36

International cooperation and resource mobilization for sustainable forestry development

International cooperation and resource mobilization for sustainable forestry development

C Chandrasekharan,[1]

Funding has been highly inadequate to meet the commitment made by countries at the Earth Summit for achieving sustainable forest development (SFD). The net annual forestry investment of US$ 31 250 million with a component of US$ 5 670 million of concessional financing for the period 1993-2000, as envisaged by UNCED Agenda 21 is far from being realized. Fund mobilization continues to be generally weak in the developing countries. National capability for fund mobilization and its efficient utilization, in many cases, is far from adequate.

Foreign investment and ODA are important for many developing countries. The current level of ODA in forestry is only 27.2% of the amount suggested in Agenda 21. In the present day economic climate, increase in ODA is unlikely.

While ODA's role remains essential and vital, it can only be catalytic. There is need to promote the involvement of the people, the private sector and the NGOs in forestry development. All means of mobilizing financial resources need to be fully tapped. Traditional measures for revenue generation and allocation of funds based on timber production alone is no longer appropriate. Innovative measures are required for generating funds based on the immense externalities and environmental benefits of forests. These require effective and sophisticated mechanisms. It further calls for a strong development partnership of government institutions, private establishments, assistance agencies, research institutions and NGOs. This strongly suggests the need for a sectoral approach for forestry development supported by appropriate policies, strategies and regulatory mechanisms. Improvement of technology needs to be assigned its due importance.

Coordination of multiple aspects of SFD is of prime importance in this connection to facilitate sharing of experience, complementarity, and consistency in policy dialogue.

Keywords: Coordination, global externalities, Official Development Assistance, sustainable forestry development.

---

[1] Previously a Senior Staff Member in the Forestry Department of the Food and Agriculture Organization of the United Nations, Rome.

Table of Contents

Acronyms and Abbreviations

ACIAR	Australian Centre of International Agricultural Research
ADB	African Development Bank
AIDAB	Australian International Development Assistance Bureau
AsDB	Asian Development Bank
ASEAN	Association of South East Nations
CARICOM	Caribbean Community
CATIE	Centro Agronomico Tropical de Investigacion y Ensenanza
CBOs	Community Based Organizations
CGIAR	Consultative Group on International Agricultural Research
CIDA	Canadian International Development Agency
CIFOR	Centre for International Forestry Research
DANIDA	Danish International Development Agency
FAO	Food and Agriculture Organization of the United Nations
FINNIDA	Finnish International Development Agency
FPA	Forest Partnership Agreements
FSC	Forest Stewardship Council
GEF	Global Environment Facility
GTZ	German Agency for Technical Cooperation
ICRAF	International Centre for Research in Agroforestry
IDB	Inter-American Development Bank
IFAD	International Fund for Agricultural Development
IFC	International Finance Corportation
ILO	International Labour Organization
ITC/WTO	International Trade Centre/World Trade Organization
ITTO	International Tropical Timber Organization
IUCN	World Conservation Union
IUFRO	International Union of Forestry Research Organizations
JICA	Japanese International Cooperation Agency
KfW	Germany's Development Aid Bank
MDB	Multilateral Development Bank
NFAP	National Forestry Action Plan
NGO	Non-Government Organization
NORAD	Norwegian Agency for Development
ODA	Official Development Assistance
OECD	Organization for Economic Cooperation and Development
RBG	Royal Botanic Gardens, Kew, UK
SADC	South African Development Council
SIDA	Swedish International Development Agency
SFD	Sustainable Forestry Development
TFAP	Tropical Forests Action Programme (previously Tropical Forestry Action Plan)
TNCs	Transnational Corporations
UK-ODA	Overseas Development Administration of the United Kingdom
UN	United Nations
UNCED	United Nations Conference on Environment and Development
UNDP	United Nations Development Programme

UNEP	United Nations Environment Programme
UNESCO	United Nations Educational, Scientific, and Cultural Organization
UNIDO	United Nations Industrial Development Organization
USAID	United States Agency for International Development
WFP	World Food Programme
WHO	World Health Organization
WRI	World Resources Institute
WWF	World Wide Fund for Nature

INTRODUCTION

Meeting future human needs of food, water, health, energy and settlements depends crucially on how the worlds' forests are managed. Forests form the main body of the terrestrial ecological system and a complete resource base. Sustainability, therefore, is not just a desirable alternative, but an imperative of forestry development. In many countries, however, forest resource is being increasingly put at risk by inappropriate policies, misplaced public expenditures and weak resource administration and supervision (Douglas & Magrath 1996).

Forest ecosystems can be managed for a variety of objectives related to the many goods (wood and non-wood) and services (e.g. soil and water conservation, conservation of biological diversity) which they can provide (FAO 1991). The forestry development scenario, compatible with the concept of sustainability and conservation principles should ensure that the values derived from the forest meet the present day needs while ensuring their continued availability to long-term development needs (FAO 1993). This would call for consistent improvement of the productivity and contribution of the forests such that future generations continue to receive the benefits of forest goods and services at least at the same level as is being enjoyed by the present generation.

With annual deforestation in developing countries running at 16.3 million ha, forests' sustainability is being severely threatened. Alarmed at the situation, world leaders at the Earth Summit in Rio de Janeiro (1992) made a commitment to work towards achieving targets for sustainable management and conservation of all types of forests by the year 2000. After more than five years into the march towards SFD, and with less than three years remaining, progress towards achieving the goals is hampered by an inadequacy of financial and technological resources.

Finance and technology are vital and interrelated components of investment in forestry as they support all aspects of SFD. Financing for SFD is also complex and complicated due to particular features of forestry, namely its long gestation period and investment horizon, blurred lines between forest products and forest resources and global externalities. Also, component activities of sustainable forestry development cover a wide range of commercial, social and environmental aspects (e.g. commercial forest plantations to protected areas, eco-restoration and agroforestry). As a result, investor preferences differ and conflicts of interest arise.

MAGNITUDE OF INVESTMENT NEEDS

UNCED Agenda 21, Chapter 11 and Forest Principles underlined the urgent need and importance of providing new and additional financial resources and transferring environmentally sound technologies to developing countries. UNCED estimated that US$ 31 250 million, including US$ 5 670 million in concessional financing, was required annually from 1993 to 2000 to promote SFD through four forestry programmes. This total excludes the cost for implementing forestry components under other chapters of Agenda 21, under the conventions, and the full cost of putting the Forest Principles into effect. In addition, the estimate does not account for the "cost" of deforestation. It represents the magnitude of the net investment required, assuming that deforestation will be halted (FAO 1994).

Table 1: UNCED estimate of annual financial requirement for forestry, 1993-2000

Programme area	Requirement (US$ million)
A. Institutional development:	2 500
B. Resource development	10 000
C. Sustainable utilization	18 000
D. Assessment and monitoring	750
Total	**31 250**

Source: FAO 1994

Notes: Full titles to above categories: A: Sustaining the multiple roles and functions of all types of forests, forest lands and wood lands. B: Enhancing the protection, sustainable management and conservation of all forests and the greening of degraded areas, through forest rehabilitation, afforestation, reforestation and other rehabilitative measures. C: Promoting efficient utilization and assessment to recover the full valuation of the goods and services provided by forests, forest lands and woodlands. D: Establishing and/or strengthening capacities for the planning, assessment, and systematic observations of forests and related programmes, projects and activities including commercial trade and processes.

A post-UNCED estimate indicates that the annual global investment cost of sustainable forestry development in the developing world, if the current level of deforestation is curbed would only be about US$ 33 300 million. The cost to counter the kinds of depreciation resulting from deforestation alone, however, would range between US$ 36 000 million and US$ 45 000 million - bringing the investment needs to over US$ 70 000 million (UN 1996, Chandrasekharan 1996b).

Development and investment

Development signifies net positive investment. Sustainability requires that the formation of new capital equals the sum of rents from resource depletion and environmental damages. For sustainable development, capital formation has to be even higher (Panayotou, 1995). With respect to forestry, investment for sustainable development should, therefore, be more than the value of capital lost through deforestation.

In the early 1990s, the overall estimated gross annual investment in forestry and forest industry, in the developing countries, was approximately US$ 20 400 million. Against this, the annual disinvestment through forest loss and degradation was of the order of US$ 45 000 million, resulting in **a net negative investment of US$ 24 600 million** (UN 1996).[3] This total would be higher if social costs from environmental hazards and loss of biodiversity were added (Chandrasekharan 1996b).

The magnitude of the problem is further exacerbated by the widespread lack of forest management to support sustainable practices. Tropical forests reportedly covered by management plans, in 1990, were only about 10% of the total (US-EPA 1991). Under these circumstances SFD is a challenging task. There is a need for reinvigorated efforts to confront these issues and to promote incremental funding flows to forestry, along with fundamental institutional changes.

