

however, that we believe a discount rate of 10 per cent is appropriate for the first 40 years of the project, but thereafter we should use a discount rate of 5 per cent. While the PV of the project's benefits rises – to a little under \$136 – the project is still unattractive. This is a contrived example, of course, and there will be cases where changing discount rate time paths will be quite significant. However, the example does illustrate that changing discount rates even quite dramatically (here we cut the discount rate in half for 10 years) may not have as much impact as one might at first expect (here it increased the PV of a future \$10,000 by only \$50).

Similar remarks apply to the fact that the so-called "equivalent variation" and "compensating variation" for a change can vary dramatically – the only implication of theory is that they will be close for small changes and this is borne out in practices.

Regarding alternatives to current practices, I am rather confused by the practical implications of the Safe Minimum Standards (SMS) approach. Presumably there are decisions to be made in determining the SMS and one suspects that those decisions will revolve around exactly the same criteria that are currently discussed – effects on livelihoods, values (financial and other) of preserving diversity, etc. That is, SMS does not seem to avoid any of the tricky trade-offs that are already the source (quite appropriately, to my mind) of much angst over environmental policy.

Finally, the remarks regarding Lady Thatcher seem to dismiss the free-market approach to environmentalism. But the discussion of the Chinese experience with plantation forestry seems to acknowledge that an increased degree of "ownership" of a resource can do wonders for peoples' incentives to maintain it. Although Richardson argues that China's greatest achievement is providing "security of tenure *without* ownership" (my italics), his discussion suggests that it is uncertainty about that tenure that is the greatest threat to sustained forestry, an uncertainty that could be resolved, presumably, by tighter property rights (as acknowledged in the first of the three "fixes" called for in the State Council decision of 1981). One of last year's Nobel winners in economics was an economic historian who, amongst other things, did some work on the economics of slave ownership. In a finding that was, naturally, highly controversial, he suggested that the material well-being and day-to-day comfort of slaves could be higher than their coeval wage earners. The reason was that their owners had every incentive to think about their long-term health and welfare, as opposed to employers of hired workers who suffered little if

a worker were to die or become useless as he could simply be replaced. This is not intended as an argument for slavery (a caveat that should go without saying except that non-economists tend to lift this kind of observation to brandish as evidence of economists' callousness and oblivion to all considerations other than the purely economic), but it is an interesting illustration of the incentives of ownership. Similarly, recent experience in Africa with alternative means of saving elephants reinforces the notion that property rights can be an effective means of preserving resources: giving local people an economic interest in the survival of elephants (as opposed to an interest simply in harvesting illegal ivory) might better, and more cheaply, preserve herds than outright prohibitions on killing.

In conclusion, while Richardson suggests that neo-classical economics is fundamentally flawed in its application to the environment, I disagree with the use of the word "fundamentally" and think that part of the problem may be that the practitioners of economics in this setting lag somewhat behind developments in economic theory. (Of course, this is not unique to environmental economics as a subfield, nor is it unique to economics as a discipline.) Further, I do not see the practical significance of alternatives to current approaches, in particular the peculiar

notion of a "new paradigm" of ecological economics. My suspicion is that the search for a "unified field theory" in this area – a grand theoretical paradigm that melds existing approaches and methodologies – is futile and of little value (and truly a case of filling a much-needed hole in the literature!). I concur fully with Richardson's concluding quotation suggesting that modern science (and I include economics here!) is not the sole answer to successful and sustainable ecological management. I do feel, however, that it is likely to be a significant part of the answer and would caution against rejecting economic insights completely.

References

- Dixit, A. and R. Pindyck. 1994. "Investment under Uncertainty", Princeton University Press, Princeton, NJ, USA.
Goodland, R.J.A. and G. Ledec. 1987. "Neo-classical Economics and Principles of Sustainable Development." *Ecol. Modelling* 38: 19-46.
Richardson, S.D., 1994. "Economics and Ethics: Approaches to Sustainable Forest Management", *NZ Forestry*, 39(1):17-20.

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Recent developments in British Columbia forestry

Controversies and struggles over timber harvesting and forest land use continue in British Columbia (B.C.). The province has about 25 million hectares of commercially designated forest land out of 60 million, nearly all in public ownership. About 60% is in mature or 'old growth' age class, mainly in valuable conifers. As more federal conifer mature timber is tied up in the western US, the value of B.C. sawtimber has increased sharply. The current harvest of about 80 million m³/year on about 180,000 ha from 5000 to 6000 separate cut blocks generates about \$C14 billion a year. The B.C. Ministry of Forests is mandated to practise sustained yield. It is faced with the long-term problem of attempting to balance age classes in natural, usually virgin, forests, composed of old trees, often at high risk of loss, while meeting multiple-use objectives – a very difficult task!

Under the Social Credit Government a

Forests Commission was formed whose report and recommendations have been largely ignored by the current NDP Government. In coastal forests the low elevation forests were the first to be cut. As old growth reserves shrank, pressures to set aside more old growth from logging have escalated. Public response to large-scale clearcuts has been negative. Environmental pressure groups (Sierra Club, Western Canada Wilderness Committee, Greenpeace, Friends of Clayoquot) have mounted vigorous campaigns to reduce harvest rates, reduce or ban clearcuts, create more parks, preserve old growth and rationalise land use. Greenpeace has attempted to convince European customers to boycott B.C. timber. Clayoquot Sound, on the West Coast of Vancouver Island, became a focal point for national attention as over 800 people were arrested in 1993 as they blocked approved logging.

