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**South-North Challenges
in Global Forestry**

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Working Papers No. 145

November 1997

South–North Challenges in Global Forestry

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November 1997

This study has been prepared within the UNU/WIDER project on the Forest in the North and the South, directed by Professor Matti Palo of the Finnish Forest Research Institute (METLA) with Dr Eustáquio J. Reis of Institute of Applied Economic Research IPEA (Brazil).

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UNU World Institute for Development Economics Research (UNU/WIDER)

Katajanokanlaituri 6 B

00160 Helsinki, Finland

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Printed at Pikapaino Paatelainen Oy, Helsinki

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ISSN 0782-8233

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ABSTRACT

Several types of transitions are operating in global forestry in the late twentieth century. These include the forest-management transition and the forest-area transition, as well as shifts in forest perceptions and forestry paradigms. A trend towards internationalization and global integration is also reflected by several forms of evidence. An evaluation of the significance of the trend suggests that it is likely that industrial forests in the South will play increasingly important roles in global timber production over the next few decades. At the same time, it is probable that post-industrial forest paradigms will become increasingly established in the North.

I INTRODUCTION

The late twentieth century will probably be seen in the future as a major turning point in the history of global forestry. Several changes are occurring concurrently, and the ways in which these are effected will have profound implications for the future of global forest resources. Within these changes lie several challenges which have important South-North dimensions, and how these challenges are met will be of the utmost significance for global forestry. Before focusing on these challenges it is worth listing some of the major transitions which are currently underway. In a sense they are so interrelated as to be almost indivisible, but nevertheless several distinct foci can be identified.

II A TIME OF TRANSITION?

At least four major transitions can be identified as operating in this latter part of the twentieth century. Some of them are almost complete at the local or national scales: not one is yet complete at the global scale. In general terms, they have all begun in the developed world and in particular in Europe. How they will spread from this core remains to be seen, and this question lies at the heart of our challenges. The transitions can be summarized as follows:

- forest-management transition: from natural forests to managed forests and plantations
- forest-area transition: transition from declining to expanding forest areas or extents
- forest paradigms: shifts from pre-industrial, to industrial, and post-industrial forests
- global integration: a global forest resource system and a North-South shift

The clarity of these four transitions varies: the trend is clearer in some cases than in others. It is self evident that the first two have become firmly established in some parts of the world. The other trends are less obvious, but this does not necessarily mean that they are less significant. Indeed the very fact that they are proceeding very gradually may mean that their

implications are slow to be identified, and for this reason most of the paper concentrates on them.

III MANAGEMENT TRANSITIONS

While the natural forest resource was plentiful and extensive, there was little perceived need to practise management. Only when scarcity began to be felt did active management begin – in Europe from the late eighteenth century and in the United States at the beginning of the twentieth. The unpalatable conclusion is that perceived scarcity has up to now been a prerequisite for the application of management and, in modern parlance, sustainable use. The partial qualification is that a perceived shortage of forest *services* (as opposed to products or goods) has played a similar role in concentrating minds in some countries. In Switzerland and neighbouring Alpine areas of France, for example, perceived links between deforestation and flooding were the stimulus for implementing effective forest-resource management, which included in particular significant expansion of the forest area. Today we hear much about possible effects of deforestation in terms of climatic change and loss of biodiversity. Whether such general concerns are sufficiently sharp and particular to give rise to global transitions in forest management and forest area remains to be seen, but the historical evidence is not encouraging. On the other hand, fears of a timber shortage have historically been a more effective driving force. The introduction and diffusion of intensive management, including plantation establishment, reflect a perception that there is no alternative if adequate supplies are to be maintained.

Historically, the response to scarcity has been to extend the area of search (Britain drew timber supplies successively from Norway, the Baltic countries, and North America). While exploitable areas of natural forest remained, this was a viable strategy. Today, relatively few new accessible areas of exploitable forest remain, and extensification is giving way to intensification, and especially to the establishment of plantations. The implications of this change could scarcely be more profound. Whereas the location of exploitable natural forests was largely determined by climatic and other physical conditions, plantations can be deliberately located in areas that are optimal in terms of growing conditions and productivities, and of markets.

IV FOREST-AREA TRANSITIONS

Net deforestation is still occurring in the world as a whole as well as in much of the South. In parts of the North, however, forests have been expanding for much of the present century. A remarkable transition has been effected in many European countries in particular (Mather 1992), and in some cases the forest area has more than doubled over the last century (Table 1). While the trend is undoubtedly real, it needs to be viewed with reservation. Forest area previously lost through deforestation has now been partly restored, but of course the structure and species composition of the replacement forest are different from the original. Nevertheless the trend is a welcome one, especially in relation to issues such as CO₂.