UNCED stipulates that about 80% of the required resources be mobilized domestically. However, most developing countries have a long way to go in this regard. Social and environmental dimensions of SFD require substantial initial investment which normally does not appeal to the private sector. Public support within countries is often constrained by a difficulty to mobilize funds. In this situation,

[3] In comparison, the annual gross investment for agriculture in developing countries during the pre-UNCED period (1987-1992) was about US$ 144 000 million, the net annual investment being US$67 billion (Anon, 1996).

international assistance has an important role to play, both as a catalyst as well as a source of leverage in fund mobilization. Increased international assistance for forestry is warranted in recognition of the multiple benefits of forests, some of which extend beyond national boundaries.

Types and sources of funds

Fund mobilization requires that all financing sources, small or large, should be effectively tapped. Financing can be broadly categorized as domestic and foreign. Within each of these, it is possible to distinguish public and private sources, providing four broad groups (domestic public, domestic private, foreign public, and foreign private) and different variations and combinations of these (Chandrasekharan 1996a).[4]

International Cooperation in Financing

Foreign sources of financing for forestry falls under two categories - development assistance and investment. Development assistance is mostly met from foreign public sources and investment from foreign private sources.

Foreign public financing

Foreign financing in the form of official development assistance (ODA) supports non-commercial activities and provides technical assistance. As emphasized in the Forest Principles, international financing on concessional terms is required for supporting capacity building, technology improvement, infrastructure development, conservation activities and also to internalize global externalities and relieve cash flow problems. ODA, in the form of either grants or loans, is provided to developing countries, bilaterally by developed donor countries, and multilaterally through international agencies. Much of the ODA is bilateral rather than multilateral. There are also a large number of "non-official" agencies which carry out development activities through funding received from bilateral and multilateral donors. Some twenty donor countries and thirteen multilateral agencies are involved in providing ODA for forestry.

Bilateral assistance

Bilateral assistance funds are mainly funnelled through special assistance agencies (e.g. AIDAB, CIDA, DANIDA, FINNIDA, GTZ, JICA, NORAD, SIDA, UK-ODA, USAID) in the donor countries. Additional official assistance is channelled from donor to recipient countries through multilateral organizations; also through international and northern NGOs. Globally, bilateral aid represents 59.3% of total aid (80.5% of total aid being in the form of grants). It is important to note that 80% of all development assistance derives from the six richest countries whether it is spent in bilateral or multilateral form. Therefore, changes in aid-fund resource position of the rich countries also affect the multilateral and international agencies (FAO 1995f).

Some bilateral donors have a regional focus, others have preference for regional networks (e.g. SADC, ASEAN, CARICOM). Interest of some donors are confined to specific aspects of forestry. Some aid appears to be linked to supplies from donor country, but most are not. Several national technical/research institutions and NGOs in developed countries also provide assistance to developing countries on specific areas, e.g. ACIAR, RBG Kew. The donor policies relating to forestry are also influenced by several of the new tendencies: increasing globalization of forestry and increased awareness of social and environmental issues.

[4]The focus of this paper being on international cooperation, only aspects relating to foreign sources of financing are included.

Multilateral assistance

Multilateral assistance is extended by different organizations (Appendix 1) and it includes grants, loans and technical assistance. These include development banks, UN and other international organizations, international NGOs, and others.

Multilateral Development Banks

The World Bank, ADB, AsDB, IDB, and IFAD are the main MDBs. The first four have been involved in financing forestry projects. Involvement of IFAD has been indirect, through agricultural projects, incorporating forestry/tree planting components. Increasingly, SFD is featuring in policy documents of these agencies as well as in loan and grant agreements. The lending profile of all the above development banks are similar. Currently, no funding is provided for forest harvesting and forest-based processing industries.

Among the MDBs, the World Bank, by far, is the single largest funding source for forestry. Currently there are some 25 active forestry projects funded by the World Bank, spread over 20 countries. It is also, along with UNDP and UNEP, a managing partner of the Global Environment Facility (GEF).

International Organizations

Technical assistance for forestry in developing countries is provided by a number of UN and other intergovernmental agencies. These include FAO, ILO, ITC/WTO, ITTO, UNDP, UNEP, UNESCO, UNIDO, WFP, and WHO. The UNDP is the main funding arm of the UN for development projects primarily through country programme allocations. The WFP provides resources mostly in the form of food (for work). Others are specialized agencies, essentially supporting transfer of technology in their respective specialized areas. Their field programme activities are dependent on funds provided by UNDP, MDBs and bilateral donors.

UNDP's forestry-related programme is centred around capacity building, to help countries to formulate and implement national forestry programmes. In 1993, UNDP launched it Forestry Capacity Programme which provides central funding to countries who best meet specified programme criteria.

Internationally, FAO is the prime agency involved in forestry. FAO is active in almost every aspect of forestry. Its normative activities in forestry are funded out of regular budget allocations. It also implements field projects financed by other donors as well as by its own Technical Cooperation Programme which supports small projects meeting certain defined criteria.

GEF - A Cooperative Multilateral Financing Programme

GEF was created in 1991 to fulfil a unique niche - that of providing financing for programmes and projects to achieve global environmental benefits in four specified focal areas. It is a cooperative venture among governments and three international agencies - World Bank, UNDP and UNEP. It grants additional and concessional funding and arranges co-financing to developing countries to assist them in global environmental problems and transfer of technology. Of the forestry projects funded by GEF, most have been for biodiversity conservation for both plants and wildlife. A GEF Small Grants Programme is also available for projects in its focal areas and to support community based activities at grassroots level.

"Non-Official" assistance agencies

Even though they are not sources of new funds, a number of non-official agencies support countries in their SFD efforts. They include international NGOs (such as IUCN, WWF, IUFRO), regional organizations (such as ICIMOD, CATIE) and CGIAR institutions (particularly CIFOR and ICRAF).

Other mechanisms

Even though small in scale, some of the interesting mechanisms not included above are Technical Cooperation among Developing Countries (TCDC) and Technical Cooperation among Countries in Transition (TCCT). With vigorous promotion these can make important contributions for forestry development. Another, which symbolizes people's spirit of cooperation is the "nest-egg" transfers: of small funds (e.g. funds generated by Christmas tree sales by children in a developed country transferred to their counterparts in a developing country, for tree planting and similar activities).

Foreign private financing

Foreign private financing takes the form of direct foreign investment, portfolio investment, foreign institutional funds, global depository receipts, external commercial borrowings, supplies of equipment and venture capitals. These help to relieve domestic capital constraints, cushion short-term impacts of policy reform, finance foreign exchange components, capture foreign markets, acquire technology, and achieve economic growth. Foreign private investment mostly takes place through trans-national corporations (TNCs) and this often complements ODA.

TNCs' presence in forest-based sector has grown, during the last four decades, both in number of developing countries covered and TNCs involved. TNCs from some 30 countries operate in the forest-based sector of the developing countries. In Africa, investment in forest-based sector by TNCs is considerably more significant in relative terms, and its forestry sector is dominated by foreign-owned and controlled operations, accounting for over 60% of the total investment in the sector (Chandrasekharan 1996a, FAO 1995e). Important attractions for TNCs in developing countries are: cheap labour, raw materials at reasonable cost and marketing advantages. Host country normally provides a package of incentives including: capital liberalization, tax holidays, exemption from export duty, infrastructure development, etc.

A recent development in international private financing in forestry is the interest of entrepreneurs in the creation and sustainable management of forest resources. For example, Precious Woods Ltd. (founded in 1990 by a group of Swiss investors) is investing about US$ 40 million in Costa Rica and Brazil for raising and managing plantations of teak and other valuable species, conserving the rain forests, establishing processing plants and promoting markets for sustainably produced products.

Similar initiatives help to prove that sustainable forestry is not a public good which needs to be subsidized or "paid for" entirely by public and concessional funds (Crossley *et al.* 1996).

Transfer of technology

Financial assistance and technology transfer are interrelated components of international development cooperation and also of foreign investment. Its purpose is to bridge the technology gaps that undermine development. There is an unprecedented accumulation of technological capability in the world today, including in forestry. Much of it, including those in public domain, remains largely unrecognized, underutilized and inadequately shared. This leaves great scope for international technology cooperation (UN 1996).

The major sources of technology transfer to developing countries are foreign investors (including equipment suppliers), bilateral and multilateral assistance agencies, CGIAR institutions, NGOs and foundations, and TCDC (South-South technology transfer). Innovative arrangements of acquiring technology through agreement with foreign firms have been tried in some countries such as the INBio-Merck agreement for bio-prospecting in Costa Rica.

RECENT TRENDS IN INTERNATIONAL COOPERATION

International cooperation and involvement in forestry started with the increasing of trade in forest products and the use of forests as a basic resource for economic development. The implication of these on social welfare and environmental stability brought in new concepts of resource management and conservation and new areas of technical and financial cooperation. The need for a holistic approach to forestry development was recognized in 1985 when Tropical Forestry Action Plan, co-sponsored by FAO, UNDP, World Bank and WRI was established to address the problem of deforestation through (i) policy reforms, (ii) inter-sectoral linkages and collaboration and (iii) external financing and donor coordination. Its scope has since been expanded to include non-tropical countries and has been re-designated, National Forestry Action Plan (NFAP).

