

mercially viable industry based on sustainable management. This will only be possible with forest owner cooperation and enthusiasm. It is therefore essential that the new structure that the Bill introduces does not so reduce the forest owners' economic benefit from their forests that they choose either to not harvest at all or, far worse, that they choose to destroy what forest they have and turn the land to another use.

Unless forest management is profitable owners will have no surplus to ensure the preservation of forest on their land. The key to forest conservation is not tight control but the development of a profitable industry that can afford the costs of sustainable management. The kind of costs that will be imposed in administering the policy could well exceed the returns for small forest owners.

Voluntary Measures

Voluntary restraints and negotiation are the only sensible way to deal with the issues. The assumption that all of the native forests must be "saved" shifts focus away from even more valuable and endangered habitats such as wetlands and coastal ecosystems. The Forest Heritage Fund and Nga Whenua Rahui are two highly successful voluntary forest protection schemes (according to the Minister of Forestry).

The need is to complement these with positive incentives for sustainable management, not the big stick.

Harold Heath, Forest Industry, Environmental and Resource Management Consultant, Dunedin.

Coppice – 'not a more noble and worthy husbandry'

The seventeenth century diarist, John Evelyn, was a man in advance of his time. In 1661 he wrote a discourse on the prevention of air pollution in London ("Fumigium: or the inconveniences of the air and the smoke of London dissipated, together with some remedies humbly proposed"), in which he advocated planning controls for industry and the planting of urban trees and shrubs, to mitigate the effects of "fuliginous clouds of smook and soot over and about great cities, and other volcanos, continuously vomiting out their acrimonious and sometimes pestiferous fervor . . ." At the same time, he urged that attention be given to the City of London's water supply and, in 1664, published "Silva, or a Discourse of Forest Trees and the Propagation of Timber in His Majesty's Dominions" – in which he discussed virtually every issue with which present-day foresters are preoccupied.

Evelyn was a staunch forest conservationist – though he considered the laws too strict, extending as they did not only to the prohibition of killing deer and felling trees but "even to that of killing little silly birds", and he regarded castration as an excessively harsh punishment for breaking them. His prescription for the control of beetle infestations in timber – "piss and vinegar" – might not be acceptable to present-day environmentalists; nor would his advocacy of "the reek and smoak of ox-dung wrapt in mangy straw" as a soil fumigant. He would also have had trouble with the organic farmers whose counterparts were active even in

the seventeenth century – to Evelyn's bewilderment; he wrote in 1676 "... airy nitre, pregnant with a vital balm, which is the thing we endeavour to find in the materials of composts . . . I cannot . . . but wonder how a thing so eminently sacred and fertile, should come to be the symbol of malediction."

And he would have collided head-on with women's libbers. Concerned about the effects of platform shoes ("monstrous choppines") on the conservation of the cork-oak in Mediterranean countries, he ascribed their popularity to women "affecting or usurping an artificial eminency above men, which nature hath denied them"!

With regard to forest management Evelyn's views would be more acceptable perhaps to conservationist fringe elements. He was an advocate of one of the earliest conscious systems of managing woodlands – that of "coppice with standards". Under this system, trees with the ability to sprout from the base after cutting – "coppice" – are grown under scattered "standards" – trees which are not felled until mature. The system yields a succession of harvests of small-sized fuelwood, pulpwood or poles (from the coppice) and at the same time some large-sized sawlogs from the standards. It is known from the seventh century in Germany and since the twelfth century in England. In 1544, Henry VIII prescribed under statute the number of standards to be left, and Evelyn wrote of such plantations, "if . . . they be so laid out as to grow for several falls, they will prove more profitable and more delightful; more profitable because of their annual succession; and more pleasant because there will always remain some of them standing . . . there is not a more noble and worthy husbandry than in this . . ."

Noble and worthy it may have been; it was certainly profitable. An eighteenth century Scottish divine, writing under the pseudonym of "Agricola" in 1773, claimed a money yield of £7-6-3 per acre per annum from 5-6 year rotation Ash coppice, compared with £1-1-11 from adjoining land under agriculture. Advantages derive from the early returns, the flexibility of the system – felling of the standards may be postponed or advanced and the coppice cycle may be reduced or extended according to the pattern of market demand – and the availability of a wide range of log sizes.

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Standards may be of different ages, and even different tree species. They were once known by different names in England according to size – teller, standard and veteran; the French had a bigger range – baliveau, moderne, ancien, bisancien and vieille encore.

Coppice was rediscovered in America in the 1960s, and described as an “exploding innovation”. Systems known as “mini-rotation forestry” and “silage sycamore” have been described and are being developed in the USA and Canada in connection with renewable energy programmes. They involve close planting (1-4 feet), heavy fertilisation and cultivation, coppicing and – after 7-10 years – mechanical harvesting of everything – stems, branches and leaves. The objective is the maximum production of wood fibre; the onus of using it all devolving upon the wood technologist.