TABLE 1
THE FOREST-AREA TRANSITION: LOW-POINT AND
CURRENT FOREST EXTENTS
(percentage of land area)

Country	Forest cover – low	Forest cover – present
Denmark	4	11
France	14	23
Italy	17	23
Portugal	7	36
Scotland	5	15
Switzerland	18	30

Source: Compiled from various sources.

In many European countries forest history prior to the last 100-200 years was characterized by deforestation, forest degradation, scarcity of forest resources and the occurrence of perceived side effects of deforestation, such as floods and accelerated erosion. In other words, strong similarities exist with recent forest histories in much of the South. The question arises, therefore, as to whether similar transitions can be expected to occur in the South, and eventually at the scale of the world as a whole.

V A CHANGING FOREST PARADIGM?

The perception of the role and purpose of forests in some parts of the world has undergone significant change in recent decades. The forest is

increasingly valued as an *environment*, rather than simply as a source of wood. This change occurred initially in relation to natural forests, in countries such as Australia and New Zealand as well as in areas such as the Pacific Northwest. In the new continents, the intensive management of industrial plantations for wood production has not yet attracted the same opposition as the logging of 'old growth' forests. In parts of Europe, however, there are clear signs that similar shifts are occurring in perceptions of plantations. The challenge to the primacy of wood production as the primary management objective is accompanied by preferences for forest designs and management practices other than those traditionally associated with maximum wood production.

This (partial) paradigm shift can be located within a three-stage descriptive model of forest use (Mather 1990, 1991). In the 'pre-industrial' forest, products are diverse, including food, medicines, fodder, fuelwood and wood and timber for utensils, implements and construction. In essence the forest is often a *de facto* common-property resource, whatever its *de jure* status may be. The 'industrial' paradigm is characterized by the primacy of timber production as the management objective, and the forest is usually under private control (i.e. it is either privately owned or operated as a concession). In several European countries, the forest-area transition was accompanied by a shift towards the 'industrial' forest paradigm. In the 'post-industrial' paradigm, the primacy of wood production as a management objective weakens, as environmental benefits such as nature conservation and recreation are increasingly sought. Typically, some form of public regulation is imposed on management, or incentives are offered for forms of management perceived as desirable. The result is likely to be a relative increase in the costs of wood production, as increasing areas in the forest are given over to slower-growing species (more favoured for amenity and wildlife conservation) and as management considerations other than those of maximum wood production increasingly apply. Some would argue that single-purpose use, in which different areas of forest are geared to wood production, recreation, conservation and other specialized uses are more efficient in economic terms (e.g. Vincent and Binkley 1993). But economic efficiency is overshadowed by public acceptability: a marginal economic advantage will count for little if a management paradigm is not politically sustainable. In practice, the forest policies of many European countries have espoused the 'post-industrial' paradigm: some areas of forest may receive special protection because of their wildlife values or for other reasons, but in general multiple objectives

including environmental protection and recreation as well as timber production are pursued.

The 'post-industrial' paradigm implies the inclusion of elements of the 'new forestry' approach, or 'forest ecosystem management' (e.g. Franklin 1989, Behan 1990, Bengston 1994). It also embraces multiple use, which is of course not a new concept. But it is more than just 'new forestry' and multiple use. In effect it is based on the notion that there is a public interest in forests, and that they are not, or should not be, simply private property. This public interest is not necessarily reflected in ownership, but is expressed in a combination of regulation and incentive. The combination of changing product mix, changing management approaches, and changing management climate justifies the perception of a paradigm shift. To some extent the 'post-industrial' forest resembles 'complex plantation forests' described by Kanowski and Savill (1992). As these authors indicate, a conceptual change or paradigm shift is required before this multi-purpose model of plantations is accepted. The shift has been at least partly effected in parts of the developed world but the prospects for it to occur elsewhere are unclear. It is possible that this transition in parts of the developed world has been facilitated by the perpetuation of the 'industrial forest' paradigm elsewhere. For example countries such as Britain and Japan have been able to regard some of their forests as amenity resources while depending on imports of products from industrial forests in other parts of the world. Indeed one of the main South: North challenges is how to address this situation.

Two points about the 'post-industrial' paradigm are worth emphasizing at this juncture. One is its application to plantations as well as to natural forests. The other is the abruptness and rapidity with which it can be embraced: in Britain, conventional commercial timber plantations of the type that had been established throughout most of the twentieth century became unacceptable during the late 1980s. Planting rates then fell to less than half of their earlier levels, and radical changes have occurred in the type and location of new planting.

