. Woodlands equipment changes must be phased in to avoid punishing costs. Industrial operations have started to change by adopting new operational and planning systems.

Résumé

Le concept du développement durable importe à l'industrie forestière. Les problèmes entraînés par l'état actuel de la technologie et des structures sociales exigent des solutions techniques et sociales. Aménagement intégrée des ressources, apport équitable des principaux intervenants, privatisation des responsabilités de l'aménagement de la ressource, planification stratégique de l'utilisation du territoire et adoption d'objectifs d'aménagement et de mesure de la performance sont des facteurs importants. L'aménagement intégrée de la ressource forestière entraînera des coûts et des avantages. Des améliorations s'imposent à la planification et à l'exécution des opérations. Elles se traduiront par une augmentation de l'efficacité. L'évolution du matériel d'exploitation forestière doit être graduelle pour éviter que les coûts soient prohibitifs. Les opérations industrielles ont commencé à adopter de nouveaux systèmes d'exploitation et de planification.

Introduction

Sustainable development is not a new name for an old idea nor is it really a new idea. It is a concept. For natural resource managers it follows in the tradition of conservation, wise use, sustained yield, multiple use, preservation and integrated resource management. The novelty lies in the fact that some how the term sustainable development has succeeded in getting people to reconsider their relationship with the rest of the world, with nature and with other people.

Perhaps the term sustainable development itself or the fact that it arrives on the scene at the same time as the growing public interest in forest management, suggests that it deals with a wider field of environmental, social and economic considerations. At any rate it calls for a middle path between a simple nonconsumptive lifestyle and uncontrolled economic activity. As such it offers something substantial to the reasonable moderates who make up the vast majority of the population, whether they are on the environmental or industrial production side of the question. Practicing sustainable development puts more emphasis on the "practice of forestry" than it does on "timber management".

Factors Limiting Sustainable Development

The Bruntland report defines sustainable development as "...development that meets the needs of the present without compromising the ability of future generations to meet their own needs." Further it addresses the idea that the state of development of our technology and social organization imposes limits on the environment's ability to meet present and future needs.

Much of the report is concerned with the effects of overpopulation in the third world — and rightfully so. However, the problem of environmental limitations and subsequent

scarcity of resources and environmental degradation is the central issue addressed by sustainable development and is important to Canadian forestry. The two limiting factors that were mentioned are:

- The state of technology, and,
- Social organization.

Scarcity of land, timber, wilderness, etc. and a concern for the environment are certainly driving all of the forestry issues we face today. If the causes of these problems are technical and social, then so are the solutions. What are these technical and social fixes? Can they give us abundance and a healthy environment?

The most pessimistic environmentalist sees environmental degradation and limits to resources and says, "Stop! Regulate! Produce less!" The most optimistic forest manager says "Develop new operating systems! Intensify management to increase growth! Be more efficient!"

Look at the history of technological change. Look at the variety of technology now available and at the steady stream of new ideas that are generated each year. These new ideas provide technical, management and social solutions which offer the only real hope for the future. Industrial foresters easily see the need for and value of technical innovation. Challenge the system and it will respond. Technical and managerial problems arise in shifting from a timber management to a forest management context. Social problems arise in shifting from operating in a lessor/lessee relationship to a lessor/lessee/community context. It is these technical, managerial and social problems that limit our ability to increase production and at the same time ensure a healthy environment. Changes are now underway but more of our focus should be put on the managerial and social aspects of operating in the future.

Most Canadian foresters are familiar with the term integrated resource management, the inclusion of all identifiable forest values in the forest management and operations planning process. This style of operation will become the rule. Developing ways to incorporate broad technical,

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environmental and social science input into the planning process is essential for both efficiency and credibility.

Most importantly the community of local stakeholders must be permanently included in the process. So many management plans are being upset across the country by political actions outside the resource shed that there is clearly a lack of regional stakeholder support for these plans. The firmest support for a sustainable management plan must be expressed in the community which has the most involvement with resource.