The much larger number of tree species in tropical countries than in the temperate zone makes coppice with standards an exciting prospect for Asia – the system has been tried in India, but not very seriously. The range of log sizes and the system’s labour intensive nature commend it for village and community forestry, while the fact that the site is never cleared gives protection from soil erosion and, at the same time, provides a rich habitat for animals and birds. It is also feasible to grow food crops between the coppice stools – immediately after cutting – while the standards provide shelter. And because the coppice and the standards draw their nutrients from different layers of the soil, and have different qualitative requirements, the system is probably more productive than conventional plantations.

In New Zealand

In New Zealand, we rediscovered the combination of pastoral grazing with tree growing in the 1970s. More recently we have extended agroforestry trials to include some species which will coppice. The trials at Tikitere in the early 1980s were regarded as heralding a revolution in land use which is also interesting because, of course, the system is older than New Zealand settlement itself. There is archaeological evidence in Europe of forest grazing with domesticated deer some 50,000 years ago; while the verderers courts in England provide a reminder of the statutes that regulated pasturage in the Crown forests of Elizabeth I. Evelyn, writing in 1664, advocated forest thinning “as that you leave straight and even intervals of 18 or 20 feet for grass . . . pastures will be both warm and prove of exceeding delight”. At Tikitere, nearly 350 years later, the so-called “State of the Art” median tree spacing is 20½ feet!

Dennis Richardson

Papua New Guinea’s National Forestry and Conservation Action Programme

The forestry sector of Papua New Guinea is changing with the help of New Zealand foresters. Alan Familton, Bruce Jefferies and Keith Dolman are leading a major restructuring of the forest service, a strengthening of the conservation department and a whole series of initiatives that will improve the way forests are planned, managed and monitored. The end result will be sustainable development and conservation programmes and a better return to the resource owners (the landowners).

The need for change was highlighted publicly in a major Commission of Inquiry into the forest industry completed in 1989, which exposed an industry that was riddled with corrupt practices, bribing of leaders and rampant transfer pricing. The forestry sector was said to be out of control.

An interdisciplinary review mission in 1989 recommended formation of new policy and legislation and a programme of technical and financial support for implementing these. The World Bank was asked to serve as “lead agency” and donors were quick to offer support under the auspices of the National Forestry and Conservation Action Programme (NFCAP) which developed from the Tropical Forestry Action Plan (TFAP). It has evolved to incorporate a more balanced coverage of economic development and conservation than the original TFAP, and with greater NGO participation.

NFCAP also provides for a Technical Support Project to help the World Bank and Government of Papua New Guinea to manage what is in any language a complex and demanding programme. The New Zealand team are that project and enjoy centre stage in this internationally visible reformation.

Extensive Resources

So it is that from the ashes of condemnation, the forestry sector is fast emerging with a fresh show of respectability. Papua New Guinea still has extensive and ecologically rich forest resources. With the support of the various participating government and non-government agencies and the donor community, they have the opportunity of becoming a model for sustainable forestry and forest conservation. This is the ultimate objective of NFCAP.

The more immediate goals of NFCAP are to help to:

- reduce the destruction of tropical forests and to promote their sustainable use;
- restructure the forestry administration;
- design better planning, management and monitoring systems for the forestry sector;
- evaluate and manage the conservation of large tracts of forest area;
- strengthen the human resources of the government and NGO agencies participating in forest management and conservation; and
- increase public awareness in forest and conservation management.

The NFCAP has enjoyed very substantial achievements since its inception in 1991 and is widely regarded as a model for collaboration in forestry sector development. Through NFCAP, Papua New Guinea has earned international accolades for the speedy accomplishment of new forest policy and legislation, and the firm commitment to a more effective and efficient Forest Authority which will comprise a Board, 19 Provincial Management Committees and a unified National Forest Service. There has been progress in identifying biodiversity values and in designing programmes to help safeguard these and other environmental interests.

The NFCAP faces some constraints too. It requires the coordination of many and varied inputs to achieve the goal of sustainable forest resource management. This goal has many competing claims and differing interpretations from the landowners, government departments, NGOs, industry and international environmental and conservation organisations. As with any major reorganisation there is resistance to change, just as there are those who would wish to see NFCAP go much further.

The reality though, is that for the first time in many years we find all of the major interest groups working together toward a more just and sustainable future of forest resource use and conservation. With that sense of goodwill, tolerance and mutual understanding and the continued support from the New Zealand team, a successful outcome for NFCAP seems assured.

Keith Dolman