VI GLOBAL INTEGRATION: A GLOBAL FOREST-RESOURCE SYSTEM AND A NORTH-SOUTH SHIFT

Most wood and forest products are consumed in their country of production, but a growing proportion of value-added forest products enters international trade (Table 2). The geographical scale and complexity of that trade have clearly increased in recent decades. Full-scale globalization, in the sense of standard products geared to global markets, has not yet been achieved, and several regional spheres of trade continue to exist, notably in Europe, in North America and in parts of the Pacific Rim. Nevertheless, there is a clear trend towards internationalization or global integration.

The trend towards global integration offers both opportunities and threats to the South. It presents opportunities through the comparative advantage that many Southern areas enjoy in terms of potentially rapid timber growth. It is a threat to the extent that activities which for environmental reasons are not welcome in the North may be displaced to the South. At least in theory, such activities could include bulk fibre production in intensively managed plantations as well as the operation of pulp mills and other processing plants.

TABLE 2
PROPORTION OF PRODUCTION ENTERING INTERNATIONAL TRADE
(exports as percentage of production, by weight or volume)

	1970	1980	1990
Industrial roundwood	7.4	7.9	7.1
Sawlogs (total)	8.3	8.0	6.8
Sawlogs (coniferous)	4.4	4.5	4.9
Sawlogs (non-coniferous)	18.7	16.0	11.7
Sawn wood	13.9	17.7	18.3
Wood-based panels	14.0	16.1	25.0
Wood pulp	16.6	16.8	16.2
Paper and paperboard	18.3	20.6	23.2

Source: Except where otherwise indicated the source of data for tables is FAO *Yearbook of Forest Products*.

The developed world has traditionally been dominant both in production of industrial wood and in trade in forest products, although some developed countries have for centuries imported timber from their empires or spheres of influence in what is now the developing world. Approximately three-

quarters of industrial wood production is in the developed world. The United States, Canada and the former Soviet Union account for 52 per cent of industrial wood production: the boreal forest alone contributes over one-third of all removals of industrial roundwood. In 1990, over three-quarters of international trade in products such as coniferous sawn wood, wood pulp and paper was concentrated within the developed world. Nearly half of all exports of forest products originate from boreal-forest countries, and the European Union accounts for half of imports. In short, the developed world has been completely dominant in production and trade.

In recent decades, however, the developing world's share in both production and trade has been expanding. Table 3 shows how the developing world's share of production has increased. Shifts in the pattern of production are not necessarily reflected directly in the global pattern of trade, as over 80 per cent of global production is directed at domestic markets. Nevertheless, the developing world's share of trade is also increasing. In other words, it is contributing an increasing share of increasing production. As the relative contribution from the developing world has grown, so also have increasing proportions of developing-world exports gone to other developing countries. South: South trade has grown as well as South: North trade. Overall, the pattern of international interaction has become more complex in recent decades.

TABLE 3
DEVELOPING WORLD'S SHARE OF PRODUCTION
(percentage by volume or weight)

	1960	1970	1980
Industrial roundwood	16.0	23.3	23.7
Sawn wood	12.2	20.0	23.2
Wood-based panels	9.0	13.8	20.5
Wood pulp	3.4	6.1	6.9
Paper and paperboard	7.8	11.5	16.0

6.1 Internationalization of production

The internationalization of wood production began during the colonial era, but its scale and complexity have greatly increased in recent years. In effect, it decouples the firm from the forest resources of a single country, and it has been facilitated by improvements in transport which have lowered the costs of exchanging goods between countries (Porter 1990). It

has also been assisted by the tremendous growth in telecommunications in recent decades, which has permitted the rapid and cheap interchange of information on availability, prices and specifications.

Until recently, internationalization was largely restricted to the involvement in developing countries of transnational corporations (TNCs) based in the developed world. Now, more extensive investment links have been forged between different parts of the developed world, and TNCs based in the developing world have become involved in both the South and in the North. Comparatively little is known about the overseas investments of wood-industry corporations, and research on the subject is not easily undertaken (e.g. Bilek and Ellefson 1992).

Data on investment links tend to be partial and qualitative rather than comprehensive and quantitative. Nevertheless, it is known, for example, that Scandinavian companies have invested, at a variety of levels from plantations to pulp and paper mills, in other parts of the North and in the South. American corporations have invested in forests and in processing facilities in areas such as South-east Asia and South America as well as in Canada. They have also invested in facilities in Europe, whilst some European investment has occurred in the United States. Japanese investment has been widespread, occurring in countries such as Brazil as well as in the Pacific Rim. The 'first wave' of Japanese investment in Canada during the 1970s mainly involved timber and minerals companies. The pulp and paper sector accounted for a large proportion of a renewed wave of Japanese investment, during the second half of the 1980s (Edgington 1994).

New Zealand is an interesting – if extreme – exemplar of the internationalizing trends that have operated in some parts of the world over the last decade (e.g. Le Heron 1988). Recent purchases of forest land in New Zealand have involved corporations based in developing countries such as Indonesia and Malaysia as well as in developed-world countries such as the United States and Japan (Table 4), and have been accompanied in some instances by investment in processing plants.