Local third party groups have coalesced around forest issues lately and they make a difference. If local interests are represented in the planning and management process on a continuing basis it will be increasingly difficult for external interests to upset long term commitments. "Not-in-my-back yard" should be the up front reaction to the urban "lock-it-up" preservationist's intrusion into the forest resource dependent community's home region. This support will be forthcoming if the local community is involved and in support of, our management. It will not occur if we ignore the interests of the local communities and special interest groups. Nor if our management and operations are carried out in a way that have a negative impact on aspects of the resource that the community values.

Responsibilities for forestry operations, and for performance in productivity and environmental quality should continue to move to the private sector coupled with a guarantee of rights to harvest the results of their efforts. Innovative ways of privatizing fish and wildlife management may also be practical.

In all of this the forest services' role as regulator and auditor is critical and increasingly difficult. But increased community involvement and a shift of responsibilities and commitment to the private sector will give public and political support to long term forest management planning.

All of this is dependent on the pressing need to resolve outstanding land use conflicts.

In the past we have espoused the multiple use of forests while really only having the capability of basing our management plans and operating systems primarily on timber management considerations. We now have the knowledge, the planning technology and operating systems options available to do a much improved resource management job. Many are now using these tools and all must soon make use of them.

Measuring The Success of Sustainable Forest Management

How will we measure the success of our application of sustainable development to forest management? From a regulatory point of view the rule should be results or performance oriented. It should not be aimed at regulating technology. This approach always has a deadening effect on innovation — a commodity we need more of rather than less. Measurable objectives should be set after discussion and agreement with regional stakeholders. The auditors should measure attainment of objectives rather than prescribing operating methods to achieve them.

Most jurisdictions have resource utilization standards in the audits of the management process. There are and will no doubt be more environmental standards applied to the impacts of various forestry operations.

Environmental audits have been suggested as an approach. These would be similar to financial audits which ensure that companies conform to accounting standards and provide a measure of the financial health of the organization. Audits are also done with energy and raw materials consumption. These audits are relatively simple because the inputs can be measured and use, loss and production efficiency can be tracked through the process.

This is not the case with an environmental audit of the forest. The process is too complicated and variable from site to site. We have not yet developed acceptable methods to perform these audits. Companies may develop some auditing procedures to satisfy their own internal management control needs. These should be encouraged. Environmental audits should not be required by regulation.

It is possible to quickly develop some measures of performance that will contribute to an internal environmental audit and as we gain knowledge of the resource and our impacts both positive and negative, we can improve our methods. However, we must be careful that the science is sound and that the process is not overly complex and expensive.

Geographic information systems and strategic planning models may help in monitoring certain environmental indicators.

A few possibilities are:

1. The rate of growth of the forest is a measure of the health of the forest environment. We should closely monitor growth and yield and annual allowable cuts which should be increasing.
2. Develop a graphic display which shows the distribution of age classes and forest types at present and as projected for sustained yield multiple use management units. Set some objective target for these indicators that will ensure a healthy mix of stands and ages and plan harvest and silviculture operations to achieve the target.
3. Establish a register of ecosystems and see that this is maintained consistent with the objective of managing a healthy forest.
4. Wildlife and fish populations can be monitored, but consideration should be given to natural cycles in non-migrating game populations and the impact of conditions in other regions on those populations which do migrate. Spatial considerations vary with species.
5. Reforestation and stand management performance and targets can be tracked.
6. Similarly control of fire and pests, losses and salvage can be reported.
7. Certain site impacts may be measurable such as annual area disturbed and crossings of natural drainage patterns.

Forestry data are in reasonably good condition. Systems for the measurement of other resources and values need improvement. Industry and provincial governments have the main role in collecting data and providing information since they have the legal responsibility for forest management performance on the vast majority of Canada's forest lands.

We must also know more about the interaction of our woodlands operations on wildlife, fish, soil productivity, microclimate, etc.

To repeat, standards should be performance based and scientifically justified. They should not specify technology but should encourage the development of new systems which will improve performance.

If sustainable development is to be applicable to resource management it must have meaning and be applicable in some spatial context. Is it a work site or a watershed? A management unit, a region, a community or a market area? The objective is to account for environmental impacts and community needs within some space. The spatial unit will vary with the value or resource being addressed.