Forestry action plans have been prepared or are in the process of preparation in some 100 countries and seven subregions. Sixty countries have completed the preparation of NFAPs. So far 14 international organizations, 17 donor countries and 4 other NGOs participated in these NFAP exercises along with national agencies. NFAPs are regarded as important means to attract investment in the forestry sector. However, evaluation of the plans under implementation indicates gaps between estimated requirements and actual availability of funds. The World Bank's Forest Sector Studies have also noted similar gaps. Part of the reason is that financial mechanisms are still rather independent from sectoral planning and programming process. The chronic problem of under-funding and inadequacies of forest resource management seem to persist in most developing countries.

Official Development Assistance

ODA to forestry is a relatively new phenomenon, having its beginning in the early 1960s. It continues to grow in size and the total ODA for 1993 was US$ 1 545 million, comprising 71% of grants and 29% loans (Appendix 2)[5]. This, however, represented only about 27% of estimated ODA needs and 7% of the current estimated annual gross investment in forestry. If considered by main donor category, funding by MDBs, almost all loans, reached US$ 420.3 million in 1993, representing 27.2% of total ODA as against 18.7% in 1990. Aid from other international organizations in 1993 was US$ 208.5 million of which US$ 121.0 million came from WFP. Other international agencies represent a total of US$ 87.5 million, or 5.7% of the total ODA for forestry.

In 1993, globally, bilateral aid represented 59.3% of total aid (80.5% of total aid in the form of grants). It should be noted that part of the funds in the form of loans has not been accounted for in these statistics (e.g. part of the funds from KfW).[6]

Regarding ODA evolution in forestry from 1986 to 1993, it may be noted that the increase in ODA was US$ 119 million or 3% per annum during the period 1990-93, while between 1988 and 1990 the rate of increase was more than 12% per annum (Table 2). This slowdown is noteworthy to understand the emerging post-UNCED trend in ODA.

[5] This amount represents ODA provided for "straight forestry projects". It does not include forestry components of non-forestry projects such as rural development, watershed management and livestock development.

[6] KfW in 1995 had 47 forestry projects in 26 countries with a fund allocation of DM 712 million (approximately US$ 500 million).

Table 2: ODA for Forestry, from 1986 to 1993 (million US$)

Categories of Donors	1986	1988	1990	1993
Bilateral Aid	434.5	723.0	937.3	915.7
Development Banks	142.5	200.3	253.7	420.3
Organizations of the United Nations	188.0	191.6	234.3	208.5
Total	**765.0**	**1 114.9**	**1 425.3**	**1 544.5**

Source: FAO/NFAP unit.

Note: FAO has not been able to update the global compilation of ODA since 1993. Therefore, the figures provided in FAO (1995f) indicate the general trend. It is also recognised that the statistical basis for ODA is weak as it lacks ability to capture information on forestry components in integrated programmes/projects.

The post-UNCED trend in ODA has not shown any significant increase. Available indications are that in fact ODA has been falling. The total of FAO's field and regular programme together fell from US$ 83 million in 1992 to US$ 70 million in 1994. World Bank loan approvals fell from US$ 278 million in 1994 to US$ 113 million in 1995. AsDB's forestry loan approval of US$ 138.7 million in 1992 fell to US$ 67.8 million in 1995. Funding of all multilateral organizations are now at zero growth or declining. Similar falling (or levelling off) trends are noted in the case of a number of bilateral donors even though there have been some exceptions. Several countries have revised their aid commitments. Swedish development aid is frozen at its current nominal level, through to 1998. Several reasons have been attributed for the change in trend such as recession and structural unemployment in OECD countries, and disillusion with what can be accomplished by development cooperation. In any case chances of increased ODA in the near future appears minimal. In addition, the outflow of resources from the south for servicing foreign debt far exceeds the inflow of resources from development assistance. The emerging decline in ODA is therefore of grave concern.

Reduction of ODA would tend to adversely affect transfer of technology to developing countries. Budget restrictions in the multilateral technical agencies also have the same effect. At the same time, terms of technology acquisition from private sources in developed countries are often unfavourable to the developing countries. In many cases developing countries end up paying too large a price in the form of incentive packages and cheap labour and raw material, without commensurate benefits in terms of local skill development or material benefits.

Experience with ODA has indicated several shortcomings, the removal of which can considerably improve its effectiveness (Chandrasekharan 1996a). These include multiplicity of donors with different priorities and lack of adequate coordination of ODA activities. The differing priorities of donors and recipients have also led to conflicts. Proliferation of frameworks for fund utilization has affected the capacity of the countries to demand and receive ODA. There is also insufficient country commitment and low absorptive capacity.[7]

Analysis of available information (Appendix 1) provides interesting insights on the trends in ODA and the need and potential to improve the system:

- Dependence of developing countries on foreign funds varies widely. For example, the share of ODA in the total government resources for forestry in 1993 was about 10% for Indonesia, whereas it was about 85% for Tanzania.

[7] This is to be dealt with through expanded technical assistance targeted at building up human capital and appropriate institutions.

- Total fund flows from OECD countries to developing countries in 1993 amounted to US$ 160 000 million, of which the aid flows accounted for US$ 55 000 million. The bilateral aid flows into forestry in the same year was US$ 916 million or 1.66% of the total OECD aid flows. In the scheme of international assistance, forestry is not receiving its due share.
- Globally, ODA for forestry research amounts to about 5% of total ODA to the sector; the corresponding figure for agriculture being 10%.
- While not clearly reflected in the statistical tabulations, one of the factors affecting the overall effectiveness of external financial assistance is the fact that a large percentage of it goes to few countries, which are not necessarily those that need it most.

Overall, ODA is observed as being rarely adequate and predictable: its preparatory procedures are often elaborate and time-consuming, and conditionalities have often delayed or interrupted development assistance (FAO 1994). Moreover, initiatives to harmonize ODA for forestry have not been successful because forestry is a minor sector for most donor agencies and therefore unable to lead a reform process (Simula 1996).

Private investment

MacNeill (1996) notes that contrary to the solemn commitments made at the Earth Summit, the trend of overall flows of public funds (ODA) has been down, falling from about US$ 55 000 million in 1993 to around US$ 50 000 million in 1995 and still falling. At the same time, the trend of international net private flows has been rising rapidly, from US$ 9 000 million in 1986 to US$ 193 million in 1993 to US$ 226 000 million in 1994 and still rising.[8] These two trends are predicted to continue (Crossley *et al.* 1996).

Private capital flows into the forestry sector in developing countries, while difficult to measure, are already in the thousands of millions (an estimated US$ 8 000 to 10 000 million from domestic plus foreign sources) each year (most of it being in forest-based industries and forest plantations). This represents an opportunity for channelling investment to sustainable forestry but is also a threat to forestry if business as usual continues. This points to the need to improve capacity to negotiate with foreign investors and to institute rational control measures.

It is to be recognized that the prospect of reaping high economic rent is a prime attraction for private investors. On the other hand, the host country's ability to capture as large a share as possible of available rent and a reasonable retained value is a principal indicator of the efficiency of its policies towards investment (Gillis 1982).

PROSPECTS OF INTERNATIONAL COOPERATION

As the retention and conservation of forests, particularly in the tropics, has become a world-wide concern, it is the expectation that there will be a world-wide willingness to provide financing and other incentives which will make it economically viable and financially attractive to the forest owning developing countries (Constantino 1995).

As noted, the size of ODA may remain small in comparison with foreign private financing. Its role, however, will remain crucial. If delivered in a prioritized and coordinated manner, it can serve as an effective and efficient means of: human resources development and capacity building; technology assessment, evaluation and acquisition; blending of foreign and indigenous technologies and institutional modernization. Technology development from ODA can serve to influence and promote

[8] Details of the share of foreign private financing for forestry is not readily available.

investment and support private sector activities. There is also scope for meshing together public and private financial resources.

While the public sector investment in forestry development is inadequate and declining world-wide, much of the private capital flowing to the forestry sector is not being invested in sustainable operations, often leading to global forestry crisis. For private sector capital to begin to flow towards SFD certain preconditions (in the form of incentives) need to be met: educating capital markets about the investment opportunities in sustainable forestry; packaging and structuring these opportunities in ways which are easily understood and recognised by private sector investors; reducing risks and incremental costs specific to an emerging industry, and covering incremental costs of internalising environmental externalities (Crossley *et al.* 1996). There is critical need for equity and debt funding instruments which lower the overall risk of sustainable forestry investment including small and medium scale early stage venture funds and medium to large scale sector specific funds. Rising consumer demand for products of high environmental quality and the development of new policies in several countries which mandate the practice of more sustainable forest management systems will serve as contributory factors. Certification and labelling can lower market and environmental risks in sustainable forestry enterprises for investors.

As is evident there is direct linkage between foreign investment and trade. It is seen reported that TNCs account for two-thirds of global trade (The Hindu, 23 December 1996). With specific regard to TNCs, there remains a potentially significant future role in developing countries, namely: to support primary and secondary processing industries and promote export of processed goods - on mutually beneficial terms. At the present state of engineering and heavy industries in developing countries, much of the equipment needed for expanding domestic capacity will have to be imported. This imposes pressure on meagre foreign exchange reserves. The TNCs can help meet these needs initially. They can progressively provide technology to increase local sourcing of inputs.