At the same time, the New Zealand-based company Fletcher Challenge expanded dramatically during the 1980s, and by 1988 owned or had harvesting rights over 3.4 million ha of forest land in Australia, Canada, Brazil and Chile. It had also become the world's largest producer of market

pulp, the second largest newsprint producer and third largest lumber producer (Marchak 1992). The trend was further emphasized in 1991 when US-based International Paper, the world's forest-product company with sales in 120 countries, acquired an interest in Carter Harvey Holt, another major NZ company (Roche 1993).

TABLE 4
FOREIGN ACQUISITIONS OF NEW ZEALAND FORESTS (1990-92)

Purchaser	Base	Area (ha)
Ermslow One	Malaysia/Singapore	23801
Juken-Nissko	Japan	43531
Wenita	Hong Kong/China	20521
Winstone Pulp International	Indonesia	8331
Oji Paper-Sanyo Kokusaken Pulp	Japan	30232
ITT Rayonier	USA	97453

Source: Based on Rowling (1993).

TABLE 5
SHELL FORESTRY PLANTATIONS IN SOUTH (1995)

Country	Area, date and type	Partners
Chile	33 k ha eucalyptus, integrated pulpmill (1987)	Shell 60%; Scott 20%; Citibank 20%
Congo	17 k ha eucalyptus, roundwood and pulpwood for export to Europe (1987-88)	Shell 50%; UAIC 50%
New Zealand	24 k ha radiata, pulpwood and sawn wood (1981-82)	Shell 50%; CarterHolt (50%)
Uruguay	30 k ha eucalyptus, roundwood and pulpwood for export to Europe (1991)	Shell 60%; Kymmene 40%

Source: Pers. comm. Shell Forestry.

The global reach of some of the actors is illustrated by the plantation interests of Shell Forestry (Table 5). The clear implication is that locational advantage is now being sought at a global – as opposed to national or regional – scale. This trend is of course not restricted only to forest production but also applies in others sectors of economic activity. Essentially it means that the significance and potencies of national policies are weakened. Combined with the freeing of the traditional locational constraints of forest production by the advent of plantations, this represents

a radically altered climate for global forest production. Its implications for national forest policies are profound.

The developing world's share of production and of trade has expanded in recent decades, and the degree of international interaction, as reflected by the involvement of transnational corporations, has increased and has become more complex. Various factors have combined to give rise to these trends. They include issues both of supply and of demand, but also involve complex and subtle issues related to changing perceptions of forests and to changing climates of trade.

6.2 Internationalizing trends: the role of supply

Intensification in the form of intensive management of natural forests has proved successful in the developed world, but has been more elusive in tropical forests. In the South, the main form of intensification in the foreseeable future is likely to be the creation and management of plantations. In 1965, the global extent of plantations was estimated at 80 million ha (Logan 1967). While their precise area at present is unknown, plantations are now believed to extend to around 150 million ha or 5 per cent of the closed forest area (Mather 1993). While the greater part of the plantation area is still in temperate latitudes, over 40 million ha of plantations have been established in the tropics and subtropics (Table 6).¹ In many countries, plantations were established initially in response to fears about wood shortages, and usually involved either direct state action in planting on state land, or indirect state support through grants and tax incentives. More recently, state support has been questioned, but at the same time international capital has been increasingly invested in industrial plantation projects. As Dargavel and Kengen (1992) point out, plantations are more thoroughly incorporated, both by trade and by the involvement of transnational enterprises, into the world economy than natural forests and are more vulnerable to its fluctuations. In other words, the management transition and the advent of plantations have facilitated internationalization.

¹ The total area of plantations in the developing world (as opposed to the tropics and sub-tropics) is given by FAO (1995) as 68.4 million ha, of which 31.8 million ha are in China. Within the tropics, the total is given as 30.8 million ha, or which 22.6 m are in tropical Asia.

Countries such as Chile and New Zealand have experienced rapid afforestation in recent years (Lara and Veblen 1993, Roche and Le Heron 1993). In Chile, for example, annual planting rates exceeded 50,000 ha during the 1980s, and by the end of the decade were over 90,000 ha. Already, the significance of plantations for industrial wood production is quite disproportionate to their extent. In Latin America, for example, industrial plantations in 1986 comprised 0.6 per cent of the forest area, yet produced 30 per cent of the industrial wood supply (McDonald and Krugman 1986). In Australia, the corresponding percentages are 0.7 and 54 (Turner and Gessel 1990). The trend is clear: the plantation area is expanding, and increasing proportions of industrial wood are coming from planted forests. As natural forests are increasingly protected for their environmental values, the trend will become even more apparent.