The practice of sustainable development requires a long-term commitment — a lot of labour, money, time and expertise. This will not happen unless there is a land use strategy and allocation. If land use is not stable one can not have a sustainable forest management area nor a park that is effectively developed, managed and valued by the population. For each use the area must be defined and accepted by society. Sustainable development will not be practiced in places where we cannot get past the watershed to watershed, last virgin valley to last virgin valley confrontation on land use issues.

It is also time to revisit the question of tenure. We have come a long way with forest management agreements. Now it is time to address the ways to ensure long-term enhanced production of all values. Uncertain tenure and land use does not promote good, responsible long-term management. It discourages managers from going beyond regulated requirements because of the lack of long-term proprietorship of the fruits of investment.

For timber oriented forestry the concept of a sustained yield management unit was a cornerstone of management. If integrated resource management and public involvement are now to be emphasized then the spatial context may change. Specific physical boundaries should be favoured over more subjective jurisdictional boundaries.

Forestry has a good idea to offer in its long-term planning time frame, its 25 year planning profile and 5 year evergreen, performance based forest management agreement renewal system. Accountability and consistency will be important to successful sustainability.

Costs Associated With Sustainable Forest Management

Moving into broader resource management will have costs associated with it. Those associated with better information will have a real payback in technical, operational, management and public acceptance terms. GIS, improved site data, planning models, public consultation processes, changes in operating technology and better understanding of the ecosystem overall will cost more but will deliver returns justifying their expense. Perhaps the biggest potential cost is a major change in woodlands equipment. There are three parts to this:

1. The program to purchase thousands of new machines.
2. Increased cost of some types of new equipment.
3. A possible loss of productivity.

Fortunately woodlands equipment has a relatively short economic life. An almost complete renewal of the fleet occurs naturally every 5-8 years.

There is also a danger when things change that excessive regulation resulting from inadequate and bad science will result in conflict and more cost. Integrated resource management should imply efficient resource use, development and the use of appropriate technology and increased productivity. We will be able to afford these additional costs if they deliver efficient resource management and all users pay their share. Ultimately the consumer pays for everything.

Benefits of Sustainable Forest Management

In the long run, the benefits of sustainable development will be new technology, management systems and a commitment to society which will allow industry to meet present and increased future needs from the renewable forest resources.

There will be some specific benefits of the addition of "sustainable development," philosophy to forest management:

- Public confidence in and approval of forest management should rise.
- We foresters should gain professional pride from doing a good job.
- Better planning and control of operations should increase efficiency and save money.
- Recreational opportunities should increase.
- The general level of health of the resources under our care should improve.
- Growth rates should go up, resulting in a sustainable increase in wood supply.

Where Are We Now?

Movement towards sustainable development in forestry is already underway throughout the country;

- Provinces are setting tighter standards on site disturbance.
- The use of hydraulic excavators on road construction has improved efficiency and reduced the amount of soil disturbance.
- FERIC has developed technology such as wide tires now commonly in use in the industry.
- GIS systems are proliferating on operations of all sizes.
- Companies are hiring wildlife biologists.
- Public input into management and operating plans is the rule rather than the exception.
- Equipment and systems capable of thinning or partially cutting stands are being developed and used.
- There is more processing at the stump.
- Planting programs have quadrupled.
- Stand tending increased 230% from 1978 to 1988.
- Foresters are talking to professionals in other fields about other resource values and how to safeguard or improve them.

Industry has a vital interest in promoting sustainable development. As a national forest industry association our role is to develop and promote the industry's viewpoint and to create a forum for the exchange of information which will help companies to deal with change. As examples of our activities in this field, The Association is organizing a conference on forest management and wildlife in 1991 in cooperation with the Canadian Society of Environmental Biologists. In 1992 we will hold a conference on how to reduce the impact of woodlands operations.

Summary

Canadians are said to be the people who have taken the Brundtland Commission Report most to heart. The Federal Government Greenplan will provide more impetus in the same direction. The concept of sustainable development has a lot to offer industrial forestry.

- It is an invitation to manage our forests in such a way that we will increase the flow of both forest products and environmental benefits to society.

- It offers an opportunity to win public approval and support for management of public forest lands by industry.
- The main requirements for its implementation are:
  - Improved planning technology.
  - Better knowledge of the forest and particularly growth and yield.
  - More information on other aspects of the forest resource.
  - A good understanding of the interaction of forest operations and these other values.
  - Land use decisions which offer the stability essential for longterm management.