For public lands management plans

and compulsory Pre-Harvest Silviculture Prescriptions (PHSPs) must be approved by one of the 2250 Registered Professional Foresters (RPFs) who belong to the Association of the Professional Foresters (ABCPF). Controversies over PHSPs and logging practices, particularly road failures, excessive clearcut size and damage to salmon streams have created great controversy and put the forest companies, who have licences on Crown Forests, in a very defensive position. A corporate funded Forest Alliance has been created which attempts to explain and provide facts about corporate forest management. The Chief Executive Officers (CEOs) of the major companies have signed a Forest Accord – a set of guiding principles for forest management.

Ethical issues, biological diversity issues and the need for RPF competence have caused the ABCPF to re-examine its Code of Ethics and discipline procedures. One landmark case over professional forester incompetence has gone to the B.C. Supreme Court.

The NDP Government replaced the Forest Commission with a Committee on Resources and Environment (CORE) with a mandate to rationalise forest land use after consultation with the people and stake holders. The first set of recommendations for Vancouver Island resulted in the biggest demonstrations in B.C.'s history as about 20,000 people, bearing yellow ribbons, protested in March 1994 before the Provincial Legislature in support of the forest industry. Other attempts by CORE to rationalise land use regionally appear to have collapsed in controversy.

The NDP politicians, in response to such controversy by both pro-environmentalist and pro-logging groups, have responded with two initiatives. The first was to draw up a Forest Practice Code – a comprehensive amalgamation of old and new regulations to govern, in great detail, all aspects of forest practices, with tough enforcement and very large fines. The Code will apply to all public lands (96% of all the forest). It is due for legislative approval before the end of 1994.

The second was to propose a new stumpage increase of about \$10/m³, tied to lumber prices which would generate \$600 million annually. Of this, \$400 million would go to a new crown corporation (Forest Renewal B.C.) to be spent on more silviculture, Research and Development and job creation to offset job losses due to logging mechanisation and reduced allowable cuts. This Act should also be legislated in 1994.

The increasing intensity of forest practices, the great increase in forest revenues and the controversies have also had other

effects: a) massive media coverage for forestry issues, b) lots of jobs for foresters, c) a big increase in forest resource management and conservation biology enrolment at the University of B.C. Faculty of Forestry, d) the opening of two new University degree programmes in forestry in Kamloops and Prince George, and e) a complete reorganisation of the B.C. Forest Service.

The spending on silviculture in B.C., which is either "basic" or "intensive", has escalated to about \$420 million/year. The licensees are responsible for all costs of basic to "free growing". The Silviculture Institute of B.C., a private non-profit educational institute operating since 1985, now offers six two-week modules of Advanced Silviculture education for registered professional foresters with five years of field experience. The Forest Practice Code plus other issues have resulted

in a great increase in continuing Forestry Education. Federal contributions to B.C. Forestry will probably decline in Federal/Provincial agreements after 1996, as the Federal Government tries to reduce the massive national debt. The Federal Government has funded nine Model Forests across Canada, where local associations, outside of Government and industry, are given \$5 million each to introduce advanced forest management practices on each forest. B.C. has two Model Forests, one at Prince George and one at Long Beach. National hearings on 'clearcutting' were held in Ottawa this spring by the Renewable Resources Parliamentary Committee. All this change and activity means that most B.C. foresters today are stressed, due to overwork!

Gordon Weetman
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West Coast forestry, on the move and testing new frontiers

The West Coast has long been seen as the black sheep of forestry in New Zealand, the last bastion of wanton and wasteful destruction.

Yet following the signing of the West Coast Forests Accord in 1986, and the corporatisation of the state's forestry assets in the region, there has been a quiet revolution taking place.

The Accord, signed in 1986 by Government, local authorities, mainstream conservation and environmental groups and the timber industry, was an important turning point. It aimed to achieve a consensus whereby deeply held opposing views might be wed in a restless but genuinely held intent to reach a compromise.

The measure of the Accord's success is often clouded by skirmishes on the fringes that continue to this day. Some proponents to the Accord tend to forget the original intent was to reach a consensus between the differing interests. Unfortunately some of these representatives are now trying to reincarnate their own original agendas. The Accord was never intended to provide a single perfect solution and answer; it aimed at producing a consensus agreement.

The consensus results ranged from:

- preserving all previously proposed reserves under the earlier "Protected Natural Areas Programme" and the creation of Paparoa National Park for the conservation movement, to,
- ensuring an adequate allocation of

indigenous forest to maintain available sawmilling industry into the future, to,

- setting a permanent base of activity for local government to encourage future development and growth in the West Coast region while
- providing a solution to the West Coast "problem" for Central Government.

In 1986 these views were modified to reach an agreement. Today dissatisfaction is being expressed by some individual factions for not achieving their own specific aims, certain extreme elements of the conservation movement because the Accord didn't stop all logging, parts of the timber industry because individual businesses cannot dictate when they feel the exotic resources are adequate to benefit them specifically.

Some would be surprised at the vigour with which a few individuals have devoted their energies to extract the literal from an intent, and convert the written into hearsay. Others however, from both conservation and industry, have continued to uphold the original intent and committed themselves to making the Accord work.

Through the smoke, tentative steps made possible by an uneasy calm in the eye of the storm have begun to yield a series of results. These results have placed indigenous forestry on the threshold of a changed era, an era headed squarely in the centre of the "big picture" set by the intent of the Accord.