TABLE 6
AREAS OF FOREST PLANTATIONS IN THE TROPICS AND
HOTTER SUBTROPICS (000 HA)

	1970	1980	1990
Africa	1378	2724	3773
Asia (including S. China)	4421	13046	29245
Latin America	798	4934	9256
27° N - 27°S	6667	20973	42694

Source: Based on Evans (1992).

This inexorable trend is of fundamental significance in relation to the global pattern of wood production. When natural forests were the main source of wood, the preferred areas for production were defined largely by accessibility. In other words, comparative advantage between potential areas of production was expressed in terms of costs of harvesting and transport (Lyon and Sedjo 1992). For plantations, however, comparative advantage is expressed in different terms. Bio-climatic conditions become very significant. Plantations can be located in areas that are optimal in terms of biological productivities, in terms of costs of labour and management, and (perhaps) also in terms of environmental standards that have to be observed. The new optimal patterns are likely to be more dispersed and more truly global than the ones they replace.

A significant spatial trend has already emerged, and it may strengthen in the years ahead. This trend is reflected in differential growth patterns, and consists essentially of a southward adjustment, in both wood production and in processing. It can be exemplified at different scales, and in a variety

of ways. Within Europe, the production of industrial roundwood and pulp has been increasing faster in countries such as Spain and Portugal than in the traditional forest-products countries of Scandinavia (Table 7).

Within the United States, the exclusion of logging from many areas of forest in the Pacific Northwest serves to reinforce the emergence of the South as a major centre of wood production and of the forest-products industry (the South accounted for 38 per cent of US wood production in 1990, compared with 31 per cent in 1970). At the global scale, the growth of wood production has been much greater in recent years in countries such as Brazil, Chile and New Zealand than in traditional forest countries such as Sweden and the former Soviet Union (Table 7).

TABLE 7
INDUSTRIAL ROUNDWOOD
(production indices 1970=100)

	1970	1980	1990
Sweden	100	79	87
Finland	100	115	107
Soviet Union	100	93	102
Spain	100	159	225
Brazil	100	259	311
Chile	100	177	302
New Zealand	100	121	146

6.3 Internationalizing trends: the role of demand

Trends in levels and composition of consumption are likely to reinforce trends in supply, and indeed underlie them. At present approximately three-quarters of the global consumption of industrial wood is in the developed world, which contains around one-quarter of the global population. In recent decades, however, rates of increase in consumption have been slowing in the North, while they have showed few signs of deceleration in the South. Nevertheless, per capita consumption is still low in the South. The raising of levels in Asia (excluding Japan) and Latin America to the world average of 0.32 m³ per capita would require a further 700 million m³ of industrial roundwood annually, or about 40 per cent of present global consumption (Bazett 1993).

In recent years, sawlogs have accounted for around 60 per cent of industrial wood removals, compared with 25 per cent for pulpwood and 15 per cent for 'other industrial roundwood'. The ratio of sawlogs to pulpwood has been falling for several decades, from 4:1 in the 1940s to around 2:1 in the 1990s. This change reflects the increasing significance of manufactured wood products relative to sawlogs and sawn wood. Globally, consumption has increased at a much faster rate for products such as paper and wood-based panels than it has for sawn wood. Annual rates of growth in sawn wood consumption have decreased in recent decades in the North, with its stabilizing population and maturing housing stock, while they have accelerated in the South. Whereas 'old growth' or natural forests have traditionally been the source of most sawlogs, plantations can readily supply the raw materials for manufactured products. The pattern of market growth and forest productivities increase the relative advantage of the South, while the changing pattern of demand and consumption increases the relative advantage of plantation-based production.

6.4 A strengthening trend?

The demand for forest products is growing faster in the South than in the North, and higher productivities can also be achieved in industrial wood plantations in the South. These are powerful 'pull' factors, and their operation may be facilitated by the changing perceptions of forests in the North and by developments in the climate of trade (including the liberalization of trade). The outcome is likely to be a pattern in which bulk wood or fibre production, and the associated processing industries, increase more rapidly in the South than in the North. A related trend is the weakening of the historical dominance of the North in trade, and the growth of exports of products such as pulp and wood-based panels from South to North. Comparative advantage is shifting from *inherited* resource endowment expressed in terms of natural forest area to *created* resource endowment manifested in productivity of plantations and in costs of production. At the global scale (and perhaps also at continental scales) this southward shift can be expected to continue and probably to accelerate, for several reasons. Some of these can be regarded as 'pull' factors, reflecting the attractions and comparative advantages of new areas. Others are 'push' factors, reflecting impediments to growth in production in some of the existing areas.