- Tenure systems that stimulate performance and innovation.
- Equitable systems to include public input into resource management systems.
- A desire by government and industry to co-operate, and to adopt new ideas and systems that will improve our performance.

This includes a continuation of the trend to privatization of responsibility for management and operations.

- Above all open minds and an acceptance of new ideas.

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Concluding comments

by G.L. Baskerville¹

Once again, we have seen that sustainable development can mean many things. Certainly it has the potential to be many things, and it can be *interpreted* by people to mean many things. However, what sustainable development actually turns out to be in reality will depend on what we as a society do — it will not depend at all on what we say.

We have heard three views of sustainable development and we have discussed the issue at some length. It is clear that whatever else it is, sustainable development is an imperative. Both the development and the community implied in the phrase are essential to the survival of civilized society, and we had best be making sure that the sustainable development we create is an operative one in the natural systems we use, and not just a comfortable slogan, or a pseudo-religious icon.

There are two overriding social problems with the idea of sustaining the productive capacity of natural systems while simultaneously developing the economic use of those systems that were not addressed here although they began to emerge in our discussion. First, because of an unequal starting point for various societies, and for various elements of a single society, there will be a problem balancing the costs of implementing sustainable development and of balancing the recovery of benefits from its implementation across geographic area — who will pay more, and who will pay less? who will get more, and who will get less? The second problem will be one of balancing the costs and benefits over time — over what time period will the costs be spread? over what time period will the benefits be spread? Especially as the process of establishing sustainable development begins, these distributional problems have the potential to destroy the process.

In discussion of sustainable development there is much concern about neat things to do, but surprisingly little or no concern about these two issues. *That is a danger signal because history shows that our inability to handle the distribution of costs and benefits has contributed to creation of the problems we hope to solve with sustainable development.*

The speakers all noted that the concept of sustainability has been around a long time. As society tries once again to make it work, the biggest danger may very well be that the result will be an approach that a majority of people like (as determined by periodic public opinion polls) rather than an approach that actually works on the ground, in nature, over time. Our society of instant gratification at minimum cost is not well equipped for the transition to real sustainable development.

The problems that created the imperative for sustainable development are inherent in the way our society operates. That is, they are systemic which means they will only be surmounted by an approach which addresses the systemic bases of the problems. Real sustainable development is not likely to be comfortable for Canadians, yet we talk about sustainable development as if it were benign.

The presentations and discussion today reflect the problems our society is having with the crucially important task of implementing sustainable development. Dave Rannard, in particular, spoke of the need to help the public identify with the process of designing sustainable development so that they are committed. It is not clear if our discussion has helped in that context. Like most discussions on the topic, ours has been a weird mix of absolute statements, and vague implications. There was talk of protecting the environment, but not of what values, measured how, or what level of protection will maintain them? There was talk of baselines as if they had real meaning, but the future will be different, at least it will certainly *look* different. We can ill afford to waste time and scarce research dollars on baseline descriptions of what systems *look* like — the need is to know how systems *operate*. The need is for knowledge of system dynamics while the public cry is to maintain some systems that look nice at the particular life stage they happen to be in just now. In this respect, did our discussion here contribute to the problem of public understanding or to its solution?

We must predict the consequences of all actions to achieve sustainable development. It is not a case of, we will learn how to predict these one day when science and our profession have finally got their ducks in a row. The media are now predicting *in the absence of a scientific cause effect basis*, because prediction is an absolute need in coping with the social problems of sustainable development, and, in managing for sustainable development. However, the issues at hand are far too important to decide by a poll to determine what the public believe the cause-effect connections to be. Dr Maini spoke of the need to predict “even if we will be surprised”, while in fact, if we do not predict we may never be surprised, but we also would never learn.

There appears to be far too little understanding of the basis of spatial and temporal change in the natural systems we need to sustain. We cannot have all things at all places all the time — the evolutionary adaptation of the species in our forests just will not allow that — no matter what the public opinion polls say. We can have all things, all the time, some place within a forest. The pressing issues are, what scale of geographic averaging will be acceptable, and what level of averaging over time will be acceptable. On the surface, public expectations in these respects seem unattainable, and unsustainable, and our society needs to spend a lot of time discovering what levels will be both sustainable, and, acceptable.