There have recently been some international initiatives to promote commercial private-sector efforts to follow-up UNCED decisions, e.g. International Network for Environmental Management (INEM) in Germany and the Business Council for Sustainable Development (BCSD) in Switzerland. The BCSD has established task forces on, *inter alia*, internalizing social and environmental costs in prices, and conducting a global study on the environmentally sound production and use of paper (UN 1995).

Another recent development has been the agreements between multinational pharmaceutical companies and national institutes for bio-prospecting (Chandrasekharan 1996b). Those who advocate chemical prospecting and sustainable utilization of pharmaceutical wealth of the forest consider them to be the hope for protecting ecosystems and conservation of biodiversity.[9]

CONSTRAINTS FOR SUSTAINABLE FORESTRY DEVELOPMENT

Several constraints for achieving SFD in turn affect international cooperation in that regard. These are mostly institutional in nature and can be addressed at the national level. These include:

- low awareness about the multiple roles and benefits of forests;
- low priority and status for forestry sector resulting in low budget allocations;
- land tenure problems;
- policies that are inappropriate, lack transparency and progressive approaches and slow to reform;
- inadequacies of laws and regulations;
- lack of arrangements for targeted funding;

[9] This has been described as bio-piracy or bio-plunder by others.

- divestment of forest capital and uncompensated forest land transfers for the benefit of other sectors;
- undervaluation of forests and forest products leading to their wasteful utilization;
- accounting distortions relating to forestry that conceal significant ecological, social and economic contributions that forests provide for sustainable development;
- weakness of public forest administration;
- low level of technology and research and limited access to new technology due to patents and other restrictions;
- lack of dissemination of information and extension;
- lack of mechanisms for peoples participation and private sector involvement;
- need for balanced and non-distortionary incentives and compensatory financial instruments;
- need for transparency in international trade through labelling and certification;
- narrow vision of some environmental lobbies which complicates the process of conflict resolution; and
- inadequate coordination at all levels.

A critical problem in almost all developing countries' natural resource sectors is that prices, regulations and incentive mechanisms fail to appropriately signal resource users to economic scarcity (Chipeta 1996, Chandrasekharan 1996b, Gavira 1996).

INNOVATIONS IN RESOURCE MOBILIZATION

The foregoing paragraphs point out that in the arena of financing for forestry there is need for innovation and change so that financial flows to forestry lead to positive results. "Innovative financing" for any given sector may refer to the creation and development of entirely new financing mechanisms and instruments; it also encompasses the adaptation and application of well-established financial vehicles (e.g. bonds, investment funds) to new and emerging investment areas such as sustainable forestry or efficient use of existing mechanisms (Crossley *et al.* 1996). Innovation serves continuous improvement and provides dynamism to a system. Innovative concepts may take time before they are accepted and implemented. In recent years, a number of innovations have been introduced for mobilising fund for forestry. Some have been quite successful, others not so much. Some new mechanisms are still in their nascent phase, and some at a conceptual stage (Mendez 1993).

Improvements of existing mechanisms

Re-deployment and more efficient use of existing resources, mechanisms and instruments can go a long way in improving the resource situation. The obstacles for being faced is not so much of insufficient capital or developing new financing instruments as it is to redirect and channel existing private capital flows towards innovative and more sustainable forestry. There is, therefore, need to have a framework and mechanism for linking SFD to existing capital markets. Also, by suitably adapting the existing financial instruments, the perceived risks of investing in an emerging market are lowered. Further, in many situations, forestry is not only capable of being self-financing, but can also support development in other sectors of economy (Repetto & Sizer 1996) provided earnest attempts are made to capture reasonable/ncreased share of rent and to avoid "revenue give aways" in the form of perverse subsidies. International cooperation can help realize that goal.

Repetto & Sizer (1996) suggest that before spending too much energy on new and innovative sources of finance for SFD, we should undertake serious reforms of old and traditional sources and adapt mechanisms which have proven successful. Some of these which offer potential scope for adoption, adaptation and replication are given below:

- Micro-finance programmes such as Grameen Bank of Bangladesh and arrangements such as CARE-Guatemala, FINCA-Costa Rica and the five country FINNIDA-PROCATOR (a Costa Rican NGO) aimed at providing financial services and technical assistance for small-scale community enterprises. These help to reach farmers directly and to promote local and community sector investment (Zapata 1996).
- NFAP type mechanisms to link existing external investment flows more directly to SFD through appropriate investment framework within sectoral investment programmes.
- Capital market infrastructure to channel capital into SFD as needed by facilitating equity/debt funding.
- Value-chain-investing for cost savings and lowered risks, using assistance funds effectively to provide infrastructure to obtain market information, to improve technology, etc.
- Partnerships of foreign/domestic/private/public sectors and joint financing instruments where resources from several sources can be combined.
- Environment-and-sustainability focused special investment/assistance funds. Experience is accumulating world-wide that such targeted and objective-oriented funding mechanisms can play an effective role.[10]
- International technical and financial support for improving and implementing existing and tested innovative instruments for domestic mobilization of public finance.[11]
- Bilateral and multilateral credit guarantee and finance agencies which support SFD based on sound practices. For example, major Swiss banks that finance investment projects in emerging markets require that projects conform to environmental guidelines prepared by the World Bank, IFC and the European Bank for Reconstruction and Development (Repetto & Sizer 1996).
- Venture capital funds that have been set up specifically to support non-wood forest products based enterprises, certified timber harvesting and the like.
- Closer links with private sector managers through such initiatives as World Bank's Sustainable Forestry Market Transformation Initiative (Crossley 1996).
- Socially and environmentally motivated capital fund. There are several interesting examples: Xylem Investments Inc., an international timber investment management firm that makes private equity investments in international, publicly traded plantation based forest companies.[12] The Forestland Group focuses on sustainable management of natural forests. In other cases, private investment corporations and bilateral aid agencies help to cover environmental externality cost of national sustainable forestry ventures.
- Public aid funds to spotlight the private sector about forestry investment opportunities and to provide early stage/start-up funds in the form of concessional finance (soft loans).
- Regional/transfrontier cooperative activities in SFD including sharing of expenses and experiences as in the case of USSE (Union des Sylviculteurs du Sud de l'Europe) involving France, Spain and Portugal (USSE 1997).

[10] Some examples are: National Fund for Environmental Conservation (promoted by IUCN); Fund for Sustainable Enterprises of Inter-American Development Bank (IDB) for helping marginalized society; Biodiversity Enterprise Fund for Latin America of International Finance Corporation (IFC) as a venture capital fund; Biodiversity Conservation Network Fund of USAID providing grant fund to help establish community enterprises; and Sustainable Environmental Enterprises Development (SEED) of Conservation International.

[11] Examples include: special funds and charges; user/beneficiary fees; objective-oriented taxation, environmental levies, forest management bonds, watershed charges; different forms of economic and financial reforms; and introduction of market-based instruments to appropriately structure incentives through price mechanisms.

[12] Xylem manages approximately US$ 235 million in forest assets which are comprised of six timber equity investments across ten countries and 1.4 million ha of softwood and hardwood plantations which are managed on a sustained yield forestry plan.

- Trust Funds, which are legally restricted to being used for a specific purpose and established with money from various sources. Trust funds can operate independently of a government's or donor agency's budget fluctuations and thus have greater long-term stability.[13]
- Non-distortionary and balanced incentives to attract foreign investment

New innovative mechanisms

New and innovative suggestions to improve the flow of funds focus on measures to capture the value of global externalities and environmental benefits of the forests. These are mostly to be achieved through internationally tradable instruments or measures for international transfer payments (Janssen 1997). Sustainable forestry would remain a small underfinanced niche within the larger area of forestry, if it is to be solely dependent on new and innovative mechanisms (Crossley 1996). Innovative ideas on SFD are either partially tested and potentially implementable concepts, or contested concepts, where implementation is not immediately foreseen. They face disadvantages in being experimental and tend to arouse more scepticism than support within financing circles.

Potentially implementable concepts

Global environmental values of forests offer possibilities for debt swapping and other ways to trade them through international transactions. Debt-for-nature swaps were the first innovative financial mechanism, started in 1987. In this arrangement, international debts can be purchased/swapped, in return for environmental safeguards (e.g. establishing nature reserves) or, as suggested recently, in return for guarantees of sustainable management of forest resources. In order to promote policy reforms in forestry, the concept can be widened to include "debt-for-policy reform swaps" (UN 1996). Green bonds and tax-exempt bonds for sustainable forestry companies are some of the other innovative ideas which have shown promise.

Untested concepts

There are a number of concepts which have not been fully tested and which in the present situation have practical difficulties to be put in practice. These include:

- carbon offset trades (where forest protection, reforestation etc. in a developing country is financed by a developed country power utility in exchange for the carbon sequestered);
- internationally tradable emission permits (establishment of emission permits, based on available forest area, which can be traded to finance protection of forests);
- biodiversity patents (creating an international legal basis for licensing biodiversity use and extracting a payment commensurate with its economic value); and
- tradable development rights (dividing natural habitats into tradable development rights which could be sold to concerned institutions or individuals to save them from commercial exploitation).