6.4.1 Pull: productivities and sources of raw material

Higher productivities can be achieved in low latitude plantations than in many parts of North America and Europe (e.g. Evans 1992, Kanowski and Savill 1992, Sedjo 1992). For example mean annual increments may range from around 3 m³/ha per year in rotations of the order of 100 years in Canada and Scandinavia to more than 20 m³/ha per year over 20-25 year rotations in pine plantations in countries such as Chile and New Zealand and to even higher productivities in the tropics (e.g. Evans 1992). Short rotations and high productivities translate into comparative advantage in wood production costs. Costs of land and labour are also often lower, or at least no higher, in the South than in the North. The cost of producing a ton of pulp in countries such as Chile and Indonesia can be less than half of that in traditional areas such as Scandinavia. In Brazil, for example, the costs of a ton of pulpwood delivered at the mill in 1991 could be as little as US\$18, compared with \$72 in Sweden and \$43 in the interior of Canada (Suchek 1991). Already by the mid-1980s it was being stated that 'The worldwide potential competitiveness of the new, low-cost raw material sources of the LDCs has gradually started to reshape the global structure of the forest industry' (Kiljonen 1986:176). A dramatic growth in exports of forest products (and especially in pulp) has already occurred in countries such as Brazil, Chile and New Zealand, where extensive new plantations have been established since the 1960s. In Brazil, for example, the trade balance in pulp and paper products changed from -\$1 million in 1970 to +\$556 million in 1990.

6.4.2 Pull: 'pollution havens'?

The concept of 'industrial flight' to 'pollution havens' has attracted attention in relation to industrial location. In theory, manufacturing industry might be expected to relocate from areas of strict environmental regulations and high compliance costs to areas of more lax regulations and lower costs (e.g. Leonard 1988). In reviewing the literature, Pearce (1995) finds little empirical evidence that this theoretical possibility has operated to a significant extent in practice. It may be difficult to isolate the environmental effect from other locational factors such as tax regimes and costs of labour and raw materials, and relocating corporations may in any case be reluctant to indicate the extent to which environmental considerations have figured in their decisions. Most studies have concentrated on pollution-intensive industries (e.g. Hesselberg 1992), rather than on primary production. In theory, the concept could apply

directly to activities such as pulping, and there are recent reports that at least some corporations have admitted engaging in operations in Latin America in order to avoid more stringent environmental regulations in the United States (Dudley et al. 1995). Lohmann (1996) suggests that lax enforcement of pollution laws in some south-east Asian countries may be an attraction for some pulp and paper interests, especially at a time of tightening controls in the North. But it is also possible in theory that a variant of the industrial flight-pollution haven hypothesis could apply at the level of the primary fibre production in the plantation. In short, traditional industrial plantations in which timber production is the only objective may be more acceptable in some parts of the world than in others. Hence in order to avoid the additional costs and managerial complications of post-industrial plantations, investors may seek out locations in such areas. The extent to which this possibility is an actuality is unknown (and hence should feature on research agendas), but it is significant that the direction of operation of this factor simply reinforces the operation of other factors such as productivity and demand.

6.4.3 Push: environmental constraints in the North

Both resource limits and environmental constraints are likely to act as 'push' factors in a North-South shift. Areas of natural forest accessible for logging in the North are becoming scarcer. This fact would in itself lead to increasing reliance on plantations. Environmental constraints are speeding up this process of effective exhaustion of natural forests as sources of timber – notably in the celebrated case of the northern spotted owl (e.g. Watson and Muraoka 1992) – and hence are encouraging the shift towards plantations. But the issue highlighted here is that the perception of forest plantations has already changed in some countries and is likely to change in others. 'Tree farms', on which the objective of management is simply maximum timber production at minimum cost, may still be acceptable in some lands, but much less so in others. In other words, environmental (and social) constraints are operating on plantations as well as on natural forests. The paradigm of the 'post-industrial' forest is better established in some parts of the North than elsewhere: if transnational corporations can continue to operate industrial forests in the South, and so enjoy the benefits of lower costs and fewer management constraints as well as those of higher productivities, the attractiveness of the South will be reinforced.

VII CHALLENGES

Internationalizing trends and a shift to the South presents challenges both for the North and for the South, but these challenges are of very different kinds. Obviously neither the North nor the South is homogeneous, and different challenges will exist within these zones as well as between them.