This is not the time to prescribe an aspirin — what is needed is an approach that is as scientifically comprehensive as the desires of society are broad. Of course, if the measure of success for sustainable development is merely to have the current public opinion polls say things are ok, and not to actually achieve sustainable development, then there is no need for such complications of science.

Tony Rotherham mentioned two limiting factors; state of technology, and social organization. In my opinion, real sustainable development as opposed to periodic appeasement of public opinion polls, is severely limited by our technological

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understanding of natural system control, and the implementation of the existing control tools is severely limited by a social organizational structure that on this day seems to border on anarchy. These are indeed serious limiting factors.

The words integrated management always follow closely on mention of sustainable development and they have been used here today. Unfortunately, the concept of integrated management has become fuzzy. In technical terms, integrated management means the statement of goals for management of a system in terms of several factors, and, in terms of a set of rules for trading achievement of one factor off against achievement with respect to other factors. This arrives at a comprehensive goal that best reflects the overall aim of management.

The key point here is that *the trade offs are made at the level of goals*. In this case, the manager seeks to design an action plan that will deliver the desired mix of values as expressed by the comprehensive goal. The actions that result from the plan will be coherent, in that they are designed to cause the system to come to the target state where the desired mix of values is consistently available.

Sadly, the contemporary view of integrated management, and the application of integrated management in many sustainable development visions, is that management will be designed for one use, say timber, and then the actions to implement that management plan will be constrained in order to protect the other values. There are two serious problems with this common misconception of integrated management. First, the approach will not achieve the timber goal because of the constraints, and second, it will not achieve goals with respect to other values because it is not possible to cause a system to converge on a multi-dimensional goal solely by using constraints on one factor.

In short, the popular view of integrated management is bad news all around. There is an urgent need for integrated management that is designed by making trade offs at the level of the objectives, rather than by constraining actions.

We have heard again that foresters are perceived as not having done well with respect to sustainability of timber. That may be a bad rap, but it does not make any difference. In the style of our times, this sort of issue is decided by public opinion. That should scare you. Canada may be about to embark on a boondoggle of heroic proportions. We may be about to dismiss the only folks who have been to the forest and studied its dynamics, in order to facilitate development design in forestry by public opinion poll. I hope that scares

you enough to get out there and show folks what real resource management looks like.

The lack of credibility for timber management is a serious problem. We will not achieve forest management, and we will not achieve sustainable development, merely by constraining timber management. As a society we must shift the focus to achieving spatial objectives over time, we must get away from constraints, and we must get away from doing neat little "right/comfortable" things that temporarily appease the public but do not control the forest system towards the integrated goal.

Finally, I find it interesting in a strange sort of way that this discussion of sustainable development should occur in an economics group. Certainly, development is a subject for economists to conjure, but the idea of sustainable development is in conflict with fundamental economic principles and beliefs. The Brundtland definition of sustainable development says it is not reasonable to discount the values available from a resource in the future. Much of the problems our profession has had in introducing timber management have stemmed from the prevalence of the economic doctrine that the future is not as valuable as the present, and therefore timber management is not a reasonable thing to undertake. I see no sign of recantation, and if foresters want to be taken seriously in the sustainable development game, nothing less will suffice.

Sustainable development is imperative to the survival of society. Yet 99% of the discussion of sustainable development is pure fluff, and I find that frightening. Our society will not achieve sustainable development by accident. We will not achieve sustainable development merely by constraining timber harvesting. While public interaction and appreciation is necessary, that alone will not do the job. *Sustainable development will only be achieved by the design of management protocols that have a complexity appropriate to the dynamics of the systems we wish to control.*

As a society we should focus on the design of natural system control, and on the objectives for natural systems. We should focus on measuring the progress towards those objectives. The latter is the crucial point. There is virtually no gain in counting the successful actions to stop logging — the measures we need to use as a society have to do with performance of natural systems. That will require a new understanding by each and every one of our individual place in society, but nothing less has a chance of achieving sustainable development.

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