These and other similar suggestions have generally been discussed, but not implemented because of the obvious difficulties facing their implementation, including logistical and political obstacles such as how to set, administer, collect and distribute revenues.

Factors favouring continued innovation

Several factors can contribute to practical innovations: full knowledge and understanding about the value of forests; appropriate policy enforcement capability; awareness in capital markets regarding

[13] Examples are Trust for the Earth, WWF, World Heritage Fund, GEF, UNEP Convention Fund and Rain Forest Trust Fund.

the potential of SFD; support for private sector involvement; clarity of financial rules and regulations and tenure rights; institutional and political commitment; adequacy of human resources; and an ethical standard (defined by criteria and indicators) for SFD.

CRITICAL ROLE OF COORDINATION

Coordinating SFD financing is important to enhance effectiveness and efficiency in fund mobilization and utilization, particularly considering the multiple sources and variations in the objectives and modalities of each source. This is necessary to avoid or eliminate overlaps, duplication, conflicts and competition, and inefficiencies in the use of resources; also to establish broad concepts, options for action and operational models, and strategies. Lack of coordination on the other hand is indicative of institutional conflicts. Coordination needs to be addressed at global, national and local levels.

Coordination at the global level

In respect to sector specific international cooperation, it is necessary to resolve the conflicts between donors and technical assistance agencies and to arrive at a common policy, strategy and coordinated approach in setting priorities, country preferences, funding levels and mechanisms (including integration of diverse frameworks), as well as information exchange. Where more donors are interested in the same country and programme area, co-financing activities can help coordinate ODA delivery. The advantages of co-financing are that risk is spread around, overlaps are avoided, and the different complementary skills and expertise of co-financiers can be used complementing each other.

The international community has realized that coordination and cooperation in the identification of investment and technical assistance needs and opportunities are just as critical, if not more so, than cooperation and coordination in the financing of identified opportunities. The Sectoral Investment Programme (SIP) of the MDBs offers a framework for forestry lending coordination in countries. The purpose is to integrate both domestic and external, public and private sector sources of funds. In respect of the forestry sector, a SIP could provide an investment component of the NFAPs. This would also improve interagency cooperation and coordination.

Based on the Principles of Sectoral Approach the World Bank and UNDP have developed Forest Partnership Agreements (FPA) between recipient countries and donor community to coalesce the national commitments and donor support for implementing forestry principles and procedures specified in Agenda 21. Establishment of a special forest partnership facility in FPA-countries is also envisaged. FPA agreements can help to establish large financing packages based on multi-donor sectoral funding and a coordinated approach and to integrate forest development and conservation into national socio-economic and environmental priorities and macro-policies. They would focus on countries with a strong national commitment to bring deforestation under control, and also would focus beyond the forest sector on the underlying causes of deforestation (UN 1996, Simula 1996).

For developing blueprint concepts and approaches, full participation of all the involved parties, both national and international, are needed, and it appears that in this field adequate provisions are not presently in place. Broad participation would be particularly vital for fast adoption of new feasible solutions. The role of the Forestry Advisers Group (FAG) has been important in this field.[14] The Group plans to bestow special attention on coordinating country-level efforts through networking. It will also continue to contribute to policy development and other coordination issues.

[14]The Forestry Advisers' Group is an informal gathering of forestry advisers representing bilateral and multilateral agencies and a few NGOs. The Group was originally created to provide guidance for TFAP and the focus has been to support country-drive national forestry programmes. The FAG has been an important forum for the development and harmonization of approaches to forestry development, particularly by focusing donor efforts on sector-wide assistance.

The multilateral and bilateral donors/agencies should willingly participate in the process of coordination and flexible arrangements should be put in place for this purpose. In such a system, the roles of donors/agencies can be clearly defined based on their comparative strength. As Simula (1996) contends, donor coordination should begin with internal consistency. Governments should direct their delegations to international agencies to take consistent positions on SFD and they should ensure that their bilateral agencies support these positions.

Coordination at national level

Even those donors who participate in global-level coordination regarding broad policies of assistance have been adopting an independent approach regarding SFD at the national level. The national level dimension of international coordination can fall under three groups: coordination among donors; coordination of donors and national government agencies; and coordination of donors and government agencies with non-government sector.

Coordination among donors

This coordination of strategic nature covers aspects related to share and mechanism of funding; common position on policies; areas of cooperation; technical assistance modalities; and roles and responsibilities. The UNDP Resident Representative often assumes the role as team leader for the agencies under the UN system at the country level. The system seeks to promote dialogue with all organizations active in development cooperation. The government is expected to provide all necessary support in making this coordination effective. In fact overall responsibility for in-country coordination should be with the government and all interested parties should participate in the process. National forestry programmes should be established through country driven processes to serve as a viable tool of coordination.

Coordination between donors and government agencies

Planning of international cooperation for SFD is to be undertaken as a joint effort of donors and recipients. A country strategy note, wherever the system exists, is often the outcome of a process of consultation at the country level between the government and the UN system.

The programmes for SFD need to be established as a country-driven process, with a lead institution having clearly defined mandate to act as the responsible organ and focal point. Often, depending on situations in countries, the political, financial and technical dimensions may have to be integrated, or segregated to ensure accountability and efficiency. At the national level coordination is to be fully supported by law. In Indonesia, the establishment of the Consultative Group on Indonesian Forestry (CGIF) has been instrumental in improving the coordination among donors and forestry projects. CGIF has four subject related working groups (Iskandar *et al.* 1996).

Coordination between donors/government agencies and the private sector

In many cases private sector (foreign and domestic) is responsible for socially desirable investment in forestry. Private sector should operate under a code of conduct that ensures SFD and recognize the potential opportunities for investment. International attention to the issues of certification and labelling of forest products should be put into perspective, in this context.

WWF, FSC, MacArthur Foundation, and others are creating "buyer groups" who commit to purchase only certified products. These efforts help to make investment in certified forest production more profitable. This would lead to demand for model codes, practices and demonstration.

Participation of domestic private sector in forest policy formulation and planning is an important element of coordination. Private-public partnerships should be employed as a means both to lever

additional funds, and to channel larger investments into SFD. Coordination of incentive packages and instruments to attract private firms to invest in forest industry should ensure that it is in consonance with international norms and principles.

Coordination at the local level

Meaningful partnerships could/should be forged between local stakeholders and government agencies/external funding sources. Such partnerships should be capable of addressing conflicts with sectors (such as of agriculture, grazing, mining, etc.) that compete with forestry. Micro and small-scale sustainable forestry ventures and their needs for technology and human resources could also fall in their purview.

The delivery of development assistance to field-level activities often requires major adjustments. Often it will be possible for donors and financing institutions to participate in the financing of forestry development funds that combine financing from national and international sources, while maintaining *decentralized funding*. The principal implications of this approach for donors and financing agencies would be: (i) using local administrative units as a basis for designing donor supported programmes, (ii) flexible programme design based on actual demand through diverse implementation arrangements, (iii) increasing reliance on local resources in implementation, and (iv) the use of participatory structures for programme management (Simula 1996).

Targeted funding for enhanced cCoordination

SFD and coordinated action in that regard, continue to be a topic of discussion. It is high time to drive home the fact, through actual performance, that SFD benefit present and future generations.

Apart from the need to design, control and facilitate the international financial flows for SFD through improved and innovative arrangements, a dedicated international mechanism to provide targeted funding for forestry in the developing countries is needed. This can be accomplished through a mechanism such as a **world forestry fund** with appropriate affiliations and linkages (UN 1996).

This proposal for multilateral channelling of forestry investment was advanced, after the IX World Forestry Congress in Mexico City (1985). While the proposal was found to be sound, the time was not opportune to pursue it. It is now time to reconsider the proposal. Such a mechanism also can coordinate multilateral consultations on funding for forestry and be organically linked to national efforts for fund mobilization. These matters and other relevant details need to be further discussed.

CONCLUSION

SFD, particularly in the tropics, is capable of providing considerable externalities, in addition to valuable goods and services essential for human welfare. International technical and financial cooperation is a vital catalyst in promoting SFD. Considering the demands placed on international resources, it is important that utmost efficiency and effectiveness is achieved in fund mobilization and utilization, through appropriate policies, strategies and coordinating mechanisms. Targeted funding is a possible means to achieve this objective.

This paper provides only an overview of the situation and perspectives of forestry, particularly in the developing world. It is not the intention of the author to propose specific recommendations. The author will be highly gratified if some of the thoughts provided in this paper facilitate discussion at the Congress on measures to ensure SFD which is essential to achieve a sustainable common future for humanity.

BIBLIOGRAPHY

Balick, M. & Mendelsohn, R.O. 1992. Assessing the economic value of traditional medicines from tropical forests *Conservation Biology* 6: 128-130.