For the North, a major challenge is that of adapting to weakening locational advantage in terms of both timber production and market. In countries which have traditionally been major players on the global forestry scene, the forest-products industry can adapt in a number of ways. One is to seek to maintain competitive advantage through research and development and through high-value products such as machinery and engineered wood products. Another is to gain access to external supplies of raw material (for example by investment in overseas plantations), and to internationalize manufacturing operations. Both of these strategies are likely to lead to increased volume of international trade and increased complexity of trade patterns, and hence to strengthen the trends previously outlined. In Canada, for example, there is acknowledgement that comparative advantage based on 'old growth' stocks of timber is weakening. Canada is unlikely to be competitive in wood production based on plantations (Sedjo 1990). Increasing reliance will have to be placed on advantages such as a well-developed industrial structure (and abundance of low-cost energy for processing) (Boulter 1990). More generally, the wood-products industry in the North will probably have little option but to follow the path of 'added-value' pioneered by Finland in particular. Over the last thirty years it has undergone a shift of role from that of major exporter of relatively low-value products such as roundwood and plywood to that of exporter of higher-value products such as fine paper, forest-industry machinery and technical 'know-how'. Finland's comparative advantage in terms of wood production may have weakened, but it has retained advantage in high-value products through its highly developed infrastructure and technology. A major challenge for it and for other Northern countries in which forest-products industries have traditionally been important is to maintain their position on the technological treadmill, and to retain technological advantage. One manifestation of the traditional technological dominance of the North is the growth of activity in the South of consultancies based in Scandinavian and North American countries. They represent one of the most globalized parts of the forestry industry, and play major parts in the development of forestry in the South, at both

the plantation level and that of the forest-products industry. Sometimes in association with aid agencies, they can facilitate the export of machinery and of the industrial-forest paradigm itself. Such bodies, and the governments which encourage or condone their activities, have a moral responsibility to ensure that the silvicultural and industrial practices that they promote in the South are of a standard that would be acceptable in their home countries. Perhaps one of the challenges for the North is to ensure that the responsibility is accepted.

More generally in the North, a challenge is to seek to ensure that the shift to the 'post-industrial forest' paradigm is not at the expense of imposing or maintaining the 'industrial' paradigm in the South. In general terms an awareness of the 'ecological shadows' cast by countries such as Japan (McNeill et al. 1991) and Britain is growing. Imports from the South might in theory be expected to have facilitated both the forest-area transition and the paradigm shift to the post-industrial forest, but we as yet know little about the precise contribution of such availability of supplies from overseas, or indeed of the environmental and social costs of production.

Various challenges face the South, or parts thereof. In some areas, the pre-industrial forest paradigm still prevails. Some of these forests are in protected areas, and may remain in their present form indefinitely. It would be unrealistic, however, to expect that all the present pre-industrial forest will be insulated from developmental pressures. The key question is whether a direct jump can be made from the pre-industrial to the post-industrial paradigm without passing through the industrial stage. Many of the features of forestry now widely perceived as undesirable in both socio-economic and ecological terms relate to that stage. The challenge is to find a way of avoiding them.

A second challenge involves policies towards plantations. Some commentators assume very positive perceptions of plantations. Gladstone and Ledig (1990), for example, welcome them as a means of reducing pressures on natural forests, and indeed the 'forestry principles' suggest that their contribution to the maintenance of ecological processes and to 'offsetting pressure on primary/old growth forest ... should be recognized and enhanced' (UN 1993: 482). Some commentators also discount the environmental effects of plantations: for example, Sedjo (1994) contends that they are usually negligible. Such sanguine views, though frequently expressed by the American forest-products industry in particular, are by no

means universal. Concern with both the socio-economic and environmental impacts of such forestry has been widespread, being reported from settings as diverse as Chile, India and Thailand (Lara and Veblen 1993, Gadgil and Guha 1993, Lohmann 1996), as well as from European countries. Too often, the plantation has had a colonial flavour, both in Europe and in other parts of the world: capital, control and management have come from outside the locality, where the profits have usually also accrued. The locality itself has often provided only cheap land and cheap labour, and social and environmental costs have been borne with little compensating benefit. Small farmers have been displaced, and monocultures of exotic species established: in Chile, for example, critics have contended that forest policies have favoured companies at the expense of the environment and the poor (e.g. Marchak, 1995). In some cases, attempts have been made to justify displacement by reference to the alleged benefits of moving small farmers off fragile or marginal environments. Sometimes it is claimed that plantations are established on degraded or otherwise useless land, with the implication that they are environmentally beneficial. Few claims of this type, however, have been substantiated by objective studies. Some governments in the South have used the 'green' images of reforestation to promote the rapid expansion of plantations (and in effect of industrial forestry) and to overcome local opposition (e.g. Bryant and Parnwell 1996). The political and economic élite claims that plantations represent sustainable development: those who suffer from their establishment take a less positive view. Perhaps a challenge for governments in the South is to ensure that the modes of establishment of plantations in their countries are beneficial in both environmental and socio-economic terms. The related challenge is to resist attempts by industrial-forest interests to play developing countries off against each other, by threatening to move elsewhere if standards and controls are imposed.