Chandrasekharan, C. 1985. *Mobilizing the private sector investment for forestry - the developing world.* Paper Presented at the 12th Session of the Commonwealth Forestry Conference, Victoria, Canada, September 1985.

Chandrasekharan, C. 1996a. status of financing for sustainable forestry management programmes. Paper presented at the *UNDP/ Denmark/South Africa Workshop on Financial Mechanisms and Sources of Finance for Sustainable Forestry*. Pretoria. 4-7 June, 1996.

Chandrasekharan, C. 1996b. Cost, incentives and impediments for implementing sustainable forest management. Paper presented at the *UNDP/Denmark/South Africa Workshop on Financial Mechanisms and Sources of Finance for Sustainable Forestry*. Pretoria. 4-7 June, 1996.

Chipeta, M.E. 1996. Forestry funding in Asia-Pacific, Africa and Latin America/Caribbean regions: Perceptions of main opportunities and constraints. Paper presented at the *UNDP/Denmark/South Africa Workshop on Financial Mechanisms and Sources of Finance for Sustainable Forestry*. Pretoria. 4-7 June, 1996.

Constantino, L. 1995. Financial incentives for industrial plantations in Argentina: The World Bank story. In *Proceedings of Workshop on The Use of Financial Incentives For Industrial Plantations*. Working Paper ENV-4 IDB. Washington DC.

Crossley, Rachel A. *et al*. 1996. Innovative financing for sustainable forestry. Paper presented at the *UNDP/Denmark/South Africa Workshop on Financial Mechanisms and Sources of Finance for Sustainable Forestry*. Pretoria. 4-7 June, 1996.

Douglas, J. & Magrath, W. 1996. Financing sustainable forestry: The World Bank perspective. Paper presented at the *UNDP/ Denmark/South Africa Workshop on Financial Mechanisms and Sources of Finance for Sustainable Forestry*. Pretoria. 4-7 June, 1996.

FAO. 1991. *Sustainable management of tropical forests.* Secretariat Note. FAO Committee on Forest Development in the Tropics. FO:FDT/ 91/5. Tenth Session. Rome.

FAO. 1993. *The challenge of sustainable forest management: what future for the worlds forests.* Rome.

FAO. 1994. *Putting UNCED to work in forestry*. Rome.

FAO. 1995a. *Yearbook of forest product statistics, 1993.* Rome.

FAO. 1995b. *Forest resources assessment 1990: Global synthesis.* FAO Forestry Paper 124. Rome.

FAO. 1995c. *Forest resource assessment 1990: Tropical forest plantations resources.* FAO Forestry Paper 128. Rome

FAO. 1995d. *Forestry statistics - Today for tomorrow, 1945-1993-...2010*. Rome.

FAO. 1995e. *Funding for forestry development in Africa.* Secretariat Note FO:AFWC/95/5 for the Tenth Session of the African Forestry and Wildlife Commission, Sanbonani, South Africa, 27 November-1 December 1995.

FAO. 1995f. *Review of Official Development Assistance in the forestry sector in 1993.* Information Note for Twelfth Session of the Committee on Forestry, 13-16 March 1995. Rome.

Gaviria, Diana. 1996. Economic and financial instruments for sustainable forestry: The case of Colombia. Paper presented at the *UNDP/ Denmark/South Africa Workshop on Financial Mechanisms and Sources of Finance for Sustainable Forestry*. Pretoria. 4-7 June, 1996.

Gillis, M. 1982. *Fiscal and financial issues in tropical hardwood concessions.* Development Discussion Paper No. 110. Harvard University, Cambridge.

Iskandar, U. *et al*. 1997. The roles and status of international cooperation for Indonesian forestry. Voluntary Paper for XI World Forestry Congress. Topic 36.

ITTO. 1992. *ITTO guidelines for the sustainable management of natural forests*. ITTO Policy Development Series No. 1. Yokohama, Japan.

Janssen, J. 1997. *Joint implementation and multiple benefits of tropical rain forest protection.* Voluntary Paper for XI World Forestry Congress. Topic 36.

MacNeil, Jim. 1996. Key note address at the *UNDP/Denmark/South Africa Workshop on Financial Mechanisms and Sources of Finance for Sustainable Forestry*. Pretoria. 4-7 June, 1996.

Mendez-R 1993. *The provision and financing of universal public goods.* Discussion Paper 7. The Centre for the Study of Global Governance. London School of Economics.

Panayotou, T. 1995. *Matrix of financial instruments and policy options: A new approach to financing sustainable development.* Paper for the Second Expert Group Meeting on Financial Issues of Agenda 21. 15-17 February 1995, New York.

Quadri, S.T. 1997. *Conservation of forest ecosystems: Approaches of the Asian Development Bank*. Voluntary Paper for XI World Forestry Congress. Topic 36.

Repetto, R & Sizer, N. 1996. Why finance sustainable forestry? Paper presented at the *UNDP/Denmark/South Africa Workshop on Financial Mechanisms and Sources of Finance for Sustainable Forestry*. Pretoria. 4-7 June, 1996.

Simula, M. 1996. Effective coordination mechanisms in financing sustainable forestry development. Paper presented at the *UNDP/ Denmark/South Africa Workshop on Financial Mechanisms and Sources of Finance for Sustainable Forestry*. Pretoria. 4-7 June, 1996.

UN. 1995. Review of sectoral clusters, second phase: land, desertification, forests and biodiversity, combating desertification and non-legally binding authoritative statement of principles for a global consensus on the management, conservation and sustainable development of all types of forests. *Report of the Secretary-General*. E/CN.17/1995/3. New York.

UN. 1996. *Report of the Secretary General, E/ CN. 17/IPF/1996/5 to the Second Session of CSD ad hoc Intergovernmental Panel on Forests (IPF)*. Geneva, 11-22 March 1996.

UNCED. 1993. *Proceedings of the United Nations Conference on Environment and Development* held in Rio de Janeiro. July 1992. Geneva.

US-EPA. 1991. *Assessment of promising forest management practices and technologies for enhancing the conservation and sequestration of atmospheric carbon and their costs at the site level.* Washington, DC.

USSE. 1997. *La cooperación transfronteriza*. Voluntary Paper for XI World Forestry Congress. Topic 36.

World Bank. 1995. *The broad sector approach to lending*. Sector Investment Programs. Report of a Thematic Team to the SPA Donors Meeting. Washington DC.

Zapata, Elssy-Fedora. 1996. A micro-finance approach to forestry financing for poor farmers: The PROCAFOR experience. Paper presented at the *UNDP/Denmark/South Africa Workshop on Financial Mechanisms and Sources of Finance for Sustainable Forestry*. Pretoria. 4-7 June, 1996.

Appendix 1:Changes in the Volume of ODA Devoted to Forestry, 1986-1993 (millions of US$)

	1986	1988	1990	1993	1990-1993 Annual variation
Bilateral					
Australia	2.7	5.3	6.3	11.0	+ 4.7
Canada	79.8	75.1	113.4	48.6	- 64.8
Japan	20.5	83.0	117.2	84.0	- 33.2
New Zealand	4.0	4.1	4.5	3.3	- 1.2
Norway	6.7	12.6	6.1	11.2	+ 5.1
Switzerland	13.1	22.9	22.5	28.0	+ 5.5
United States of America	54.6	117.0	149.6	121.0	- 28.6
Sub-total	**181.4**	**320.0**	**419.6**	**307.1**	**- 112.5**
Austria	0.1	0.1	0.2	0.1	- 0.1
Belgium	1.9	0.9	1.6	1.4	- 0.2
Denmark	10.0	29.3	30.4	30.00 (10.0)[1]	- 20.4
Finland	31.2	22.0	36.8	28.0	- 8.8
France	42.9	(42.9)	(42.9)	30.5	- 12.4
Germany	34.0	147.3	203.0	173.1	- 29.9
Ireland	0.3	0.2	0.2	(0.2)	-
Italy	NA	11.2	(11.2)	8.0	- 3.2
Netherlands	28.5	32.1	46.0	60.6	+ 14.6
Portugal	0.1	0.1	0.1	(0.1)	-
Spain	NA	0.9	0.3	(0.3)	-
Sweden	49.1	57.9	72.0	37.1	- 34.9
United Kingdom	35.2	23.1	28.5	45.2	+ 16.7
Sub-total	**233.3**	**368.0**	**473.2**	**394.6**	**- 78.6**
European Commission	19.8	35.0	44.5	214.0	+ 169.5
Sub-total European Union	253.1	403.0	517.7	608.6	+ 90.9
Total bilateral	**434.5**	**723.0**	**937.3**	**915.7**	**- 21.6**
Multilateral					
ADB	2.7	1.0	3.0	5.0	+ 2.0
AsDB	9.0	77.0	71.4	74.0	+ 2.6
IDB	8.5	6.8	9.8	65.3	+ 55.5
World Bank	122.3	115.5	169.5	276.0	+ 106.5
Bank Total	**142.5**	**200.3**	**253.7**	**420.3**	**+ 166.6**

(Continued)

(Continued)

ITTO [2]	0	3.6	12.8	15.5	+ 2.7
FAO [3]	10.8	11.4	14.8	14.1	- 0.7
ILO	2.8	2.0	0.6	0.2	- 0.4
UNDP	22.0	24.9	52.0	33.5	- 18.5
UNEP	1.7	1.5	0.1	1.1	+ 1.0
UNESCO	1.2	1.8	0.5	2.4	+ 1.9
UNIDO	2.0	2.8	2.8	0.4	- 2.4
UNSO	15.0	12.2	18.1	10.0	- 8.1
WFP	132.5	131.4	132.6	121.0	- 11.6
GEF[4]	0	0	0	10.3	+ 10.3
Sub-total	**188**	**191.6**	**234.3**	**208.5**	**- 25.8**
Total multilateral	**330.5**	**391.9**	**488.0**	**628.8**	**+ 140.8**
Grand total	**765.0**	**1 114.9**	**1 425.3**	**1 544.5**	**+119.2**

Source: FAO/NFAP Unit. Note: The figures in brackets indicate that, lacking information, they are taken from the previous survey. NA: not available

[1] The Danish Ministry of Foreign Affairs has informed that Danish assistance is at a consolidated level of US$30.0 million, and increasing, given new and additional funds to the environment sector in which forestry is defined as an independent subsector. Similar corrections are likely in respect of other countries.
[2] Total budget of the organization plus special funding for projects.
[3] Total budget of the FAO Forestry Department plus special funding for projects (TCP).
[4] Spending on forestry components of GEF projects.

Appendix 2: ODA for forestry, 1993 (million US$)

Category of Donors	Grant	Loans	Total ODA	Percentage of Total ODA
Bilateral Aid (Members of the European Union)	384.2	10.4	394.6	25.5%
European Commission	214.0	-	214.0	13.9%
Sub-total European Union	598.2	10.4	608.6	39.4%
Other Bilateral Aid	287.1	20.0	307.1	19.9%
Total Bilateral Aid	885.3	30.4	915.7	59.3%
Development Banks	5.0	415.3	420.3	27.2%
Organizations of the United Nations (other than WFP)	87.5	-	87.5	5.7%
World Food Programme (WFP)	121.0	-	121.0	7.8%
Total Organizations of the United Nations	208.5	-	208.5	13.5%
Grand Total	**1 098.8**	**445.7**	**1 544.5**	**100%**

Source: FAO/NFAP unit.

Priorities for international forest research

Jeffrey Sayer,[1] Neil Byron,[1] Dennis Dykstra,[1] Jerry Vanclay [1]

SUMMARY

The world is moving towards knowledge-based societies. Economies are globalizing. The global public goods value of forests is being recognized at the same time that the traditional role of state forest agencies in production forestry is being taken over by multi-national corporations. At the same time emerging technologies are greatly enhancing our ability to assess and monitor forest attributes, process and disseminate information and enhance forest production. All of these changes will have an impact on how forest research is organized, who does it and who pays for it. It seems inevitable that much traditional forestry research concerned with sustainability and productivity enhancement at the stand level, will be taken over by the private sector. However, there is going to be a major challenge in finding resources for research in support of the public goods values of forests at both the local, national and global levels. There is a widely held view that we are in the midst of a world forest crisis. It is not a crisis of declining production but one of erosion of the public goods, environmental values of forests. So far, we have not seen a concerted scientific response to this crisis, the Inter-Governmental Panel on Forests (IPF) has given us the mandate to orchestrate such a response and the World Forestry Congress is valuable opportunity to provide impetus to a new vision of forest science for the 21st century.

NEW IMPERATIVES

Knowledge, rather than the endowment of natural resources, is becoming a primary determinant of the economic performance of nations. Countries which have invested heavily in science and technology are observed to make more rapid economic progress than those that have not. Economists now use science and technology investment figures as indicators of potential economic prosperity. Many industrialized countries invest up to 3% of their GNP in R&D whilst most developing countries invest very much less, often only a fraction of 1%. They are currently being urged to invest more and some countries such as Malaysia have set targets to greatly increase R&D investments in coming years. In assessing the potential of corporations it is also common to use their investments in research and development as an indicator. Advanced-technology corporations often reinvest 10, 20 or 30% of their annual turnover in R&D.

In the natural resource context, it is common to rank countries and corporations on the basis of the percentage of product value that they reinvest in R&D. In agriculture, this percentage is often 2 to 3%. In forestry, it is much less than 1% (CIFOR 1993). A number of studies conducted at the time that Center for International Forestry Research (CIFOR) was being established (1993) concluded that investments in forestry research were much lower than those in almost any other comparable

[1] Center for International Forestry Research. Office address: Jalan CIFOR, Situ Gede, Sindangbarang, Bogor Barat 16680, Indonesia. Mailing address: P.O. Box 6596 JKPWB, Jakarta 10065, Indonesia.
Facsimile: (62 251) 622 100; E-mail: cifor@cgnet.com

area of human activity. Forestry continues to "buck-the-trend" towards greater investment in R&D.

It is in this context that the deliberations of the IPF have increasingly focused on the need for research. The report which emerged from IPFIV in New York in February 1997 gave more prominence to research than previous documents emerging from international negotiations on forests. It has become clear throughout the IPF process that there are still great scientific uncertainties on global forest issues. IPFIV recognized the need for a thorough review not only of the research that is required but of the mechanisms that exist to execute that research and to generate resources to support it.

The IPF report recognizes that there is a need for greater co-ordination and for the exploitation of synergies between the work of organizations such as CIFOR, International Centre for Research in Agroforestry (ICRAF), the European Forestry Institute (EFI), the International Boreal Forest Research Association (IBFRA), Food and Agriculture Organization (FAO), International Tropical Timber Organization (ITTO) and of course International Union of Forestry Research Organizations (IUFRO). During the period of the IPF debates there were also suggestions for the establishment of new forest research capacity in Russia to address the needs of boreal forests and for a much greater focus on forests and natural resources in the work of Tropical Agriculture Research and Higher Education Center (CATIE) in the Americas.

RESOURCES FOR FORESTRY RESEARCH

The need for forestry research has finally been recognized but unfortunately this recognition has come at a time when conventional resources available for public sector research are stagnating or declining. The Consultative Group on International Agricultural Research (CGIAR) which was established to support a number of international research institutes engaged in crop improvement in the early 1970s is illustrative of this point. During its first 20 years the CGIAR enjoyed a healthy rate of financial growth. Most of its funding came from the major aid donors of the OECD. However, since 1990 it has been much harder for the CGIAR to find funds and such growth as has occurred has come from restricted sources of funding for specific research activities. The sort of funding that the CGIAR was set up to assure, to support long-term, high-technology, international public goods research, has become less attractive to donors. It is precisely this sort of funding that is needed for forestry because of the long pay-off periods involved and the public goods nature of most of the potential benefits.

However, if the research effort that is required to address global forest problems is to be realized, it seems almost certain that it will not be entirely funded from the conventional OECD aid budgets. It should be noted that the World Bank predicts that in the next one or two decades some of the world's most important tropical forest countries will be amongst the world's leading economic powers. The G7 of the year 2020 may include Brazil, Indonesia, India and China. These countries already make major investments in research and if forestry research needs in the 21st century are to be met, it seems inevitable that these and other tropical countries will have to bear an increasing share of the burden. In the closing years of the 20th century, we are also seeing the emergence of major multi-national corporations operating in forestry. It is to be hoped that these will be concerned with the sustainability of the resource base of their industry and will be prepared to allocate resources to support not only research and development addressing their own production needs but also to support public goods research.

THE IMPACT OF INFORMATION TECHNOLOGY ON RESEARCH

Many forest problems have to be researched at a local or regional level. Yet very few libraries in the world have comprehensive collections of literature on forests. Most of the best libraries are in the developed world. Forest researchers throughout the tropics have great difficulty in accessing the literature that they require as a basis for their research. It would be virtually impossible for a new

research centre in a tropical developing country to accumulate a critical mass of printed literature on forests in a short space of time without a huge financial investment. Fortunately, major revolutions are occurring in the possibilities for storing information in electronic form and in the technologies that allow it to be shared. From 1997 onwards CIFOR will put all of its annual publications onto a CD-ROM and distribute this free to its major stakeholders. We are urging other research organizations operating in forestry to do the same. The availability of information on CD-ROMs is rapidly increasing. The World Conservation Monitoring Centre has put forest maps of the world on a CD-ROM. CABI has for some years produced Tree-CD which contains citations and abstracts of mainstream forestry literature dating back to the 1930s. Numerous other abstracting services in Europe and North America are now dealing with natural resources and forestry material. Increasingly all this information is becoming available on the Internet and more and more developing country scientists are getting access to advanced information technology. We can be reasonably optimistic that electronic communications are going to enormously facilitate access to information for the forest scientists of the next century. Perhaps one of the new challenges will be sorting out the quality information from a large volume of poor-quality or irrelevant material which may begin to clutter up cyberspace and slow down meaningful electronic communications.