Can a shift towards the post-industrial paradigm of plantations help to avert the strongly negative perceptions that eventually develop in relation to the typical type and management of the industrial plantation? Will countries in the South be able to impose effective constraints on the nature and management of plantations, and if so will they run the risk of diverting investment capital to other countries with lesser concerns on these issues? The natural forests of various lands – especially in south-east Asia – have been exploited in succession for exports to developed countries (e.g. Kitabatake 1992). Is there a risk that the same type of sequence will

develop in respect of plantations? The fact that the establishment of plantations is at present strongly localized in only a few countries, and conversely that other countries would welcome investment, might suggest that the answer could be positive.

Third, an obvious challenge is to control deforestation. There is plenty of experience of deforestation, but as yet limited understanding. How to halt these trends is still uncertain, but there is clear evidence from many developed countries that they can be controlled and indeed reversed. Equally it is clear that certain national and international factors – such as inappropriate systems of land tenure and indebtedness – are likely to exacerbate deforestation. Perhaps this is a reminder that while deforestation may be a process of the South, the challenge that it represents is of global scale. The stabilization of the global forest area is at present a distant but not unrealistic prospect. The examples of many European countries suggest that dramatic transitions from deforestation to reforestation are possible. These have not always been effected smoothly or without stress: perhaps one of the major challenges is not only to effect such transitions more smoothly and less stressfully than in some European countries.

For North and South alike, the combination of the process of internationalization and the quest for sustainability presents a challenge that is unprecedented in terms of scale and complexity. As such, we have no historical analogy or experience from which to benefit. If we look back to nineteenth century Europe, however, we may find some basis for encouragement and optimism.

In the nineteenth century, near-revolutionary change occurred in the perception and management of forests in much of Europe. In essence, the spectre of timber shortage had stimulated the adoption of intensive management. Successive countries enacted forest laws in an effort to safeguard their dwindling and deteriorating forests, and sought to apply intensive management through new state forest services and other national institutions. The effectiveness of such new legislation and institutions is difficult to evaluate in precise terms, and it would be foolish to conclude that they had been completely successful. Nevertheless, the forest area was stabilized and forest productivity was increased.

Perhaps history will show the late twentieth century to be a period of comparable significance, when new perceptions, new objectives and new institutions emerged. Perhaps the late twentieth century will be associated with international forest law in the same way in which the nineteenth century was with national law. Perhaps it may also be associated with a transition towards sustainable 'forest ecosystem management' in the same way as the earlier period is associated with the beginnings of sustained-yield management. The last few years have seen much discussion of the tenets of sustainable forest management, and indeed 1994 saw the publication of a journal paper entitled 'international law of forests' (Hooker 1994).

One of the 'forestry principles' emanating from the United Nations Conference on Environment and Development at Rio in 1992 was that 'forest resources and forest lands should be sustainably managed to meet the social, economic, ecological, cultural and spiritual needs of present and future generations. These needs are for forest products and services, such as wood and wood products, water, food, fodder, medicine, fuel, shelter, employment, recreation, habitats for wildlife, landscape diversity, carbon sinks and reservoirs, and for other forest products' (UN 1993: 481). (It should be noted that the preamble to the principles specifically stated that they should apply to all types of forests, both natural and planted, in all geographical regions and climatic zones.) In subscribing to these principles, national governments acknowledge that forests have values ranging beyond the economic values of timber production, and endorse the concept of sustainable management. To be meaningful, of course, these concepts have to be put into practice, and it is too early to evaluate the extent to which this is currently occurring. Nevertheless, there are some signs of progress, not only in terms of restatements of national forest policies but also on the international scene. The 'Helsinki Process' has since 1990 developed general guidelines for the sustainable management of forests in Europe and to devise measurable criteria and indicators that can be employed in relation to that management. The parallel 'Montreal Process', involving a number of countries fringing the Pacific, began in 1993 and resulted in the 'Santiago Declaration' of 1995. One of its criteria is the 'maintenance and enhancement of long-term multiple socio-economic benefits to meet the needs of societies'. Amongst the indicators suggested in relation to that criterion are measures of recreation and tourism, of employment and community needs, and of cultural, social and spiritual needs and values. At another level, eco-certification is a

promising innovation. Its effectiveness remains to be fully proven, but it is a welcome indication that at least some progress, however limited it may be, is being made in respect of a shift towards the post-industrial forest paradigm.

Perhaps the biggest challenge of all is for North and South alike to implement the 'forestry principles' and in particular the central one outlined above. In essence it represents the adoption of the post-industrial forest paradigm worldwide. The challenge it represents is formidable: while we may be depressed by the limited achievements to date, we may be encouraged by the impressive degree of activity at the international level in recent years. This activity may not be sufficient to meet the challenge, but surely it is necessary.

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