REMOTE SENSING

The closing years of the 20th century have also seen enormous advances in the availability of high-quality remotely sensed imagery dealing with forests and natural resources. The development of the capacity to interpret this information digitally and the advent of widely available radar images covering the world's forests are all leading us to a situation where information on at least some broad-scale attributes of forests will be readily available for the entire world and in a form that permits time series comparisons. The forest assessments of 1980 and 1990 were based upon assemblages of national information and low-intensity sampling of forest areas. The analysis was carried out in dispersed localities by people with different competencies, and the 1980 and 1990 estimates were derived by extrapolations (rather than from actual field measurements in those years). We are witnessing the emergence of a small number of centres of excellence with the capacity to treat large amounts of data in efficient ways and to make the results of their work widely available. The work of the TREES project supported by the European Union and of the Pathfinder project in the USA are notable examples.

THE CULTURE OF SCIENCE

As well as improved science and more science, there is also a widely perceived need to change the culture of science as applied to forests. The issues concerned have been reviewed in CIFOR's initial medium-term plan (CIFOR 1993) the "Bali Dialogue" (CIFOR 1995) and in CIFOR's strategy (CIFOR 1996). In the past, most forestry research was carried out by public sector forest research institutes whose primary mandate was the national forest estate. The normal scale at which research was conducted was that of the management unit or forest stand. Foresters did not in general look outside the limits of the forest that was allocated to their state forest service. A high proportion of research was concerned with improving productivity for timber - genetic improvement of trees, site management, silvicultural treatments, and inventory and monitoring of forest stands. The needs identified by the IPF are for research which provides answers to the questions posed by a much broader set of forest stakeholders. It has become apparent that major determinants of the extent and condition of forests are decisions that are taken entirely outside the forest sector. These include decisions taken with regard to infrastructure, agricultural and trade policies, resettlement of migrants, fiscal policies, etc. A whole new body of research is needed to enable us to understand the implications

of extra-sectoral decision-making on forests. There is also a need to better understand the relationships between people and forests at the local community and household levels, and then the connections between these micro and macro studies (CIFOR 1996). These needs suggest that research relating to forests must embrace a new scientific culture which includes investigation of extra-sector influences and social interactions in addition to the traditional disciplines of forest science.

THIRD GENERATION R&D

Some of the most interesting findings to emerge from forest research over the last few years have been from research that has been intimately associated with projects dealing with local management of forests. This research had much of the character of the so called "third generation research" (Rousell *et al.* 1991) which is much talked about in the context of industrial R&D. Rousell *et al.* portrayed industrial R&D as having evolved from first generation R&D where corporations recognized the value of research and established a research capacity in isolation from their day-to-day activities in the hope that it would yield benefits in the long term. The second generation was where corporations set tasks for their researchers to accomplish and provided funding against a requirement for specific outputs. This is the classic contract research which now dominates much work in forestry. Third generation R&D (which Rousell *et al.* claim is characteristic of more advanced corporations) is where the researchers and the corporate directors work together so that there is intense feedback between the research community and corporate management. Research is fully integrated into the day-to-day operations of the corporation. In some ways, the community based research on forests of the 1980s was a form of third generation R&D. Perhaps what has emerged from the IPF is the requirement for a third generation R&D operating at higher levels of aggregation. The US Forest Service Ecosystem Management Program and the Canadian Model Forest Program both integrate research into management at the landscape level. This would seem to us to be the form of third generation R&D which is likely to predominate in the forest sector in the early 21st century. It is R&D which recognizes the need to understand the relationships between interventions at different scales to take account of the interests of multiple stakeholders and of the need to be able to adapt management objectives to changes in stakeholder perceptions and requirements. It is the adaptive management advocated, for example, by Hollings *et al.* (1996), etc.

SYSTEMS APPROACHES TO FOREST RESEARCH

Research at all these scales can benefit greatly from the application of systems analysis to its conception and execution. The "systems approach," coupled with much greater capacity to manipulate spatial data through geographic information systems, is transforming our ability to predict outcomes of different management interventions in forests at a number of scales. We are already witnessing a move from reductionist forest science working at the level of components of forest systems to a more eclectic science attempting to generate insights into the functioning of the systems themselves.

INSTITUTIONAL ARRANGEMENTS FOR FOREST RESEARCH

Most research on forests has in the past been conducted by forest research institutes established within national forest departments. In some countries universities have had a capacity to conduct research and a lot of the work on the biodiversity of forests has come from academic institutions and non-governmental organizations. The private sector has dealt with a relatively narrow subset of research issues mainly dealing with trees for industrial plantations and technologies for harvesting and processing wood. In our introduction we speculated that increased investments in forestry research will come from the private sector more than from the traditional public sector research institutes. However, the difficulty of obtaining intellectual property protection on much of the output of forest

research and the increasing appreciation of the public goods nature of forests are likely to have an impact on who actually undertakes research in the future, and who pays for it.

Classic mainstream research on productivity enhancement, notably on genetic improvement, micro-propagation and related issues to improve planting material for industrial timber estates seem likely to move almost entirely into the domain of the private sector. Fewer and fewer governments are attempting to manage plantation forests and some very large corporations (and some smaller ones) are already at the cutting edge of the technologies involved. Private sector investments in biotechnology are already running far ahead of those from the public sector. Our prediction is, therefore, that this area of research will be almost exclusively the domain of the private sector in the 21st century. The benefits of such research can be readily captured and privatized. Consortia of private sector researchers (e.g. tree-breeders in Australia and New Zealand) can achieve economies of scale, reducing any comparative advantages State sponsored researchers may previously have held.

Processing and harvesting research and development may also move to the private sector. Advances in processing and harvesting will come from new and better machines and materials handling systems. This is one area where intellectual property protection does allow private sector research to capture the value of its output through patenting. The sophisticated feller-bunchers now found in the forests of Scandinavia are an example of private sector R&D. As societies impose stricter conditions upon the environmental tolerances associated with forest harvesting, the need for sophisticated technologies to reduce impacts will increase. This should provide a major opportunity for the private sector. The role of the State is not to do the research, nor to specify which technologies must be used, but rather to specify the acceptable impacts and performance standards that society demands. Industry can best devise ways to achieve the specified limits. This represents a change from a rule-based to a performance-based system.

There is a significant area of forest research whose products will be national public goods. This is research which deals with environmental and social issues of forestry and also with the needs for technologies, planting material and silvicultural methodologies and institutional and tenure arrangements for small producers. The latter technologies lie in areas where intellectual property protection is difficult. We would expect this to be the main focus for public sector forest research institutes in the future. These institutes will also have an important role in dealing with the increasingly complex issue of the silviculture of forests which are maintained primarily for amenity and environmental reasons but which are managed for a wide variety of goods and services destined for consumption at the local level. Much of this research will be locally specific in nature and of a type where few products will be commercialized and intellectual property protection will be difficult. This seems likely to become the main focus of national forest research institutes. It will require major changes in those institutes and particularly it will require them to mobilize more scientists from disciplines such as biology, the social sciences and economics.

There remains a significant area of research dealing with the international public goods derived from forests. These are the issues being dealt with by the IPF and they concern global environmental services such as carbon sequestration and biodiversity conservation. As the dominant role of national governments declines and global governance slowly becomes a reality and as the role of multinational corporations grows in importance, there are likely to be increasing research needs which will fall into the international public goods arena. Corporations are likely to re-locate to areas of comparative advantage for the production of forest products. Countries are likely to collaborate more and to recognize the significance of transboundary values of forests. This may lead to a whole new generation of research at levels of aggregation at which foresters have not worked in the past. If so, it will require the mobilization of new types of science. Geographers, political scientists and economists may become much more important players in global forest research.

CONCLUSIONS

This is the last World Forest Congress of the 20th century. It is taking place at a time when whatever inter-governmental process follows the IPF is likely to be looking seriously at research. We hope that some of the above discussion will lead this Congress in the direction of a consensus on what research we need, who should do it, who should pay for it and how it should be organized. At the moment forest research is trailing behind research in other areas of human endeavour. The concluding statement of this Congress should make a strong appeal to the international community for greatly expanded research in the 21st century. This new research should break free from the culture of research that predominated in the 20th century, should incorporate scientists from more disciplines and should deal with forests through a systems approach at a much higher level of aggregation than has been the case in the past.

REFERENCES

CIFOR. 1993. *International forestry research: Towards the 21st century. A provisional medium-term plan for CIFOR 1993-98*. Bogor, Indonesia.

CIFOR. 1995. *A way forward to sustainable development. A dialogue on science, forests and sustainability*. Bogor, Indonesia.

CIFOR. 1996. CIFOR's strategy for collaborative forestry research. *Forests and people*. Bogor, Indonesia.

CIFOR/IUFRO/FAO. 1997. *New arrangements for forest science*. A discussion paper prepared for the Intergovernmental Panel on Forests, Fourth Session, New York, February 1997.

Holling, C. S. & Meffe, G.K. 1996. Command and control and the pathology of natural resource management.*Conservation Biology* Vol. 10 No. 2 pp 328-338.

Rousell, P.P., Saad, K.N. & Erickson, T.J. 1991. *Third-gneration R&D: Managing the link to corporate strategy*. Harvard, Boston MS, 192 pp.